# JanFeb Korsgaard AC

#### I’ll defend the resolution as a general principle. I affirm that the appropriation of outer space by private entities is unjust.

### Framing

#### Ethics must begin apriori –

#### [A] Apriori Aposteriori Paradox – big bang proves our theory true – independent of material conditions there was some existence which necessitates objective truth absent material reality.

#### [B] Action theory – infinite division logically concludes from empiricism. i.e If I was brewing tea, I could break up that one big action into multiple small actions. Only our intention unifies these actions. If we were never able to unify action, we could never classify certain actions as moral or immoral.

#### [C] Constitutive Authority – reason is the only unescapable authority because to ask for why we should be reasoners concedes its authority since it uses reason – anything else is nonbinding and arbitrary.

#### [D] Naturalistic fallacy – experience only tells us what is since we can only perceive what is, not what ought to be.

#### That means we must universally will maxims— any non-universalizable norm justifies someone’s ability to impede on your ends.

#### Thus, the standard is consistency with the categorical imperative.

#### Prefer the standard:

#### [1] Only universalizable reason can effectively explain the perspectives of agents – that’s the best method for combatting oppression. First, frameworks all share equal value. Weighing between them becomes infinitely regressive as it presupposes there is a higher metric to determine who has the better justifications. That means contestation is vacuous which means a locus of moral duty is sufficient since it has an uncontested obligatory power.

Farr 02 Arnold Farr (prof of phil @ UKentucky, focusing on German idealism, philosophy of race, postmodernism, psychoanalysis, and liberation philosophy). “Can a Philosophy of Race Afford to Abandon the Kantian Categorical Imperative?” JOURNAL of SOCIAL PHILOSOPHY, Vol. 33 No. 1, Spring 2002, 17–32.

**One** of the most popular **criticism**s **of Kant’s moral philosophy is that it is too formalistic.**13 That is, the universal nature of the categorical imperative leaves it devoid of content. Such a principle is useless since moral decisions are made by concrete individuals in a concrete, historical, and social situation. This type of criticism lies behind Lewis Gordon’s rejection of any attempt to ground an antiracist position on Kantian principles. The rejection of universal principles for the sake of emphasizing the historical embeddedness of the human agent is widespread in recent philosophy and social theory. I will argue here on Kantian grounds that **although a distinction between the universal and the concrete is** a **valid** distinction, **the unity of the two is required for** an understanding of human **agency.** The attack on Kantian formalism began with Hegel’s criticism of the Kantian philosophy.14 The list of contemporary theorists who follow Hegel’s line of criticism is far too long to deal with in the scope of this paper. Although these theorists may approach the problem of Kantian formalism from a variety of angles, the spirit of their criticism is basically the same: The universality of the categorical imperative is an abstraction from one’s empirical conditions. **Kant is** often **accused of making the moral agent an abstract, empty**, noumenal **subject. Nothing could be further from the truth. The Kantian subject is** an embodied, empirical, concrete subject. However, this concrete subject has a dual nature. Kant claims in the Critique of Pure Reason as well as in the Grounding that human beings have an intelligible and empirical character.15 It is impossible to understand and do justice to Kant’s moral theory without taking seriously the relation between these two characters. The very concept of morality is impossible without the tension between the two. By “empirical character” Kant simply means that we have a sensual nature. We are physical creatures with physical drives or desires. **The** very **fact that I cannot simply satisfy my desires without considering the rightness** or wrongness **of my actions suggests that my empirical character must be held in check** by something, or else I behave like a Freudian id. My empiri- cal character must be held in check **by my intelligible character**, which is the legislative activity of practical reason. It is through our intelligible character that **we formulate principles that keep our** empirical **impulses in check.** The categorical imperative is the supreme principle of morality that is constructed by the moral agent in his/her moment of self-transcendence. What I have called self-transcendence may be best explained in the following passage by Onora O’Neill: In restricting our maxims to those that meet the test of the categorical imperative we refuse to base our lives on maxims that necessarily make our own case an exception. The reason why a universilizability criterion is morally signiﬁcant is that it makes our own case no special exception (G, IV, 404). In accepting the Categorical Imperative we accept the moral reality of other selves, and hence the possibility (not, note, the reality) of a moral community. **The Formula of Universal Law enjoins no more than that we act only on maxims that are open to others also.**16 O’Neill’s description of the universalizability criterion includes the notion of self-transcendence that I am working to explicate here to the extent that like self-transcendence, universalizable moral principles require that the individ- ual think beyond his or her own particular desires. The individual is not allowed to exclude others **as** rational **moral agents** who have the right to act as he acts in a given situation. For example, if I decide to use another person merely as a means for my own end I must recognize the other person’s right to do the same to me. I cannot consistently will that I use another as a means only and will that I not be used in the same manner by another. **Hence,** the **universalizability** criterion **is a principle of consistency and** a principle of **inclusion.** That is, in choosing my maxims **I** attempt to **include the perspective of other moral agents.**

#### [2] Performativity – freedom is the key to the process of justification of arguments. Willing that we should abide by their ethical theory presupposes that we own ourselves in the first place.

### Offense

#### [1] ETIs are mandated the same treatment under universal law – taking and commercializing their land violates their freedom and treats them as a mere means.

Brian Patrick Green 2014, Santa Clara University, "Ethical Approaches to Astrobiology and Space Exploration: Comparing Kant, Mill, and Aristotle," Scholar Commons, <https://scholarcommons.scu.edu/markkula/5/> //Jia

But to assume that Kant has not considered these questions is an enormous mistake. In 1755, quite early in his career, Kant published the book Universal Natural History and Theory of the Heavens, where he described the solar nebular hypothesis (now the accepted theory for how the solar system formed).4 More than that, Kant not only allowed that extraterrestrial intelligences might exist, he believed that if they did not yet exist, that someday they would,5 and that some of these ETIs would be inferior and some superior to humans in intelligence.6 One might wonder if the young Kant’s belief in ETIs continued into his older years, when he was writing on ethics. There is good evidence that it does. Writing his Foundations of the Metaphysics of Morals, 30 years after his work on the nebular hypothesis, Kant is explicit – he is not just discussing humans, but “all rational beings.” 7 So with respect deontology and extraterrestrial intelligent life, Case 1) on the chart, Kant would extend the same full dignity and respect to ETIs which humans owe to each other, in accord with his categorical imperative, which requires the universalizability of moral norms8 and treating all rational beings as ends in themselves.9 For deontology and non-intelligent life, Case 2), Kant argues that animals, as non-rational beings, are of only relative worth. They are not as ends in themselves, not persons, but things.10 If humans discovered non-intelligent life on other worlds (most likely microbes, but if larger then we would have to carefully evaluate what it means to be intelligent, and make sure the discovered life does not qualify), according to Kant, we could do with it as we pleased. While some contemporary moral philosophers have tried to reinterpret or rehabilitate Kant on animals, these works are developments of Kant’s philosophy; they are not his philosophy itself.11 So while Kantianism might be modifiable into a system which is more friendly towards the rest of the living world, without these modifications it is not. For non-life and Kantian deontology, Case 3), there is likewise a simple answer: nonliving things are just things. Non-living things are not a moral concern, they are merely instrumental, and as such intelligent creatures can treat these things as they wish. However, there is an odd exception to this conclusion which is worth mentioning (and which I note with a star in the table). Kant believed that if other planets were not yet inhabited, they someday would be. If this is the case, then what of planets currently without intelligent life but which may someday have it? Ought we to anticipate these intelligent creatures and therefore respect them proactively by respecting their prospective goods? Kant does not say (perhaps because he was not interested in speculating or because humans were, in his time, far from being in a position to affect the futures of these planets). However, given the importance of rational beings in Kant’s system (rationality, teleology, and morality are the purpose of universe) the answer is possibly, or even probably, yes.

#### [2] Space Exploration is non universalizable -

#### a). Entails that everyone leaves Earth which means that no one would be around to create the means to leave earth

#### b). Assumes all agents have access to the resources to fund a space trip, and is thus exclusionary.

Benjamin Segobaetso 2018, Project Officer at United Nations Association in Canada “Ethical Implications of the Colonization, Privatization and Commercialization of Outer Space.” https://ruor.uottawa.ca/bitstream/10393/38318/1/Benjamin\_Segobaetso\_2018.pdf?fbclid=IwAR2yROoOf\_np9HL97WmBB-xDUGSZnQrRPbvs2Gmo6V5NlyEFBoSLWxQFuV0 //Dulles VN

It can be argued through Kantian ethics that our record here on Earth paints a picture of neoliberal and capitalist policies with tendencies to favour the highest bidder at the exclusion of the under privileged and puts profit first at the expense of the environment. For Kantians, there are two questions that we must ask ourselves whenever we decide to act: (i) Can I rationally will that everyone act as I propose to act? If the answer is no, then we must not perform the action. (ii) Does my action respect the goals of human beings? Again, if the answer is no, then we must not perform the action. Kantian ethicists would argue that extending to space neoliberal and capitalist policies is immoral because these systems create economic disparities and life threatening environmental injustices; therefore, they are set up in a way that we could 16 not rationally will everyone to act the way they act either here on Earth or in space. Also, Kantian ethicists would ask whether the action of extending neoliberal and capitalist policies to space would respect the goals of extra-terrestrial intelligent life if any rather than merely using them for humans’ own purposes? If the answer is no, then the participating agent must not perform the action. Kant wrote on the possible existence of extra-terrestrial intelligent species in the final pages of the last book that he published, Anthropology from a Pragmatic Point of View [Anthropologie in pragmatischer Hinsicht] (1978). In this publication, Kant hinted that the highest concept of the Alien species may be that of a terrestrial rational being [eines irdischen vernünftigen ]; however, he argued that it will be difficult to describe its characteristics because there is no knowledge available of a non-terrestrial rational being [nicht irdischen Wesen] which could be used as a reference in regards to its properties and ultimately classify that terrestrial being as rational. This dilemma will continue until extraterrestrial intelligent life is discovered because comparing two species of rational beings has to be on the basis of experience, but that experience has not been possible yet (Kant, 237-238).

### Advantage: Substainable Space

#### Private Space Industry showing enormous increase in launches – that causes pollutants and warming.

Gammon 21 Katharine Gammon 7-19-2021 "How the billionaire space race could be one giant leap for pollution" <https://www.theguardian.com/science/2021/jul/19/billionaires-space-tourism-environment-emissions> (I’m an award-winning independent science journalist based in Santa Monica, California. My interests range from culture and nature in public lands to the lives of scientists to the complexity of baby brains. Before I became a professional journalist, I served in the Peace Corps in Bulgaria, and attended MIT and Princeton University.)//Jia Recut

Last week Virgin Galactic took Richard Branson past the edge of space, roughly 86 km up – part of a new space race with the Amazon billionaire Jeff Bezos, who aims to make a similar journey on Tuesday. Both very wealthy businessmen hope to vastly expand the number of people in space. “We’re here to make space more accessible to all,” said Branson, shortly after his flight. “Welcome to the dawn of a new space age.” Already, people are buying tickets to space. Companies including SpaceX, Virgin Galactic and Space Adventures want to make space tourism more common. The Japanese billionaire Yusaku Maezawa spent an undisclosed sum of money with SpaceX in 2018 for a possible future private trip around the moon and back. And this June, an anonymous space lover paid $28m to fly on Blue Origin’s New Shepard with Bezos – though later backed out due to a “scheduling conflict”. But this launch of a new private space industry that is cultivating tourism and popular use could come with vast environmental costs, says Eloise Marais, an associate professor of physical geography at University College London. Marais studies the impact of fuels and industries on the atmosphere. When rockets launch into space, they require a huge amount of propellants to make it out of the Earth’s atmosphere. For SpaceX’s Falcon 9 rocket, it is kerosene, and for Nasa it is liquid hydrogen in their new Space Launch System. Those fuels emit a variety of substances into the atmosphere, including carbon dioxide, water, chlorine and other chemicals. The carbon emissions from rockets are small compared with the aircraft industry, she says. But they are increasing at nearly 5.6% a year, and Marais has been running a simulation for a decade, to figure out at what point will they compete with traditional sources we are familiar with. “For one long-haul plane flight it’s one to three tons of carbon dioxide [per passenger],” says Marais. For one rocket launch 200-300 tonnes of carbon dioxide are split between 4 or so passengers, according to Marais. “So it doesn’t need to grow that much more to compete with other sources.” Right now, the number of rocket flights is very small: in the whole of 2020, for instance, there were 114 attempted orbital launches in the world, according to Nasa. That compares with the airline industry’s more than 100,000 flights each day on average. But emissions from rockets are emitted right into the upper atmosphere, which means they stay there for a long time: two to three years. Even water injected into the upper atmosphere – where it can form clouds – can have warming impacts, says Marais. “Even something as seemingly innocuous as water can have an impact.” Closer to the ground, all fuels emit huge amounts of heat, which can add ozone to the troposphere, where it acts like a greenhouse gas and retains heat. In addition to carbon dioxide, fuels like kerosene and methane also produce soot. And in the upper atmosphere, the ozone layer can be destroyed by the combination of elements from burning fuels. “While there are a number of environmental impacts resulting from the launch of space vehicles, the depletion of stratospheric ozone is the most studied and most immediately concerning,” wrote Jessica Dallas, a senior policy adviser at the New Zealand Space Agency, in an analysis of research on space launch emissions published last year. Another report from 2019 penned by the Center for Space Policy and Strategy likened the space emissions problem to that of space debris, which the authors say creates an existential risk to the industry. “Today, launch vehicle emissions present a distinctive echo of the space debris problem. Rocket engine exhaust emitted into the stratosphere during ascent to orbit adversely impacts the global atmosphere,” they wrote. “We just don’t know how large the space tourism industry could become,” says Marais. A new market report estimates that the global suborbital transportation and space tourism market is estimated to reach $2.58bn in 2031, growing 17.15% each year of the next decade. “The major driving factor for the market’s robustness will be focused efforts to enable space transportation, emerging startups in suborbital transportation, and increasing developments in low-cost launching sites,” the report says. In the past, most space transportation has been focused on cargo supply missions to the International Space Station and satellite launch services, but currently, this focus has shifted to in-space transportation, planetary explorations, crewed missions, suborbital transportation and space tourism. Several companies, including SpaceX, Blue Origin and Virgin Galactic, have been focusing on developing platforms such as rocket-powered suborbital vehicles that will enable the industry to carry out suborbital transportation and space tourism. People have pointed out that the money these billionaires have poured into space technology could be invested in making life better on our planet, where wildfires, heatwaves and other climate disasters are becoming more frequent as the globe warms up in the climate crisis. “Is anyone else alarmed that billionaires are having their own private space race while record-breaking heatwaves are sparking a ‘fire-breathing dragon of clouds’ and cooking sea creatures to death in their shells?” the former US Labor Secretary Robert Reich tweeted last week. Marais says that there is always an element of excitement to new developments in space – but it’s still possible to be responsible while doing something exciting. She urges caution as the space tourism industry grows, and says there are currently no international rules around the kinds of fuels used and their impact on the environment. “We have no regulations currently around rocket emissions,” she says. “The time to act is now – while the billionaires are still buying their tickets.”

#### Warming causes Extinction

Kareiva 18, Peter, and Valerie Carranza. "Existential risk due to ecosystem collapse: Nature strikes back." Futures 102 (2018): 39-50. (Ph.D. in ecology and applied mathematics from Cornell University, director of the Institute of the Environment and Sustainability at UCLA, Pritzker Distinguished Professor in Environment & Sustainability at UCLA)//Recut Jia

In summary, six of the nine proposed planetary boundaries (phosphorous, nitrogen, biodiversity, land use, atmospheric aerosol loading, and chemical pollution) are unlikely to be associated with existential risks. They all correspond to a degraded environment, but in our assessment do not represent existential risks. However, the three remaining boundaries (climate change, global freshwater cycle, and ocean acidification) do pose existential risks. This is because of intrinsic positive feedback loops, substantial lag times between system change and experiencing the consequences of that change, and the fact these different boundaries interact with one another in ways that yield surprises. In addition, climate, freshwater, and ocean acidification are all directly connected to the provision of food and water, and shortages of food and water can create conflict and social unrest. Climate change has a long history of disrupting civilizations and sometimes precipitating the collapse of cultures or mass emigrations (McMichael, 2017). For example, the 12th century drought in the North American Southwest is held responsible for the collapse of the Anasazi pueblo culture. More recently, the infamous potato famine of 1846–1849 and the large migration of Irish to the U.S. can be traced to a combination of factors, one of which was climate. Specifically, 1846 was an unusually warm and moist year in Ireland, providing the climatic conditions favorable to the fungus that caused the potato blight. As is so often the case, poor government had a role as well—as the British government forbade the import of grains from outside Britain (imports that could have helped to redress the ravaged potato yields). Climate change intersects with freshwater resources because it is expected to exacerbate drought and water scarcity, as well as flooding. Climate change can even impair water quality because it is associated with heavy rains that overwhelm sewage treatment facilities, or because it results in higher concentrations of pollutants in groundwater as a result of enhanced evaporation and reduced groundwater recharge. Ample clean water is not a luxury—it is essential for human survival. Consequently, cities, regions and nations that lack clean freshwater are vulnerable to social disruption and disease. Finally, ocean acidification is linked to climate change because it is driven by CO2 emissions just as global warming is. With close to 20% of the world’s protein coming from oceans (FAO, 2016), the potential for severe impacts due to acidification is obvious. Less obvious, but perhaps more insidious, is the interaction between climate change and the loss of oyster and coral reefs due to acidification. Acidification is known to interfere with oyster reef building and coral reefs. Climate change also increases storm frequency and severity. Coral reefs and oyster reefs provide protection from storm surge because they reduce wave energy (Spalding et al., 2014). If these reefs are lost due to acidification at the same time as storms become more severe and sea level rises, coastal communities will be exposed to unprecedented storm surge—and may be ravaged by recurrent storms. A key feature of the risk associated with climate change is that mean annual temperature and mean annual rainfall are not the variables of interest. Rather it is extreme episodic events that place nations and entire regions of the world at risk. These extreme events are by definition “rare” (once every hundred years), and changes in their likelihood are challenging to detect because of their rarity, but are exactly the manifestations of climate change that we must get better at anticipating (Diffenbaugh et al., 2017). Society will have a hard time responding to shorter intervals between rare extreme events because in the lifespan of an individual human, a person might experience as few as two or three extreme events. How likely is it that you would notice a change in the interval between events that are separated by decades, especially given that the interval is not regular but varies stochastically? A concrete example of this dilemma can be found in the past and expected future changes in storm-related flooding of New York City. The highly disruptive flooding of New York City associated with Hurricane Sandy represented a flood height that occurred once every 500 years in the 18th century, and that occurs now once every 25 years, but is expected to occur once every 5 years by 2050 (Garner et al., 2017). This change in frequency of extreme floods has profound implications for the measures New York City should take to protect its infrastructure and its population, yet because of the stochastic nature of such events, this shift in flood frequency is an elevated risk that will go unnoticed by most people. 4. The combination of positive feedback loops and societal inertia is fertile ground for global environmental catastrophes Humans are remarkably ingenious, and have adapted to crises throughout their history. Our doom has been repeatedly predicted, only to be averted by innovation (Ridley, 2011). However, the many stories of human ingenuity successfully addressing existential risks such as global famine or extreme air pollution represent environmental challenges that are largely linear, have immediate consequences, and operate without positive feedbacks. For example, the fact that food is in short supply does not increase the rate at which humans consume food—thereby increasing the shortage. Similarly, massive air pollution episodes such as the London fog of 1952 that killed 12,000 people did not make future air pollution events more likely. In fact it was just the opposite—the London fog sent such a clear message that Britain quickly enacted pollution control measures (Stradling, 2016). Food shortages, air pollution, water pollution, etc. send immediate signals to society of harm, which then trigger a negative feedback of society seeking to reduce the harm. In contrast, today’s great environmental crisis of climate change may cause some harm but there are generally long time delays between rising CO2 concentrations and damage to humans. The consequence of these delays are an absence of urgency; thus although 70% of Americans believe global warming is happening, only 40% think it will harm them (http://climatecommunication.yale.edu/visualizations-data/ycom-us-2016/). Secondly, unlike past environmental challenges, the Earth’s climate system is rife with positive feedback loops. In particular, as CO2 increases and the climate warms, that very warming can cause more CO2 release which further increases global warming, and then more CO2, and so on. Table 2 summarizes the best documented positive feedback loops for the Earth’s climate system. These feedbacks can be neatly categorized into carbon cycle, biogeochemical, biogeophysical, cloud, ice-albedo, and water vapor feedbacks. As important as it is to understand these feedbacks individually, it is even more essential to study the interactive nature of these feedbacks. Modeling studies show that when interactions among feedback loops are included, uncertainty increases dramatically and there is a heightened potential for perturbations to be magnified (e.g., Cox, Betts, Jones, Spall, & Totterdell, 2000; Hajima, Tachiiri, Ito, & Kawamiya, 2014; Knutti & Rugenstein, 2015; Rosenfeld, Sherwood, Wood, & Donner, 2014). This produces a wide range of future scenarios. Positive feedbacks in the carbon cycle involves the enhancement of future carbon contributions to the atmosphere due to some initial increase in atmospheric CO2. This happens because as CO2 accumulates, it reduces the efficiency in which oceans and terrestrial ecosystems sequester carbon, which in return feeds back to exacerbate climate change (Friedlingstein et al., 2001). Warming can also increase the rate at which organic matter decays and carbon is released into the atmosphere, thereby causing more warming (Melillo et al., 2017). Increases in food shortages and lack of water is also of major concern when biogeophysical feedback mechanisms perpetuate drought conditions. The underlying mechanism here is that losses in vegetation increases the surface albedo, which suppresses rainfall, and thus enhances future vegetation loss and more suppression of rainfall—thereby initiating or prolonging a drought (Chamey, Stone, & Quirk, 1975). To top it off, overgrazing depletes the soil, leading to augmented vegetation loss (Anderies, Janssen, & Walker, 2002). Climate change often also increases the risk of forest fires, as a result of higher temperatures and persistent drought conditions. The expectation is that forest fires will become more frequent and severe with climate warming and drought (Scholze, Knorr, Arnell, & Prentice, 2006), a trend for which we have already seen evidence (Allen et al., 2010). Tragically, the increased severity and risk of Southern California wildfires recently predicted by climate scientists (Jin et al., 2015), was realized in December 2017, with the largest fire in the history of California (the “Thomas fire” that burned 282,000 acres, https://www.vox.com/2017/12/27/16822180/thomas-fire-california-largest-wildfire). This catastrophic fire embodies the sorts of positive feedbacks and interacting factors that could catch humanity off-guard and produce a true apocalyptic event. Record-breaking rains produced an extraordinary flush of new vegetation, that then dried out as record heat waves and dry conditions took hold, coupled with stronger than normal winds, and ignition. Of course the record-fire released CO2 into the atmosphere, thereby contributing to future warming. Out of all types of feedbacks, water vapor and the ice-albedo feedbacks are the most clearly understood mechanisms. Losses in reflective snow and ice cover drive up surface temperatures, leading to even more melting of snow and ice cover—this is known as the ice-albedo feedback (Curry, Schramm, & Ebert, 1995). As snow and ice continue to melt at a more rapid pace, millions of people may be displaced by flooding risks as a consequence of sea level rise near coastal communities (Biermann & Boas, 2010; Myers, 2002; Nicholls et al., 2011). The water vapor feedback operates when warmer atmospheric conditions strengthen the saturation vapor pressure, which creates a warming effect given water vapor’s strong greenhouse gas properties (Manabe & Wetherald, 1967). Global warming tends to increase cloud formation because warmer temperatures lead to more evaporation of water into the atmosphere, and warmer temperature also allows the atmosphere to hold more water. The key question is whether this increase in clouds associated with global warming will result in a positive feedback loop (more warming) or a negative feedback loop (less warming). For decades, scientists have sought to answer this question and understand the net role clouds play in future climate projections (Schneider et al., 2017). Clouds are complex because they both have a cooling (reflecting incoming solar radiation) and warming (absorbing incoming solar radiation) effect (Lashof, DeAngelo, Saleska, & Harte, 1997). The type of cloud, altitude, and optical properties combine to determine how these countervailing effects balance out. Although still under debate, it appears that in most circumstances the cloud feedback is likely positive (Boucher et al., 2013). For example, models and observations show that increasing greenhouse gas concentrations reduces the low-level cloud fraction in the Northeast Pacific at decadal time scales. This then has a positive feedback effect and enhances climate warming since less solar radiation is reflected by the atmosphere (Clement, Burgman, & Norris, 2009). The key lesson from the long list of potentially positive feedbacks and their interactions is that runaway climate change, and runaway perturbations have to be taken as a serious possibility. Table 2 is just a snapshot of the type of feedbacks that have been identified (see Supplementary material for a more thorough explanation of positive feedback loops). However, this list is not exhaustive and the possibility of undiscovered positive feedbacks portends even greater existential risks. The many environmental crises humankind has previously averted (famine, ozone depletion, London fog, water pollution, etc.) were averted because of political will based on solid scientific understanding. We cannot count on complete scientific understanding when it comes to positive feedback loops and climate change.

#### Private appropriation causes space wars and escalates conflict

Perez 21 Veronica Delgado-Perez. 12/14/21. Argument | The Commercialization of Space Risks Launching a Militarized Space Race. <https://www.theintlscholar.com/periodical/12/14/2020/analysis-commercialization-space-risk-international-law-military-space-race> [Veronica Delgado-Perez is a Staff Writer at The International Scholar.] //Jia

With new actors on the game stage, conflicts of interest may arise. There is a risk that each actor adopts a kind of short-term Realist approach to space policy — one which is driven by self-interest in reaping the greatest benefits of extraterrestrial exploration and commercialization while controlling access to others. If unmitigated, states may choose to militarize outer space to gain a strategic edge over competitors and adversaries. This process has already begun. Under the Trump administration, the Pentagon established the U.S. Space Force as a new branch of the Armed Forces to protect the country and allied interests in space. Already, Delta 4 — one of the U.S. Space Force’s missions — conducts strategic and theater missile warnings, manages weapon systems, and provides information to missile defense forces. The measure shows that for the U.S., outer space is not only a domain of scientific exploration but has the potential to become increasingly securitized. With the impending expiration of the Strategic Arms Reduction Treaty (START) between the U.S. and Russia on February 5, 2021, a number of security dilemmas could arise. If the world’s two largest nuclear powers do not edge toward extending the treaty, Washington and Moscow risk returning to the era of unrestricted expansion of launch platforms and strategically-deployed nuclear warheads — potentially with the aid of military infrastructure in space. Although President-elect Biden has expressed his interest in negotiating an extension of New START, how Moscow and Washington might proceed remains an open question. Bilateral progress towards a new arms-control regime would require establishing limits on the number and range of long- and mid-range missiles, establishing measures to limit the expansion of traditional missile deployment to space, and banning the deployment of nuclear weapons and weapons of mass destruction in outer space. More than the risk of the securitization of space, state, and private actors could begin to claim exclusive legal rights over the resources they discover. Indeed, the U.S. Commercial Space Launch Competitiveness Act, which came into force in 2015, expressly recognizes the right of U.S. Citizens to possess, own, transport, use, and sell space resources. By this means, domestic law already acknowledges the legal claim to property by individuals, which is prohibited by international law. Under the Outer Space Treaty, states renounced any traditional form of acquisition of territories and agreed not to foray unilaterally into space to extend their national policies on Earth or to exercise any kind of sovereignty over celestial bodies or resources. The absence of a modern international treaty that addresses these issues should be received with grave concern, as there is significant potential for risk to become reality. Existing UN treaties lack the technological context and foresight to address legal questions regarding the potential for commercial exploration and exploitation of outer space or its resources. During the sixties and seventies, when international instruments like the Outer Space treaty were conceived, the principal aim of states was to support and expand the scale of the state’s national capacity for operation in space and the development of legal instruments to guide state’s international cooperation in the peaceful exploration of outer space. These instruments were never designed to respond to commercial questions over mining or tourism in space, private investment in space activities, or the emergence of non-state private enterprises operating in space. As a result, private enterprises operating in the vacuum of space also float in an unstable legal vacuum which threatens to implode in geopolitical competition. Beyond Stars and States In an increasingly commercial outer space in which there are no set limits to the exploitation of resources or claim to property, states and private companies will inevitably pursue the development of new extraterrestrial industries to suit their geoeconomic interests. If unchecked, the legal protection of outer space as a domain of exploration for the benefit of all humanity would functionally fail. To protect investments and profit from national space industries, states would likely resort to military force to protect and secure private assets. Over time, space would ultimately become a fourth border domain over which states claim, exercise, and defend sovereignty — including through the use of force.

#### Space Escalation cause Nuclear War.

Gallagher 15 “Antisatellite warfare without nuclear risk: A mirage” <http://thebulletin.org/space-weapons-and-risk-nuclear-exchanges8346> (interim director of the Center for International and Security Studies in Maryland, previous Executive Director of the Clinton Administration’s CTBT Treaty Committee, an arms control specialist at the State Dept., and a faculty member at Wesleyan)//Jia

In recent decades, however, as space-based reconnaissance, communication, and targeting capabilities have become integral elements of modern military operations, strategists and policy makers have explored whether carrying out antisatellite attacks could confer major military advantages without increasing the risk of nuclear war. In theory, the answer might be yes. In practice, it is almost certainly no. Hyping threats. No country has ever deliberately and destructively attacked a satellite belonging to another country (though nations have sometimes interfered with satellites' radio transmissions). But the United States, Russia, and China have all tested advanced kinetic antisatellite weapons, and the United States has demonstrated that it can modify a missile-defense interceptor for use in antisatellite mode. Any nation that can launch nuclear weapons on medium-range ballistic missiles has the latent capability to attack satellites in low Earth orbit. Because the United States depends heavily on space for its terrestrial military superiority, some US strategists have predicted that potential adversaries will try to neutralize US advantages by attacking satellites. They have also recommended that the US military do everything it can to protect its own space assets while maintaining a capability to disable or destroy satellites that adversaries use for intelligence, communication, navigation, or targeting. Analysis of this sort often exaggerates both potential adversaries’ ability to destroy US space assets and the military advantages that either side would gain from antisatellite attacks. Nonetheless, some observers are once again advancing worst-case scenarios to support arguments for offensive counterspace capabilities. In some other countries, interest in space warfare may be increasing because of these arguments. If any nation, for whatever reason, launched an attack on a second nation's satellites, nuclear retaliation against terrestrial targets would be an irrational response. But powerful countries do sometimes respond irrationally when attacked. Moreover, disproportionate retaliation following a deliberate antisatellite attack is not the only way in which antisatellite weapons could contribute to nuclear war. It is not even the likeliest way. As was clearly understood by the countries that negotiated the Outer Space Treaty, crisis management would become more difficult, and the risk of inadvertent deterrence failure would increase, if satellites used for reconnaissance and communication were disabled or destroyed. But even if the norm against attacking another country’s satellites is never broken, developing and testing antisatellite weapons still increase the risk of nuclear war. If, for instance, US military leaders became seriously concerned that China or Russia were preparing an antisatellite attack, pressure could build for a pre-emptive attack against Chinese or Russian strategic forces. Should a satellite be struck by a piece of space debris during a crisis or a low-level terrestrial conflict, leaders might mistakenly assume that a space war had begun and retaliate before they knew what had actually happened. Such scenarios may seem improbable, but they are no more implausible than the scenarios that are used to justify the development and use of antisatellite weapons.

#### Nuclear war causes extinction – ice age and famine.

Steven Starr 15 [Director of the University of Missouri’s Clinical Laboratory Science Program, as well as a senior scientist at the [Physicians for Social Responsibility](http://www.psr.org/). He has worked with the Swiss, Chilean, and Swedish governments in support of their efforts at the United Nations to eliminate thousands of high-alert, launch-ready U.S. and Russian nuclear weapons; he maintains the website [Nuclear Darkness](http://www.nucleardarkness.org/). “Nuclear War: An Unrecognized Mass Extinction Event Waiting To Happen.” Ratical. March 2015. <https://ratical.org/radiation/NuclearExtinction/StevenStarr022815.html>]//Jia

A war fought with 21st century strategic nuclear weapons would be more than just a great catastrophe in human history. If we allow it to happen, such a war would be a mass extinction event that ends human history. There is a profound difference between extinction and “an unprecedented disaster,” or even “the end of civilization,” because even after such an immense catastrophe, human life would go on. But extinction, by definition, is an event of utter finality, and a nuclear war that could cause human extinction should really be considered as the ultimate criminal act. It certainly would be the crime to end all crimes. The world’s leading climatologists now tell us that nuclear war threatens our continued existence as a species. Their studies predict that a large nuclear war, especially one fought with strategic nuclear weapons, would create a post-war environment in which for many years it would be too cold and dark to even grow food. Their findings make it clear that not only humans, but most large animals and many other forms of complex life would likely vanish forever in a nuclear darkness of our own making. The environmental consequences of nuclear war would attack the ecological support systems of life at every level. Radioactive fallout, produced not only by nuclear bombs, but also by the destruction of nuclear power plants and their spent fuel pools, would poison the biosphere. Millions of tons of smoke would act to destroy Earth’s protective ozone layer and block most sunlight from reaching Earth’s surface, creating Ice Age weather conditions that would last for decades. Yet the political and military leaders who control nuclear weapons strictly avoid any direct public discussion of the consequences of nuclear war. They do so by arguing that nuclear weapons are not intended to be used, but only to deter. Remarkably, the leaders of the Nuclear Weapon States have chosen to ignore the authoritative, long-standing scientific research done by the climatologists, research that predicts virtually any nuclear war, fought with even a fraction of the operational and deployed nuclear arsenals, will leave the Earth essentially uninhabitable.

### Offense 2

#### [1] Space is not subject to property rights – a). It has no physical manifestation as space is by definition the absence of matter which means it cannot be measured, bordered, or divided, thus it cannot be owned b). Owning unexplored planets/space is incoherent – there could be other agents there, and it can’t be deemed an agents property lest agents have a rational conception of it.

#### [2] Private entities are incapable of making omnilateral decisions as privatization entails that they withhold information which limits deliberation over making maxims.

Chiara Cordelli 2016, University of Chicago, Political Science <https://www.law.berkeley.edu/wp-content/uploads/2016/01/What-is-Wrong-With-Privatization_UCB.pdf> //Dulles VN//recut Jia

The intrinsic wrong of privatization, I will suggest, rather consists in the creation of an institutional arrangement that, by its very constitution, denies those who are subject to it equal freedom. I understand freedom as an interpersonal relationship of reciprocal independence. To be free is not to be subordinated to another person’s unilateral will. By building on an analytical reconstruction of Kant’s Doctrine of Right, I will argue that current forms of privatization reproduce (to a different degree) within a civil condition the very same defects that Kant attributes to the state of nature, or to a pre-civil condition, thereby making a rightful condition of reciprocal independence impossible. Importantly, this is so even if private actors are publicly authorized through contract and subject to regulations, and even if they are committed to reason in accordance with the public good. The reason for this, as I will explain, derives from the fact that private agents are constitutionally incapable of acting omnilaterally, even if their actions are omnilaterally authorized by government through some delegation mechanism, e.g. a voluntary contract. Omnilateralness, I will suggest, must be understood as a function of 1) rightful judgment and 2) unity. By rightful judgment I mean the capacity to reason publicly and to make universal rules that are valid for everyone, according to a juridical ideal of right, as necessary to solve the problem of the unilateral imposition of private wills on others. By unity I mean the capacity to make rules and decisions that change the normative situation of others, as a part of a unified system of decision-making. The condition of unity is crucial, as I shall later explain, insofar as there might be multiple interpretations compatible with rightful judgment, which would still problematically leave the definition of people’s rightful entitlements indeterminate. Further, the practical realization of the juridical idea of an omnilateral will, I will contend, requires embeddedness within a shared collective practice of decision-making. In practice, rightful judgment can only obtain when certain shared background frameworks that structure practical reasoning and confer unity to that reasoning are in place. The rules of public administration and the authority structure of bureaucracy should be understood as playing this essential function of giving empirical and practical reality to the omnilateral will, as far as the execution of rules and the concrete definition of entitlements are concerned. Together, these two requirements are necessary, (whether they are also sufficient is a different question), to make an action the omnilateral action of a state, which has the moral power to change the normative situation of citizens, by fixing the content of their rights and duties in accordance with the equal freedom of all. The phenomenon of privatization thus raises the fundamental questions of why we need political institutions to begin with, and what makes an action an action of the state. Insofar as private agents make decisions that fundamentally alter the normative situation (the rights and duties) of citizens, and insofar as, by definition, private agents are not public officials embedded in that shared collective practice, their decisions, even if well intentioned and authorized through contract, cannot count as omnilateral acts of the state. They rather and necessarily remain unilateral acts of men. Hence, I will conclude, for the very same reasons that we have, following Kant, a duty to exit the state of nature so as to solve the twofold problems of the unilateral imposition of will on others and the indeterminacy of rights, we also have a duty to limit privatization and to support, on normative grounds, a case for the re-bureaucratization of certain functions. Therefore, my paper provides foundational reasons to agree with Richard Rorty’s nonfoundational defense of bureaucracy as stated in the opening epigraph, since only agents who are appropriately embedded within a bureaucratic structure, properly understood, are, in many cases, capable of acting omnilaterally. The “bosses” I am here concerned with are not primarily those who 5 can unilaterally impose their will on us in their capacity as private employers, but rather any private actor who acts unilaterally while in the garb of the state.

#### [3] Korsgaard affirms – overthinking is bad, which is intrinisic to clash so vote on the ac only.

**Wikipedia** [Brackets Original. “Analysis Paralysis”. Wikipedia. No Date. <https://en.wikipedia.org/wiki/Bonini%27s_paradox>]

Analysis paralysis (or paralysis by analysis) describes an individual or group process when overanalyzing or overthinking a situation can cause forward motion or decision-making to become [frozen] "paralyzed", meaning that no solution or course of action is decided upon. A situation may be deemed too complicated and a decision is never made, due to the fear that a potentially larger problem may arise. A person may desire a perfect solution, but may fear making a decision that could result in error, while on the way to a better solution. Equally, a person may hold that a superior solution is a short step away, and stall in its endless pursuit, with no concept of diminishing returns. On the opposite end of the time spectrum is the phrase extinct by instinct, which is making a fatal decision based on hasty judgment or a gut reaction.

#### [4] An exclusive and permanent right to property is not entailed by the categorical imperative. Only conditional use is universalizable

Westphal 97 [(Kenneth R., Professor of Philosophy at Boðaziçi Üniversitesi, PhD in Philosophy from Wisco) “Do Kant’s Principles Justify Property or Usufruct?” Jahrbuch für Recht und Ethik/Annual Review of Law and Ethics 5 (1997):141–94.] RE//Jia recut

The compatibility of possession with the freedom of everyone according to universal laws is not a trivial assumption even for the case of detention or “empirical” possession. Under conditions of extreme scarcity, anyone’s use of some vital thing precludes someone else’s equally vital use of that thing or of anything of its kind (given the condition of extreme relative scarcity). This is not quite to agree with Hume, that conditions of justice exclude both extreme scarcity and superabundance.32 But it is to recognize that he came close to an important insight: legitimate action requires sufficient abundance so that one person’s use (benefit) is not (at least not directly) someone else’s vital injury (deprivation). This is not merely to say that property is psychologically impossible in extreme scarcity because no one could respect it (per Hume); the point is that possession and perhaps even use are not, at least not obviously, legitimate under such conditions. (How Kant would propose to resolve the conflicting grounds of obligation in such circumstances, the duty to self-preservation versus the duty not to harm others’ life or liberty, I do not understand.) The assumption that possession is compatible with the freedom of everyone according to universal laws [5] is even less trivial for the case of “intelligible” or “noumenal” possession, that is, possession without physical detention. The compatibility of intelligible possession with the freedom of everyone according to universal laws requires both sufficient resources so that the free use of something by one person is not as such the infringement of like freedom of another, and it requires that mere empirical or physical possession does not suffice to secure the innate right to freedom of overt (äußere) action. If physical possession did suffice to secure the innate right to overt action, Kant’s main ground of proof would entail no conclusion stronger than that rights of physical possession (detention) are legitimate. Furthermore, by assuming that noumenal possession is compatible with the freedom of everyone according to universal laws [5], Kant assumes rather than proves that possession without detention is permissible. However, this is precisely the point that needs to be proven! This issue remains central throughout the remainder of §2 and is addressed again in §3 below. 2.2.6 The previous section raises a very serious question about Kant’s justification of intelligible rights to possess and use (possessio). The questions about Kant’s supposed justification of property rights, the possibility of having things as one’s own (Eigentum, dominium), are even more acute. To derive such strong rights from Kant’s argument requires at least one of three assumptions. The first assumption would be that the sole relevant condition of use is proprietary ownership of things (cf. RL §1 ¶1); this assumption requires interpreting “Besitz” broadly. The second assumption would involve conflating the ownership of a right – viz., a right to use – with a right to property ownership. However, the legitimacy of neither of these assumptions is demonstrated by Kant’s argument in RL §2. Or it may be assumed, third, that Kant’s argument in §2 aims to prove, not merely rights to possession, but rights to property, insofar as it aims to prove a right to “arbitrary” (beliebigen) use, that is, the right to do whatever one pleases with something ([10]; cf. RL §7, 253.25–27), where this can include any of the rights involved in the further incidents of proprietary ownership. Reading Kant’s text in this way assimilates possessio to dominium by stressing Kant’s term “beliebigen”. So far as Kant’s literal statement is concerned, it is equally plausible to stress Kant’s term “Gebrauch” (use), which would restrict Kant’s argument to justifying possessio. Kant’s reductio ad absurdum argument assumes the contrapositive thesis that [it is not] altogether ... rightly in my power, i.e. it [is] not ... compatible with the freedom of everyone according to a universal law ([it is] wrong), to make use of [something which is physically within my power to use]. ([2], [1]) His argument then purports to derive a contradiction from this assumption. From this contradiction follows the negation of this assumption by disjunctive syllogism. Strictly speaking, what Kant’s argument (at best) proves is that it is indeed rightful to make use of things which in principle are within one’s power, provided (“obgleich ...”) that one ’s use is compatible with the freedom of everyone in accord with a universal law [5]. As mentioned, Kant’s argument assumes rather than proves that this assumption is correct. Kant must prove that this assumption is correct in order to prove his conclusion. This requires showing that possession and use of things (in their narrow, strict senses) is consistent with the freedom of everyone in accord with universal laws. That would justify rights to possessio. To justify the stronger rights to dominium requires showing that holding things in accord with the rights involved in the further incidents of property ownership is also consistent with the freedom of everyone in accord with universal laws. Because the rights involved in property ownership are not analytically, indeed are not necessarily, related, justifying dominium requires separate justification of each component right. But it also requires more than this. Insofar as these rights are supposed to be proven as a matter of natural right, these further rights cannot be instituted solely by convention. However, there are alternative packages of rights, both for kinds of property as well as for various weaker sets of rights to use, any of which can be formulated in ways that are consistent with the like freedom of everyone according to universal laws. Consequently, merely demonstrating the consistency of one or another of these sets of rights with the freedom of everyone according to universal laws suffices only to justify the permissibility of that set of rights. It does not suffice to justify the obligation to respect that set of rights instead of any other such set of rights. This is to say, once alternative sets of rights are possible or permissible because they meet the sine qua non of consistency with the like freedom of everyone according to universal laws [5], Kant’s natural law grounds of proof do not suffice to justify an obligation to respect one particular set of rights among the range of possible, permissible alternatives. Consequently, interpreting Kant’s statement [10] by stressing “beliebigen”, using it to specify the scope of “Gebrauch”, can only lead to fallacious, question-begging interpretations of Kant’s argument. Consequently, it is strongly preferable to interpret Kant’s statement by stressing “Gebrauch”, and using it in its strict, narrow sense to specify the scope of “beliebigen”. (This parallels the case for interpreting “Besitz” narrowly instead of broadly.) In sum, to use something legitimately it suffices to have a right to use it. That, in brief, is “possession” strictly speaking; in the narrow sense of the term, “possession” involves only the right of a qualified chose in possession. Since this condition suffices to fulfill the condition specified by Kant’s reductio argument, no stronger condition follows from Kant’s argument. One can have or “own” a right to use something without, of course, having property in that thing. Recall Honoré’s point that possession involves two claims: being in exclusive control and remaining in control by being free of unpermitted interference of others. Insofar as possession persists despite subsequent and continuing disuse, Kant’s proof does not demonstrate even a narrow right to possession. (This is why I speak of qualified choses in possession; one key qualification justified by Kant’s argument is that one’s right to use persists only so long as one’s legitimate need to use and regular use continue.) Moreover, aside from the prohibition on harmful use, Kant’s argument does not even address the other incidents of property ownership. If Kant’s primary assumption [5] can be justified, then Kant’s proof demonstrates at most three important conclusions: one has the right to use things one currently detains, one has the right to use any usable thing not previously (and hence currently) detained by others (provided one’s use does not infringe the like freedom of others), and one has the right to continue to use things so long as one’s need to use them and actions of using them continue. These are not trivial theses! However, because it does not prove the indefinite duration of possession, in the narrow sense, Kant’s proof of the (first version of the) Postulate of Practical Reason regarding Right is unsound. Kant’s further considerations in RL §6 suffer analogous weaknesses (see §§2.4f.).

#### That implies that private appropriation is unjust.

Westphal 97 [(Kenneth R., Professor of Philosophy at Boðaziçi Üniversitesi, PhD in Philosophy from Wisco) “Do Kant’s Principles Justify Property or Usufruct?” Jahrbuch für Recht und Ethik/Annual Review of Law and Ethics 5 (1997):141–94.] RE

6.2 One right that is not justified by the Kantian defense of rights to use developed above is the exclusion of others from the use of something to which one has a right on those occasions when one does not need and is not likely to need to use the item in question. Property rights involve such an exclusion. To the extent that I have shown that qualified choses in possession suffice to fulfill the desiderata established by Kant’s own principles and strategy for justifying possession (in the narrow sense), I have shown that property rights cannot be justified by Kant’s metaphysical principles. This is because there are alternative sets of rights to things which meet both Kant’s sine qua non of being consistent with the freedom of all in accord with universal laws [5] and Kant’s metaphysical grounds of proof concerning freedom of overt action. Neither Kant’s own argument nor my reconstruction of it address most of the incidents of property ownership. (Though I have suggested that Kant’s principles can justify the prohibition on harmful use and very likely some version of the liability to execution.) Indeed, Kant’s sole Innate Right to Freedom, Universal Law of Right, and Permissive Law of Practical Reason appear to entail that it is illegitimate to exclude others’ use of something to which one has a qualified chose in possession provided that their use does not interfere with one’s own regular and reliable use of the item in question. Moreover, Kant’s principles give priority to use over first acquisition, and indeed they justify first acquisition only in view of legitimate and needful use. To this extent, Kant’ s principles undermine and repudiate one of the cherished hallmarks of the liberal conception of private property, namely, that first acquisition as such secures a right over the disposition of a thing, regardless of subsequent disuse (cf. §3.10).

### Underview:

#### [1] Presumption and permissibility affirm – [a] Statements are true before false since if I told you my name, you’d believe me. [b] Epistemics – we wouldn’t be able to start a strand of reasoning since we’d have to question that reason. [c] Otherwise we’d have to have a proactive justification to do things like drink water. [d] If anything is permissible, then definitionally so is the aff since there is nothing that prevents us from doing it.

#### [2] Consequences fail: [A] They only judge actions after they occur, which fails action guidance [B] Every action has infinite stemming consequences, because every consequence can cause another consequence. Probability doesn’t solve because 1) Probability is improvable, as it relies on inductive knowledge, but induction from past events can’t lead to deduction of future events and 2) Probability assumes causation, we can’t assume every act was actually the cause of tangible outcomes [C] If you’re held responsible for things other than an intention ethics aren’t binding because there are infinite events occurring over which you have no control, so you can never be moral as you are permitting just action. [D] There’s no objective arbiter to evaluate consequences [E] You can’t aggregate consequences, happiness and sadness are immutable – ten headaches don’t make a migraine

#### [3] Interpretation: The negative must concede the affirmative framework if it is not morally repugnant and the advocacy is topical

#### Violation: they didn’t

#### Prefer-

#### A] Time skew- Winning the negative framework moots 6 minutes of 1AC offense – that outweighs on quantifiability and reversibility – I can’t get back time lost and it’s the only way to measure abuse

#### B] Topic Ed- Every debate would just be a framework debate which means we never get access to core topic lit – that outweighs on time frame – we only have 2 months

#### C] No RVIs – 7 min of answers to the shell is gg.

### Advantage 2: Space Mining

#### Scenario is space mining. It’s coming now – lack of regulations makes conflicts likely.

Zeisl 19 [Yasemin Zeisl, MSc in International Relations and Affairs from the London School of Economics and Political Science (LSE), “Three Salient Risks of Mining in Space,” 05/03/19, *GlobalRiskIntel*, https://www.globalriskintel.com/insights/three-salient-risks-mining-space, EA]//Jia

The harvesting of natural resources from space objects is the goal of numerous companies such as Planetary Resources or Deep Space Industries in the United States, Asteroid Mining Corporation in Scotland, or iSpace in Japan. While some companies such as iSpace are focusing on resources inside the Moon, others are developing strategies to identify and extract resources from asteroids and extinct comets. Given that calculations evaluate space mining as a highly lucrative business with potential profits amounting to trillions in U.S.-dollars, it is unsurprising that investment into space mining rose from 534 million USD in 2014 to 3.1 billion USD in 2018. Research institutions such as the Center for Near-Earth Object Studies (CNEOS) — which cooperates with the National Aeronautics and Space Administration (NASA) — detects, traces, and assesses risks of objects moving close to the Earth. Such calculations are relevant for future ventures into space mining, which will focus on metals such as platinum, gold, iron, rhodium, zinc, cobalt, and nickel, as well as water and carbon found in asteroids and extinct comets. Celestial ice would be particularly useful for generating rocket fuel by splitting it into hydrogen and oxygen. This may facilitate long space travel to destinations such as Mars. The usage of extinct comets as gas stations may bring engineers and scientists one step closer to the goal of colonizing Mars. While rocket fuel extraction may be a relatively feasible project for the near future, it is expected that harvesting metals from space may require several more decades to realize. Spotting the potential profitability of space mining, the United States passed the Commercial Space Launch Competitiveness Act in 2015 to grant U.S. citizens the right to harvest natural resources from celestial bodies. Similarly, Luxembourg established a space mining law and provided investment opportunities in August 2017. In January 2019, Russia started negotiating a bilateral cooperation arrangement with Luxembourg. The fact that there is no clearly defined international treaty on space mining poses a major risk. Although the Agreement Governing the Activities of States on the Moon and Other Celestial Bodies of 1984 may provide some detail on the issue by asserting that no state, organization, or natural person can lay claim to any object in space, the fact that only 18 countries have committed to this multilateral treaty leaves the majority of states unbound by this regulation. An inconsistent legal landscape in regard to resource extraction of celestial bodies could lead to legal clashes between different countries and potential disadvantages for companies or organizations from certain countries. Mining in space could turn into a fierce competition among various private businesses and states. Therefore, licensing regulations will also have to be clearly defined. Licenses will help to clarify both ownership of yields and the relationships among miners, investors, and governments in order to avoid conflict in the future.

#### Asteroid mining spikes the risk of satellite-dust collisions

**Scoles 15** [(Sarah Scoles, freelance science writer, contributor at Wired and Popular Science, author of the books Making Contact and They Are Already Here) “Dust from asteroid mining spells danger for satellites,” New Scientist, May 27, 2015, [https://www.newscientist.com/article/mg22630235-100-dust-from-asteroid-mining-spells-danger-for-satellites/]//Jia](https://www.newscientist.com/article/mg22630235-100-dust-from-asteroid-mining-spells-danger-for-satellites/%5d//Jia)

* Study this is citing – Javier Roa, Space Dynamic Group, Applied Physics Department, Technical University of Madrid. Casey J Handmer, Theoretical Astrophysics, California Institute of Technology. Both PhD Candidates. “Quantifying hazards: asteroid disruption in lunar distant retrograde orbits,” arXiv, Cornell University, May 14, 2015, <https://arxiv.org/pdf/1505.03800.pdf> “In 10 yrs particles have been found to intersect GEO up to 900 times, 63 times on average.”

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).

#### Space dust wrecks satellites

**Intagliata 17** [(Christopher Intagliata, MA Journalism from NYU, Editor for NPRs All Things Considered, Reporter/Host for Scientific American’s 60 Second Science) “The Sneaky Danger of Space Dust,” Scientific American, May 11, 2017, <https://www.scientificamerican.com/podcast/episode/the-sneaky-danger-of-space-dust/>]//Jia

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 of debris, according to NASA. 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. "Wealso 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]

#### Earth observation satellites key to warming adaptation

* Monitoring deforestation/ice caps
* ECV essential climate variables

**Alonso 18** [(Elisa Jiménez Alonso, communications consultant with Acclimatise, climate resilience organization) “Earth Observation of Increasing Importance for Climate Change Adaptation,” Acclimatise, May 2, 2018, <https://www.acclimatise.uk.com/2018/05/02/earth-observation-of-increasing-importance-for-climate-change-adaptation/>]//Jia

Earth observation (EO) satellites are playing an increasingly important role in assessing climate change. By providing a constant and consistent stream of data about the state of the climate, EO is not just improving scientific outcomes but can also inform climate policy. Managing climate-related risks effectively requires accurate, robust, sustained, and wide-ranging climate information. Reliable observational climate data can help scientists test the accuracy of their models and improve the science of attributing certain events to climate change. Information based on projections from models and historic data can help decision makers plan and implement adaptation actions. Providing information in data-sparse regions Ground-based weather and climate monitoring systems only cover about 30% of the Earth’s surface. In many parts of the world such data is incomplete and patchy due to poorly maintained weather stations and a general lack of such facilities. EO satellites and rapidly improving satellite technology, especially data from open access programmes, offer a valuable source information for such data-sparse regions. This is especially important since countries and regions with a lack of climate data are often particularly vulnerable to climate change impacts. International efforts for systematic observation The importance of satellite-based observations is also recognised by the international community. Following the recommendations of the World Meteorological Organization’s (WMO) Global Climate Observing System (GCOS) programme, the UNFCCC strongly encourages countries that support space agencies with EO programmes to get involved in GCOS and support the programme’s implementation. The Paris Agreement highlights the need for and importance of effective and progressive responses to the threat of climate change based on the best available scientific knowledge. This implies that climate knowledge needs to be strengthened, which includes continuously improving systematic observations of the Earth’s climate. To meet the need of such systematic climate observations, GCOS developed the concept of the Essential Climate Variable, or ECV. According to WMO, an ECV “is a physical, chemical or biological variable or a group of linked variables that critically contributes to the characterization of Earth’ s climate.” In 2010, 50 ECVs which would help the work of the UNFCCC and IPCC were defined by GCOS. The ECVs, which can be seen below, were identified due to their relevance for characterising the climate system and its changes, the technical feasibility of observing or deriving them on a global scale, and their cost effectiveness. The 50 Essential Climate Variables as defined by GCOS. One effort supporting the systemic observation of the climate is the European Space Agency’s (ESA) Climate Change Initiative (CCI). The programme taps into its own and its member countries’ EO archives that have been established in the last three decades in order to provide a timely and adequate contribution to the ECV databases required by the UNFCCC. Robust evidence supporting climate risk management Earth observation satellites can observe the entire Earth on a daily basis (polar orbiting satellites) or continuously monitor the disk of Earth below them (geostationary satellites) maintaining a constant watch of the entire globe. Sensors can target any point on Earth even the most remote and inhospitable areas which helps monitor deforestation in vast tropical forests and the melting of the ice caps. Without insights offered by EO satellites there would not be enough evidence for decision makers to base their climate policies on, increasing the risk of maladaptation. Robust EO data is an invaluable resource for collecting climate information that can inform climate risk management and make it more effective.