# 1AR

#### 1] Counter-interp: the aff can specify a specific an actor.

We meet- the signatories of OST

#### Using actors is normal means w/ issues of private appropriation.

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Lunar rock samples from the Apollo missions containing rare Earth resources, such as Helium-3 which produces more power and less waste than traditional nuclear reactors on Earth, have since fuelled incentives for extraterrestrial resource mining (Brearley, 2006: 44-46). This was further facilitated by suggestions that near-earth objects (NEOs) like the so-called ‘Anteros asteroid’ could comprise of over five trillion dollars’ worth of magnesium silicate and aluminium (Kramer, 2017: 131). **Envisaging appropriation concerns that might arise from the future extraction of space assets by spacefaring nations, Article II of the UN OST declared that: “Outer space is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means**” (UN, 1967). **The emphasis on claims of national sovereignty were intimately tied to the Cold War context at the time, where space activities were under the exclusive monopoly of governmental agencies and initiated for goals of military dominance or national prestige** (Sachdeva, 2017: 210). **However, the privatisation of the space industry that has occurred since the 1980s has meant that the legislation leaves an enormous amount of legal ambiguity and interpretation regarding the regulation of private resource mining in space.** As Shaer (2016) demonstrates, **the Article II provision fails to address either the exploitation of space for financial gain or the property claims of commercial enterprises** (Shaer, 2016: 47). **Nevertheless, Article VI of the UN OST asserts that: “States shall be responsible for national space activities whether carried out by governmental or non-governmental entities**” (UN, 1967; own emphasis). Some scholars have suggested that **this clause significantly restrains the activities of private space corporations by incentivising states to regulate their domestic organisations for fear of liability concerns** (Abeyratne, 1998: 168). However, the US government recently enacted a piece of legislation which exploited this clause, in order to circumvent its own restrictions and strengthen US economic influence in space. The passage of the 2015 SPACE Act enabled US citizens to privately “possess, own, transport, use, and sell the resources” they obtain in outer space, whilst making careful consideration to deny national sovereign claims over such materials (Leon, 2018: 500).

#### Prefer contextual evidence—it solves arbitrary linguistic intuitions and boosts topic literature: this is the TOC topic and no one wants to have a continuous phil debate. Actors are key to gov’t action- otherwise we’ll just lose to process CPs that don’t link.

#### Standards:

#### A] Topic Lit—Core debates are about the OST and its legitimacy, but they arbitrarily exclude core controversies.

#### B] Aff ground—even phil authors don’t talk about the hypothetical unjustness of space mining, but policy authors do.

#### C] Functional limits—a viable aff needs strong UQ which means random country affs like “NoKo” are feasible

#### D] Reasonability—competing interps encourages the neg to always shift the goalpost with arbitrary interps that skirt topical discussion—voting neg incentivizes T-reliant neg strategies which outweighs the offense solved by their interp

#### 2] We meet—we don’t specify a government; we specify a *group* of governments.

#### 3] We meet—issues of justice are resolved by agents.

#### 4] This shell goes both ways- if we didn’t spec, you’d read ASPEC means that you should draw the line and use reasonability.

1] Can’t solve the aff

a) War – granting limited property grants still allows the private industry to flourish which causes perception gaps since it’s a question of defending assets

2] Extend 1ac rajaploan – specifically says that the ones dictating the process will be the ones in control like the US which leads to legal ambiguity but treaties would be negotiated by all

#### Extend -- Mallick & Rajagopalan 19 – independent changes to outer space without the OST fails:

#### 1] Norms – Countries think they can be in violation of the treaty which cascades WMD restrictions that the OST has – but only changing the treaty solves

#### 2] Strength – minor changes to unilateral action curb sovereignty and allow for exceptions

#### 3] Ambiguity – OST gets interpreted by CIL and has international consensus, but changes to space involvement get loophooled and have NO check

#### Substitutes solve – multiple breakthroughs being made

Adam Currie, market writer, 3/18/13 [“Rare Earth Recycling: Risk to Sector or Investment Opportunity?” Rare Earth Investing News, 2013, http://rareearthinvestingnews.com/9255-rare-earth-recycling-risk-to-sector-or-investment-opportunity.html]

While Honda has impressed investors by succeeding in its recycling goals and its plans to commercialize this recycling process, it is not the only company focused on innovation. Since the industry underwent a severe shake up in 2008, more and more manufacturers have begun seeking alternative solutions aimed at either decreasing their dependence on rare earths, or securing their own REE supply.¶ In 2012, Toyota (TSE:7203) announced that it had developed a method to manufacture hybrid and electric vehicles (EVs) without the use of rare earth metals, while General Motors Company (NYSE:GM) confirmed it was “close to a breakthrough” that would reduce its need for dysprosium, a rare earth in especially high demand. Japan’s Hitachi (TSE:6501) has been clear of its intentions to move away from the use of REEs, announcing in April last year a highly-efficient permanent magnet synchronous motor that employs an iron-based amorphous metal in the core – and, crucially, no REEs.¶ Also, Ford (NYSE:F) announced that its nickel-metal-hydride batteries will be replaced with lithium-ion alternatives in a move that could see the company cut 500,000 pounds of REEs from its manufacturing process annually, while the US Department of Energy’s (DOE) Ames Laboratory confirmed that it too is working towards creating a method to remove neodymium from the mix of other materials in magnets.

#### Won’t compete with earth mining – costs, supply & demand, profit

Szecsi, 21, Space Industries, “How Did Market Analysts Derail The Nonexistent Space-Mining Business?”, Gabor Szecsi (Berkeley, California) is an attorney licensed in the State of California, counseling space startups on transactions, export controls compliance, and privacy law compliance., URL: <https://spaceindustries.com.au/market-analysts-derail-space-mining/space_mining/>, KR

Asteroid Mining Cannot Compete With Earth Mining

While you can develop a mine on Earth within five years with less than $1 billion investment, asteroid mining requires $2.6 billion to be tied up for decades. Furthermore, the operating cost of asteroid mining would be higher than Earth mining.

This raises a simple question: why would a company bring more expensive platinum to an already over supplied market? No, it should not. When the precious metal supply drops below a certain critical supply because of the decline of Earth resources a company may consider looking for new resources in space. Until then, precious metal mining in space will not be able to compete with Earth mining.

Platinum, Even a Football-Field Amount, Will Not Make You Rich

Platinum has been the most frequently mentioned precious metal to be mined in space. In 2020, the all-in sustaining cost of platinum exceeded $1,100 per ounce while the market price was less than $1,100 per ounce. That meant that the platinum mining on Earth was not profitable. The reason for the relatively low price was over supply caused by the continuously declining demand. The industry no longer needs as much platinum as is produced.

Historical platinum prices

Other precious metal markets are not as tough as the platinum market. For example, the all-in sustaining cost of gold is around $700-$1,000 per ounce. Although the current market price is much higher than the all-in sustaining cost, a significant increase in supply could push gold off the cliff as well. Not to mention that space mining will not produce gold for $700-$1000 per ounce it is very doubtful that gold mining in space would be profitable at the current gold market price.

Thus, the platinum-mining sector is struggling, and the way to solve this problem is to not bring more platinum from space; instead, some existing mining operations should probably be suspended or closed down to adjust supply to current needs. While other precious metal markets are healthy, mining those materials in space would not be profitable.

#### Solvency Deficits:

#### 1] Sovereignty – no reason why private actors have to listen to the UN, even if they fiat it it’s a question of legitimacy in the future AND that model of fiat is bad since it allows for things like cp; end war

#### 2] Can’t solve the aff

#### a) War – China and russia don’t care about the UN’s norms so they’d perceive any private industry growth as a threat and pre-emtpively attack

#### b) Collisions --

#### 3] Trust – no guarantee of resolving tensions and past examples prove

Rao et. al, 19, OIOS (UN evaluation group), “Evaluation of the United Nations Office for Outer Space Affairs”, Srilata Rao: Chief of Peacekeeping Evaluation Section URL: <https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKEwiVkLT0scT1AhXPIEQIHUKGAqQQFnoECAoQAQ&url=https%3A%2F%2Foios.un.org%2Ffile%2F7742%2Fdownload%3Ftoken%3DuPFNsUU2&usg=AOvVaw3p8wTYyJfzXC-iumeERmsT>, KR

\*UNOOSA = The United Nations Office for Outer Space Affairs

60. Effectiveness: UNOOSA successfully served as Secretariat to ICG and maintained the Register of objects launched into outer space. The Office sought partnerships with non-traditional entities, secured or renewed funding from its traditional donor base, and elaborated a strong new vision of space solutions and capacity building and the role of the Office therein. But UNOOSA was not entirely successful in gaining Member State support of its vision of a modernized and reinforced mandate. Its partnerships, furthermore, had yet to result in widescale benefit to Member States, with limited linkages to United Nations country teams, unresolved tensions with key entities, and untapped potential across the UN-SPIDER network and Regional Centres. UN-SPIDER activities were well- regarded, but they plateaued while resources remained unspent. The Office organized and participated in an extensive number of conferences and workshops, which benefited a broad range of participants from diverse countries, but its own travel to countries in need of technical assistance constituted a minority of all trips. Participation in UN-Space increased sharply in 2018, though the forum remained more of a reporting than a coordination mechanism.

#### 4] Overstaffing – unable to solve in the future

Rao et. al, 19, OIOS (UN evaluation group), “Evaluation of the United Nations Office for Outer Space Affairs”, Srilata Rao: Chief of Peacekeeping Evaluation Section URL: <https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKEwiVkLT0scT1AhXPIEQIHUKGAqQQFnoECAoQAQ&url=https%3A%2F%2Foios.un.org%2Ffile%2F7742%2Fdownload%3Ftoken%3DuPFNsUU2&usg=AOvVaw3p8wTYyJfzXC-iumeERmsT>, KR

61. Efficiency: UNOOSA was consistently noted by stakeholders for significant accomplishments despite a small staff. However, staff were over-extended, and the Office was sometimes unable to fulfil its project management responsibilities. Work streams remained largely segregated across the Office’s sections, with promising experience from the recently-introduced project team approach. A significant portion of the extrabudgetary Trust Fund remained unspent, suggesting gaps in the Office’s capacity to fully implement its mandated activities.

#### Asteroid mining won’t solve resource shortages or conflict. Too many technical hurdles and pro mining ev is a prisoner to mining companies PR machines.

**Riederer 14** (Rachel Riederer is co-Editor in Chief of Guernica. Her writing has appeared in The New Yorker, The Nation, Best American Essays. “Silicon Valley Says Space Mining Is Awesome and Will Change Life on Earth. That’s Only Half Right”. May 19, 2014.)

What’s misleading about **these projects** isn’t that they’re subject to budget problems and delays, but that they **come couched in overblown rhetoric about their potential to** radically **alter human life, to do away with the notion of scarcity and deliver us to a future of** plenty and **peace**. It’s a pattern that has become familiar in Silicon Valley: develop a plan for a business that will do something cool and make a lot of money, but describe it instead as something that will change the world. Return to that platinum asteroid for a moment. There’s one that Planetary Resources has been tracking: It passes near the Earth’s orbit every 23 months and is a half-kilometer by one kilometer in size. A spacecraft could travel to it in around eight months. Diamandis estimates its total worth at between $300 billion and $5 trillion. If it were to be mined at some point in the future, it would drive down the global price of platinum, which might make some items more affordable—luxury jewelry, of course, but also catalytic converters for cars and hard disks for laptops and DVRs—but it would primarily make the investors of Planetary Resources extremely rich. **Allusions to the Wild West abound in the literature of space-mining companies**. The Moon Express website talks about “brave pioneers” who explored new territories "with the backing of a monarch or a state.” For these entrepreneurs, space is not a distant emptiness; beyond the frontier, they envision a business-place. And with the exception of a Cold War–era treaty prohibiting national appropriation of the moon, there aren’t laws about ownership in space; its riches are there for the taking, like gold nuggets in a California stream. In a March debate on "Selling Space," at the American Museum of Natural History, Space Foundation CEO Elliot Pulham said that asteroids are clearly up for grabs: “There’s no law that says you can’t snag an asteroid. Knock yourself out.” It’s certainly true that space is full of valuables. Billions of years ago, during the formation of the solar system, gravity pulled the heavy materials on would-be planets toward their cores, forcing the comparatively lighter rocky material out to the surface. When those planets broke apart, they became asteroids. Some are made of rocky surface fragments, but some are made of the core materials—platinum, gold, silver, palladium—that are rare and precious on Earth. At a press roundtable after the "Selling Space" debate, Tyson explained why this process matters so much to those who would mine the sky: “Nature has pre-sifted the ingredients for you. You go grab yourself an asteroid made from the core of a planet that never survived, and you’ve got this stuff concentrated in the palm of your hand.” This is what Manifest Destiny must have felt and sounded like. Wealth beyond your wildest dreams, and it’s there for the taking. You just have to get there first. The “getting there first” will not be simple, or cheap. Most of the asteroids in the solar system are in the asteroid belt between Mars and Jupiter. But the orbit paths of some near-Earth asteroids, or NEAs, bring them relatively close to our planet—that is, within around 30 million miles. Planetary Resources has developed what is essentially an outer-space drone: a small telescope-equipped spacecraft, around the size of a desktop computer, that will survey near-Earth asteroids. Once an asteroid is identified and determined to be valuable, the **extraction** could begin, though that **introduces** a new set of **technical obstacles**. Because of the difficulty and expense of getting heavy machinery from Earth into space, some have suggested using 3D printing technology to use materials found in space to create the necessary equipment. Then, some modified version of a terrestrial mining method, like drilling or magnetic separation, could be used for the mining itself. But these extraction processes have been developed for the pressure and gravity of Earth, and they would need to be overhauled to function in the low-gravity, vacuum environment of space. If this part of the process sounds unclear, it’s because it is. To give an idea of the scale—in time and difficulty—of these kinds of operations, consider the government’s version of asteroid prospecting. In April, NASA greenlighted a mission in which a spacecraft called OSIRIS-REx will rendezvous with an asteroid called Bennu. OSIRIS-Rex is scheduled to launch in 2016, reach the asteroid in 2018, reconnoiter it for over a year, and then bring back samples for scientific study. The amount of asteroid that NASA plans to collect after all this time and trouble? Two ounces. **A major premise of private space mining companies is that they will be able to work far faster and more economically** than NASA, and will be willing to take on levels of risk beyond that of a government operation, **but** the **scale** and timeline of OSIRIS-REx **shows how complex these operations will be**, even **for** the swiftest companies. The most far-out proposal in **space mining** is to "redirect" an NEA toward Earth and into lunar orbit. There, the asteroid could spin safely around the moon, accessible to our planet. A 2012 Cal Tech study determined that this method would be not only feasible, but “essential” for long-term human space exploration. According to the study, it will soon be possible for an unmanned spacecraft to identify a target asteroid—one around seven meters in diameter and 500,000 kilograms in mass—approach it, “loiter” nearby to determine its spin, and ultimately enclose the asteroid in what is described as a “draw-string bag.” (Take a moment to imagine a man-made drawstring bag capturing a giant mass of precious metal hurtling through space. “This is awesome!” does feel like the only reasonable response.) Once the asteroid and spacecraft are connected, a solar-powered propulsion system could fly the asteroid back to our moon and deposit it in lunar orbit. Depending on **the** mass of the asteroid, this **retrieval flight would last between six and ten years.** This idea, like the other **space-mining projects**, will require tremendous patience, money, vision, and bluster. So it's no surprise that the **futurists of Silicon Valley are behind them**: The group of companies founded with the intention of mining space are backed largely by investors who made their names and fortunes in tech. Peter Diamandis is the founder of the X Prize Foundation and of Silicon Valley’s Singularity University, which he co-founded with futurist Ray Kurzweil; Eric Schmidt is one of Planetary Resources’ major investors; before starting Moon Express, Naveen Jain was a senior executive at Microsoft and then CEO of his own startup, InfoSpace; Elon Musk founded PayPal and now has a private space company, SpaceX, currently under contract with NASA to begin carrying astronauts to the International Space Station. The New Yorker's George Packer identifies the “conflicting pressures” of Silicon Valley as “work ethic, status consciousness, idealism, and greed.” All of these pressures are present in the space-mining race, too. The work required to pull it off is undeniable—as is the idealistic delusion that outer-space extraction would bring world peace. Whoever accomplishes this first will be hailed, from Mountain View to Capitol Hill, as a genius. They will also become unfathomably wealthy, and rightly so: Entering a new, high-risk, high-tech field of business should come with the possibility for enormous reward. These entrepreneurs have evinced as much in less-utopian, off-the-cuff remarks. Diamandis has joked that his company’s financing plan is to buy puts in the platinum market and then announce their plan to bring a platinum asteroid home. Jain imagines coming back from trips to the moon with payloads worth billions of dollars: “I don’t care what people say," he said in an interview with Wired's editor last year. "That’s a shit load of money.” It’s telling that the foundational text of the space mining industry—1997's Mining the Sky, by John Lewis, a professor of planetary science at the University of Arizona and the chief scientist of Deep Space Industries—begins not with a catalog of the wealth of space, but with a brief history of exploration and military domination on Earth. Here, there isn’t enough, but in space, rather than nothingness, we find “a lively, rich understanding of the unity and lawfulness of Creation, within which the diversity and complexity of local materials and events falls into place.” Thanks to the saving power of technology, the very ideas of “limited resources and finite living space” are “tired old myths,” he writes. **It’s exhilarating, this notion that tech advances could end scarcity as we know it, relegating wars over mineral wealth and energy sources to the list of woes defeated by science**, alongside plague and polio. But **it’s a dangerous exhilaration**. It seems far more likely that new sources of wealth will, in their abundance, be one more thing for us to scrabble over. The space-mining notion is immensely appealing: the sky is full of infinite riches and abundance leads to peace. But why wouldn’t riches from the heavens cause conflicts and problems? Their vulgar terrestrial cousins always have. The problem with comparing **space-mining** to the Wild West isn’t just that it **won’t revolutionize our economy** like Manifest Destiny did. It isn’t even that there’s something suspect in taking the sky—something that feels so shared, so very deeply part of the commons—and turning it into a set of privately held commodities. It’s that this rhetoric gives the industry a kind of up-by-the-bootstraps patina, calling to mind a situation in which anyone with a gold-pan could go and seek their fortune, if one were plucky and lucky enough to set out for virgin territory. This simply does not apply to space mining, an industry where—to an even greater degree than modern-day resource extraction businesses on Earth—the barriers to entry in terms of both technology and capital are so immense that it is only open to entrepreneurs who are already billionaires.

#### Condo is a voting issue – the time crunched 1AR can’t read its best offense against multiple worlds with different uniqueness conditions – they collapse to what’s undercovered which wrecks engagement. Dispo solves—they can kick it if we perm—they get to test the aff but we get strategic options like pointing out contradictions and straight turns

# Asteroid Mining

#### Plan: The appropriation of outer space through asteroid mining by private entities should be banned.

#### We’ll defend normal means as the signatories of the OST adding an optional protocol under Article II.

Tronchetti 7[Fabio Tronchetti is a professor at the International Institute of Air and Space Law, Leiden University, The Netherlands, 2007, <https://iislweb.org/docs/Diederiks2007.pdf>, 12-15-2021 amrita]

ARTICLE II OF THE OUTER SPACE TREATY: A MATTER OF DEBATE The legal content of Article II of the Outer Space Treaty is one of the most debated and analysed topic in the field of space law. Indeed, several interpretations have been put forward to explain the meaning of its provisions. Article II states that: “Outer space, including the Moon and other celestial bodies, is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means”. **The text of Article II represents** the final point of a process, formally initiated with Resolution 1721, aimed at conferring to outer space the status of res communis omnium, namely a thing open for the **free exploration** and use by all States **without the possibility of being appropriated**. By prohibiting the possibility of making territorial claims over outer space or any part thereof based on use or occupation, Article II **makes clear that** the customary procedures of **i**nternational **law allowing** subjects to obtain **sovereignty rights over un-owed lands**, namely discovery, occupatio and effective possession, **do not apply to** outer **space.** This prohibition was considered by the drafters of the Outer Space Treaty the best guarantee for preserving outer space for peaceful activities only and for stimulating the exploration and use of the space environment in the name of all mankind. What has been the object of controversy among legal scholars is the question of whether both States and private individuals are subjected to the provisions of Article II. Indeed, **while Article II forbids** expressis verbis the national **appropriation by** claims of **sovereignty**, by means of use and occupation or other means of outer space, **it does not** make **a**ny explicit **mention** **to** its **private** appropriation. Relying on this consideration, some authors have argued that the private appropriation of outer space and celestial bodies is allowed. For instance, in 1968 Gorove wrote: “Thus, at present an individual acting on his own behalf or on behalf of another individual or private association or an international organisation could lawfully appropriate any parts of outer space…”6 . The same argument is used today by the enterprises selling extraterrestrial acres. They base their claim to the Moon and other celestial bodies on the consideration that Article II does not explicitly forbid private individuals and enterprises to claim, exploit or appropriate the celestial bodies for profit7 . However, it must be said, that nowadays there is a general consensus on the fact that **both national appropriation and private** property rights **are denied** under the Outer Space Treaty. Several way of reasoning have been advanced to support this view. Sters and Tennen affirm that the argument that Article II does not apply to private entities since they are not expressly mentioned fails for the reason that they do not need to be explicitly listed in Article II to be fully subject to the non-appropriation principle8 . **Private entities are allowed to carry out** space **activities but**, according to Article VI of the Outer Space Treaty, they **must be authorized** to conduct such activities **by the** appropriate **State** of nationality. But if the State is prohibited from engaging in certain conduct, then it lacks the authority to license its nationals or other entities subject to its jurisdiction to engage in that prohibited activity. Jenks argues that “States bear international responsibility for national activities in space; it follows that what is forbidden to a State is not permitted to a chartered company created by a State or to one of its nationals acting as a private adventurer”9 . It has been also suggested that **the prohibition of national** appropriation **implies prohibition of private** appropriation because the latter cannot exist independently from the former10. In order to exist, indeed, private property requires a superior authority to enforce it, be in the form of a State or some other recognised entity. In outer space, however, this practice of State endorsement is forbidden. Should a State recognise or protect the territorial acquisitions of any of its subjects, this would constitute a form of national appropriation in violation of Article II. Moreover, it is possible to use some historical elements to support the argument that both the acquisition of State sovereignty and the creation of private property rights are forbidden by the words of Article II. During the negotiations of the Outer Space Treaty, the Delegate of Belgium affirmed that his delegation “had taken note of the interpretation of the non-appropriation advanced by several delegations-apparently without contradiction-as covering both the establishment of sovereignty and the creation of titles to property in private law”11. The French Delegate stated that: “…there was reason to be satisfied that three basic principles were affirmed, namely: the prohibition of any claim of sovereignty or property rights in space…”12. The fact that the accessions to the Outer Space Treaty were not accompanied by reservations or interpretations of the meaning of Article II, it is an evidence of the fact that this issue was considered to be settled during the negotiation phase. Thus, summing up, we may say that **prohibition of appropriation of outer space** and its parts is a rule which **is valid for both private and public entity**. The theory that private operators are not subject to this rule represents a myth that is not supported by any valid legal argument. Moreover, it can be also added that if any subject was allowed to appropriate parts of outer space, the basic aim of the drafters of the Treaty, namely to prevent a colonial competition in outer space and to create the conditions and premises for an exploration and use of outer space carried out for the benefit of all States, would be betrayed. Therefore, **the need to protect the non-appropriative nature o**f outer **space emerges** in all its relevance.

#### Disputes and misperceptions create cascading effects towards space weaponization and an arms race—an international framework solves BUT unilateral action causes escalating space wars

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The first concern is establishing clear regulations regarding asteroid mining. With an intent to establish clear regulations with respect to asteroid mining and to legalise material extraction from the moon and other celestial bodies by private companies in the US, the US government legalised space mining in 2015 by introducing the US Commercial Space Launch Competitiveness Act, 2015.[xxvii] This move was heartily welcomed by the private companies as it provided legitimacy to their planned activities. Subsequently in 2017, Luxembourg followed suit.[xxviii] While the US has been a spacefaring nation for many decades now, Luxembourg aspires to become a global leader in the nascent race to mine resources in outer space. In the 1980s the tiny European nation arose out of almost nowhere to become a leader in the satellite communications industry; today it is looking to the skies again, hoping to be the Silicon Valley of asteroid mining.[xxix] In the backdrop of a thriving steel industry that faced trade recession during the oil crisis of 1973, Luxembourg is trying to capitalise on the potential of space mining. As Prime Minister Xavier Bettel put it, “We realized it wouldn't be forever, the steel, so we decided to do other things.”[xxx] Similarly, looking beyond oil, the UAE is framing its policy approaches to make advances in two key areas: human space exploration, and commercial activities of resource extraction through mining.[xxxi] The two formal pieces of legislation (passed by the US and Luxembourg) provide an answer to the complex question of ownership in outer space; the two-word answer appears to be, “finders, keepers”. The US Commercial Space Launch Competitiveness Act, 2015 states: “A US citizen engaged in commercial recovery of an asteroid resource or a space resource shall be entitled to any asteroid resource or space resource obtained.”[xxxii] This legislation gives US space firms the right to own, keep, use, and sell the spoils of the cosmos as they deem fit. Luxembourg’s legislation is fairly analogous to the US Act, giving mining companies the right to keep their plunder. However, unlike the US law, Luxembourg’s does not require a company’s major stakeholders to be based in the country to enjoy its safeguards; the only requirement is for that company to have an office in the country.[xxxiii] In 2017, Japan entered into a five-year agreement with Luxembourg for mining operations in celestial bodies. Japan today appears a step closer to realising its objective of asteroid mining with two Japanese rovers, Minerva II-1, of JAXA landing on the surface of the asteroid named Ryugu in September 2018.[xxxiv] Earlier, Portugal and the UAE signed similar cooperation agreements with Luxembourg.[xxxv] Meanwhile, a few other countries—which have been critical of the US and Luxembourg, at the forefront of the space mining efforts—have also decided to join the field. The increasingly competitive and contested nature of outer space activities is spurring major spacefaring nations to push the boundaries in their space exploration. Asteroid mining could possibly become the next big thing and is already seeing a race among the space powers. The US and Luxembourg are at the forefront in space resource extraction in terms of the policy frameworks and funding.[xxxvi] Even as the US has clarified that the US Space Act 2015 is being misunderstood and that there is no change in the US policy towards national appropriation of space, the reality is that it has already spurred a major debate.[xxxvii] China and Russia are among those countries that are following on the path of the US and Luxembourg in undertaking mining missions in space. According to media reports, Ye Peijian, chief commander and designer of China’s lunar exploration programme has stated that China would send the first batch of asteroid exploration spacecraft around 2020.[xxxviii] Speaking to China’s Ministry of Science and Technology-run newspaper, Science and Technology Daily, Ye said that these asteroids have a high concentration of precious metals, which could rationalise the huge cost and risks involved in these activities as their economic value could run into the trillions of US dollars. Therefore, extraction, mining and transporting them back to Earth through robotic equipment will be a significant activity. Chinese scientists are working on missions to “bring back a whole asteroid weighing several hundred tonnes, which could turn asteroids with a potential threat to Earth into usable resources.”[xxxix] Ye was also quoted as saying that China has plans of “using an asteroid as the base for a permanent space station.”[xl] Helium mining on the moon is also part of China’s goals.[xli] Russia, for its part, is also responding to the space-mining developments of the last decade. For one, it plans to have a permanent lunar base somewhere between 2015 and 2020 for possible extraction of Helium.[xlii] Even as Russia’s official position on asteroid mining is that it is forbidden under the 1967 OST—which states that space is the “province of mankind”—the Russian industry players are of the view that they must follow the lead taken by the US and Luxembourg.[xliii] In early 2018, the director of the Scientific-Educational Center for Innovative Mining Technologies of the Moscow-based National University of Science and Technology MISIS (NUST MISIS), Pavel Ananyev, spoke about the Russian ambitions and proposed activities including space drilling rigs, water extraction on the Moon and 3D printers at space stations.[xliv] Russia’s private space companies including Dauria Aerospace, one of the first Russian private space companies, also hold the opinion that they must go forward in the same direction and call for a larger space to private sector to engage in extracting space resources.[xlv] Moscow may not have yet actively pursued space mining and resource extraction, but it is likely to pick up pace in the coming years alongside global efforts. Moscow clearly has a capacity gap in terms of funding because its earlier plans to have a permanent base in the Moon by 2015 is yet to happen. India, too, has ambitions in extraterrestrial resource extraction. In fact, a year after the US legislation, Prabhat Ranjan, executive director of Technology Information, Forecasting and Assessment Council (TIFAC), a policy organisation within the Department of Science and Technology, made a case for India to push ahead with lunar and asteroid mining. He said, “Moon is already being seen as a mineral wealth and further one can go up to the asteroids and start exploiting this. This can be a big game changer and if India doesn’t do this, we will lag behind.”[xlvi] More recently, Dr. K Sivan, Chairman of the country’s civil space organisation, Indian Space Research Organisation (ISRO), talked about ISRO’s plans for helium-3 extraction and said, “the countries which have the capacity to bring that source from the moon to Earth will dictate the process. I don’t want to be just a part of them, I want to lead them.”[xlvii] However, gaining proficiency in such missions is not easy – the NASA and ESA (the European Space Agency) have been discussing these possibilities for a longer time, albeit quietly. The ISRO Chairman’s response was characterised by an Indian commentator as “aspirational” and “emotional”, clearly conceding that the country’s technological wherewithal is yet to be adequate.[xlviii] Importantly, it is not clear how the legal and regulatory aspects of space mining operations are being dealt with. There was one instance, though, when Luxembourg and Japan in a joint press statement said, “The exchange of information may cover all the issues of the exploration and commercial utilization of space resources, including legal, regulatory, technological, economic, and other aspects.”[xlix] Whether such legalisation is truly legal is arguable. Space Mining: Legal or Not? The Outer Space Treaty (OST) of 1967, considered the global foundation of the outer space legal regime, along with the other four associated international instruments have provided the fundamental basis for outer space activities by prohibiting certain activities and emphasising aspects such as the “common heritage of mankind”. These agreements have been useful in highlighting the global common nature of outer space. At the same time, however, they have been insufficient and ambiguous in providing clear regulations to newer space activities such as asteroid mining. Based on the premise of ‘res communis’, the magna carta of space law, the OST, illustrates outer space as “the province of all mankind”.[l] Under Article I, States are free to explore and use outer space and to access all celestial bodies “on the basis of equality and in accordance with international law.”[li] Although the OST does not explicitly mention “mining” activities, under Article II, outer space including the Moon and other celestial bodies are “not subject to national appropriation by claim of sovereignty” through use, occupation or any other means.[lii] Furthermore, the Moon Agreement, 1979, not only defines outer space as “common heritage of mankind” but also proscribes commercial exploitation of planets and asteroids by States unless an international regime is established to govern such activities for “rational management,” “equitable sharing” and “expansion of opportunities” in the use of these resources.[liii] Slipping conveniently through the loophole in the OST, both the US and Luxembourg have authorised companies to claim exclusive ownership over extracted resources (but not of the asteroid itself). Proponents argue that since no sovereign nation is actually asserting rights over an area of outer space, instead, it is only a private unit claiming rights over singular resources, the treaty norm, “national appropriation by claim of sovereignty”, is not being violated. In the words of renowned space lawyer, Frans von der Dunk, “In terms of the law, yes it’s true that no country can claim any part of outer space as national territory — but that doesn’t mean private industry can’t mine resources.”[liv] Quoting reference from maritime law, Luxembourg regards space resources as appropriable akin to fish and shellfish, but celestial bodies and asteroids are not, just like the high sea. It is noteworthy that out of the only 18 nations that have ratified the Moon Agreement,[lv] none are major spacefaring nations, thereby giving themselves a convenient leeway to not abide by the same. These unilateral initiatives have set off a critical response from the international community. Applying literal interpretation of the OST, there is certainly room to construe that space mining may be legal, compared to the Moon Agreement whose prohibition is absolute. However, taking into consideration the letter and spirit of the OST, strengthened by the Moon Agreement, the argument that “national appropriation” only extends to appropriation of territory and not appropriation of resources is a far reach. That resource extraction is contemplated, albeit implicitly, in the OST, is nothing but logical. Not only have such claims of possessory rights not been recognised in the past, there is also global consensus regarding its illegality.[lvi] It therefore forms a part of customary international law, despite the Moon Agreement not having been widely ratified. In this light, the legalisation of space mining is a sheer violation of the elemental principles of international space law. Yet, there is no clarity on what activity is allowed and what is prohibited in outer space under the existing law.[lvii] There is ambiguity around most issues—from “who would license and regulate asteroid mining operations” to the legality of these activities as per the existing international space law.[lviii] When comparing it to the law of the seas, resource appropriation in the high seas and deep seabed is governed by the United Nations Convention on the Law of the Sea (UNCLOS), 1982, and that in Antarctica, as per the Protocol on Environmental Protection to the Antarctic Treaty, 1991. While the former is strictly regulated under Part XI of UNCLOS, the latter is completely forbidden but for scientific purposes. The law of the sea argument—“owning the fish, not the sea”—cannot be applied to outer space primarily because fish are living resources that can reproduce and therefore are renewable. Outer space resources, on the other hand, are depletable: once harvested, they cannot be replenished. The analogy with fish and seas, therefore, is not a fair one and its transposition to outer space and celestial bodies would be inaccurate. Perhaps a more comparable regime is the deep seabed, which contemplates property rights over mineral extraction. The utilisation and ownership of the deep seabed’s resources are exclusively structured around the International Seabed Authority (ISA), which is responsible for organising, carrying out and controlling all activities in the seabed.[lix] Not only must State parties seek sanction from the ISA before beginning resource exploitation, but the fiscal benefits from seabed mining must also be shared among all.[lx] Evidently, even the UNCLOS upholds State ownership and fair distribution over individual ownership and self-centred gains.[lxi] By allowing private ownership, the US and Luxembourg are once again in contravention of the very same law they are relying on. The touchstone principle, “province of all mankind” is also being defeated. Therefore, to even reap the limited benefits as under UNCLOS, at least the derivation must be made alike. This argument too falls flat. The Way Ahead Undoubtedly, growing technological adeptness has made space mining inevitable and, therefore, the question is no longer “if” but “when”. Nevertheless, a scenario where companies can, solely based on domestic laws, steadily exploit mineral resources in outer space, would be universally unacceptable. Minus regulations, the realisation of space exploitation will create great disparity between nations and disrupt dynamics of the world economy. Regulations are particularly important in the context of the space debris problem. We definitely do not wish for a future, befittingly described by renowned engineer and inventor Graham Hawkes, thus: “Space exploration promised us alien life, lucrative planetary mining, and fabulous lunar colonies. News flash, ladies and gents: Space is nearly empty. It’s a sterile vacuum, filled mostly with the junk we put up there.”[lxii] Therefore, it is extremely important that resource appropriation is carried out in an ethical manner, without interrupting safe and secure access to outer space, simultaneously allowing all countries a share in the proceeds. Technological advances and financial readiness are pushing both, states and non-state players towards new ventures in outer space. Yet, the rules of engagement especially dealing with the new commercial activities are far from ideal. There is a clear and urgent need to debate and come up with either a new regulation or accommodate the space mining activities within the existing international legal measures. Experts have articulated that these could possibly be addressed under the existing property law principles or old mining law principles.[lxiii] However, given the scale of activities that states and non-state parties will engage in, the ability of the existing regime to address space mining could be highly inadequate. The second option would be to develop a new instrument including an institutional architecture that would set out the parameters for activities related to resource extraction and space mining. Since there are a good number of commercial players playing a formidable role in asteroid mining, there has to be space for commercial players in the new gig, which might be a big departure from the earlier era institutions that saw states being the sole authority in regulating activities in outer space. A clear role for commercial players has been articulated for some time but the global space community has yet to reach a consensus in how they can be incorporated into the global governance debates. The apprehension on the part of a number of states is driven by the fact that private sector participation is still largely a western phenomenon. This trend may be undergoing change in other parts of the world but until there is a sizeable private sector community in other major spacefaring powers, there is a fear that the western bloc of countries may stand to gain from the industry being represented in the global governance debates. A third possible option is to get a larger global endorsement of the Moon Treaty, which highlights the common heritage of mankind. The Moon Treaty is important as it addresses a “loophole” of the OST “by banning any ownership of any extraterrestrial property by any organization or private person, unless that organization is international and governmental.”[lxiv] But the fact that it has been endorsed only by a handful of countries makes it a “failure” from the international law perspective.[lxv] Nevertheless, efforts must be made to strengthen the support base for the Moon Agreement given the potential pitfalls of resource extraction and space mining activities in outer space. Signatories to the Moon Treaty can take the lead within multilateral platforms such as the UN to debate the usefulness of the treaty in the changed context of technological advancements and new geopolitical dynamics, and potentially find compromises where there are disagreements. Pursuing a collective approach is ideal. An example is UNCLOS, which demonstrates that the international society possesses the capability of regulating mining quarters deemed to be the “province of mankind”. However, a sui generis legal framework must be crafted because the difference between the marines and outer space and their resources is wide, and the regulations are too region-specific to permit a superimposition of the oceanic regime to outer space. A sound legal environment will protect both the company performing operations and its beneficiaries, while ensuring even-handed resource allocation. In addition, regulations spelling out safety standards and identifying safety zones around mining operations could be useful in ensuring safe and secure operations in outer space. It would be wrong, however, to say that the international community has not debated over this. In fact, one of the main agenda points of the fifty-seventh session of UNCOPUS Legal Committee held in April 2018, was especially devoted to “general exchange of views on potential legal models for activities in the exploration, exploitation and utilization of space resources.”[lxvi] Upon evaluation, it is clear that countries are not against space mining as such; rather the contentious points are vis-à-vis authorisation, regulation, and where to place responsibility. There also appears to be concurrence regarding the need for international coordination efforts of some sort. Over the last two years, The Hague Space Resources Governance Working Group,[lxvii] established with the purpose of “assess[ing] the need for a regulatory framework for space resource activities, has identified 19 “building blocks”,[lxviii] encompassing subject matters that could be included in such a regulatory framework. Although this leaves a lot of hope for the legitimate mining of space resources, its status is still pending. Also, several questions need to be agreed upon by the global space policy community before the establishment of a framework. First, there must be an agreement among all the space powers on the need for a global governance framework for the use of space resources. This must be followed by detailed deliberations on the scope, mandate and objectives of such a framework. Can and should there be safety zones and exclusive rights be recognised under such a framework and how one can ensure equitable sharing of the resources, and lastly, the role of industries and how the interests of the industry as pioneers in this area can be secured. These are all pertinent questions that need to be considered and debated before an international regime for extraction and use of space resources can be established.[lxix] Even legal space mining activity could have serious impacts in two ways. For instance, any technological spinoffs that a country might have could add to the space weaponisation debate. Two, the erosion of norms with regard to space mining could have a cascading effect on other norms in the same issue area such as weaponisation of space. It is imperative for nations to actively combine their efforts to ensure that this activity transpires in the most globally acceptable manner and not one which stirs anarchism. The ancient Roman maxim, ‘Quod omnes tangit ab omnibus approbatur’ (What touches all must be approved by all) gains due traction in this kind of a scenario. Therefore, a universal activity like space exploration mandates an international guideline; or else, the first haul from mining, instead of earning admiration and exultation, will only be enmeshed in litigation.

### Advantage – US/Russia

#### Russo-US relations suck—we’re on the brink of Putin bombing all our space tech to oblivion.

Koffler 11-17[Rebekah Koffler is a former Defense Intelligence Agency officer and author of “Putin’s Playbook: Russia’s Secret Plan to Defeat America.”, Opinion, 11-17 2021,WSJ,https://www.wsj.com/articles/space-armageddon-and-putins-threats-to-ukraine-russia-antisatellite-weapon-11637183651, 12-15-2021 amrita]

**Russia successfully conducted a test** in which a direct-ascent missile destroyed a nearly 40-year-old defunct Soviet spy satellite, U.S. Space Command announced Monday. This unsettling development is noteworthy because it coincides with Russia’s massive military buildup along the Ukrainian border. Moscow’s pre-positioning of more than 100,000 soldiers, tanks and heavy weaponry has spurred the Pentagon’s concerns about a possible Russian invasion of Ukraine. **Moscow’s posturing on what the Russians call a “space weapon” signals a rapidly escalating crisis in U.S.-Russia relations**. Washington’s foreign policy and Moscow’s view of its national interests are on a geopolitical collision course. Russia views the formerly Soviet Ukraine as part of its strategic security perimeter, on which Moscow has relied for centuries as a geographical buffer against foreign invasion. President Vladimir Putin has repeatedly said the U.S. is crossing a red line by attempting to pull Ukraine out of Russia’s orbit. In April, at his annual address to the Russian Parliament, Mr. Putin threatened a “swift, asymmetric and harsh response,” if the U.S. and the North Atlantic Treaty Organization intervene on Ukraine’s behalf. A trained intelligence operative, Mr. **Putin maintains strategic ambiguity** regarding what U.S. action precisely would constitute the crossing of Moscow’s red line with regard to former Soviet states, such as Ukraine. Ukraine’s admission into the European Union and NATO would almost certainly be unacceptable to the Kremlin. Mr. Putin is prepared to fight a war against the West to prevent this from happening. But how could Russia win a war against a much stronger adversary? That’s where Monday’s antisatellite test comes in. It’s a preview of Mr. Putin’s Space Armageddon strategy. **Russian strategists have observed** American **war fighters’ tactics in conflict zones** for nearly a quarter-century—in Kosovo, Iraq, Afghanistan, Libya and Syria. They **learned that America’s** superior **space capability is its Achilles’ heel** because of the U.S. military’s near-total dependence on it. Many civilian drivers would be lost without directions from their smartphones. **U.S. troops in war zones rely on the same constellation of 31 GPS** satellites for tasks like synchronizing operations, pinpointing targets and locating personnel. Moscow therefore seeks to deafen and blind U.S. forces in conflicts. By attacking U.S. satellites, the Russians would attempt to offset superior U.S. conventional firepower. They also hope to paralyze U.S. forces psychologically by rendering them helpless. Russian military theorists often write about the importance of targeting both the technical capabilities and the mind of an adversary, planning to disorganize its troops and weaken their will to fight. This is the essence of Mr. Putin’s asymmetric approach to warfare. Moscow believes it can win an all-out space war with America, which stands to lose a lot more since its entire society, from ATMs to home offices, is connected via satellites. Alarmingly, Washington is as unprepared for Mr. Putin’s star wars as it was for Russia’s determination to wage cyberwarfare. Monday’s test executed only a single page out of Mr. Putin’s playbook, which includes lasers, jammers and other satellite killers. Before the situation in Ukraine escalates into war, the **Pentagon** had **better develop a strategy to counter** Mr. **Putin**’s plan for Space Armageddon.

#### American private appropriation of outer space is a core issue that tanks our relations- specifically asteroid mining.

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U.S. Commercial Space Launch Competitiveness Act of 2015 (“Space Act”): The Dawn of the Second Space Age **Until recently, it did not matter that the OST was unclear**, and the Moon Treaty failed to garner support. Space exploration remained the province of state actors like NASA because the sheer expense of rocketry and other technologies remained beyond the reach of private corporations and investors throughout the twentieth century.61 However, over the last two decades the industry has changed rapidly. **In the U**nited **S**tates alone, several of the most **innovative companies have invested in space exploration tech**nology.62 As the research accelerates, costs have decreased, and the potential for profits is tremendous – in 2018 the space economy was $360 billion.63 By 2040, its estimated worth is anywhere between $1.1 trillion and $1.7 trillion.64 However, investors demand certainty, and the uncertainty surrounding OST interpretation was reason to pause.65 After all, no investor or company wanted to pour millions, or even billions, into a company designed to mine liquid ice on the Moon only to discover that this violated international law and that the United States had decided to stop licensing such ventures. Just as President Eisenhower feared, the military-industrial complex, augmented by private industry, lobbied Congress heavily to reduce regulatory hurdles and legal uncertainty in space investment.66 In 2015, their efforts bore fruit **when Congress passed the Space Act**, which President Obama signed into law.67 Chapter 513 of Subtitle V – “Space Resource Commercial Exploration and Utilization” – was the shift **that enabled the** American **private** space **industry to flourish**. This **affirmed tha**t American **citizens could own and sell any “space resources”** that were **obtained through “commercial recovery**.”68 In one stroke, **Congress guaranteed property rights to American** citizens and **companies on a “first come, first served basis.”**69 Moreover, American courts would not permit foreign lawsuits accusing entrepreneurs and businesses of violating the OST.70 The law also required the executive branch to “discourage government barriers” to development and for regulation to “facilitate commercial utilization” in space.71 Finally, it required the President to promote the interest of the American space industry.72 Ever wary of the ambiguities of the OST, and likely out of concern that the Space Act might violate the treaty, the law included a disclaimer that it was the sense of Congress that nothing in the Space Act asserted American sovereignty over any celestial body.73 This disclaimer should be read as opinio juris of American interpretation of the OST. In 1967, the United States and the Soviet Union shared a concern that other nations would challenge their technological preeminence in space.74 In 2015, this proved no different, except, this time, the United States was alone in its preeminence. **Russia**, in fact, **strongly objected and claimed that the Space Act violated i**nternational **law.**75 Russia **submit**ted **an objection to** the United Nations Committee on the Peaceful Uses of Outer Space (“**COPUOS**”), claiming the Space Act demonstrated “total disrespect for international law order [sic].”76 **Russia** went on to **declare that this law manifested a “doctrine of domination in outer space**.”77 Nonetheless, a careful reading of Russia’s complaint to COPUOS elucidates that Russia never actually asserted that the United States violated the OST.78 To be sure, **Russia came as close as possible** to this, but never outright said it.79 Indeed, the Russians lag behind in investment in outer space and technology and fear American exploitation of space’s vast resources in space without their participation.80 American private investment has accelerated this gap with NASA paying companies like SpaceX $55 million per seat to ferry astronauts to the ISS instead paying the Russians more than $90 million to do the same.81 In fact, in its objection to the Space Act, **Russia stated that the U**nited **S**tates “**could propose** discussing the possibility to reach **uniform understanding** of the status of resources and set forth the structure of the doctrine that would include safety and security aspects.”82 It seems Russia is pining for its prior role of crafting space law with the United States. This also suggests that if Russia had the same capabilities as the United States, its policy would likely be comparable.83

#### US asteroid mining pushes Russia to do the same despite it violating international law- increases the likelihood for tensions to escalate.

Mallick and Rajagopalan 19 [Senjuti Mallick and Rajeswari Pillai Rajagopalan, If space is ‘the province of mankind’, who owns its resources?, 1-24-2019,ORF,https://www.orfonline.org/research/if-space-is-the-province-of-mankind-who-owns-its-resources-47561/, 12-16-2021 amrita]

Meanwhile, **a few other countries**—**which have been critical of the US and** Luxembourg, **at the forefront of** the **space mining** efforts—**have** also **decided to join** the field. **The increasingly competitive and contested nature** of outer space activities is spurring major spacefaring nations to **push the boundaries in** their **space exploration**. **Asteroid mining** could possibly become the next big thing and **is** already **seeing a race** among the space powers. The US and Luxembourg are at the forefront in space resource extraction in terms of the policy frameworks and funding.[xxxvi] **Even as the US has clarified that the** US Space **Act** 2015 **is** being **misunderstood** and that there is no change in the US policy towards national appropriation of space, **the reality** is that it has already **spurred a** major **debate**.[xxxvii] China and Russia are among those countries that are following on the path of the US and Luxembourg in undertaking mining missions in space. According to media reports, Ye Peijian, chief commander and designer of China’s lunar exploration programme has stated that China would send the first batch of asteroid exploration spacecraft around 2020.[xxxviii] Speaking to China’s Ministry of Science and Technology-run newspaper, Science and Technology Daily, Ye said that these asteroids have a high concentration of precious metals, which could rationalise the huge cost and risks involved in these activities as their economic value could run into the trillions of US dollars. Therefore, extraction, mining and transporting them back to Earth through robotic equipment will be a significant activity. Chinese scientists are working on missions to “bring back a whole asteroid weighing several hundred tonnes, which could turn asteroids with a potential threat to Earth into usable resources.”[xxxix] Ye was also quoted as saying that China has plans of “using an asteroid as the base for a permanent space station.”[xl] Helium mining on the moon is also part of China’s goals.[xli] **Russia,** for its part, **is** also **responding to the space-mining developments** of the last decade. For one, it plans to have a permanent lunar base somewhere between 2015 and 2020 for possible extraction of Helium.[xlii] **Even as** Russia’s **official position** on asteroid mining **is that it is forbidden** under the 1967 OST—which states that space is the “province of mankind”—the Russian **industry players** are of the view that they **must follow the** lead taken by the **US** and Luxembourg.[xliii] In early 2018, the director of the Scientific-Educational Center for Innovative Mining Technologies of the Moscow-based National University of Science and Technology MISIS (NUST MISIS), Pavel Ananyev, spoke about the Russian ambitions and proposed activities including space drilling rigs, water extraction on the Moon and 3D printers at space stations.[xliv] **Russia’s private space companies** including Dauria Aerospace, one of the first Russian private space companies, also **hold the opinion that they must go forward** in the same direction and call for a larger space to private sector to engage in extracting space resources.[xlv] **Moscow may not have** yet **actively pursued space mining** and resource extraction, **but it is likely to pick up pace** in the coming years alongside global efforts. Moscow clearly has a capacity gap in terms of funding because its earlier plans to have a permanent base in the Moon by 2015 is yet to happen.

#### Rocky relations with Russia on space issues cause China-Russian alliances—a recommitment is needed.

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The Artemis **Accords are a culmination of American space policy to enable commercialization** of outer space. However, they pose a variety of problems. To start, any future agreements under the accords **may violate** international law – both **the OST** and the VCLT. While the Trump Administration appears willing to ignore this issue, violating international law **is a dangerous precedent and should be avoided**.118 Further, the dual nature of all space technology means that **any commercial activity in space** that the Artemis Accords enable **could** readily **be converted for belligerent purposes**.119 This would both violate international law and threaten national security. Despite these inherent dangers, the **Trump** Administration has **maintained a bellicose rhetoric** on its space policy.120 Although American technology and investments surpass those of Russia and China, such rhetoric serves **to inflame** already **tense relations.** **Russia and China are** each **pursuing** their own space **programs which threaten national security** interests, but the United States has engaged neither in Artemis Accords diplomacy.121 A. Violations of International Law? **At best**, future Artemis Accords agreements **exist in a gray area** of international law. After all, the Moon Treaty failed to update and clarify the gaps in the OST on space exploration and resource exploitation by non-state actors. The Space Act and the Artemis Accords together represent American state practice and opinio juris as to the meaning of the OST. At worst, the Trump Administration would be blatantly and knowingly violating international law, in particular the ban on national appropriation. Certainly, the Artemis Accords **signal a willingness to push i**nternational **law to the limit**, if not to step over the line. In addition to potentially violating the OST, the Artemis Accords may also violate the VCLT. Though the United States has not ratified the VCLT, the “treaty on treaties” is customary international law and thus binding on all states. Article 41 of the VCLT permits two or more parties to a treaty to make bilateral, inter-se agreements or to modify a treaty among themselves.122 Yet, if these side deals are “incompatible with the effective execution of the object and purpose of the treaty as a whole” then the VCLT forbids them.123 NASA made clear that bilateral Artemis Accords agreements with other nations will be “grounded in the Outer Space Treaty” and that resource utilization will be conducted under the “auspices of the Outer Space Treaty.”124 Therefore, the United States appears ready to create bilateral, inter-se agreements every time it signs an Artemis Accords agreement. **Because Article II** of the OST clearly **bans national appropriation, licensing non-state actors** to create mining colonies on the Moon in safety zones **verges on appropriation**, especially when coupled with Article VI’s responsibility clause based on national activity.125 Overall, the Administration advances on very uneven legal footing, which is further **compounded by** the fact that **space tech**nologies **are** inherently **dual purpose**. B. Dual Purpose Any technology – from rocketry, to satellites, to mining equipment – introduced into space is inherently dual purpose. That is, it may readily be converted to military uses. The OST makes clear that nuclear weapons are prohibited in space. It also completely demilitarizes the Moon, under Article IV.126 However, military **personal may** **participate in** scientific research or other peaceful purposes – i.e., **commercial ones**.127 Hence, from a national security standpoint it would be legal for other rival nations, namely Russia and China, to create lunar bases or asteroid mines. But **should conflict arise, such tech**nology and infrastructure could readily **be turned hostile** and harnessed against American infrastructure in space. **This is troubling because for** a country like **China there is no** obvious **distinction between public and private** industry.128 And from China’s perspective, NASA is still teaming up with SpaceX in public-private partnerships and the DoD has many of similar agreements as well. In fact, in its 2020 Defense Space Strategy, the DoD proclaimed its eagerness to “[l]everage commercial technological advancements and acquisition processes.”129 An incident with Russia highlights the dangers of dual-purpose space technologies. On November 26, 2019, Russia launched what appeared to be a single satellite.130 Eleven days later the single satellite “birthed” a second.131 In mid-January the pair floated near KH-11, a multi-billion- dollar U.S. military reconnaissance satellite. The United States complained to Moscow, which moved the satellites away from KH-11. However, on July 15, 2020, the “birthed” satellite launched a missile into outer space. This is the first time the United States has alleged a space-based anti-satellite missile test.132 Although Russia claimed that the satellites are peaceful, it proved that even a so-called peaceful satellite could be secretly armed with military capabilities. Ironically, in a speech that same day to his counterparts in Brazil, India, China, and South Africa, Dmitry Rogozin, head of Russia’s space program, called for a “space free of weapons of any type, to keep it fit for long-term and sustainable use as it is today.”133 It requires little imagination to envision a Chinese or Russian base on the Moon doubling as a commercial mining post and as a secret military garrison. After all, when the Soviets feared American ICBM superiority and a first-strike capability in the early 1960s they chose to place missiles in Cuba.134 Nowadays, a similar dynamic exists, with the US enjoying a comparable advantage. C. Bellicose American Rhetoric The Trump Administration has provided mixed signals to rivals about American intentions in outer space. In 2017, Vice President Mike Pence declared that “America must be as dominant in the heavens as it is on Earth.”135 Citing the fear that Sputnik instilled in Americans, Pence later warned that Russia and China were racing to pass the United States in space technology, especially with respect to the military.136 In its 2020 Defense Space Strategy, the DoD pronounced, “China and Russia present the greatest strategic threat due to their development, testing, and deployment of counterspace capabilities and their associated military doctrine for employment in conflict extending to space.”137 More modestly, however, Stephen Kitay, Deputy Assistant Secretary of Defense for Space Policy, made clear that the United States is still superior in space capabilities; however, the gap is rapidly diminishing.138 Still, this rhetoric is somewhat misleading. American public investment in space dwarfs Russian and Chinese investments combined: in 2018, the United States invested $41 billion whereas China invested $5.8 billion, and Russia invested $4.2 billion.139 Moreover, this spending does not account for private investment in space. Unfortunately, this author has been unable to procure aggregate data on total U.S. private investment. However, for reference, Jeff Bezos has claimed he invests $1 billion each year of Amazon stock to finance Blue Origins.140 Elon Musk spent $100 million to found SpaceX in 2002.141 In 2019, the company raised $1.33 billion in three rounds of funding.142 Additionally, SpaceX has estimated its broadband satellite project, Starlink, will cost at least $10 billion to build and deploy.143 Finally, Bryce Technology reported that start up space ventures raised $5.7 billion in funding in 2019.144 Whatever the total number is, it is quite large and likely in the tens of billions a year. Russia and China simply do not have the same level of private investment. This is not to say that the Administration is wrong for taking foreign threats in outer space seriously. It should, precisely **because the Russians and Chinese take these threats seriously**. The **U**nited **S**tates **should not**, however, **start a space race** when it is already light years ahead of its rivals, **as this would** repeat the mistake of the first space race – **permit**ting **private industry**, which Eisenhower warned against, **to dictate** American **policy and** thereby **create a technocracy**.145 Naturally, this talk of competition begs the question, what do the Russians and Chinese actually want in outer space? D. Engagement with Russia and China? i. Russia **Russia has** strongly **rejected the** Artemis **Accords as a violation of** **i**nternational **law**.146 After the United States excluded Russia from the Artemis Accords, Dmitry Rogozin, Chief of Roscosmos, fumed, “The principle of invasion is the same, whether it be the Moon or Iraq. The creation of a ‘coalition of the willing’ is initiated. Only Iraq or Afghanistan will come out of this.”147 More recently, he called the Artemis Accords a “political project,” and compared it to NATO.148 When asked if Russia would partner with NASA on Artemis, Rogozin answered, “Frankly speaking, we are not interested in participating in such a project.”149 **Ominously**, Rogozin signaled **a Russian shift towards partnering with the Chinese**, “We respect their results…[China] is definitely our partner.”150 In a sign **of how quickly this partnership is forming**, just a few weeks later, Rogozin announced that he and the Director of the China National Space Administration, Zhang Kejian, had agreed to “probably” build a lunar research base together.151 On March 9, 2021, **Russia and China** signed an agreement to **build** **this base** together.152 This partnership is dripping with irony. Recall that, in 2016, Russia issued a complaint about the Space Act before COPUOS.153 But that complaint walked a fine line and never directly claimed that American resource exploitation in space violated the OST.154 Indeed, the Russians appeared more interested in signaling to the United States their interest in “discussing the possibility to reach uniform understanding of the status of resources and set forth the structure of the doctrine that would include safety and security aspects.”155 As discussed, the Russians care less about complying with international law than being able to shape it to suit their own interests. Though they may lack the level of investment and advanced technologies of the United States, they appear willing to join the Chinese who have a long-term plan to achieve space supremacy. Of course, **the creation of Russo-Chinese partnership** and system in space to challenge the Artemis Accords **would render** Rogozin’s **fear of NATO a self-fulfilling** prophecy.

#### A strong Sino-Russian alliance sets the stage for the replacement of the ILO and a new hegemonic era.

Kevin 3-25 [Tony Kevin, Russia and China are sending Biden a message: don't judge us or try to change us. Those days are over, 3-25-2021,Conversation,https://theconversation.com/russia-and-china-are-sending-biden-a-message-dont-judge-us-or-try-to-change-us-those-days-are-over-157771, 12-15-2021 amrita]

Putin’s message to the new US president The tense test of strength began when Biden was asked about Putin in an interview with ABC News’ George Stephanopoulos and agreed he was “a killer” and didn’t have a soul. He also said Putin will “pay a price” for his actions. Putin then took the unusual step of going on the state broadcaster VGTRK with a prepared five-minute statement in response to Biden**. In an unusually pointed manner, Puti**n recalled the US history of genocide of its Indigenous people, the cruel experience of slavery, the continuing repression of Black Americans today and the unprovoked US nuclear bombing of Hiroshima and Nagasaki in the second world war. He **suggested states should not judge others by their own standards:** Whatever you say about others is what you are yourself. Some American journalists and observers have reacted to this as “trolling”. It was not. It was the preamble to Putin’s most important message in years to what he called the American “establishment, the ruling class”. He said the US leadership is determined to have relations with Russia, but only “on its own terms”. Although they think that we are the same as they are, we are different people. We have a different genetic, cultural and moral code. But we know how to defend our own interests. And we will work with them, but in those areas in which we ourselves are interested, and on those conditions that we consider beneficial for ourselves. And they will have to reckon with it. They will have to reckon with this, despite all attempts to stop our development. Despite the sanctions, insults, they will have to reckon with this. **This is new** for Putin. He has **for years made the point**, always politely, **that Western powers need to deal with Russia on a basis of correct diplomatic protocols and mutual respect** for national sovereignty, if they want to ease tensions. But never before has he been as blunt as this, saying in effect: do not dare try to judge us or punish us for not meeting what you say are universal standards, because we are different from you. Those days are now over. **China pushing back against the US**, too Putin’s forceful statement is remarkably similar to the equally firm public statements made by senior Chinese diplomats to US Secretary of State Antony Blinken in Alaska last week. Blinken opened the meeting by lambasting China’s increasing authoritarianism and aggressiveness at home and abroad - in Tibet, Xinjiang, Hong Kong and the South China Sea. He **claimed** such **conduct was threatening “the rules-based order that maintains global stability**”. Yang Jiechi, Chinese Communist Party foreign affairs chief, responded by denouncing American hypocrisy. He said The US does not have the qualification to say that it wants to speak to China from a position of strength. The US uses its military force and financial hegemony to carry out long-arm jurisdiction and suppress other countries. It abuses so-called notions of national security to obstruct normal trade exchanges, and to incite some countries to attack China. He said the US had no right to push its own version of democracy when it was dealing with so much discontent and human rights problems at home. **Russia and China drawing closer together** Putin’s statement was given added weight by two diplomatic actions: Russia’s recalling of its ambassador in the US, and Foreign Minister Sergey Lavrov’s meeting in China with his counterpart, Wang Yi. Beijing and Moscow agreed at the summit to stand firm against Western sanctions **and boost ties between their countries to reduce** their **dependence on the US** dollar in international trade and settlements. Lavrov also said, We both believe the US has a destabilising role. It relies on Cold War military alliances and is trying to set up new alliances to undermine the world order. Though Biden’s undiplomatic comments about Putin may have been unscripted, the impact has nonetheless been profound. Together with the harsh tone of the US-China foreign ministers meeting in Alaska — also provoked by the US side — **it is** clear there has been **a major change** in the atmosphere of US-China-Russia relations. What will this mean in practice? Both Russia and China are signalling they will only deal with the West where and when it suits them. Sanctions no longer worry them. The two powers are also showing they are increasingly comfortable working together as close partners, if not yet military allies. They will step up their cooperation in areas where they have mutual interests and the development of alternatives to the Western-dominated trade and payments systems.**Countries** in Asia and further afield **are closely watching** the development of **this alternative international order**, led by Moscow and Beijing. And they **can also recognise** the **signs of increasing US econ**omic and political **decline**. It is a new kind of Cold War, but not one based on ideology like the first incarnation. It is **a war for international legitimacy**, a struggle for hearts and minds and money in the **very large part** of the world **not aligned to the US** or NATO. The US and its allies will continue to operate under their narrative, while Russia and China will push their competing narrative. This was made crystal clear over these past few dramatic days of major power diplomacy. **The global balance of power is shifting**, and for many nations, the smart money might be on Russia and China now.

#### That causes draw-in through great power wars—goes nuclear.

Forsyth and Mezzell 19 [Jim Forsyth is a Forsyth is the Dean of Air Command and Staff College Maxwell AFB and has a PhD in International Studies from the University of Denver, Ann Mezzell is an Assistant Professor in the Department of International Security, Through the Glass—Darker, Strategic Studies Quarterly , Vol. 13, No. 4, (WINTER 2019), pg. 24-26]

As the article argued in 2007, “technological shifts have continuously altered the methods of war,” but in the end, “political arrangements matter, and the deterrent effect of any weapon should be evaluated within the context of the structure of the international system.”20 This claim is as true now as it was then. Indeed, one might conclude that structure matters even more now than it did 10 years ago, given the shift to multipolarity.21 Under “lopsided” multipolarity—where the United States outweighs both China and Russia militarily—it will maintain power advantages on some fronts, but at smaller margins than it did during the unipolar moment when it reigned supreme. Power diffusion, and related great power competition concerns, will be governed by the continued growth of Asian economic and military clout predominantly from China and India and the relative decline of Western economic influence.22 As China continues to translate economic gains into military modernization, the US will “focus mainly on countering China.”23 Avoiding the perils of security competition will require that the US be more cautious about exercising its power abroad.24 Yet exercising diplomacy and restraint could prove to be challenging. Even scholars who adopt a more circumspect view of emerging multipolarity, and the implications of growing military-technological parity, acknowledge its underlying risks. Barry Posen, who questions the assumption that multipolarity is inherently unstable, nonetheless acknowledges that growing parity will only “mute” great power competition. The diffusion of power will not eradicate “great power adventures.”25 China’s rise is apt to entail alliance reconfigurations and temptations to employ conventional military power.26 In fact, just as the original article predicted, the United States and India, Russia and China, and France and Germany have taken steps toward tightening their security relationships. China’s progress toward narrowing its power gap with the US has already met with a return to US defense budget growth and the establishment of new US defense cooperation commitments—notably with India. In parallel, China and Russia have grown closer, with Presidents Xi Jinping and Vladimir Putin meeting three times in 2018 and China sending a “strong supporting contingent” to Russia’s Vostok-2018 military exercises.27 Given the complexities and uncertainties of multipolarity, the US arsenal of advanced conventional weapons (and those of other great powers) may not only prove ill suited to deterring great power war but also provide occasion for its inadvertent onset. The stealth, speed, and lethality of advanced conventional technologies—allowing for quick and decisive US victories in the Persian Gulf (1991), Kosovo (1999), and Afghanistan (2001)—have proven increasingly enticing to other great powers. Russia and China drew similar lessons from these conflicts, each embarking on military modernization programs geared toward antiaccess/area-denial (A2/AD) and grey zone strategies.28 Advanced conventional weapons already undergird Russia’s and China’s respective salami-slicing campaigns in Eastern Europe and the South China Sea. Russia began modernizing its military following its 2008 war with Georgia, enhancing its ground force readiness and updating its integrated air defense system. The improvements have allowed for significant defensive and force-projection gains (against border states).29 Though Russia has since dialed back modernization efforts in the wake of its economic downturn, China continues to seek avenues for undermining the United States’ conventional weapons edge. The People’s Liberation Army (PLA) still trails the United States in the areas of innovation and operational proficiency. Its modernization achievements, though—especially the development of intermediate-range missiles that threaten US forward bases and carrier strike groups—have substantially augmented China’s “advantage of proximity in most plausible conflict scenarios.”30 As great power rivals continue to chip away at the United States’ once considerable smart-weapons advantage, national security experts are reevaluating the viability of deterrence. On this front, the diffusion of capabilities, as well as the expansion of competition to the space and cyber domains, do more than complicate appraisals of the balance of power; they threaten to upend the foundations of deterrence.31 The arrival of dualcapable hypersonic weapons (and delivery systems)—currently being designed and tested by the US, China, and Russia—will arguably risk jeopardizing strategic stability. Their ultrahigh velocity could reduce warning time to the extent that “a response would be required on first signal of attack”; likewise, their deployment in ready-to-launch mode could trigger preemptive strikes, as others might perceive it as a sign of impending attack.32 Further, cyber weapons’ potential for disabling an opponent’s “early warning and command systems” may diminish the expected costs of first strike under crisis conditions.33 Autonomous weapons also have the potential to fundamentally alter the psychological underpinnings of strategy. And, as Kenneth Payne notes, there is no “a priori reason” to expect that substituting artificial intelligence (AI) for human intelligence—that rapid, accurate, and unbiased information processing and responses—“will necessarily be safer.” Because AI limits the risks of using force, it could make conflict more acceptable to risk-averse states; because its speed and precision favor the offense, it could prove more conducive to aggression than deterrence; and because it shapes a host of processes and technologies rather than a single weapon or system, its effects on strategy (and the challenges of its regulation) could prove counter to deterrence.34 As noted in the original article, nuclear weapons helped sustain the “cold peace” during the Cold War—not because of their awesome destructive power but because that awesome destructive power helped buttress bipolarity.35 The simplicity of bipolarity and superpower balancing, in turn, limited “the dangers of miscalculation and overreaction.”36 Multipolarity, though, makes for complexity; additional great power players provide additional opportunities for miscalculation and overreaction. Given these conditions and the perceived “usability” of advanced conventional weapons relative to nuclear weapons, it seems likely that they will fall short of yielding “the kinds of political structures necessary to enhance deterrence.”37 To counter Posen, the diffusion of advanced conventional technology may well have cheapened the near-term costs and risks of going to war, and particularly engaging in hybrid warfare. Even if the US manages to avoid a direct confrontation with Russia or China, it seems increasingly plausible that it could be dragged into a conflict involving one or more of their allies.

### Advantage – Collisions

#### Unregulated mining is existential and causes collisions – multiple scenarios

#### Scenario 1 is deflection

#### Unregulated mining causes asteroid deflection and astroterror

Drmola and Mareš 15 - Jakub Drmola is a PhD student and Miroslav Mareš professor, at the Divison of Security and Strategic Studies, Masaryk University, Czech Republic, "Revisiting the deflection dilemma", *Astronomy & Geophysics*, Volume 56, Issue 5, October 2015, Pages 5.15–5.18, <https://academic.oup.com/astrogeo/article/56/5/5.15/235650>

There are two basic ways to go about moving the resources contained within a given asteroid to the Earth. They can be extracted from the asteroid during its natural orbit and then transported to the Earth, or the entire asteroid might be moved closer to a more convenient location before starting mining. Thus repositioned, it might even be used as a shielded habitat, once hollowed out (Ostro 1999). There are different speculative costs and benefits associated with either option, which would vary with the size, orbit and composition of the asteroid. But, crucially, the second option would entail putting asteroids into orbit around the Earth, the Moon or possibly at one of the Earth’s Lagrangian points. Indeed, NASA has already planned a mission to capture a small asteroid and place it in a high cislunar orbit, where it would serve as a destination for future manned missions and experiments. This “Asteroid Redirect Mission” is to take place in the next decade and is being pitched mainly as a stepping stone towards a future mission to Mars (see box “NASA’s Asteroid Redirect Mission”; Brophy et al. 2012, Burchell 2014, Gates et al. 2015). Programmes to redirect asteroids and, especially, plans to mine asteroids on an industrial scale essentially resurrect the deflection dilemma. But it is no longer a matter of superpowers intentionally misusing technology designed to prevent dangerous impacts. It becomes an issue of proliferation among private entities. Once private mining companies acquire the technical ability to redirect suitable NEOs (Baoyin et al. 2011) in order to extract platinum or water from them, perilous inflections become more likely. The probability of accidents will rise with the number of asteroids whose trajectories we decide to manipulate. Such accidents might be very unlikely, but even a tiny technical or human error in the execution of an inflection meant to place an asteroid into the lunar or geocentric orbit might send it crashing into the Earth with potentially devastating consequences. And while we might find solace in the low probabilities associated with such an accident, even contemporary industries which are considered very safe suffer from unlikely tragedies. Despite being dependable and reliable, airliners do crash; there are a lot of them flying and very improbable accidents do happen if the dice are rolled often enough. Undoubtedly, we will not be steering as many asteroids as we steer planes any time soon, but industries tend to be more accident-prone during their infancy. Furthermore, a single asteroid can do a lot more damage than a single plane. And who is to say how much metal or water we are going to need in space over the course of the 21st century, or the next? The second source of risk is the intentional misuse, similar to the original deflection dilemma. But the entry barrier for asteroid weaponization gets much lower if mining them and moving them around becomes a common industrial activity. This is in stark contrast to the original scenario which envisioned this technology to be used solely for planetary defence and under control of a very small number of the most powerful countries (Morrison 2010). If such a powerful technology becomes widely and commercially available, even rogue states and wellfunded terrorist groups might be tempted to use it for an unexpected and devastating attack. In addition, an active asteroid mining industry would make it more difficult to detect any hostile inflection attempts among the number of legitimate and benign ones. Policy implications Considering these possible future dangers, it seems prudent to consider what to do about them sooner rather than later. The most obvious “solution” would be a blanket ban on the development of any technology that might lead to artificially inflected asteroids crashing into the Earth. However, such a ban would be incompatible with the dream of increased presence of humans in the solar system. It would stymie both scientific exploration and economic development here on Earth, which is increasingly dependent on precious metals and spacebased technologies. Furthermore, this approach would leave us more vulnerable to natural impacts which, in the long view, seems less than desirable. Another approach might be similar to the current regime of non-proliferation of nuclear weapons, aiming to support peaceful civilian use of nuclear power while at the same time prohibiting the spread of weapons of mass destruction. The regime mostly works (with caveats, see Wood et al. 2008) because these applications require different infrastructures and fissile materials enriched to different levels of purity. This makes it possible, at least in principle, to tell apart operations meant for the production of electricity and those designed to create weapons. Unfortunately, the difference between legitimate and hostile trajectory modification would lie only in the acceleration imparted on the asteroid and not in the technical means to do it. As the spacecraft launched with the intent to cause impact with the Earth might be identical to those sent off to retrieve resources, telling them apart would be nearly impossible, until it was too late. And this approach makes no difference to the chances of an industrial accident. If monitoring equipment on Earth is unhelpful, the focus changes to space. In other words, all asteroid movement missions should be constantly monitored. For an attacker, it would make most sense to delay the final course adjustment for as long as possible in order to give the least warning and make the timeframe for reaction as short as possible. So an asteroid might head towards a safe orbit fit for resource extraction for most of its altered flight time, but be further accelerated at the last possible moment onto an impact trajectory, perhaps mere days before it hits a major city. Our current programmes cataloguing NEOs (such as CSS or Pan-STARRS), which look for new, previously unknown objects, are not ideally suited for the task of constantly tracking a number of different, already known asteroids. New instruments would be needed to track them in order to immediately detect any hazardous inflection, whether intentional or accidental. Once such a detection is made, emergency measures to evacuate the population or, preferably, to “re-deflect” the incoming object can be executed right away, regardless of the cause. Accidents and hostilities could be treated the same way and countered by the same system (initially, at least). Such a system would be more akin to an air traffic control than a non-proliferation regulation, offering security through vigilance, rather than absence. Additionally, development of a system able to deflect incoming objects at relatively short notice would be beneficial in case of an impending natural impact. Conclusion Perhaps none of these concerns will become relevant. Maybe the idea of asteroid mining will soon fizzle out because we will discover cheaper and more efficient local alternatives. Maybe humanity will lose the will or the capability to explore space any further. Or perhaps manipulating asteroid trajectories will prove impractical or too costly. Certainly, it would not be the first time that a promising and seemingly obvious future does not come about. In the 1960s it seemed almost self-evident that by the second decade of the 21st century we would have flying cars and a base on the Moon. Yet we do not. Asteroid mining might be a similar case of unfulfilled promises and misplaced visions. On the other hand, there are examples of industries that developed surprisingly fast despite being considered unrealistic, not too long ago: air travel, nuclear power generation, or commercial satellites. The spread of the internet and the accompanying digital information revolution is another example; hardly anyone anticipated having virtually the entire repository of human knowledge at our fingertips at all times (except Douglas Adams). Whether the deflection dilemma forever remains an unmaterialized threat or it becomes a palpable problem, it is something to be mindful of now, as the foundations of the prospective asteroid mining industry are being laid. In the end, the purpose of this paper is not to predict the future. Instead it aims to merely update a conscientious warning which called for our diligence more than 20 years ago. While the world has changed somewhat, the basic idea remains valid. Whether the danger comes from warring superpowers, terrorists or negligent corporations, we must be aware of the realistic risks in order to avoid being either stumped by unforeseen catastrophes or paralysed by unwarranted fear. Either extreme would be harmful for our future.●

#### Major collisions cause extinction

Baum ’19 - executive director of the Global Catastrophic Risk Institute, Ph.D in Geography

Seth Baum, “Risk-Risk Tradeoff Analysis of Nuclear Explosives for Asteroid Deflection,” SSRN Scholarly Paper (Rochester, NY: Social Science Research Network, May 31, 2019), <https://papers.ssrn.com/abstract=3397559>.

The most severe asteroid collisions and nuclear wars can cause global environmental effects. The core mechanism is the transport of particulate matter into the stratosphere, where it can spread worldwide and remain aloft for years or decades. Large asteroid collisions create large quantities of dust and large fireballs; the fire heats the dust so that some portion of it rises into the stratosphere. The largest collisions, such as the 10km Chicxulub impactor, can also eject debris from the collision site into space; upon reentry into the atmosphere, the debris heats up enough to spark global fires (Toon, Zahnle, Morrison, Turco, & Covey, 1997). The fires are a major impact in their own right and can send additional smoke into the stratosphere. For nuclear explosions, there is also a fireball and smoke, in this case from the burning of cities or other military targets. While in the stratosphere, the particulate matter blocks sunlight and destroys ozone (Toon et al., 2007). The ozone loss increases the amount of ultraviolet radiation reaching the surface, causing skin cancer and other harms (Mills, Toon, Turco, Kinnison, & Garcia, 2008). The blocked sunlight causes abrupt cooling of Earth’s surface and in turn reduced precipitation due to a weakened hydrological cycle. The cool, dry, and dark conditions reduce plant growth. Recent studies use modern climate and crop models to examine the effects for a hypothetical IndiaPakistan nuclear war scenario with 100 weapons (50 per side) each of 15KT yield. The studies find agriculture declines in the range of approximately 2% to 50% depending on the crop and location.11 Another study compares the crop data to existing poverty and malnourishment and estimates that the crop declines could threaten starvation for two billion people (Helfand, 2013). However, the aforementioned studies do not account for new nuclear explosion fire simulations that find approximately five times less particulate matter reaching the stratosphere, and correspondingly weaker global environmental effects (Reisner et al., 2018). Note also that the 100 weapon scenario used in these studies is not the largest potential scenario. Larger nuclear wars and large asteroid collisions could cause greater harm. The largest asteroid collisions could even reduce sunlight below the minimum needed for vision (Toon et al., 1997). Asteroid risk analyses have proposed that the global environmental disruption from large collisions could cause one billion deaths (NRC, 2010) or the death of 25% of all humans (Chapman, 2004; Chapman & Morrison, 1994; Morrison, 1992), though these figures have not been rigorously justified (Baum, 2018a). The harms from asteroid collisions and nuclear wars can also include important secondary effects. The food shortages from severe global environmental disruption could lead to infectious disease outbreaks as public health conditions deteriorate (Helfand, 2013). Law and order could be lost in at least some locations as people struggle for survival (Maher & Baum, 2013). Today’s complex global political-economic system already shows fragility to shocks such as the 2007- 2008 financial crisis (Centeno, Nag, Patterson, Shaver, & Windawi, 2015); an asteroid collision or nuclear war could be an extremely large shock. The systemic consequences of a nuclear war would be further worsened by the likely loss of major world cities that serve as important hubs in the global economy. Even a single detonation in nuclear terrorism would have ripple effects across the global political-economic system (similar to, but likely larger than, the response prompted by the terrorist attacks of 11 September 2001). It is possible for asteroid collisions to cause nuclear war. An asteroid explosion could be misinterpreted as a nuclear attack, prompting nuclear attack that is believed to be retaliation. For example, the 2013 Chelyabinsk event occurred near an important Russian military installation, prompting concerns about the event’s interpretation (Harris et al., 2015). The ultimate severity of an asteroid collision or violent nuclear conflict use would depend on how human society reacts. Would the reaction be disciplined and constructive: bury the dead, heal the sick, feed the hungry, and rebuild all that has fallen? Or would the reaction be disorderly and destructive: leave the rubble in place, fight for scarce resources, and descend into minimalist tribalism or worse? Prior studies have identified some key issues, including the viability of trade (Cantor, Henry, & Rayner, 1989) and the self-sufficiency of local communities (Maher & Baum, 2013). However, the issue has received little research attention and remains poorly understood. This leaves considerable uncertainty in the total human harm from an asteroid collision or nuclear weapons use. Previously published point estimates of the human consequences of asteroid collisions12 and nuclear wars (Helfand, 2013) do not account for this uncertainty and are likely to be inaccurate. Of particular importance are the consequences for future generations, which could vastly outnumber the present generation. If an asteroid collision or nuclear war would cause human extinction, then there would be no future generations. Alternatively, if survivors fail to recover a large population and advanced technological civilization, then future generations would be permanently diminished. The largest long-term factor is whether future generations would colonize space and benefit from its astronomically large amount of resources (Tonn, 1999). However, it is not presently known which asteroid collisions or nuclear wars (if any) would cause the permanent collapse of human civilization and thus the loss of the large future benefits (Baum et al., 2019). Given the enormous stakes, prudent risk management would aim for very low probabilities of permanent collapse (Tonn, 2009). It should be noted that the severity of violent nuclear conflict could depend on more than just the effects of nuclear explosions, because the overall conflict scenario could include non-nuclear violence. Indeed, it is possible for the nuclear explosions to constitute a relatively small portion of the total severity, as was the case in World War II. 4.4 Risk of Violent Non-Nuclear Conflict Finally, it is necessary to discuss the risk of violent non-nuclear conflict. Only a small portion of violent non-nuclear conflicts are applicable, specifically the portion affected by nuclear weapons. More precisely, this section discusses non-nuclear conflicts involving one or more countries that possess nuclear weapons at some point during the lifetime of a nuclear deflection program. Nuclear deterrence theory predicts that nuclear-armed adversaries will not initiate major wars against each other because both sides could be destroyed in a nuclear war. However, the theory does permit limited, small-scale violent conflicts between nuclear-armed countries. These conflicts likely would not involve nuclear weapons. Indeed, nuclear deterrence may even make small violent conflicts more likely, because the countries know that neither side wants to escalate the conflict into major war. This idea is known as the stability-instability paradox: nuclear deterrence brings stability with respect to major wars but instability with respect to minor conflicts. Empirical support for the stability-instability paradox has been found by some research (Rauchhaus, 2009),while other research has found no significant effect of the possession of nuclear weapons on the probability of conflicts of any scale (Bell & Miller, 2015; Gartzke & Jo, 2009). If countries fully disarm their nuclear arsenals, such that they would never have nuclear weapons again, then there would be no nuclear deterrence to prevent the onset of major wars. A simple risk analysis could assume that the risk of major wars would be comparable to the risk prior to the development of nuclear weapons. The two twentieth century World Wars combined for around 100 million deaths in 50 years,13 suggesting an annualized risk of two million deaths. However, two World Wars do not make for a robust dataset. Indeed, the robustness of these two data points is called into question by historical analysis finding that both world wars might not have occurred in the reasonably plausible event that the 1914 assassination of Archduke Ferdinand had failed (Lebow, 2014). Similarly, another historical analysis finds that the U.S. and Soviet Union would probably not have waged major war against each other even in the absence of nuclear deterrence (Mueller, 1988). Furthermore, these past events are not necessarily applicable to the future conditions of a post-nuclear-disarmament world. To the best of the present author’s knowledge, no studies have analyzed the risk of major wars in a post-nucleardisarmament world.

#### Scenario 2 is satellite collisions

#### Mining creates space debris

Boley and Byers 20 (Arron, Department of Physics and Astronomy, University of British Columbia; Michael, Department of Political Science, University of British Columbia) U.S. policy puts the safe development of space at risk, SCIENCE, 9 Oct 2020, Vol 370, Issue 6513, pp. 174-175 <https://www.science.org/doi/full/10.1126/science.abd3402> EE

Mining can generate serious operational concerns. Lunar dust is a known challenge to operations on the Moon. Any surface activity could exacerbate lunar dust migration, including by lofting dust onto trajectories that cross lunar orbits, such as that of NASA's proposed Lunar Gateway (11). Moreover, without cooperation by all actors, the limited number of useful lunar orbits could quickly become filled with space debris.

On asteroids, low escape speeds will make it difficult to prevent the loss of surface material. Even if full enclosures are used, waste material may be purposefully jettisoned. Mining could also lead to uncontrolled outbursts of volatile sublimation after the removal of surface layers. Because the asteroids targeted for mining are likely to be those with small minimum orbit intersection distances, the resulting meteoroid debris streams could threaten lunar operations as well as satellites in Earth's orbit (12). In a worst-case scenario, a trajectory change resulting from mining could eventually lead to an Earth-impact emergency.

Space missions already provide some evidence of these risks. In 2019, during the course of Japan's Hayabusa2 mission, a small impactor was used to make a crater on (162173) Ryugu (13). Some of the resulting anthropogenic meteoroids could begin reaching Earth during the 2033 apparition. In 2022, NASA will test its ability to deflect an asteroid by striking (65803) Didymos B (Dimorphos) with the Double Asteroid Redirection Test spacecraft. This impact will produce anthropogenic meteoroids, with the possibility of immediate delivery to Earth (14). Although these risks are small, they demonstrate how easily human actions can change the near-Earth environment.

#### Space dust destroys spirals and exponentially accumulates through time, increasing the likelihood of collisions.

Intagliata 17 [Christopher Intagliata, 5-11-2017, "The Sneaky Danger of Space Dust," Scientific American, <https://www.scientificamerican.com/podcast/episode/the-sneaky-danger-of-space-dust/>]//DDPT

When tiny particles of space debris slam into satellites, the collision could cause the emission of hardware-frying radiation, Christopher Intagliata reports.

Aside from all the satellites, and the space station orbiting the Earth, there's a lot of trash circling the planet, too. Twenty-one thousand [baseball-sized chunks](https://www.scientificamerican.com/article/orbital-debris-space-fence/) of debris, [according to NASA](https://www.orbitaldebris.jsc.nasa.gov/faq.html). But that number's dwarfed by the number of small particles. There's hundreds of millions of those.

"And those smaller particles tend to be going fast. Think of picking up a grain of sand at the beach, and that would be on the large side. But they're going 60 kilometers per second."

Sigrid Close, an applied physicist and astronautical engineer at Stanford University. Close says that whereas mechanical damage—like punctures—is the worry with the bigger chunks, the dust-sized stuff might leave more insidious, invisible marks on satellites—by causing electrical damage.

"We also think this phenomenon can be attributed to some of the failures and anomalies we see on orbit, that right now are basically tagged as 'unknown cause.'"

Close and her colleague Alex Fletcher modeled this phenomenon mathematically, based on plasma physics behavior. And here's what they think happens. First, the dust slams into the spacecraft. Incredibly fast. It vaporizes and ionizes a bit of the ship—and itself. Which generates a cloud of ions and electrons, traveling at different speeds. And then: "It's like a spring action, the electrons are pulled back to the ions, ions are being pushed ahead a little bit. And then the electrons overshoot the ions, so they oscillate, and then they go back out again.”

That movement of electrons creates a pulse of electromagnetic radiation, which Close says could be the culprit for some of that electrical damage to satellites. The study is in the journal Physics of Plasmas. [Alex C. Fletcher and Sigrid Close, [Particle-in-cell simulations of an RF emission mechanism associated with hypervelocity impact plasmas](http://aip.scitation.org/doi/full/10.1063/1.4980833)]

#### An increase in space debris and dust from mining collides with key defense satellites

Scoles 15 Sarah Scoles [Freelance science writer, and a contributing writer at WIRED Science, with articles in places like Popular Science, the New York Times, Scientific American, Vice, Outside, and others.], 5-27-2015, "Dust from asteroid mining spells danger for satellites," New Scientist, <https://www.newscientist.com/article/mg22630235-100-dust-from-asteroid-mining-spells-danger-for-satellites/> DD AG

IF THE gold mine is too far from home, why not move it nearby? It sounds like a fantasy, but would-be miners are already dreaming up ways to drag resource-rich space rocks closer to home. Trouble is, that could threaten the web of satellites around Earth.

Asteroids are not only stepping stones for cosmic colonisation, but may contain metals like gold, platinum, iron and titanium, plus life-sustaining hydrogen and oxygen, and rocket-fuelling ammonia. Space age forty-niners can either try to work an asteroid where it is, or tug it into a more convenient orbit.

NASA chose the second option for its Asteroid Redirect Mission, which aims to pluck a boulder from an asteroid’s surface and relocate it to a stable orbit around the moon. But an asteroid’s gravity is so weak that it’s not hard for surface particles to escape into space. Now a new model warns that debris shed by such transplanted rocks could intrude where many defence and communication satellites live – in geosynchronous orbit.

According to Casey Handmer of the California Institute of Technology in Pasadena and Javier Roa of the Technical University of Madrid in Spain, 5 per cent of the escaped debris will end up in regions traversed by satellites. Over 10 years, it would cross geosynchronous orbit 63 times on average. A satellite in the wrong spot at the wrong time will suffer a damaging high-speed collision with that dust.

The study also looks at the “catastrophic disruption” of an asteroid 5 metres across or bigger. Its total break-up into a pile of rubble would increase the risk to satellites by more than 30 per cent (arxiv.org/abs/1505.03800).

That may not have immediate consequences. But as Earth orbits get more crowded with spent rocket stages and satellites, we will have to worry about cascades of collisions like the one depicted in the movie Gravity.

#### Laundry list of impacts – compromised communication, loss of military capability and more

Divorsky 15 George Divorsky [George P. Dvorsky (born May 11, 1970) is a Canadian bioethicist, transhumanist and futurist. He is a contributing editor at io9[1] and producer of the Sentient Developments blog and podcast. He was Chair of the Board for the Institute for Ethics and Emerging Technologies (IEET)[2][3] and is the founder and chair of the IEET's Rights of Non-Human Persons Program], 6-4-2015, "What Would Happen If All Our Satellites Were Suddenly Destroyed?," Gizmodo <https://gizmodo.com/what-would-happen-if-all-our-satellites-were-suddenly-d-1709006681> DD AG

Given these grim prospects, it’s fair to ask what might happen to our civilization if any of these things happened. At the risk of gross understatement, the complete loss of our satellite fleet would instigate a tremendous disruption to our current mode of technological existence—disruptions that would be experienced in the short, medium, and long term, and across multiple domains.

Compromised Communications

Almost immediately we’d notice a dramatic reduction in our ability to communicate, share information, and conduct transactions.

“If our communications satellites are lost, then bandwidth is also lost,” Jonathan McDowell tells io9. He’s an astrophysicists and Chandra Observatory scientist who works out of the Harvard-Smithsonian Center for Astrophysics.

McDowell says that, with telecommunication satellites wiped out, the burden of telecommunications would fall upon undersea cables and ground-based communication systems. But while many forms of communication would disappear in an instant, others would remain.

All international calls and data traffic would have to be re-routed, placing tremendous pressure on terrestrial and undersea lines. Oversaturation would stretch the capacity of these systems to the limit, preventing many calls from going through. Hundreds of millions of Internet connections would vanish, or be severely overloaded. A similar number of cell phones would be rendered useless. In remote areas, people dependent on satellite for television, Internet, and radio would practically lose all service.

“Indeed, a lot of television would suddenly disappear,” says McDowell. “A sizable portion of TV comes from cable whose companies relay programming from satellites to their hubs.”

It’s important to note that we actually have a precedent for a dramatic—albeit brief —disruption in com-sat capability. Back in 1998, there was a day in which a single satellite failed and all the world’s pagers stopped working.

The sudden loss of satellite capability would have a profound effect on the military.

The Marshall Institute puts it this way: “Space is a critical enabler to all U.S. warfare domains,” including intelligence, navigation, communications, weather prediction, and warfare. McDowell describes satellite capability as as the “backbone” of the U.S. military.

And as 21st century warfare expert Peter W. Singer from New America Foundation tells io9, “He who controls the heavens will control what happens in the battles of Earth.” Singer summarized the military consequences of losing satellites in an email to us:

Moreover, and as McDowell explains to io9, the loss of satellite capability would have a profound effect on arms control capabilities. Space systems can monitor compliance; without them, we’d be running blind.

“The overarching consideration is that you wouldn’t really know what’s going on,” says McDowell. “Satellites provide for both global and local views of what’s happening. We would be less connected, less informed—and with considerably degraded situational awareness.”

One great thing satellites have done for us is improve our ability to forecast weather. Predicting a slight chance of cloudiness is all well and good, but some areas, like India, Pakistan, and Bangladesh, are dependent on such systems to predict potentially hazardous monsoons. And in the U.S., the NOAA has estimated that, during a typical hurricane season, weather satellites save as much as $3 billion in lives and property damage.

There’s also the effect on science to consider. Much of what we know about climate change comes from satellites.

As McDowell explains, the first couple of weeks without satellites wouldn’t make much of a difference. But over a ten-year span, the lack of satellites would preclude our ability to understand and monitor such things as the ozone layer, carbon dioxide levels, and the distribution of polar ice. Ground-based and balloon-driven systems would help, but much of the data we’re currently tracking would suddenly become much spottier.

# Framework

**The standard is maximizing expected wellbeing.**

#### Utilitarianism respects the moral equality of individuals.

Philosopher Eric Rakowski explains. “Taking and Saving Lives.” Columbia Law Review. June 1993.

On one side**, it presses toward the consequentialist view that** **individuals' status as moral equals requires that the number of people kept alive be maximized.** Only in this way, the thought runs, can we give due weight to the fundamental equality of persons; **to allow more deaths when we can ensure fewer** is to **treat[s] some** people **as less valuable[.]** than others. Further,killing some to save others, or letting some die for that purpose**,** **does not entail that those who are killed** or left to their fate **are being used** merely **as means to** the well-being of **others, as would be true if they were slain** or left to drown merely **to please [other] people[.]** who would live anyway. They do, of course, in some cases serve as means. But they do not act merely as means. Those who die are no less ends than those who live**. It is because they are also no more ends than others whose lives are in the balance that an impartial decision-maker must choose to save the more numerous group[.], even if she must kill to do so.**