# Framework

#### I value morality. My value criterion is preventing structural violence.

#### You should oppose everyday violence for two reasons- A) social bias underrepresents its effects B) its effects are exponential, not linear which means even if there is only a small amount of structural violence, its terminal impacts are huge

**Nixon ’11** (Rob, Rachel Carson Professor of English, University of Wisconsin-Madison, Slow Violence and the Environmentalism of the Poor, pgs. 2-3)

Three primary concerns animate this book, chief among them my conviction that we urgently need to rethink-politically, imaginatively, and theoretically-what I call "slow violence." By slow violence I mean a violence that occurs gradually and out of sight, a violence of delayed destruction that is dispersed across time and space, an attritional violence that is typically not viewed as violence at all. Violence is customarily conceived as an event or action that is immediate in time, explosive and spectacular in space, and as erupting into instant sensational visibility. We need, I believe, to engage a different kind of violence, a violence that is neither spectacular nor instantaneous, but rather incremental and accretive, its calamitous repercussions playing out across a range of temporal scales. In so doing, we also need to engage the representational, narrative, and strategic challenges posed by the relative invisibility of slow violence. Climate change, the thawing cryosphere, toxic drift, biomagnification, deforestation, the radioactive aftermaths of wars, acidifying oceans, and a host of other slowly unfolding environmental catastrophes present formidable representational obstacles that can hinder our efforts to mobilize and act decisively. The long dyings-the staggered and staggeringly discounted casualties, both human and ecological that result from war's toxic aftermaths or climate change-are underrepresented in strategic planning as well as in human memory. Had Summers advocated invading Africa with weapons of mass destruction, his proposal would have fallen under conventional definitions of violence and been perceived as a military or even an imperial invasion. Advocating invading countries with mass forms of slow-motion toxicity, however, requires rethinking our accepted assumptions of violence to include slow violence. Such a rethinking requires that we complicate conventional assumptions about violence as a highly visible act that is newsworthy because it is event focused, time bound, and body bound. We need to account for how the temporal dispersion of slow violence affects the way we perceive and respond to a variety of social afflictions-from domestic abuse to posttraumatic stress and, in particular, environmental calamities. A major challenge is representational: how to devise arresting stories, images, and symbols adequate to the pervasive but elusive violence of delayed effects. Crucially, slow violence is often not just attritional but also exponential, operating as a major threat multiplier; it can fuel long-term, proliferating conflicts in situations where the conditions for sustaining life become increasingly but gradually degraded.

#### Additionally prefer:

#### It’s a prerequisite. Morality must be applied equally to everyone, or else it wouldn’t be moral. Oppression excludes minorities from moral consideration.

# Contention 1: Global Warming

#### Mining Industry destroying itself.

David Oni, Space analyst at Space in Africa, writes in 2019:

David Oni 19 (David Oni, Space industry and technology analyst at Space in Africa, Graduate of Mining Engineering from the Federal University of Technology Akure.) The Effect of Asteroid Mining On Mining Activities in Africa 9-24-2019 Space in Africa https://africanews.space/the-effect-of-asteroid-mining-on-mining-activities-in-africa/ //DebateDrills TJ

The earth, as we have come to know, is enriched with a vast array of mineral resources. But these resources are nonrenewable and hence, constant growing consumption in developing and developed countries, with the rising need for more resources to keep driving the fourth industrial revolution, will ultimately lead to a depletion in a couple of years to come. Experts say that elements needed for modern industry and food production could be exhausted on Earth within 50–60 years.

In terms of mineral resources, Africa has the most abundant of reserves. Currently, Africa hosts 30% of the world’s mineral reserve, 55% of the world’s diamond comes from Botswana and Congo, 60% of the mining in Africa is gold mining but to mention a few.

Given that the mining industry is consistently rising across sub-Saharan Africa, it is good news for the African mining sector as mining companies are beginning to expand operations, countries are already looking into improving regulatory frameworks that will enhance activities and also attract more investors.

But recent breakthroughs in space technology have led to many space scientists and engineers looking to explore alternatives to sustaining the earth while generating massive revenue and improving life generally. Currently, there are various comprehensive research documents on the Space Mining market, with detailed insights on growth factors and strategies. With the current advances and cutting edge technologies developed in preparation for the first stages of asteroid mining, one might want to ask if it is indeed good news for the African continent.

Apart from the environmental impacts, major mining activities are largely hindered in Africa by a handful of other factors such as access to energy, health and safety volatility of commodity prices, etc. Other issues such as political uncertainty, economic instability, religious and tribal wars, industrial unrest, and the fickle nature of regulatory bodies have also rendered foreign direct investment increasingly unattractive to global investors. Furthermore, most African countries have a relatively undeveloped infrastructure for exploiting resources effectively.

At the moment, Asteroid mining poses no threat to terrestrial mining; however, this will not hold for long. The space industry is progressing at such a rapid pace, and the prospects are unequivocally mouth-watering. The big question is, will asteroid mining lure away investors in Africa? The planetary resources company estimates that a single 30-m asteroid may contain 30 billion dollars in platinum alone and a 500m rock could contain half the entire world resources of PGM. Considering the abundance of minerals in asteroids, once asteroid mining materialises, it will severely affect the precious metals market, usurp the prices of rare earth minerals, and a whole lot more because minerals that are usually somewhat scarce on earth will be easily accessible on asteroids.

While foreign investors run the majority of the large-scale mining activities in the region, reports say that many African countries are dangerously dependent on mining activities. For some African countries, despite massive mineral wealth, their mining sectors are underdeveloped, and this is as a result of much focus on oil resources and a couple of other challenges. The million-dollar question is, what will become of the mining activities in Africa?

#### So instead, we should turn to Asteroid mining because it provides necessary precious metals

Matthew Williams, Journalist for Universe Today, writes in 2020:

Matthew S. Williams 20 (Matthew S. Williams, writer for Universe Today, and the curator of their Guide to Space section, Articles have been featured in Phys.org, HeroX, Popular Mechanics, Business Insider, Gizmodo, and IO9, ScienceAlert, Knowridge Science Report, and Real Clear Science,) Asteroid Mining to Shape the Future of Our Wealth 11-6-2020 No Publication https://interestingengineering.com/asteroid-mining-to-shape-the-future-of-our-wealth //DebateDrills TJ

The argument in favor of asteroid mining is simple: within the Solar System, there are countless bodies that could contain a wealth of minerals, ores, and volatile elements that are essential to Earth's economy.

Asteroids, as we saw above, are believed to be the material left over from the formation of the Solar System. As such, many asteroids are thought to have compositions that are similar to that of Earth and the other rocky planets (Mercury, Venus, and Mars).

All told, there are thought to be more than 150 million asteroids in the inner Solar System alone, and that's only the ones that measure 100 meters (330 ft) or more in diameter.

These can be divided into three main groups: C-type, S-type, and M-type, which correspond to asteroids composed, respectively, largely of clay and silicates, silicates and nickel-iron, and metals. About 75% fall into the category of C-type; S-types account for 17%; while M-type and other types make up the remainder.

These latter two groups are thought to contain abundant minerals, including gold, platinum, cobalt, zinc, tin, lead, indium, silver, copper, iron, and various rare-Earth metals. For millennia, these metals have been mined from the Earth's crust and have been essential to economic and technological progress.

In addition, there are thought to be many asteroids and comets that contain water ice and other volatiles (ammonia, methane, etc.). Water ice could be harvested to satisfy a growing demand for freshwater on Earth, for everything from drinking to irrigation and sanitation.

Volatile materials could also be used as a source of chemical propellant like hydrazine, thus facilitating further exploration and mining ventures. In fact, Planetary Resources indicates that there are roughly 2.2 trillion US tons (2 trillion metric tons) of water ice in the Solar System.

Of course, this raises the obvious question: wouldn't it be really expensive to do all this mining? Why not simply continue to rely on Earth for sources of precious metals and resources and simply learn to use them better?

To put it simply, we are running out of resources. To be clear, learning to use our resources better and more sustainably is always the most important idea. And while it is certainly true that Earth-based mining is far cheaper than going to space would be, that may not be the case indefinitely.

#### Private sector mining is coming now – new tech and precious resources create concrete incentives.

Christian Davenport from the Washington Post writes in 2020

Davenport 20 Davenport, Christian. [Reporter covering NASA and the space industry, Education: Colby College, B.A., American Studies]“A Dollar Can't Buy You a Cup of Coffee but That's What NASA Intends to Pay for Some Moon Rocks.” *The Washington Post*, WP Company, 3 Dec. 2020, https://www.washingtonpost.com/technology/2020/12/03/moon-mining-contracts-named/. //Debatedrills AS

NASA announced Thursday that several companies had won contracts to mine the moon and turn over small samples to the space agency for a small fee. In one case, a company called Lunar Outpost bid $1 for the work, a price NASA jumped at after deciding the Colorado-based robotics firm had the technical ability to deliver.

“You’d be surprised at what a dollar can buy you in space,” Mike Gold, NASA’s acting associate administrator for international and interagency relations, said in a call with reporters.

But the modest financial incentives are not the [driver of the program](https://www.washingtonpost.com/technology/2020/09/10/moon-mining-nasa-search/?itid=lk_inline_manual_6). Nor to a large extent is the actual lunar soil. NASA is asking for only small amounts — between 50 and 500 grams (or 1.8 ounces to about 18 ounces). While there would be scientific benefits to the mission, it’s really a technology development program, allowing companies to practice extracting resources from the lunar surface and then selling them.

It would also establish a legal precedent that would pave the way for companies to mine celestial bodies in an effort blessed by the U.S. government to help build a sustainable presence on the moon and elsewhere.

To do that, NASA says it needs its astronauts, like the western pioneers, to “live off the land,” using the resources in space instead of hauling them from Earth. The moon, for example, has plenty of water in the form of ice. That’s not only key to sustaining human life, but the hydrogen and oxygen in water could also be used as rocket fuel, making the moon a potential gas station in space that could help explorers reach farther into the solar system.

Asteroids also have significant resources, particularly precious metals that could be used for in-space manufacturing. While the prospect of large mining and manufacturing facilities in orbit is still many years away, NASA wants to use the mining program as a small step toward that goal.

NASA is now trying to return astronauts to the moon under its Artemis program for the first time since 1972. Unlike its predecessor, Apollo, where the astronauts visited the lunar surface for a short while before coming home, the Artemis program would create a permanent presence on and around the moon.

“The ability to extract and utilize space resources is the key to achieving this objective of sustainability,” Gold said. “We must learn to generate our own water, air and even fuel. Living off the land will enable ambitious exploration activities that will result in awe-inspiring science and unprecedented discoveries.”

In 2015, then-President Barack Obama signed a law that allowed private companies the right to own the resources they mined in space. Under the program announced Thursday, NASA said the materials would be transferred from the private companies to NASA.

The effort would not violate the 1967 Outer Space Treaty, NASA officials have said, which prohibits nations from claiming sovereignty over a celestial body. NASA Administrator Jim Bridenstine previously likened the policy to the rules governing the seas.

**“We do believe we can extract and utilize the resources of the moon, just as we can extract and utilize tuna from the ocean,” he said earlier this year.**

As part of its lunar exploration mission, NASA has been working to get countries around the world to adopt what it calls the Artemis Accords, a legal framework that would govern behavior in space and on celestial bodies such as the moon.

The rules would allow private companies to extract lunar resources and create safety zones to prevent conflict and ensure that countries act transparently about their plans in space, while sharing their scientific discoveries.

The mining announcement came during the same week that China landed a spacecraft on the moon, extracted resources and then lifted off from the lunar surface in an effort to return the sample to Earth.

Instead of developing and sustaining a big government sample-return mission, NASA is taking another approach by partnering with the private sector. “If you step back and think about how really amazing it is that NASA can essentially piggyback on the private-sector space capabilities to perform this mission, it would not have been possible 10 years ago,” said Phil McAlister, the director of NASA’s commercial spaceflight division.

In addition to Lunar Outpost, the other companies chosen for NASA’s program are: ispace Japan and Europe, which would each charge $5,000 for the material; and Masten Space Systems of California, would charge $15,000.

All of the companies would already be on the moon, according to NASA, conducting other missions. McAlister said Lunar Outpost would be ferried to the moon by the lunar lander known as Blue Moon being developed by Jeff Bezos’s Blue Origin. (Bezos owns The Washington Post.) The company later clarified that it was looking at a number of landers to get it to the lunar surface, and not just Blue Origin’s. The ispace companies would fly on a Japanese lander, McAlister said, and Masten, already part of another NASA lunar contract, would use its own Masten XL-1 lander.

#### Dwindling precious metals are key to innovation.

Jeremy Hsu, Author for Popular Science, writes in 2012:

Jeremy Hsu 12 (Jeremy Hsu, Masters in Science Journalism from NYU, written in publications such as Popular Science, Scientific American Mind and Reader's Digest Asia.) Shortage of Rare Metals Could Threaten High-Tech Innovation 1-30-2012 livescience https://www.livescience.com/18167-shortage-rare-metals-threaten-high-tech-innovation-hitchhiker-metals-clean-technologies.html //DebateDrills TJ

A world in need of faster computers, smarter phones and more energy-efficient light bulbs threatens to strain the small supply of rare metals used by the global electronics industry. But limits on the production of such rare metals mean the supply can't easily expand to meet the demand for innovation in both consumer electronics and clean technologies.

Scarce metals such as gallium, indium and selenium — known as "hitchhiker" metals — come only as byproducts of mining major industrial metals such as aluminum, copper and zinc. That makes it hard to simply boost production of hitchhiker metals whenever industries face a shortage, even if the metals have become critical components of everything from high-performance computers to solar panels.

"With respect to metals that are hitchhikers, a higher price isn't going to lead to much more production," said Robert Ayres, a physicist and economist based at the international business school INSEAD in France. "And therefore it's much more important to think in terms of conservation, recycling and substitution."

That sobering message was delivered by Ayres at a Royal Society discussion meeting held in London Jan. 30. He wants both governments and industries to come up with a standard recycling process that could reuse rare metals.

"You produce something, you use it, but you don't just toss it in a landfill; it goes to another stage and another, and eventually the rare materials are recovered," Ayres told InnovationNewsDaily. "At present, hardly any are recovered."

Take gallium as an example. Gallium is a small byproduct of mining bauxite and zinc, but it has become a critical component for technologies such as lasers, energy-efficient LED lighting and solar panels. The metal has also become a replacement for silicon in faster microchips powering the latest generation of smartphones.

U.S. demand for gallium relied upon $66 million of overseas imports in 2011, according to the U.S. Geological Survey. And just one company, in Utah, recovered and refined gallium from scrap metal and impure gallium metal.

Indium has become a crucial ingredient in the liquid crystal displays for smartphones and in some types of solar panels. A third hitchhiker metal, selenium, also forms part of the solar panels containing both gallium and indium.

Ayres worries in particular about rare metal shortages crippling innovation in clean energy technologies such as solar power.

"Tellurium, part of the lowest-cost photovoltaic material, is only available from copper refineries," Ayres pointed out. "And so the quantity available in the world isn't anywhere near enough to satisfy the potential demand for thin-film photovoltaic surfaces (solar panels)."

#### Besides metals, Space Research is key to solving climate change.

Greg Autry, Professor of Space Leadership at Thunderbird School of Global Management, writes in 2019:

Greg Autry 19 (Greg Autry, Clinical Professor of Space Leadership, Policy and Business at Thunderbird School of Global Management, Tech startup founder, Researcher on entrepreneurship, commercial space and economics. Former NASA Presidential Appointee. Writer & regular Forbes contributor, 2021 Space Advocate of the Year.) Space Research Can Save the Planet—Again 7-20-2019 Foreign Policy https://foreignpolicy.com/2019/07/20/space-research-can-save-the-planet-again-climate-change-environment/ //DebateDrills TJ

Indeed, understanding the evolution of other planets’ climates is essential for modeling possible outcomes on Earth. NASA probes revealed how, roughly 4 billion years ago, a runaway greenhouse gas syndrome turned Venus into a hot, hellish, and uninhabitable planet of acid rain. Orbiters, landers, and rovers continue to unravel the processes that transformed a once warm and wet Mars into a frigid, dry dust ball—and scientists even to conceive of future scenarios that might terraform it back into a livable planet. Discovering other worlds’ history and imagining their future offers important visions for climate change mitigation strategies on Earth, such as mining helium from the moon itself for future clean energy.

Spinoff technologies from space research, from GPS to semiconductor solar cells, are already helping to reduce emissions; the efficiency gains of GPS-guided navigation shrink fuel expenditures on sea, land, and air by between 15 and 21 percent—a greater reduction than better engines or fuel changes have so far provided. Modern solar photovoltaic power also owes its existence to space. The first real customer for solar energy was the U.S. space program; applications such as the giant solar wings that power the International Space Station have continually driven improvements in solar cell performance, and NASA first demonstrated the value of the sun for powering communities on Earth by using solar in its own facilities.

Promisingly, space-based solar power stations could overcome the inconvenient truth that wind and solar will never get us anywhere near zero emissions because their output is inherently intermittent and there is, so far, no environmentally acceptable way to store their power at a global scale, even for one night. Orbital solar power stations, on the other hand, would continually face the sun, beaming clean power back through targeted radiation to Earth day or night, regardless of weather. They would also be free from clouds and atmospheric interference and therefore operate with many times the efficiency of current solar technology. Moving solar power generation away from Earth—already possible but held back by the current steep costs of lifting the materials into space—would preserve land and cultural resources from the blight of huge panel farms and save landfills from the growing problem of discarded old solar panels.

Sustainable energy advocates in the U.S. military and the Chinese government are actively pursuing space-based solar power, but just making solar cells damages the environment due to the caustic chemicals employed. Space technology offers the possibility of freeing the Earth’s fragile biosphere and culturally important sites from the otherwise unavoidable damage caused by manufacturing and mining.

The U.S. start-up Made in Space is currently taking the first steps toward manufacturing in orbit. The company’s fiber-optic cable, produced by machinery on the International Space Station, is orders of magnitude more efficient than anything made on Earth, where the heavy gravity creates tiny flaws in the material. Made in Space and others are eventually planning to build large structures, such as solar power stations, in space. As these technologies develop, they will augment each other, bringing costs down dramatically; space manufacturing, for instance, slashes the cost of solar installations in space.

#### Solving for climate change is imperative because the lower classes suffer disproportionately, global issue

Leonardo Yip, author at Earth.Org, writes in 2021

Yip 21 (Leonardo Yip is an author at Earth.Org) “Why Marginalised Groups are Disproportionately Affected by Climate Change.” July 15, 2021 https://earth.org/marginalised-groups-are-disproportionately-affected-by-climate-change/

Economic Disparity In the face of climate change**, the poor** possess a relatively limited adaptive capacity; most **lack the financial capacity to adapt to the changes** in lifestyle and living conditions **spurred by climate changes**. A striking example of this can be observed in Hong Kong, where its infamous subdivided flats, known colloquially as ‘cage homes’, are becoming increasingly greater health risk factors as the city faces higher temperatures in the warm seasons. Most occupants of Hong Kong’s subdivided flats cannot afford ventilation or air conditioning, thus posing a high risk to public health as the city gets warmer over the years. In fact, just in 2019, the city recorded its [warmest year in history](https://www.news.gov.hk/eng/2020/01/20200108/20200108_155046_992.html). With the most expensive housing market in the world, most of the lower economic class in Hong Kong are forced into [unethical living conditions](https://www.goldthread2.com/videos/coronavirus-hong-kong-cage-home/article/3081439); subdivided flats are incredibly cramped, housing up to six times the number of people they were designed for. Occupants of these small flats have a very limited storage space, making it very difficult to house air conditioning units. What’s more, even in the flats where air conditioning is available, most residents choose not to use it to save on electricity costs. Consequently, many poor Hong Kong residents end up suffering through the warm temperatures in uncomfortable conditions with poor ventilation, for months at a time. A study found that 50% of flats surveyed in a local neighbourhood had an [indoor temperature over 30](https://doi.org/10.1111/area.12341) degree Celsius, a temperature that can easily lead to dehydration and overheating. Moreover, the University of Hong Kong found that consecutive hot nights bring a 6% higher risk of death in elderly, and residents of subdivided housing [suffer disproportionately during hot spells](https://www.scmp.com/news/hong-kong/health-environment/article/3098611/hong-kongs-hot-nights-and-even-hotter-days-bring). It has also found that **due to financial scarcity**, residents of subdivided flats often under-consume energy, yet **they are hit disproportionately by the consequences of warming** in Hong Kong. As global warming accelerates, the plight of subdivided flat dwellers will only worsen. **Racial Disparity** Environmental racism refers to the injustices suffered by marginalised communities in terms of unequal distribution of environmental resources and hazards, and discrimination in environmental support and policy-making. In essence, **the burdens of pollution, natural disasters, and poisoned resources are distributed unequally in society, with marginalised communities being hit disproportionately harde**r. When it comes to severing climate change, this means that **racial minorities will be bearing the brunt of the environmental impacts**. One such case of environmental racism can be observed in the United States, where people of colour suffer from a multitude of environmental injustices. In the US, air pollution is distributed unevenly among the different racial groups, with people of colour being hit the hardest. An important ratio to consider when assessing the distribution of adverse impacts of pollution is the ratio of how much pollution one is responsible for relative to how much pollution one is exposed to. Scientists have found that Hispanics and African-Americans breathe in [63% and 56%](https://apnews.com/article/f6bf2f47c81c4958811dc4e99d526197) more pollution than they make respectively. On the other hand, Caucasians are exposed to 17% less air pollution than they make. This means that relative to their contribution to pollution, people of color in the US are disproportionately exposed to pollutants. Across the country, people of colour on average are also exposed to [far higher levels of air pollutants](https://www.scientificamerican.com/article/people-of-color-breathe-more-unhealthy-air-from-nearly-all-polluting-sources/) (PM2.5), regardless of region or household income. In short, people of colour in the United States are disproportionately impacted by an increasingly polluted climate, both in relative and absolute terms. **Global Disparity** Inequality also exists on the global scale, where there exist large disparities in emissions and climate impacts from country to country. There is a large asymmetry when it comes to the proportion of CO2 emissions from region to region. For example, North America is home to only 5% of the world’s population, but it emits 18% of the world’s total CO2. Conversely, Africa is home to 16% of the world’s population, but emits only 4% of total CO2. In other words, different continents hold different amounts of responsibility when it comes to climate change, and some regions should bear more of the blame. Moreover, in terms of aggregate income, 86% of global CO2 emissions are emitted by the richest half of countries in the world, whilst the bottom half only emits 14%. This inequality in global emissions renders the issue of international climate change responsibility very delicate and contentious. In light of this, **the countries hit hardest by climate change are coincidentally the countries with less relative responsibility for climate change**. For example, the Philippines consists of 1.41% of the total world population, but it only produces [0.35% of total world’s emissions of CO2](https://www.worldometers.info/co2-emissions/philippines-co2-emissions/). Yet, it has been hit disproportionately hard from climate change; every year it suffers numerous casualties and damage from typhoons, floods, and landslides of increasing frequency and intensity. Just last year, the Philippines [suffered 67 casualties](https://www.reuters.com/article/asia-storm-philippines-idUSKBN27V03C) in the year’s deadliest cyclone, and in 2013 the country was hit by one of the [most powerful cyclones ever recorded](https://www.worldvision.org/disaster-relief-news-stories/2013-typhoon-haiyan-facts), displacing over 4.1 million people and causing over 6,300 casualties. Due to the region’s high exposure to natural hazards and its location in the world’s most cyclone-prone area, the [Philippines is highly vulnerable](https://www.climatelinks.org/resources/climate-risk-profile-philippines) to the impacts of climate change, especially rising sea levels, extreme rainfall, and extreme weather events. This increased vulnerability, combined with a weaker adaptive capacity, means that the Philippines will likely experience the consequences of climate change to a far higher degree compared to other countries, and will therefore suffer increasingly disproportionate damage as our climate becomes more and more erratic.

# Frontlines

#### NASA is establishing a legal framework to regulate private companies’ behaviors

Davenport 20 Davenport, Christian. [Reporter covering NASA and the space industry, Education: Colby College, B.A., American Studies] “NASA unveils new rules to guide behavior in space and on the lunar surface.” May 15, 2020 https://www.washingtonpost.com/technology/2020/05/15/moon-rules-nasa-artemis/

**NASA** on Friday **unveiled a legal framework that would govern the behavior of countries and companies in space and on the moon**, including the creation of “safety zones” around sites where mining and exploration would take place on the lunar surface. The United States has long held that nations and companies should be allowed to extract and use resources on the moon. The new legal framework, known as the Artemis Accords, comes as the U.S. space agency works to return people to the lunar surface by 2024. NASA would make signing the accords a requirement for allied countries to participate in its lunar exploration program. The proposal, some aspects of which were first reported by Reuters, would “in no way change the 1967 Outer Space Treaty,” which prohibits nations from laying claim to the moon and other celestial bodies, said NASA administrator Jim Bridenstine. Rather, the **series of principles** would follow the tenets of the treaty and “**promote peaceful purposes” that would allow nations “to participate safely in outer space**,” Bridenstine said in an interview. The accords already have run into resistance from the head of Russia’s space agency, Dmitry Rogozin, [who called them an invasion](https://twitter.com/Rogozin/status/1258088165732167681?s=20) that would lead to another “Iraq or Afghanistan.” NASA said it would be “premature to release” the accords ahead of sharing them with allied nations. But a copy obtained by The Washington Post said parties would be required to publicly release “the extent and general nature of operations taking place within” the safety zones “while taking into account appropriate protection of business confidential, national security, and export controlled information.” **Parties would also agree to use** the **zones “in a manner that encourages scientific discovery, technology demonstration, as well as the safe and efficient extraction and utilization of space resources.”** They would also be required to publicly reveal “the extent and general nature of operations taking place within” the zones.

At the very end of cros-ex my opp. Justifies public-private combo efforts of approp. As just but isolates specifically private; I would argue that this partnership should be looped together because there is no other way the public sector can innov without priv.

#### Public sector space innovation falls continues to fall short. The private sector is key to space research/innovation, wins against marx 20 card because

Follett 21 [Andrew Follett- previously space and science reporter for Daily Caller News Foundation, researcher for the Congressional Committee on Science, Space and Technology, the National Aeronautics and Space Administration, the Cato Institute, and the Competitive Enterprise Institute. currently conducts research analysis for nonprofit in Washington, D.C., area.. “Private Firms Are the Key to Space Exploration.” 8/21/21. National Review. https://www.nationalreview.com/2021/08/private-firms-are-the-key-to-space-exploration/]

#### America’s public-sector space program recently had a rough couple of weeks that perfectly exemplify why it desperately needs a free-market overhaul. On July 29, the International Space Station (ISS) suffered a serious loss of control after a Russian spacecraft docked with it, accidentally causing the station to make a full 540-degree rotation and a half before coming to a stop upside down, when the astronauts got it under control. Like most NASA programs, the ISS is massively over budget. Costs were initially projected at $12.2 billion, but the bill ultimately reached a stunning $150 billion. American taxpayers paid around 84 percent of that. What happened to the American dream of human space exploration? Put simply, the government happened. NASA devolved into a jobs program to bring home the space bacon. Then, on August 10, NASA’s inspector general released a report deeming plans to send astronauts back to the moon in 2024 unfeasible because of significant delays in developing the mission’s spacesuits. Right now the suits are being built by 27 different companies that successfully lobbied the government for a piece of the action. SpaceX’s Elon Musk has rightly noted that NASA has “too many cooks in the kitchen.” The difference between NASA’s cumbersome designed-by-committee suits and SpaceX’s suits — created by a single contractor — is remarkable, even to the naked eye. The report unconvincingly blames NASA’s failure to develop a new spacesuit over the last 14 years solely on shifting technical requirements. It recommends “ensuring technical requirements for the next-generation suits are solidified before selecting the acquisition strategy to procure suits for the ISS and Artemis programs.” Instead of dealing with the problem, the Biden administration is trying to distract attention from the space agency’s mismanagement by announcing plans to land the first person of color on the moon . . . even though NASA has been incapable of sending astronauts of any color into space under its own power since July 2011. NASA has been reduced to begging the Russians for a ride. The agency’s troubled Constellation program, meant to replace the Space Shuttle fleet, was canceled after tens of billions of dollars had already been spent. But NASA’s troubles are, depressingly, likely to get even worse. In November the James Webb Space Telescope (JWST) will finally launch, after taxpayers have forked over $9.7 billion. It was originally supposed to launch in 2007 on a budget of $500 million. That means the project is over a decade behind schedule and costing almost 20 times its initial budget. Perhaps the telescope, meant to locate potentially habitable planets around other stars and perhaps even extraterrestrial life, could instead search for a calendar . . . or fiscal sanity . . . in the stars? JWST isn’t the first NASA space telescope to suffer cost overruns and setbacks. The Hubble Space Telescope (HST) was originally intended to launch in 1983, but technical issues delayed the launch until 1990 because the main mirror was incorrectly manufactured. JWST is very likely to fail because it is supposed to unfold itself “origami style” in space in an extremely technically complicated process. If difficulties arise, JWST lacks HST’s generous margin for error because of its location far beyond earth’s orbit at the Sun-Earth L2 LaGrange point. NASA currently lacks the capability to send a team of astronauts out that far to fix any problems. Even if NASA could get out to JWST, the telescope doesn’t have a grappling ring for an astronaut to grab onto and thus could potentially kill astronauts attempting to fix it. It is hard to imagine a better example of the private sector’s amazing ability to outcompete government bureaucracy and mismanagement than NASA’s planned Shuttle replacement, the Space Launch System. It is estimated to cost more than $2 billion per flight. That’s on top of the $20 billion and nine years the agency has already spent developing the vehicle. Contrast that with the comparatively inexpensive $300 million spent by SpaceX to develop the Falcon 9 in a little over four years, and the fact that each Falcon 9 costs around $62 million. One SLS launch could pay for over 32 SpaceX launches. Private ventures such as SpaceX are more efficient because they have a lot more incentive to avoid excessive costs and focus on solutions: Their own money is at stake, and people spend their own money more carefully than they spend taxpayer dollars collected from others. Multiple private American space firms are currently pursuing accomplishments beyond those of NASA, and they are more advanced and ambitious than the entire government space programs of China and the European Union combined. So one possible solution to NASA’s woes would be to greatly increase its reliance on commercial launch providers. And one way to do that would be to return to the system that made civil aviation great: prizes to reward private-sector innovation. Charles Lindbergh flew across the Atlantic Ocean in pursuit of the privately funded Orteig prize, valued at almost $395,000 in today’s money. Another famous example was the X Prize, which rewarded Burt Rutan’s company Scaled Composites with over $14 million in today’s money for becoming the first nongovernmental organization to launch a reusable and manned space vehicle, SpaceShipOne. The X Prize succeeded in creating over $100 million in investment by private corporations and individuals. Aerospace experts expect that establishing a $10 billion prize for successfully landing a crew on Mars and returning it safely to earth could very well lead to a successful landing. That’s a bargain compared with the $500 billion cost estimates NASA puts out for the same objective. And of course in the worst-case failure scenario for a prize program, taxpayers would pay nothing until the mission was complete. A system based on private enterprise incentivized by a fixed prize would end government cost overruns and waste. The cause of space exploration is simply too important to leave to the public sector.

#### Aff doesn’t solve – public entity mining and private-public partnerships will still exist.

Helmore 20 (Helmore, Edward. “NASA Is Looking for Private Companies to Help Mine the Moon.” The Guardian, Guardian News and Media, 11 Sept. 2020, www.theguardian.com/science/2020/sep/11/nasa-moon-mining-private-companies.) //DebateDrills AY

Nasa has announced it is looking for private companies to go to the moon and collect dust and rocks from the surface and bring them back to Earth. The American space agency would then buy the moon samples in amounts between 50 to 500 grams for between $15,000 to $25,000. The Nasa administrator, Jim Bridenstine, announced on Thursday that the moon material collection would become part of a technology development program that would help astronauts “live off the land” for crewed missions in the future to the moon or elsewhere. Bridenstine wrote that the agency “is buying lunar soil from a commercial provider. It’s time to establish the regulatory certainty to extract and trade space resources.” The collection is part of Nasa’s Artemis lunar exploration program established last year to land US astronauts, including the first woman and the next man, on the moon by 2024. The agency has indicated that missions further afield, to Mars for instance, will require the use of locally mined resources. “We will use what we learn on and around the moon to take the next giant leap – sending astronauts to Mars,” Bridenstine wrote. In a blogpost, Bridenstine said the effort would comply with the Outer Space Treaty of 1967, which says that no country may lay sovereign claim to the moon or other celestial bodies in much the same way that the Antarctic continent is off-limits for territorial conquest. In May, Nasa unveiled a legal framework that would govern the behavior of countries and companies in space and on the moon. The legal framework, known as the Artemis Accords, include the creation of “safety zones” around sites where mining and exploration would take place on the lunar surface. Nasa’s top administrator also told a forum held by the Secure World Foundation that the policies that will govern mining from celestial bodies would be much the same as those that currently exist for the world’s oceans. “We do believe we can extract and utilize the resources of the moon, just as we can extract and utilize tuna from the ocean,” he said, without referring to overfishing and pollution that is rapidly destroying fish stocks in many regions. Unlike fisheries, however, participating celestial mining companies would be required to provide imagery of the material and the location from which it was recovered. Nasa already has a separate program to contract companies to fly science experiments and cargo to the moon ahead of a human landing. Those include Astrobotic, SpaceX, Blue Origin, Sierra Nevada Corp and Lockheed Martin. Bridenstine said he anticipated some of those might also be interested in lunar mining. Casey Dreier, chief advocate & senior space policy adviser at the Planetary Society, wrote on Twitter that the importance of Nasa’s announcement is “not so much the financial incentive (which is tiny) but in establishing the legal precedent that private companies can collect and sell celestial materials (with the explicit blessing of NASA/U.S. gov)”.

### AT Collisions / Private Failures

**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.

#### Squo solves, NASA is taking careful measures to avoid collision.

NASA 21 (Garcia, Mark. “Space Debris and Human Spacecraft.” NASA, NASA, 14 Apr. 2015, www.nasa.gov/mission\_pages/station/news/orbital\_debris.html.)//DD AY

NASA has a set of long-standing guidelines that are used to assess whether the threat of such a close pass is sufficient to warrant evasive action or other precautions to ensure the safety of the International Space Station and its crew. These guidelines essentially draw an imaginary box, known as the “pizza box" because of its flat, rectangular shape, around the space vehicle. This box is about 2.5 miles deep by 30 miles across by 30 miles long (4 x 50 x 50 kilometers), with the International Space Station in the center. When predictions indicate that any tracked object will pass close enough for concern and the quality of the tracking data is deemed sufficiently accurate, Mission Control centers in Houston and Moscow work together to develop a prudent course of action. Sometimes these encounters are known well in advance and there is time to move the International Space Station slightly, known as a “debris avoidance maneuver” to keep the object outside of the box. Other times, the tracking data isn’t precise enough to warrant such a maneuver or the close pass isn’t identified in time to make the maneuver. In those cases, the control centers may agree that the best course of action is to move the crew into the Russian Soyuz or U.S. commercial crew spacecraft that are used to transport humans to and from the station. This allows enough time to isolate those spaceships from the station by closing hatches in the event of a damaging collision. The crew would be able to leave the station if the collision caused a loss of pressure in the life-supporting module or damaged critical components. The spacecraft act as lifeboats for crew members in the event of an emergency. Mission Control also has the option of taking additional precautions, such as having the crew close hatches between some of the station’s modules, if the likelihood of a collision is great enough. Maneuvering Spacecraft to Avoid Orbital Debris Debris avoidance maneuvers are planned when the probability of collision from a conjunction reaches limits set in the flight rules used to operate the space station and the spacecraft used to transport humans and cargo to and from the station. For the space station, if the probability of collision is greater than 1 in 100,000, a maneuver will be conducted if it will not result in significant impact to mission objectives. If it is greater than 1 in 10,000, a maneuver will be conducted unless it will result in additional risk to the crew. Debris avoidance maneuvers are usually small and occur from one to several hours before the time of the conjunction. Such maneuvers with the space station require about 5 hours to plan and execute using the station’s Russian thrusters, or the propulsion systems on one of the docked spacecraft. The International Space Station has conducted 29 debris avoidance maneuvers since 1999, including three in 2020. NASA implemented the conjunction assessment and collision avoidance process for human spaceflight beginning with shuttle mission STS-26 in 1988. Before launch of the first element of the International Space Station in 1998, NASA and DoD jointly developed and implemented a more sophisticated and higher fidelity conjunction assessment process for human spaceflight missions. In 2005, NASA implemented a similar process for selected robotic assets such as the Earth Observation System satellites in low-Earth orbit, and the Tracking and Data Relay Satellite System in geosynchronous orbit. In 2007, NASA extended the conjunction assessment process to all NASA maneuverable satellites within low-Earth orbit and within 124 miles (200 kilometers) of geosynchronous orbit. The U.S. Space Force’s 18th Space Control Squadron (18 SPCS) is responsible for performing conjunction assessments for all designated NASA space assets in accordance with an established schedule (every eight hours for human spaceflight vehicles and daily Monday through Friday for robotic vehicles). The 18 SPCS notifies NASA (Johnson Space Center for human spaceflight, and Goddard Space Flight Center for robotic missions) of conjunctions that meet established criteria. The Space Force tasks the Space Surveillance Network to collect additional tracking data on a threat object to improve conjunction assessment accuracy. NASA computes the probability of collision, based upon miss distance and uncertainty provided by the Space Force.Based upon specific flight rules and detailed risk analysis, NASA decides if a collision avoidance maneuver is necessary. If a maneuver is required, NASA provides planned post-maneuver orbital data to the Space Force for screening of near-term conjunctions. This process can be repeated if the planned new orbit puts the NASA vehicle at risk of future collision with the same or another space object.Additional information on orbital debris is available at NASA Orbital Debris Program Office’s website... <https://www.orbitaldebris.jsc.nasa.gov/>

#### Current efforts to remove space debris check.

Weiner 21 (Weiner, Chloee. “New Effort to Clean up Space Junk Reaches Orbit.” NPR, NPR, 22 Mar. 2021, [www.npr.org/2021/03/21/979815691/new-effort-to-clean-up-space-junk-prepares-to-launch.)// DebateDrills](http://www.npr.org/2021/03/21/979815691/new-effort-to-clean-up-space-junk-prepares-to-launch.)//DD)  AY

A demonstration mission to test an idea to clean up space debris launched Monday morning local time from the Baikonur Cosmodrome in Kazakhstan. Known as ELSA-d, the mission will exhibit technology that could help capture space junk, the millions of pieces of orbital debris that float above Earth. The more than 8,000 metric tons of debris threaten the loss of services we rely on for Earth-bound life, including weather forecasting, telecommunications and GPS systems. The spacecraft works by attempting to attach itself to dead satellites and pushing them toward Earth to burn up in the atmosphere. ELSA-d, which stands for End-of-Life Services by Astroscale, will be carried out by a "servicer satellite" and a "client satellite" that launched together, according to Astroscale, the Japan-based company behind the mission. Using a magnetic docking technology, the servicer will release and try to "rendezvous" with the client, which will act as a mock piece of space junk. The mission, which will be run from the U.K., will carry out this catch and release process repeatedly over the course of six months. The goal is to prove the servicer satellite's ability to track down and dock with its target in varying levels of complexity. The spacecraft is not designed to capture dead satellites already in orbit, but rather future satellites that would be launched with compatible docking plates on them. Space junk has been a growing problem for years as human-made objects such as old satellites and spacecraft parts build up in low Earth orbit until they decay, deorbit, explode or collide with other objects, fragmenting into smaller pieces of waste. In 2019, for example, India blew apart one of its satellites orbiting Earth, creating hundreds of pieces of debris that threatened to collide with the International Space Station. According to a recent report by NASA, at least 26,000 of the millions of pieces of space junk are the size of a softball. Orbiting along at 17,500 mph, they could "destroy a satellite on impact." More than 500,000 pieces are a "mission-ending threat" because of their ability to impact protective systems, fuel tanks and spacecraft cabins. And the most common debris, more than 100 million pieces, is the size of a grain of salt and could puncture a spacesuit, "amplifying the risk of catastrophic collisions to spacecraft and crew," the report said. According to NASA, cleaning up space — and addressing the risks associated with debris — depend on preventing the accumulation of more waste and actively removing it. The development of other cleanup technologies has been underway for years. In 2016, Japan's space agency sent a 700-meter tether into space to try to slow down and redirect space junk. In 2018, a device called RemoveDebris successfully cast a net around a dummy satellite. The European Space Agency also plans to send a self-destructing robot into orbit in 2025, which the organization's former director general has referred to as a space "vacuum cleaner." These efforts could prove increasingly important as private space ventures like SpaceX continue to clutter low Earth orbit with a "mega-constellation" of satellites.

#### Non unique – there’s already existing space debris in the squo that would cause collision and war, the plan doesn’t solve. Either the aff’s impacts are true and the existing efforts to clean space fail and we go extinct because there’s nothing we can do and the aff does nothing, or space debris won’t cause extinction and the aff has no impacts.

Sample 16 (Sample, Ian. “Rise in Space Junk Could Provoke Armed Conflict Say Scientists.” The Guardian, Guardian News and Media, 22 Jan. 2016, www.theguardian.com/science/2016/jan/22/rise-in-space-junk-could-provoke-armed-conflict-say-scientists.)// DebateDrills AY

The steady rise in space junk that is floating around the planet could provoke a political row and even armed conflict, according to scientists, who warn that even tiny pieces of debris have enough energy to damage or destroy military satellites. Researchers said fragments of spent rockets and other hurtling hardware posed a “special political danger” because of the difficulty in confirming that an operational satellite had been struck by flying debris and had not fallen victim to an intentional attack by another nation. Space agencies in the US and Russia track more than 23,000 pieces of space junk larger than 10cm, but estimates suggest there could be half a billion fragments ranging from one to 10cm, and trillions of even smaller particles. The junk poses the greatest danger to satellites in low Earth orbit, where debris can slam into spacecraft at a combined speed of more than 30,000mph. This realm of space, which stretches from 100 to 1200 miles above the surface, is where most military satellites are deployed. In a report to be published in the journal Acta Astronautica, Vitaly Adushkin at the Russian Academy of Sciences in Moscow writes that impacts from space junk, especially on military satellites, posed a “special political danger” and “may provoke political or even armed conflict between space-faring nations. The owner of the impacted and destroyed satellite can hardly quickly determine the real cause of the accident.” Adushkin adds that in recent decades there have been repeated sudden failures of defence satellites which have never been explained. But there are only two possibilities, he claims: either unregistered collisions with space debris, or an aggressive action by an adversary. “This is a politically dangerous dilemma,” he writes. The warning comes after an incident in 2013 when a Russian satellite, Blits, was disabled after apparently colliding with debris created when China shot down one of its own old weather satellites in 2007. The Chinese used a missile to destroy its satellite, an act that demonstrated its anti-satellite capabilities, and left 3,000 more pieces of debris in orbit. Space junk threatens real-life Gravity incident, Congress hears Read more According to the report, the amount of debris cluttering low Earth orbit has risen dramatically in half a century of spacefaring. Without efforts to clean up the space environment, Adushkin warns of a “cascade process” in which chunks of debris crash into one another and produce ever more smaller fragments. Data in the study from the Russian space agency show that the International Space Station took evasive action five times in 2014 to avoid space debris. Even small flecks of paint that have flaked off spacecraft can be hazardous. Nasa’s space shuttle was struck by flying paint several times in orbit, forcing ground staff to replace some of the spaceship’s windows. The report follows a report commissioned by Nasa in 2011 which warned that the level of space junk was rising exponentially, and had reached a “tipping point” in the threat it posed to satellites and the International Space Station.

#### Partnerships between governments and private industry solves debris and only getting better --- major strides by 2024

**Pultarova 21**

[Tereza Pultarova, 05-26-2021, "Commercial space clean-up service could be ready in 2024," Space, ereza is a London-based science and technology journalist, aspiring fiction writer and amateur gymnast. Originally from Prague, the Czech Republic, she spent the first seven years of her career working as a reporter, script-writer and presenter for various TV programmes of the Czech Public Service Television. She later took a career break to pursue further education and added a Master's in Science from the International Space University, France, to her Bachelor's in Journalism and Master's in Cultural Anthropology from Prague's Charles University. She worked as a reporter at the Engineering and Technology magazine, freelanced for a range of publications including Live Science, Space.com, Professional Engineering, Via Satellite and Space News and served as a maternity cover science editor at the European Space Agency. [https://www.space.com/commercial-space-debris-removal-2024-astroscale]//DebateDrillsWW](https://www.space.com/commercial-space-debris-removal-2024-astroscale%5d//DebateDrillsWW)

"This **partnership with OneWeb** demonstrates their commitment to space sustainability and is the next step towards maturing our technologies **to develop** a full-service **debris removal** offering **by 2024**," John Auburn, managing director of Astroscale U.K. and group chief commercial officer [said in a statement](https://astroscale.com/astroscale-uk-signs-2-5-million-agreement-to-develop-space-debris-removal-technology-innovations-with-oneweb/). The new service **targets constellation operators** and is called ELSA-M. **The program would enable the removal of** multiple **retired satellites in** a **single mission**, thus **reducing cost** for the client, the company said in the statement. **The** orbital junk **collector would push each satellite into the atmosphere to burn up**, then return for the next defunct piece. "This funding **will help us evolve** key rendezvous and proximity operations technologies and capabilities beyond ELSA-d towards an end-of-life servicing offering for a range of constellation customers," Jason Forshaw, Astroscale's head of future business, Europe, said in the statement. "In parallel to this project, we're developing our next generation docking plate (DP), which is fitted to clients before launch, and is designed to enable a servicer to grapple the client. We are encouraging constellation customers to fit DPs to future-proof their satellites in case of need for removal due to failure, or at end of life, or to provide future in-orbit servicing." Astroscale's ELSA-d demonstration mission, currently in low Earth orbit, will carry out a series of rendezvous and close proximity debris capture and release manoeuvres this summer. The results of the test campaign will inform further work on the ELSA-M program, Astroscale said. The funding is part of the European Space Agency's (ESA) program called Sunrise, developing [flexible reprogrammable communication satellites.](https://www.gov.uk/government/news/uk-companies-join-forces-to-build-revolutionary-beam-hopping-satellite)

### AT Space Junk

#### 2. The space junk has been put there by PUBLIC entities like governments as well as private entities, even a ban on private entities in space couldn’t solve the problem. As long as anyone is launching anything it is inevitable

**Polyakov 21**, Dr. Max Polyakov, Founder, Noosphere Ventures, Firefly Aerospace, EOS Data Analytics, 5-5-2021, "Where does space junk come from – and how do we clean it up?," World Economic Forum,<https://www.weforum.org/agenda/2021/05/why-we-need-to-clean-up-space-junk-debris-low-earth-orbit-pollution-satellite-rocket-noosphere-firefly/> Livingston RB

Where does space junk come from? **As long as humans launch objects into orbit, space debris is inevitable.** Rocket launches leave boosters, fairings, interstages, and other debris in LEO. So do rocket explosions, which currently account for seven of the top 10 debris-creating events. **Human presence also creates orbital flotsam** – such as cameras, pliers, an astronaut’s glove, a wrench, a spatula, even a tool bag lost during space walks. Some debris is created naturally from the impacts of micrometeoroids – dust-sized fragments of asteroids and comets. With limited lifetimes, **operational satellites can become space debris**. Satellites run out of maneuvering fuel, batteries wear out, solar panels degrade – causing an orbital debris feedback loop, in which the problem is exacerbated when solar panels are sandblasted by micrometeoroids and tiny debris. As with rocket debris, spent satellites eventually re-enter Earth’s atmosphere and burn up, but the process can take years – and the higher they orbit above Earth, the longer those orbits take to decay.