### Framework

#### *Ethics must begin a priori and the meta-ethic is bindingness.*

#### [A] Uncertainty – evil demon could deceive us and inability to know others experience make empirics unreliable for universal ethics. Justifies skep since people say they don’t experience the same.

#### [B] Unity – Practical reason is the only unescapable authority because to ask why I should be a reasoner concedes it’s authority since you’re actively reasoning.

#### That justifies universality AND outweighs – a] a priori principles like reason apply to everyone since they are independent of human experience and b] any non-universalizable norm justifies someone’s ability to impede on your ends i.e. if I want to eat ice cream, I must recognize that others may affect my pursuit of that end. c] Epistemology – rational deliberation of educational concepts is necessary to interpret other arguments since it’s a prerequisite to interpreting epistemological concepts and it’s the terminal impact of debate d] Procedure – reason is a side constraint on debate since otherwise we can’t refute – responding to this concedes the authority of reason since you’re reasoning via deliberation.

#### Additionally:

#### [A] Ethical frameworks are topicality interpretations of the word ought so they must be theoretically justified. Prefer on resource disparities—focusing on evidence and statistics privileges debaters with the most preround prep excluding lone-wolfs who lack huge evidence files. A debater under my framework can easily be won without any prep since minimal evidence is required. That controls the internal link to other voters because a pre-req to debating is access to the activity.

#### [B] Only universalizable reason can effectively explain the perspectives of agents – that’s the best method for combatting oppression.

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.**

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

#### [1] Presumption and Permissibility affirm: a] Statements are true before false since if I told you my name, you’d believe me. b] If anything is permissible, then so is the aff since there is nothing prohibiting us.

#### [2] Consequences Fail: a] Every action has infinite stemming consequences, because every consequence can cause another consequence so we can’t predict. b] Induction is circular because it relies on the assumption that nature will hold uniform and we could only reach that conclusion through inductive reasoning based on observation of past events. c] Every action is infinitely divisible, only intents unify because we commit the end point of an action – but consequences cannot determine what step of action is moral d] Yes act/omission distinction – there are infinite events occurring over which you have no control, so you can never be moral

### Advocacy

#### Plan – Resolved: The appropriation of outer space by private entities is unjust.

#### The aff interprets enforcement as an OUF (Orbital Use Fee). Proportionality in relation to the space industry solves best without harming it and any other solution only worsens the threat – models.

Rao et al 20. Akhil, Matthew Burgess, and Daniel Kaffine \*Department of Economics, Middlebury College, Middlebury \*\*Cooperative Institute for Research in Environmental Sciences, University of Colorado, Environmental Studies Program, and Department of Economics \*\*\*Department of Economics. 2020 [PNAS, “Orbital-use fees could more than quadruple the value of the space industry,” <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7293599/>] Justin

The space industry’s rapid recent growth represents the latest tragedy of the commons. Satellites launched into orbit contribute to—and risk damage from—a growing buildup of space debris and other satellites. Collision risk from this orbital congestion is costly to satellite operators. Technological and managerial solutions—such as active debris removal or end-of-life satellite deorbit guidelines—are currently being explored by regulatory authorities. However, none of these approaches address the underlying incentive problem: satellite operators do not account for costs they impose on each other via collision risk. Here, we show that an internationally harmonized orbital-use fee can correct these incentives and substantially increase the value of the space industry. We construct and analyze a coupled physical–economic model of commercial launches and debris accumulation in low-Earth orbit. Similar to carbon taxes, our model projects an optimal fee that rises at a rate of 14% per year, equal to roughly $235,000 per satellite-year in 2040. The long-run value of the satellite industry would more than quadruple by 2040—increasing from around $600 billion under business as usual to around $3 trillion. In contrast, we project that purely technological solutions are unlikely to fully address the problem of orbital congestion. Indeed, we find debris removal sometimes worsens economic damages from congestion by increasing launch incentives. In other sectors, addressing the tragedy of the commons has often been a game of catch-up with substantial social costs. The infant space industry can avert these costs before they escalate.

In 2017, 466 new satellites were launched—more than double the previous year’s launches and more than 20% of all active satellites in orbit in 2017 (1, 2). Rapid space industry growth is projected to continue, driven largely by commercial satellites (Fig. 1). This growth is driving buildup of debris in low-Earth orbit, currently including over 15,000 objects (3). Collision risk from debris is costly; collisions damage or destroy expensive capital assets that are difficult or impossible to repair. Debris buildup could eventually make some low-Earth orbits economically unviable and other orbits difficult or impossible to access (4). In the worst case—although uncertain and occurring over long time sshorizons—debris growth could become self-sustaining due to collisions between debris objects, a tipping point called Kessler Syndrome (4, 5).

Proposed solutions have so far largely been technological and managerial, aimed at mapping, avoiding, and removing debris (6, 7). These include end-of-life deorbit guidelines and “keep out” zones for active satellites and nets, harpoons, and lasers to deorbit debris (6). However, with open access to orbits, reducing debris and collision risk incentivizes additional satellite launches, which eventually restore the debris and risk. For instance, if firms were willing to tolerate a 0.1% annual risk of satellite loss before a technological improvement in debris removal, they will be willing to launch more satellites until the 0.1% annual risk of satellite loss was restored.

Thus, the core of the space debris problem is incentives, not technology. Since satellite operators are unable to secure exclusive property rights to their orbital paths or recover collision-related costs imposed by others, prospective operators face a choice between launching profitable satellites, thereby imposing current and future collision risk on others, or not launching and leaving those profits to competitors. This is a classic tragedy of the commons problem (1, 3, 8, 9). It can be economically efficiently addressed via incentive-based solutions, such as fees or tradable permits per year in orbit, analogous to carbon taxes or cap and trade (8, 10–12). Incentives should target objects in orbit—rather than launches—because orbiting objects are what directly imposes collision risk on other satellites (13). We quantify the economic benefits of implementing such incentives to correct the underlying open-access problem.

We use a coupled physical–economic model combining rich physical dynamics with satellite economics to quantify the benefits of an internationally harmonized “orbital-use fee” (OUF) relative to a business as usual (BAU) open-access scenario and relative to a scenario with active debris removal. An OUF is a type of Pigouvian tax—a well-known economic instrument for addressing externality problems (14). Our model accounts for the effects of each scenario on satellite launch decisions (Materials and Methods and SI Appendix). While we focus on an OUF for analytical convenience, it is conceptually equivalent to other mechanisms for pricing orbits, such as tradable permits.

Our physical model of satellite and debris evolution in orbit obeys relevant accounting identities and utilizes reduced form approximations of physical processes validated in other works (15, 16). We fit and calibrate the model using data on collision risk and orbital debris from the European Space Agency (ESA) (17) and data on active satellites from the Union of Concerned Scientists (UCS) (2) (Materials and Methods and SI Appendix). The ESA dataset covers 1958 to 2017, and the UCS dataset covers 1957 to 2017. Our physical model assumes runaway debris growth (Kessler Syndrome) cannot occur, which likely leads our model to understate the benefits of OUFs (Materials and Methods). Our economic model assumes that satellites are launched and operated to maximize per satellite private profits, net of any fees, subject to collision risk. We calibrate the model by fitting the BAU scenario (no fees or debris removal) to historical industry data and launch trends (1, 2) (Materials and Methods and SI Appendix).

We project future launch rates to 2040 under the BAU scenario using our fitted model and published projections of future growth of the space economy (18). The projections in ref. 18 were developed by projecting how the industries constituting the space sector—telecommunications, imaging, etc.—would grow from 2017 to 2040 under different assumptions on their individual profitability over time, then aggregating up to obtain projections for the space sector. We then calculate launch rates that would maximize the long-run value of the industry, and we calculate the time series of OUFs that would incentivize these optimal launch rates. The industry value is measured as net present value (NPV)—the long-run value of the entire fleet of satellites in orbit, accounting for both the financial costs of replacing satellites due to natural retirement and collisions as well as the opportunity cost of investing funds in satellites rather than capital markets. For instance, an NPV of $1 trillion in 2020 means the sum total of the stream of net benefits, looking from 2020 into the future and accounting for the timing of the net benefits, is $1 trillion.

Although our models are deliberately simplified for tractability, they are based on previously validated approaches to orbital object modeling (15, 16), and our calibrations allow us to reproduce observed trends and magnitudes in the growth of orbital debris and satellite stocks as well as the calculated collision risk (Fig. 3). Nonetheless, our projections should be interpreted as order of magnitude approximations that can be refined as needed by more detailed models. In these respects, our approach mirrors integrated assessment modeling approaches that have been useful in developing solutions to other natural resource management problems (e.g., ref. 19).

RESULTS

We project that shifting from open access to the optimal series of OUFs in 2020 would increase the NPV of the satellite industry from around $600 billion under BAU to around $3 trillion—a more than 4-fold increase (4.18- to 6.49-fold increases in 95% of parameter sets randomly drawn from their calibrated distributions) (Fig. 2D). Assuming a 5% market rate of return, an increase of $2.5 trillion in NPV would be equivalent to annual benefits of approximately $120 billion in perpetuity. The large immediate increase in NPV that we project in each OUF scenario, relative to BAU (Fig. 2A), comes primarily from the immediate effect of reducing launch activity while the satellite and debris stocks are suboptimally high (SI Appendix).

Based on our calculations (Materials and Methods), the optimal OUF starts at roughly $14,900 per satellite-year in 2020 and escalates at roughly 14% per year (aside from some initial transition dynamics) to around $235,000 per satellite-year in 2040. Rising optimal price paths are common in environmental pricing such as carbon taxes (20), although declining optimal price paths are also possible (21). The rising price path in this case partly reflects the rising value of safer orbits (resulting in rising industry NPV) (Fig. 2A) from the OUF. For comparison, the average annual profits of operating a satellite in 2015 were roughly $2.1 million. The 2020 and 2040 OUF values we describe amount to roughly 0.7 and 11% of average annual profits generated by a satellite in 2015.

Forgone NPV from the satellite industry in 2040—which is the cost of inaction under BAU—escalates from around $300 billion if optimal management begins in 2025 to around $700 billion if optimal management begins in 2035. Without OUFs, losses remain substantial even when active debris removal (implemented in the model as removal of 50% of debris objects in orbit each year) is available. In a best-case analysis where we assume debris removal is costless (i.e., it requires no payments nor additional satellites to implement), debris removal can only recover up to 9.5% of the value lost under open access. (The satellite industry’s willingness to pay for debris removal is not easily calculable in our model [SI Appendix, section 1.9.2].) At worst, debris removal can exacerbate orbital congestion via a rebound-type effect, causing additional losses on the order of 3% of the value already lost from open access (Fig. 4 and SI Appendix). The inability of debris removal to induce efficient orbit use is driven by open-access launching behavior and underscores the importance of policies to correct economic incentives to launch satellites.

DISCUSSION

The costly buildup of debris and satellites in low-Earth orbit is fundamentally a problem of incentives—satellite operators currently lack the incentives to factor into their launch decisions the collision risks their satellites impose on other operators. Our analysis suggests that correcting these incentives, via an OUF, could have substantial economic benefits to the satellite industry, and failing to do so could have substantial and escalating economic costs.

Escalating costs of inaction are a common feature of the tragedy of the commons, evident in several other sectors in which it went unaddressed for lengthy periods (22). For example, tens of billions of dollars in net benefits are lost annually from open-access or poorly managed fisheries globally (23). Similarly, open access to oil fields in the United States at the turn of the century drove recovery rates down to 20 to 25% at competitively drilled sites, compared with 85 to 90% potential recovery under optimal management (24). Open access to roadways—somewhat analogous to orbits—is estimated to create traffic congestion costs in excess of $120 billion/y in the United States alone (25). In contrast, there is still time to get out ahead of the tragedy of the commons in the young space industry.

The international and geopolitically complex nature of the space sector poses challenges to implementing orbital-use pricing systems, but these challenges need not be insurmountable. Theory suggests countries could each collect and spend OUF revenues domestically, without losing economic efficiency, as long as the fee’s magnitude was internationally harmonized (20). Engaging in such negotiations would be in the economic interests of all parties involved (26). An example of such a system is the Vessel Day Scheme (VDS) used by the Parties to the Nauru Agreement (PNA) to manage tuna fisheries. Under the VDS, PNA countries each lease fishing rights within their waters, using a common price floor (27). The European Union’s Emissions Trading System provides an example of an internationally coordinated tradable permit system (28). Notably, each of these pricing programs is built on a preexisting international governance institution (the Nauru Agreement and the European Union).

An OUF could also be built within existing space governance institutions, such as the Outer Space Treaty (29). For example, Article VI states that countries supervise their space industries, which provides a framework for OUFs to be administered nationally. Article II prohibits national appropriation of outer space but does not prohibit private property rights, potentially allowing for tradable orbital permitting.

### Offense

#### Now Affirm:

#### 1] Property rights assume a government to enforce them which means original acquisition in space is unjust, and cosmopolitan rights trump acquired rights like property.

Walla 16 [(Alice Pinheiro, Department of Philosophy at Trinity College Dublin) “Common Possession of the Earth and Cosmopolitan Right” Kant-Studien Volume 107 Issue 1, 2016] TDI

Similarly to Grotius and Pufendorf, Kant tells us how external objects of choice can become the property of persons, that is, how the original suum can be extended to external objects. For Kant, this is far from being obvious. He assumes that we are born with a right to be free from unjustified interference in the exercise of our agency. This innate right also entails our physical integrity, but does not originally extend to objects outside us. The fundamental assumption which Kant shares with Grotius and Pufendorf is that rights can only be derived from something the person already has, that is, from the suum. Kant’s argument for the inclusion of external objects under the notion of right is that we must assume a legal capacity to become owners of objects, in order to avoid a contradiction. External freedom (and with it pure practical reason) would be depriving itself of the possibility of using objects of choice and thus contradicting itself (ein Widerspruch der äußeren Freiheit mit sich selbst). We must thus introduce a postulate of practical reason, assuming the possibility of becoming legal owners of objects.

Once it has been established that external objects can become the matter of rights (i.e., that the suum can be extended to external objects), the next question Kant’s theory must address is the problem of acquisition of external objects. Acquisition is the empirical deed through which an external object is incorporated into a person’s suum. First or original acquisition is when an object becomes for the first time the possession of someone. Explaining the possibility of original acquisition is extremely important since all further acts of acquisition are derived from it. Interestingly, Kant argues that acquisition of land must be conceived as prior to the acquisition of objects. Possession of anything on a territory presupposes the possession of the territory itself, since objects are regarded as mere accidents of the substance on which they “inhere”, i.e. the land on which are located. Kant’s claim relies on the ontological dependence of accidents on the substance: just as the accidents cannot exist independently of the substance, movable objects cannot be acquired without the prior acquisition of land on which they are located. However, one may wonder if this ontological dependence can be extended to the relation between land and movable objects. Is it not possible to possess movable objects without possessing the land on which they are located? Katrin Flikschuh argued that unless one has some control over the land on which one’s possessions are situated one’s right to those possessions would be easily compromised. One would be at the mercy of others while pursuing one’s ends. While possession of external objects does not require that I myself possess the land on which these objects are placed, I must at least be able to enter some form of agreement with someone who owns or has control over the land lest I be in the situation of a squatter: someone who can be permanently pushed away with one’s possessions from one place to the other. If so, some kind of ownership of land or at least a right to control the land is necessary to secure one’s right to things. Because I can in principle occupy the space on which your object is situated by displacing your object from its location, displacing your object without your consent would be in principle no infringement upon your possession. We could think of a scenario where you would have to look for your car every time you leave work because it keeps being moved around from where you parked it in the morning. The car would still be yours, but you have no control over its location. However, secure possession of objects must entail the possibility of determining the location of one’s possessions.

Although this is certainly correct, it seems to miss Kant’s fundamental point, which is not merely about the empirical conditions necessary for securing possession of objects, but about the normative priority of acquisition of land over acquisition of objects. Acquisition of land must be understood as normatively prior to acquisition of objects due to the spatial character of Kant’s theory of property and of his legal theory in general. Right has to do with external freedom, an aspect of freedom which would be irrelevant if we were not embodied rational beings, not only in space, but also confined with each other to the limited surface of the earth. The limited dimension of the planet (which also defines the limits of human expansion) renders the interaction and the possibility of impact on the mutual exercise of external freedom inevitable. Our agency can have, and will most likely have, an impact on the agency and rights of others. Nowadays we do not even need to travel to distant lands to do this: climate change proves that my external deeds can have a considerable impact on your agency and way of living wherever you are. In other words, we are globally interconnected, whether we want it or not. Therefore, there would be no problem of Right without the possibility of interaction which arises from our embodiment and the limited space to which we are confined. The problem of Right in Kant’s theory is thus essentially a spatial problem: we must bring the external exercise of freedom of a plurality of persons under a system of external freedom, that is, in accordance with universal laws which can regulate these interactions. Without universal laws, that is, a priori principles, there can be no necessity and consequently no rights and obligations that deserve the name. Therefore, although the problem of Right has an empirical component, namely the facts about the human condition mentioned above, the solution to the problem of right must nevertheless be provided by rational principles. The project of Kant’s legal philosophy in the Doctrine of Right is to provide the a priori principles capable of addressing the problem of right, taking into account the different levels of possible interaction and institutionalization of right: within individuals in a common polity (state right), between polities (international right) and as citizens of the world (cosmopolitan right).

Although we can conceive possession of objects as separate from possession of land, this independence is only normatively possible through the idea that the first proprietor of land can dispose of the objects acquired via his acquisition of land. The idea is that persons were able to enter contractual relations with whoever first possessed the land and thus acquire movable objects independently of possessing the land themselves. Kant’s point is to explain where acquired rights to movable objects come from, normatively speaking. Once acquisition of objects becomes independent from possession of land, we need contracts regulating the location of objects, that is, agreements between possessors of land or those with jurisdictional rights over land and proprietors of movable objects. I can park my car in the street, even though the street does not belong to me, provided I satisfy certain requirements (I might need to pay a parking ticket or refrain from parking at certain areas at certain times and so on).

Acquiring land for the first time must be regarded as a realization or “particularization” of innate right. But this is the beginning of another problem. First acquisition of a piece of land involves both singling out a specific part of land as my “dominion” and excluding others from access to it. However, Kant’s legal theory does not assign a right conferring function to empirical acts. If acquisition is to have a legal quality, its lawfulness cannot be grounded on an empirical act. Further, if empirical acquisition justified possession, we would have to regard possession as a legal relationship between a thing and a person. This is not an option in Kant’s theory, according to which legal relations pertain only between persons as beings capable of obligation and consequently as subjects of rights. Therefore, the legal foundation or title (Rechtsgrund, titulus possessionis) enabling the acquisition of land must be understood as follows: it must precede the empirical act of acquisition and is not created by it; is a relation between persons in regard to external objects, and finally it is able to impose an obligation on all others to respect one’s acquisition. The idea of the original community of the earth is what constitutes this Rechtsgrund:

All human beings are originally in common possession of the land of the entire earth (communio fundi originaria) and each has by nature the will to use it (lex iusti) which, because the choice of one is unavoidably opposed by nature to that of another, would do away with any use of it if this will did not also contain the principle for choice by which a particular possession for each on the common land could be determined (lex iuridica) But the law which is to determine for each what land is mine or yours will be in accordance with the axiom of outer freedom only if it proceeds from a will that is united originally and a priori (that presupposes no rightful act for its union). Hence it proceeds only from a will in the civil condition (lex iustitiae distributivae), which alone determines what is right (recht), what is rightful (rechtlich), and what is laid down as right (Rechtens). But in the former condition, that is before the establishment of the civil condition, but with a view to it, that is provisionally, it is a duty to proceed in accordance with the principle of external acquisition. Accordingly, there is also a rightful capacity of the will to bind everyone to recognize the act of taking possession and of appropriation as valid, even though it is only unilateral.

A unilateral will cannot impose an obligation on others. It is a contingent exercise of freedom and has no authority to impose an obligation. For this, we would need the consent of all others whose exercise of freedom is restricted by that unilateral act. Omnis obligatio est contracta: all obligation must be self-imposed. The idea of a united will of all therefore extends the scope of Kant’s reason based legal philosophy, introducing what seems to be a voluntaristic element in his theory. A unilateral will can only impose an obligation on others if it is the will of everyone that it be so. However, for Kant it is not enough that this be the will of all (as a contingent matter of fact), but that it is a priori the will of all. In Kant’s reason based legal theory, only reason can impart necessity. The necessity of respecting unilateral acts of acquisition is thus derived not from the unilateral acts themselves (which are empirical and therefore contingent), but from the united will of all, which is a priori and therefore necessary.

But how can he assume that we all want a priori that objects be appropriated to the exclusion of others? How could I possibly want to be excluded from using an object I might be interested in? The notion of a united will a priori follows from the fact that intelligible possession is a priori necessary and for this, acquisition of objects to the exclusion of others must be permitted from the perspective of pure practical reason. Since on pain of contradiction practical reason must allow appropriation of objects, it must be the case that it is our will to be able to use objects of choice. This is why the general will is said to be united a priori, independently of actual consent.

It is important to note that the same rational principle that allows the use of external objects as an extension of innate freedom is the one that makes it necessary to assume an a priori united will. This idea ensures the compatibility of Kant’s theory of acquisition with the principle of right. Because acquisition of objects to the exclusion of others would mean an unjustified impediment on their freedom, only the assumption of an a priori united will can make acquisition rightful. However, Kant also stresses that a united will is only realized in a condition of public justice, that is, in the civil condition. Possession of objects thus commits us to the implementation of a system of distributive justice under which the a priori united will can be realized.

The transition from common ownership of the earth to a concrete individual possession of land requires a principle of distribution, according to which the earth can be divided. Distribution in this case can only be done by an empirical act: occupation (Bemächtigung, occupatio) through a unilateral act of choice (Act der Willkür). In taking physical possession of a piece of land, an individual is particularizing her original right to be somewhere. However, the only principle available for determining who has originally acquired something is prior in time, strong in right (qui prior tempore portior iure). Unless the right is given to the person who arrived first, no person would ever be able to exercise the right to acquire land, for anyone else would have a claim to the land that person acquired. Being the first to take control over a piece of land must entitle the agent to keep it despite the possible interest of others, as a condition for the possibility of making use of land at all. It therefore follows from prima occupatio that native peoples must be seen as the rightful possessors of their land. All later acquisition of land can only be derived from first possession, that is, it must be transferred to another by means of a contract with the native peoples, which presupposes their free and true consent in order to be valid. Further, this principle of distribution must be understood as contained in the united will of all (who have the will, individually, to use the land).

III. Community of the Earth as the basis of Cosmopolitan Right

The idea of communio fundi originaria has implications that extend beyond what is required for the justification of a right to external things. This is because the realization of one’s right to occupy space does not start with the occupation of land for the first time, but already with birth. When we are born, our mere “entrance in the world” is already a legally relevant fact. Not only have we come to occupy space in the world, we also have an original right to do so: this is “the right to be wherever nature or chance (apart from their will) has placed them”. The existence of a person in the world entails both her equal legal status among a plurality of subjects of right and her original right to occupy space. Persons are also automatically members of the global community of the earth, which is constituted by the unity of all possible places individuals can occupy within the limited surface of the earth.

Common possession of the earth plays a central role in Kant’s argument for cosmopolitan right. Although the role of cosmopolitan right, I will argue, has an analogous function to Grotius’ right of necessity and Pufendorf’s imperfect rights and duties, Kant’s “revival”of the original community in cosmopolitan right is nevertheless a radical redefinition of the Grotius- Pufendorf tradition.

[It] is not the right to be a guest (Gastrecht) (…) but the right to visit (Besuchsrecht); this right to present oneself for society, belongs to all human beings by virtue of the right to possession in common of the earth’s surface on which, as a sphere, they cannot disperse infinitely but must finally put up with being near one another; but originally no one had more right than another to be on a place on the earth.

This rational idea of a peaceful, even if not friendly, thoroughgoing community of all nations on the earth that can come into relations affecting one another is not a philanthropic (ethical) principle but a principle having to do with rights. (…) And since possession of the land, on which an inhabitant of the earth can live, can be thought only as possession of a part of a determinate whole, and so as possession of that to which each of them originally has a right, it follows that all nations (Völker)stand originally in a community of land, though not of rightful community of possession (communio) and so of use of it (…).

In the Doctrine of Right, Kant derives nations’ original community of the land from the fact that the possession of individuals (to which they have an original right), can be thought as a part of a determinate whole. National borders in connection with an internal civil condition make the extent of individual possessions relatively determinate. Borders delineate the scope of individual acquisition in a way which, although not peremptory until the institution of a cosmopolitan condition of distributive justice, is closer to the idea of right than leaving individuals to determine the limits of their acquisition in a wholly unilateral way (as in the state of nature). Unlike Locke, Kant has no theoretical resources for establishing the content (Inhalt) of occupation; the prior occupans must decide according to her own judgment if her possession is being infringed upon and consequently have a conception of the extent of her possession. Only the civil condition is able to provide relatively legitimate conditions for determining the scope of acquisition. This necessity makes Kant’s theory far more dependent on the institutionalization of right than Locke’s theory. The territorial rights of states can thus be understood as a necessary step towards a cosmopolitan condition of distributive justice.

As Kant formulates in Perpetual Peace, “cosmopolitan rights shall be limited to the conditions of universal hospitality”. This is a right to offer oneself for commerce (Verkehr) with one another, be the subjects of these rights individuals or nations. As cosmopolitan right makes clear, the idea of common ownership of the earth presents itself under two different modes:(1) as basis of the acquired right of host peoples to their territory, enabling them to decline voluntary interaction, and (2) as the basis for the original right of individual citizens of the world or nations to offer themselves for interaction with foreign nations. In Perpetual Peace Kant called this right “right to visit”, which is neither a right to settle (ius incolatus ) nor to be a guest in the foreign land (kein Gastrecht ). As Kant stresses, host nations retain a right to reject the visitor on the condition that this can be done “without causing his destruction”. Although visitors have no claim to enter the foreign territory, they should not be treated with hostility by the inhabitants, if they behave peacefully.

However, the original community of the earth also imposes constraints on the acquired right of host nations to control their borders. Kant makes clear that host nations have the right to reject visitors whenever their reason for interaction is voluntary. Similarly to the original right to a place on the surface of the earth, the right to admission in a foreign territory obtains only under the condition of involuntary occupation of space. Just as the occupation of space by virtue of one’s entry in the world is independent of one’s will, rejecting an involuntary visitor when this would harm or destroy her is incompatible with the original community of the earth. As Kant stresses, in principle no one has more claim to a specific area of the earth than another person. The global distribution of land is thus wholly contingent. Today’s nations can be seen as “permitted” to control a certain territory to the exclusion of others because borders are helpful for determining the extent of individual acquisition, at least within that territory. However, to deny life-saving occupation of space to another being, who is in principle just as entitled as anyone else to any place of the earth would be to contradict the very justification for the territorial rights of states. This is because the permission to control territory and the right of the involuntary visitor to be admitted are based on the same legal foundation or Rechtsgrund, namely, the original community of the earth. Kant could easily have insisted that the acquired right of nations to their territory not only has priority but trumps the original right of persons to occupy space. It is worthy of attention that he did not accept this in the case of involuntary occupation of space.

My view is that cosmopolitan right signalizes a contradiction of the right to occupy space with itself under different modalities: on the one hand as the original right of individuals or nations to “be somewhere” (as belonging to the lex iusti) and on the other, the acquired right of peoples to their land (belonging to the lex iuridica). Kant distinguishes between three leges or conditions of justice: lex iusti, lex iuridica and lex iustitiae . The distinction is essential for understanding the relationship between Right as a system of external laws a priori and the subsequent developments of right. As Byrd and Hruschka stressed, the three leges correspond to three categories of modality in the Critique of Pure Reason: possibility (Möglichkeit), reality (Dasein) and necessity (Notwendigkeit ). They can be seen as different “modes” of the same idea of right: original right as the pure rational concept of right (possibility), acquired right as arising from concrete deeds or relations between agents (reality) and peremptory right as legitimized and enforced by a public court of justice (necessity). Although there is a positive development in the transition from the lex iusti, through the lex iuridica, to thelex iustitaedistributivae in the civil condition, the lex iusti is not made superfluous in the civil condition, but is still the source of the normativity, and consequently, of the legitimacy, of all further developments of right. The need for maintaining the compatibility of the development of right with its a priori normative source is what gives rise to cosmopolitan right. In this sense, cosmopolitan right in Kant’s theory has a similar function to the right of necessity in Grotius and imperfect rights and duties in Pufendorf’s theory. They are needed to avoid scenarios which would contradict the rationale for introducing certain rights.

#### 2] An exclusive and permanent right to property is not entailed by the categorical imperative – that implies that private appropriation is unjust since exclusions would undermine the ability for private agents to set and pursue their ends.

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

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.).

#### 3] Their offense assumes no a priori restrictions – privatization of outer space runs counter to international law

van Eijk 20 [(Cristian, finishing an accelerated BA in Law at the University of Cambridge. He holds a BA cum laude in International Justice and an LLM in Public International Law from Leiden University, and has previously worked at the T.M.C. Asser Institute and the International Commission on Missing Persons.) “Sorry, Elon: Mars is not a legal vacuum – and it’s not yours, either,” 5/11/20, Völkerrechtsblog, [https://voelkerrechtsblog.org/sorry-elon-mars-is-not-a-legal-vacuum-and-its-not-yours-either](https://voelkerrechtsblog.org/sorry-elon-mars-is-not-a-legal-vacuum-and-its-not-yours-either%20)] TDI

On October 28th, Elon Musk’s company SpaceX published its Terms of Service for the beta test of its Starlink broadband megaconstellation. If successful, the project purports to offer internet connection to the entire globe – an admirable, albeit aspirational, mission. I must confess: Starlink’s terrestrial impact is a pet issue of mine. But this time, something else caught my attention. Buried in said Terms of Service, under a section called “Governing Law”, I discovered this curious paragraph:

“Services provided to, on, or in orbit around the planet Earth or the Moon… will be governed by and construed in accordance with the laws of the State of California in the United States. For Services provided on Mars, or in transit to Mars via Starship or other colonization spacecraft, the parties recognize Mars as a free planet and that no Earth-based government has authority or sovereignty over Martian activities. Accordingly, Disputes will be settled through self-governing principles, established in good faith, at the time of Martian settlement.”

CAN HE DO THAT? In short, the answer is a resounding “no”. Outer space is already subject to a system of international law, and even Elon Musk cannot colombus a new one.

Who’s responsible for Elon Musk?

Two provisions of the Outer Space Treaty (OST), both also customary, are particularly relevant here.

OST article II: “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.”

OST article III: “States… shall carry on activities in the exploration and use of outer space, including (…) celestial bodies, in accordance with international law”.

SpaceX is a private entity, and is not bound by the Outer Space Treaty – but that does not mean it can opt out. Its actions in space could have consequences for the United States in three ways. First, the US, as SpaceX’s launch state, bears fault-based liability for injury or damage SpaceX’s space objects cause to other states’ persons or property (OST article VII, Liability Convention articles I, III). Second, the US, as SpaceX’s state of registry, is the sole state that retains jurisdiction and control over SpaceX objects (OST article VIII, Registration Convention article II). Both refer to objects in space and are irrelevant.

According to article VI OST, States “bear international responsibility for national activities in outer space”, including Mars, including those by “non-governmental entities”. The US, as SpaceX’s state of incorporation, must authorise and continuously supervise SpaceX’s actions in space to ensure compliance with the OST (OST article VI) and international law (OST article III). In practice, this task is done by the US Federal Communications Commission, which licenses and regulates SpaceX.

Article VI OST sets a specific rule of attribution, supplementing the customary rules of state responsibility (Stubbe 2017, pp. 85-104). SpaceX acts with US authorisation, and its conduct in space within and beyond that authorisation is attributable to the US (ARSIWA articles 5, 7). In the absence of circumstances precluding wrongfulness, the result is straightforward. If SpaceX breaches a US obligation under international law, the US bears responsibility for an internationally wrongful act.

The principle of non-appropriation

SpaceX risks breaching OST article II, the “cardinal rule” of space law (Tronchetti, 2007). This principle is a jus cogens norm (Hobe et al. 2009, pp. 255-6) establishing Mars as res communis, rather than terra nullius. I must acknowledge, with tongue firmly in cheek, that SpaceX is partly correct – states have no sovereignty on Mars. But that does not leave Mars a “free planet” up for grabs – SpaceX has no sovereignty either.

On plain reading, article II OST lacks clarity on two key points: i) whose claims are prohibited, and ii) what exactly constitutes a ‘claim of sovereignty’. The first has been answered; per the then-customary interpretative rules and travaux préparatoires, there is quite broad academic consensus (Hobe, et al. 2017; Tronchetti, 2007; Pershing, 2019; Cheney, 2009) that sovereign claims include those by private entities. This is consistent with OST article VI; private entities act in space with state authorisation, and thus state authority. It also accords with the law of state responsibility, wherein conduct of entities exercising state authority is attributable to the state, even if ultra vires (ARSIWA articles 5, 7).

The second issue is more complex. Much has been written on whether claims to space resources or space property (Nemitz v United States) are sovereign. In this case, the territorial claim is less clear; is establishing a jurisdiction a sovereign claim “by other means”? SpaceX purports not to create law horizontally via contract, but to establish the only law on Mars – a vertical structure endemic to sovereign legal orders. International caselaw on territorial acquisition agrees; sovereign acts include “legislative, administrative and quasi-judicial acts” (Case concerning sovereignty over Pulau Ligitan and Pulau Sipadan (Indonesia v. Malaysia), para 148; Decision regarding delimitation of the border between Eritrea and Ethiopia, para. 3.29) with the exercise of jurisdiction and local administration having “particular, probative value” (Minquiers and Ecrehos (France v. UK), p. 22). Also relevant are attempts to exclude other states’ jurisdiction (Island of Palmas (USA v. Netherlands), pp. 838-9). An attempt by SpaceX to prescribe its own jurisdiction on Mars would constitute a sovereign claim in breach of OST article II, and entail US responsibility for an internationally wrongful act.

Of course, as Thom Cheney points out, this is all just words until it isn’t – but there is cause for concern. The Federal Communications Commission (FCC) has been consistently accommodating to commercial space actors, and to SpaceX in particular, preferring to leave regulation up to markets rather than regulatory bodies. As Commissioner O’Rielly said upon granting SpaceX market access: “our job at the Commission is to approve the qualified applications [by SpaceX et al.] and then let the market work its will.” It is not unforeseeable that the FCC would prioritise corporate objectives over principle, and under an administration increasingly dismissive of the international rule of law, might fail to regulate SpaceX in case of breach. Both SpaceX’s actions or FCC inaction risk breaching OST article II, and could leave the US facing reparations claims from injured state(s).

Mars nullius: A thought experiment

But this problem extends beyond the legal. As previously mentioned, the OST, especially article II, designates Mars as res communis. This precludes territorial acquisition by occupation, which can only legitimately occur on terra nullius.

But indulge me for a moment in a half-serious thought experiment. No provision of outer space law explicitly designates Mars res communis. The exploration and use of Mars is the “province of mankind” per OST article I (emphasis added), but that language was specifically diluted in negotiations from the originally-proposed “common heritage of mankind”. The Moon is the “common heritage of mankind” (Moon Agreement, article 5), but only for 18 states. The United States has recently and repeatedly attempted to erode the status of space as res communis, including by treaty and by Executive Order, and it is not alone. If current trends continue, Mars nullius may come sooner than we think.

That line between res communis and terra nullius is the principal legal obstacle to acquiring extra-terrestrial land by the legal process of occupation. In territorial acquisition cases, international law distinguishes between the act of attempting to exercise jurisdiction or sovereignty (called an ‘effectivité‘), and the legal right to do so (sovereign title). The former is a question of fact; the latter is a question of law. Absent other sovereign claims, an effectivité compliant with international law is “as good as title” (Island of Palmas (USA v. Netherlands), p. 839; Frontier Dispute (Burkina Faso v. Mali), para 63). Such an effectivité would contravene international law now, but that law is in flux. What if the current rule proves less-than-robust? As shown above, the elements of successful effectivité, state attribution and a sovereign act with sovereign intention, are satisfied. Slipping this provision on the future Martian legal order into satellite broadband Terms of Service serves little purpose – except as basis for a claim prior to some future critical date.

Crucially, SpaceX is not an international actor. It is an American company subject to US law and continuing US supervision. In both Island of Palmas and the Pedra Branca Dispute, corporations acting under national authorisation and regulation established sovereign titles for their respective states. A future attempt by SpaceX to act on its Terms could be received by other states, either legally or politically, as an American colonisation of Mars.

Concerns and conclusions

Three primary concerns emerge from this picture. First, non-appropriation is cardinal for a reason – if breached, international peace and security in space hangs in the balance. Second, even signalling the implementation of a provision so contrary to US obligations without censure risks the international rule of law. Finally, and most pragmatically, American vulnerability to future claims by other states should concern American citizens; it is their money, their national reputation on the line.

Commercial actors in space present great innovative and developmental potential for all mankind (Aganaba-Jeanty, 2015), but their so-called ‘self-regulatory’ or administrative role should be taken with a healthy scepticism. We already know how that story ends. As Bleddyn Bowen put it, “[t]he continuation of the term ‘colonies’ in describing the potential human future in space should raise political and moral alarm bells immediately given the last 500 years of international relations. Will billionaires run their ‘colonies’ the way they run their factory floors, and treat their citizens like they treat their lowest paid employees?”

As humanity expands into space, we will need new legal rules and understandings of sovereignty to govern the process (Leib, 2015). The current legal order is a critical framework that, without supplement, will someday prove incomplete. The legal governance of Mars is an excellent example. However, those new laws must fit into that framework; they cannot hang suspended in a vacuum. We have seen previously the dangers of rashly governing the global commons based on aspiration and resource hunger (Ranganathan, 2016 and 2019). Martian soil cannot become the manganese nodules of this century. If anything, it is imperative on us to recognise and correct the inequities the current rules have created (Craven, 2019) before proposing new ones.

Space law is an established rulebook likely to undergo some high-octane developments in coming decades. While Elon is welcome to the table, he can’t keep sucking the air from the room. It leaves us space lawyers just shouting into the void.

#### Violating i-Law is a form of promise breaking that is non universalizable – outweighs since it leads to an inconceivable world where everyone lies and there is no conception of truth.

#### 4] The categorical imperative rejects states and companies desires to profit off of space for themselves.

Wurth 19 Wurth, Nicolas. “SPACE ETHICS IN INTERNATIONAL SPACE LAW: ADVANCEMENT AND ENFORCEABILITY.” *University of Luxembourg* , 2019. SJEP

Hans Jonas, german philosopher, studied the concept of ethics related to Kant’s “Categorical Imperative” under the angle of modern technology allowing humans to surpass their own frontiers.10 By extending the aforementioned Categorical Imperative to modern technologies, (which includes space activities) he wrote: “Act that the effects of your action are compatible with the permanence of genuine human life. [...] Act so that the effects of your action are not destructive of the future possibility of such life [...] Do not compromise the conditions for an indefinite continuation of humanity on earth.”11 The conceptualization of ethics implies to evaluate behavior, actions and activities of space actors.12 Related to space activities, ethical behavior shall therefore be aligned with a sort of conduct that is to be followed, independently of “any natural desires.” Such an understanding does naturally challenge States’ desires to diversify their economy via the adoption of a legal framework on space activities13 or the profit-making goal of a company which has the technical ability to conduct a profitable space activity such as space-mining?

### Advantage

#### The private sector locks in the Kessler Syndrome as a structurally inevitability by 2035.

Rao and Rondina 2/16/22 [Akhil Rao and Giacomo Rondina. \*Middlebury College in the Department of Economics. \*\*University of California, San Diego. “Open access to orbit and runaway space debris growth.” <https://arxiv.org/pdf/2202.07442.pdf>] Justin

In this paper we present a dynamic physico-economic model of orbit use under rational expectations with endogenous collision probability and Kessler Syndrome. We show how both economic and physical parameters drive equilibrium short- and long-run orbital-use patterns, derive the marginal external cost of a satellite, explore the multiplicity and stability of openaccess steady states, and examine the relationships between open-access orbit use, optimal orbit use, and Kessler Syndrome. We then calibrate the model to an important region of LEO and estimate the likely times when Kessler Syndrome will occur under different patterns of satellite industry economics. We highlight three messages regarding orbital-use management.

First, under open access too many firms will launch satellites because they won’t internalize the risks they impose on other orbit users. Though profit maximizing satellite owners have incentives to reduce launches as the risk of a collision grows, they do not respond to debris growth or collision risk optimally. This inefficiency is independent of whether Kessler Syndrome is possible or not. Unlike many other bioeconomic commons problems, higher discount rates can induce less (rather than more) open-access overexploitation.

Second, Kessler Syndrome is possible as long as debris objects can collide with each other and generate new fragments, i.e the new fragment formation debris coupling exists. Engineering studies indicate that this coupling does in fact exist. Due to open access, even profit maximizing firms with rational expectations may continue to launch satellites despite recognizing their role in causing Kessler Syndrome and even after the Kessler threshold has been crossed.

Third, under open access Kessler Syndrome is more likely as the excess return on a satellite rises, even if firms will respond to orbital congestion by launching fewer satellites. As launch costs fall and new commercial satellite applications become viable, LEO is thus increasingly and inefficiently likely to experience Kessler Syndrome. While it may seem paradoxical that the very changes which make orbit use profitable can also increase the risk of resource collapse, such dynamics occur frequently in bioeconomic commons problems. Calibrated simulations reveal that space economy growth rates projected by investment banks and industry associations are consistent with Kessler Syndrome occurring as early as 2035. Our results suggest that, absent institutional reform, continued growth of the space economy may trigger Kessler Syndrome in the near future. This can occur even in regions perceived to have relatively high rates of natural renewability, providing new evidence that compliance with the 25-year rule is insufficient to ensure sustainable orbit use.

#### Fragmentation leads to speedy debris – that’s laws of physics.

Aerospace.org n.d. [As an independent, nonprofit corporation operating the only FFRDC for the space enterprise, The Aerospace Corporation performs objective technical analyses and assessments for a variety of government, civil, and commercial customers. “SPACE DEBRIS 101.” AEROSPACE. <https://aerospace.org/article/space-debris-101>] Justin

Can you see space debris coming at you?

It is very unlikely that you would see space debris. Relative to a person in orbit, space debris is moving about ten times faster than a bullet, and the vast majority of debris is as small as or smaller than a bullet. No one can see a bullet coming, let alone an object moving ten times faster.

What is an on-orbit collision like?

It looks more like an explosion of each object, as if they passed through each other and exploded on the other side. A hyper-velocity collision like those at orbital speed doesn’t behave like collisions that we are used to seeing. The objects are moving so fast that they travel through each other faster than the shock waves can travel. The shock waves in the structures of each object then shatter them into fragments of varying sizes and, in the process, give each fragment a boost in a different direction. Each one of these fragments is then in a different orbit than the original object and will move away according to the laws of orbital motion. With thousands of fragments, each moving in slightly different directions, it looks a lot like an explosion.

Do breakups look like the movies?

For dramatic purposes, movies, TV, and commercials tend to show space breakups at a much slower speed than they would happen at in real life. A breakup in space, especially a collision, can involve a lot of energy, and the pieces are flung away at extremely high speeds. Since there is no air to slow the pieces down the fragments would all fly away from one another and rapidly disappear from view. For many breakups, a softball-sized fragment would fly the length of the space station (a little less than a football field) in less than half a second. If you were watching it from nearby, you would see a flash, and the object that broke up would just disappear and be gone. It would be very unlikely for you to see pieces drifting away. Similarly, a low orbit space collision is unlikely to look much like a car crash — the speeds are much too high. The collisions would look like explosions to a nearby observer.

#### Debris cascades triggers global grid shutdown---generator dispersion is dependent on satellites.

Silberg 1/26/14 [Bob Silberg, NASA’s Jet Propulsion Laboratory. “Satellites help power grid keep its balance.” Climate.NASA.Gov. <https://climate.nasa.gov/news/1027/satellites-help-power-grid-keep-its-balance/>] Justin

Imagine a generator pumping more electricity than a nuclear power plant into the grid, but inconsistently and without the grid’s caretakers being able to see what it was doing. How could they maintain the critical balance between generation and consumption that the grid requires? A key to the answer hovers some 22,000 miles overhead.

The amount of electricity fed into an electrical grid at any given moment must equal the amount that is being used at that moment. Too much or too little could damage the millions of electrical devices connected to the grid or even trigger a power outage. Nine of North America’s largest grids have special independent organizations charged with maintaining that balance.

California Independent Service Operator (ISO) manages the grid that serves most of California and a chunk of Nevada. They rebalance the grid’s intake and output every four seconds, using sophisticated algorithms to forecast demand and a variety of ways to adjust the wattage they introduce into the system throughout the day. But they can only manage what they can see: the big power plants that produce the bulk of the system’s electricity. “We can’t see the solar panels on the rooftop of your house,” said Jim Blatchford, the ISO’s short-term forecasting manager. “We don’t know how much they are reducing your demand or feeding back into the grid.” And that’s a significant challenge.

More electricity than a power plant

The nearly 200,000 solar installations on private homes and businesses in California, taken together, generate more electricity than any power plant in the state. Clearly, grid managers need to take them into account to calculate accurately how much electricity the grid should carry.

But this multitude of small solar setups is scattered over a vast area with a wide range of highly variable weather conditions that affect how much sunlight each one receives—and therefore how much electricity it produces—at any given moment. The sun may shine brightly on a rooftop in Bakersfield while a bungalow in Santa Monica is shrouded in fog. When the fog lifts and those panels begin to produce, a morning shower may dampen productivity in San Francisco while a giant cloud bank plays peekaboo with the sun over Sacramento.

Tracking all those solar panels and their ever-changing environments may seem like herding cats, but a company called Clean Power Research (CPR) has developed a solution that the California ISO is currently testing. CPR accumulated information about the state’s small solar installations by playing a role in registering them for rebates. So they know where the solar panels are and the size, angle and shading characteristics of each group.

What remains is to determine how much sunlight reaches each set of solar panels at any given time, and that’s where the Geostationary Operational Environmental Satellite (GOES) system comes in.

CPR uses a stream of data from GOES in real time to characterize how much sunlight each relevant square kilometer of California is receiving and to forecast how the picture is going to change over the course of a week. “If you look at a series of those GOES images, you can track the motion of the clouds,” said Adam Kankiewicz, Solar Research Specialist at CPR. “You can say if it’s gone from here to here in the last hour, we predict that it’s going to go, say, 10 kilometers in that direction in two hours. For short-term forecasting, that's the most accurate method out there.”

Hour by hour

“We model each of those nearly 200,000 systems individually,” said Mark Liffmann, who is Vice President of Business Development, Sales and Marketing at CPR. “We use the irradiance (the measurement of sunlight intensity) to determine how much electricity each system is likely to produce each hour for the next seven days, and then we aggregate those forecasts and feed that into the ISO’s software so they can determine how much generation they’ll need to meet the net load.”

CPR’s software and the ISO’s software engage in an ongoing dialogue to keep the balancing authority up to date. “It needs to happen quickly in real time,” Liffmann said. “You need the ongoing forecast continuously to be able to accurately calculate what solar panels are going to provide and therefore what traditional resources you are going to need to turn on and off.”

California ISO’s Blatchford points out that the monitoring and forecasting that GOES enables can also help his organization determine what to expect from the large, commercial solar stations in its system. Their output is just as dependent on weather conditions as a small rooftop system.

“The sun angle plays a big part in it, too,” he said. “A cloud 10 miles away from the plant could be in between the plant and the sun.”

Despite the challenges they present, having California’s single largest generator in the form of 200,000 widely dispersed solar-panel setups has a big potential upside. “It gives you two advantages,” Liffmann said. “One, you don’t have a single point of failure. If one system goes down, it’s a small percentage of the total generation. The other is that it smooths out a lot of the weather variation. As long as you can forecast it well, it’s a great benefit.”

And the view from 22,000 miles up is indispensible to making those forecasts. “GOES satellites are the only available source for the images we need over North America,” Kankiewicz said.

#### Grid security is an impact filter.

Denkenberger 21 – David Denkenberger, Anders Sandberg, Ross John Tieman, and Joshua M. Pearce, \*Assistant professor of mechanical engineering at University of Alaska Fairbanks, “Long-term cost-effectiveness of interventions for loss of electricity/industry compared to artificial general intelligence safety,” 2021, *European Journal of Futures Research*, Vol. 9, Issue 1, https://doi.org/10.1186/s40309-021-00178-z, EA Recut Justin

Civilization relies on a network of highly interdependent critical infrastructure (CI) to provide basic necessities (water, food, shelter, basic goods), as well as complex items (computers, cars, space shuttles) and services (the internet, cloud computing, global supply chains), henceforth referred to as industry. Electricity and the electrical infrastructure that distributes it plays an important role within industry, providing a convenient means to distribute energy able to be converted into various forms of useful work. Electricity is one component of industry albeit a critical one. Industry provides the means to sustain advanced civilization structures and the citizens that inhabit them. These structures play a critical role in realizing various futures by allowing humanity to discover and utilize new resources, adapt to various environments, and resist natural stressors.

Though industry is capable of resisting small stressors, a sufficiently large event can precipitate cascading failure of CI systems, resulting in a collapse of industry. If one does not temporally discount the value of future people, the long-term future (thousands, millions, or even billions of years) could contain an astronomically large amount of value [18]. Events capable of curtailing the potential of civilization (existential risks, such as human extinction or an unrecoverable collapse) would prevent such futures from being achieved, implying reducing the likelihood of such events is of the utmost importance [100]. Reducing the prevalence of existential risks factors; events, systemic structures, or biases which increase the likelihood of extinction but do not cause extinction by themselves is also highly valuable. Complete collapse or degraded function of industry would drastically reduce humanity’s capacity to coordinate and deploy technology to prevent existential risks, representing an existential risk factor. Consequently, interventions preventing loss of industry, reducing the magnitude of impacts, or increasing speed of recovery could be extremely valuable.

Existential risk research is, by nature, future focused, requiring the investigation of events that have not yet occurred. Futures studies methodologies are often applied to uncover salient trends or events, and explore potential causal structures [54, 123]. Probabilistic modeling techniques can then be used to determine the likelihood of such events occurring, including adequate treatment of uncertainty [101]. The cost-effectiveness modeling approach outlined in this paper is an example of this, attempting to assess the marginal utility of losing industry interventions on improving the long-term future. This approach could guide future efforts to assess the relative cost-effectiveness of interventions for different risks, existential or otherwise. More practically, this research can inform prioritization efforts of industrialized countries by providing estimates of the cost of global industrial collapse, and the utility of resilience interventions. This is relevant to the European Union which has a highly industrialized economy, providing $2.3 Trillion USD of the $13.7 Trillion USD global total of value add manufacturing [122]. The EU has shifted toward a more proactive foresight approach about natural and man-made disasters, noting the importance of rare high-impact events, systemic risks, and converging trends requiring better data and forecasting to drive a more ambitious crisis management system [47]. Still, it is clear that most academic and institutional emphasis has been on “ordinary” rather than extreme disasters, and risks from industry to the public and environment rather than widespread failures of industrial services causing harm. The integrated nature of the electric grid, which is based on centralized generation makes the entire system vulnerable to disruption.1 There are a number of anthropogenic and natural catastrophes that could result in regional-scale electrical grid failure, which would be expected to halt the majority of industries and machines in that area. A high-altitude electromagnetic pulse (HEMP) caused by a nuclear weapon could disable electricity over part of a continent [16, 48, 66, 93]. This could destroy the majority of electrical grid infrastructure, and as fossil fuel extraction and industry is reliant on electricity [49], industry would be disabled. Similarly, solar storms have destroyed electrical transformers connected to long transmission lines in the past [117]. The Carrington event in 1859 damaged telegraph lines, which was the only electrical infrastructure in existence at the time. It also caused Aurora Borealis that was visible in Cuba and Jamaica [70]. This could potentially disable electrical systems at high latitudes, which could represent 10% of electricity/industry globally. Though solar storms may last less than the 12 h that would be required to expose the entire earth with direct line of sight, the earth’s magnetic field lines redirect the storm to affect the opposite side of the earth [117]. Lastly, both physical [6, 8, 69, 89, 111] and cyber attacks [3, 63, 90, 96, 118, 128, 130] could also compromise electric grids. Physical attacks include traditional acts of terrorism such as bombing or sabotage [130] in addition to EMP attacks. Significant actors could scale up physical attacks, for example by using drones. A scenario could include terrorist groups hindering individual power plants [126], while a large adversary could undertake a similar operation physically to all plants and electrical grids in a region. Unfortunately, the traditional power grid infrastructure is simply incapable of withstanding intentional physical attacks [91]. Damage to the electric grid resulting in physical attack could be long lasting, as most traditional power plants operate with large transformers that are difficult to move and source. Custom rebuilt transformers require time for replacement ranging from months and even up to years [91]. For example, a relatively mild 2013 sniper attack on California’s Pacific Gas and Electric (PG&E) substation, which injured no one directly, was able to disable 17 transformers supplying power to Silicon Valley. Repairs and improvements cost PG&E roughly $100 million and lasted about a month [10, 102]. A coordinated attack with relatively simple technology (e.g., guns) could cause a regional electricity disruption. However, a high-tech attack could be even further widespread. The Pentagon reports spending roughly $100 million to repair cyber-related damages to the electric grid in 2009 [57]. There is also evidence that a computer virus caused an electrical outage in the Ukraine [56]. Unlike simplistic physical attacks, cyber attackers are capable of penetrating critical electric infrastructure from remote regions of the world, needing only communication pathways (e.g., the Internet or infected memory sticks) to install malware into the control systems of the electric power grid. For example, Stuxnet was a computer worm that destroyed Iranian centrifuges [73] to disable their nuclear industry. Many efforts are underway to harden the grid from such attacks [51, 63]. The U.S. Department of Homeland Security responded to ~ 200 cyber incidents in 2012 and 41% involved the electrical grid [103]. Nations routinely have made attempts to map current critical infrastructure for future navigation and control of the U.S. electrical system [57]. The electric grid in general is growing increasingly dependent upon the Internet and other network connections for data communication and monitoring systems [17, 112, 118, 127, 135]. Although this conveniently allows electrical suppliers management of systems, it increases the susceptibility of the grid to cyber-attack, through denial of webpage services to consumers, disruption to supervisory control and data acquisition (SCADA) operating systems, or sustained widespread power outages [3, 72, 118, 120]. Thus global or regional loss of the Internet could have similar implications. A less obvious potential cause is a pandemic that disrupts global trade. Countries may ban trade for fear of the disease entering their country, but many countries are dependent on imports for the functioning of their industry. If the region over which electricity is disrupted had significant agricultural production, the catastrophe could be accompanied by a ~ 10% food production shortfall as well. It is uncertain whether countries outside the affected region would help the affected countries, do nothing, or conquer the affected countries. Larger versions of these catastrophes could disrupt electricity/industry globally. For instance, it is possible that multiple HEMPs could be detonated around the world, due to a world nuclear war [105] or due to terrorists gaining control of nuclear weapons. There is evidence that, in the last 2000 years, two solar storms occurred that were much stronger than the Carrington event [85]. Therefore, it is possible that an extreme solar storm could disable electricity and therefore industry globally. It is conceivable that a coordinated cyber or physical attack (or a combination) on many electric grids could also disrupt industry globally. Many of the techniques to harden the electric grid could help with this vulnerability as well as moving to more distributed generation and microgrids [23, 29, 75, 76, 103, 114]. An extreme pandemic could cause enough people to not show up to work such that industrial functioning could not be maintained. Though this could be mitigated by directing military personnel to fill vacant positions, if the pandemic were severe enough, it could be rational to retreat from high human contact industrial civilization in order to limit disease mortality. The global loss of electricity could even be self-inflicted as a way of stopping rogue artificial general intelligence (AGI) [124]. As the current high agricultural productivity depends on industry (e.g., for fertilizers), it has been assumed that there would be mass starvation in these scenarios [107].

Repairing these systems and re-establishing electrical infrastructure would be a goal of the long term and work should ideally start on it immediately after a catastrophe. However, human needs would need to be met immediately (and continually) and since there is only a few months of stored food, it would likely run out before industry is restored with the current state of preparedness. In some of the less challenging scenarios, it may be possible to continue running some machines on the fossil fuels that had previously been brought to the surface or from the use microgrids or shielded electrical systems. In addition, it may be feasible to run some machines on gasified wood [31]. However, in the worst-case scenario, all unshielded electronics would be destroyed.

#### Debris triggers miscalculated war.

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The recent Russian anti-satellite test didn’t tell the world anything new, but it did reaffirm the peril posed by warfare in space. Debris from explosions could make some earth orbits remarkably risky to use for both civilian and military purposes. But the test also highlighted a less visible danger; attacks on nuclear command and control satellites could rapidly produce an extremely dangerous escalatory situation in a war between nuclear powers. James Acton and Thomas Macdonald drew attention to this problem in a recent article at Inside Defense. As Acton and MacDonald point out, nuclear command and control satellites are the connective tissue of nuclear deterrence, assuring countries that they’re not being attacked and that they’ll be able to respond quickly if they are.

For a long time, these strategic early-warning satellites were akin to a center of gravity in ICBM warfare. Nuclear deterrence requires awareness that an attack is underway. Attacks on the monitoring system could easily be read as an attempt to ~~blind~~ an opponent in preparation for general war, and could themselves incur nuclear retaliation. Thus, the nuclear command and control satellites are critical to the maintenance of nuclear deterrence. They make it possible to distribute an order from the chief of government to the nuclear delivery systems themselves. Consequently, their destruction might lead to hesitation or delay in performing a nuclear launch order.

It was only later that the relevance of satellites for conventional warfare became clear. Satellites could reconnoiter enemy positions and, more importantly, provide communications for friendly forces. Indeed, the expansion of the role of satellites in conventional warfare has complicated the prospect of space warfare. States have a clear reason for targeting enemy satellites which support conventional warfare, as those satellites enable the most lethal part of the kill chain, the communications and recon networks that link targets with shooters. Thus, we now have a situation in which space military assets have both nuclear and conventional roles. In a conflict confusion and misperception could rapidly become lethal. If one combatant views an attack against nuclear command and control as a prelude to a general nuclear attack, it might choose to pre-empt.

Nuclear powers have dealt with problems in this general category for a good long while; would a conventional attack against tactical nuclear staging areas represent an escalation, for example? Would the use of ballistic missiles that can carry either conventional or nuclear weapons trigger a nuclear response? Do attacks against air defense networks that have both strategic and tactical responsibilities run the risk of triggering a nuclear response? There’s also the danger that damage to communications networks designated for conventional combat could force traffic onto the nuclear control systems, further confusing the issue.

#### **No checks on escalation.**

MacDonald 18. Bruce W. MacDonald, professor at the Johns Hopkins University School of Advanced International Studies (SAIS), ("Outer Space; Earthly Escalation? Chinese Perspectives on Space Operations and Escalation," August 2018, *NSI* white paper, <https://nsiteam.com/social/wp-content/uploads/2018/08/SMA-White-Paper_Chinese-Persepectives-on-Space_-Aug-2018.pdf>, accessed 7-14-2019) bm

Challenges across all five phases: Another escalation threat is the inexperience that nations share in the space and cyber domains, unlike in conventional domains of conflict and in the nuclear domain to a lesser extent. This inexperience gives rise to a “sorcerer’s apprentice” problem, placing leaders at risk of making potentially unwise judgment calls without a full grasp of their implications. The space and cyber domains are sufficiently new and dynamic that such decisions are highly likely. Adding to this uncertainty is the ever-growing interdependence of infrastructures within and among advanced countries, making the impact of major attacks against a country’s space and/or cyber infrastructures inherently unknowable. In considering all these factors, it is important to keep in mind that events in space do not happen in isolation. Any space conflict would likely be part of a multidimensional field of play, with space being important because of the effects it has on the earth. Significant instability in space is unlikely to lead to war if there is stability in other domains and in the larger geopolitical relationship between participants, while conflict could easily spread to a stable space domain if war in other domains appeared preferable to the alternative. While any use of nuclear weapons would pose a serious threat of escalation to full-scale nuclear war, any use of space or cyber offense would not pose a comparable escalation threat. That said, a series of reciprocal escalations could easily become unstable. No clear-cut escalation barrier exists in the space and cyber domains, and given the short-term tactical benefits of escalating ahead of an adversary, each additional escalation could create incentives for further escalation that an adversary would not always anticipate. Escalation in space, then, is a slippery slope with few off-ramps.

### Underview

##### [1] Aff gets 1AR theory since the neg can be infinitely abusive and I can’t check back. Aff theory is drop the debater, competing interps, and the highest layer since the 1ar is too short to win both theory and substance and reasonability bites intervention since it’s up to the judge to determine. No 2NR RVI, paradigm issues, theory, evidence, or new responses to AC arguments since they’d dump on it for 6 minutes and my 3-minute 2AR is spread too thin.