#### **Ethics must be derived a priori. Permissibility affirms – otherwise we’d have to have a proactive justification to do things like drink water which is illogical and collapses decision making.**

#### **1] Uncertainty – experiences are locked within our own subjectivity and are inaccessible to others, however a priori principles are created in the noumenal world and are universally applied to all agents.**

#### **2] Is/Ought Gap – experience in the phenomenal world only tells us what is since we can only perceive what is, not what ought to be. But it’s impossible to derive an ought from descriptive premises, so there needs to be additional a priori premises within the noumenal world to make a moral theory.**

#### **The existence of extrinsic goodness requires unconditional human worth—that means we must treat others as ends in themselves.**

**Korsgaard ’83** (Christine M., “Two Distinctions in Goodness,” The Philosophical Review Vol. 92, No. 2 (Apr., 1983), pp. 169-195, JSTOR) OS/Recut Lex AKu \*brackets for gendered language

The argument shows how Kant's idea of justification works. It can be read as a kind of regress upon the conditions, starting from an important assumption. The assumption is that **when a rational being makes a choice or undertakes an action,[they] he or she supposes the object to be good, and its pursuit to be justified**. At least, **if there is a categorical imperative there must be objectively good ends, for then there are necessary actions and so necessary ends** (G 45-46/427-428 and Doctrine of Virtue 43-44/384-385). **In order for there to be any objectively good ends, however, there must be something that is unconditionally good and so can serve as a sufficient condition of their goodness**. Kant considers what this might be: **it cannot be an object of inclination**, for those have only a conditional worth, "**for if the inclinations and the needs founded on them did not exist, their object would be without worth**" (G 46/428). It cannot be the inclinations themselves because a rational being would rather be free from them. Nor can it be external things, which serve only as means. So, Kant asserts, **the unconditionally valuable thing must be "humanity" or "rational nature,"** which he defines as "**the power set to an end**" (G 56/437 and DV 51/392). Kant explains that **regarding your existence as a rational being as an end in itself is a "subjective principle of human action."** By this I understand him to mean that **we must regard ourselves as capable of conferring value upon the objects of our choice, the ends that we set, because we must regard our ends as good**. But since "every other rational being thinks of his existence by the same rational ground which holds also for myself' (G 47/429), **we must regard others as capable of conferring value by reason of their rational choices and so also as ends in themselves**. Treating another as an end in itself thus involves making that person's ends as far as possible your own (G 49/430). **The ends that are chosen by any rational being, possessed of the humanity or rational nature that is fully realized in a good will, take on the status of objective goods. They are not intrinsically valuable, but they are objectively valuable in the sense that every rational being has a reason to promote or realize them**. For this reason it is our duty to promote the happiness of others-the ends that they choose-and, in general, to make the highest good our end.

#### **Practical reason is inescapable - Any moral rule faces the problem of regress – I can keep asking “why should I follow this.” Regress collapses to skep since no one can generate obligations absent grounds for accepting them. Only reason solves since asking “why reason?” requires reason to do in the first place which concedes its authority.**

#### **Reason means we must be able to universally will maxims— [A] our judgements are authoritative and can’t only apply to ourselves any more than 2+2=4 can be true only for me.**

**This the standard is consistency with the categorical imperative.**

#### **Other frameworks collapse—they contain conditional obligations which derive their authority from the categorical imperative.**

**Korsgaard 98** [CHRISTINE M. KORSGAARD, greatest philosopher alive, 1998, “Introduction”, Groundwork of the Metaphysics of Morals] AG // Recut Lex AKu

This is the sort of thing that makes even practiced readers of Kant gnash their teeth. A rough translation might go like this: **the categorical imperative is a law, to which our maxims must conform**. But **the reason they must do so cannot be that there is some further condition they must meet, or some other law to which they must conform.** For instance, **suppose** someone proposed **that one must keep one's promises because it is the will of God** that one should do so - **the law would** then **"contain the condition" that our maxims should conform to the will of God**. **This would yield only a conditional requirement to keep one's promises — if you would obey the will of God**, then **you must keep your promises - whereas the categorical imperative must give us an unconditional requirement.** **Since there can be no such condition, all that remains is that the categorical imperative should tell us that our maxims themselves must be laws - that is, that they must be universal, that being the characteristic of laws**. There is a simpler way to make this point. What could make it true that we must keep our promises because it is the will of God? **That would be true only if** it were true that we must indeed obey the will of God, that is, if **"obey the will of God" were itself a categorical imperative**. **Conditional requirements give rise to a regress; if there are unconditional requirements, we must at some point arrive at principles on which we are required to act, not because we are commanded to do so by some yet higher law, but because they are laws in themselves**. **The categorical imperative**, in the most general sense, **tells us to act on those principles**, principles which are themselves laws. Kant continues:

#### **Actor specificity – governments use Kantian conceptions of the state when implementing policies.**

#### **RIPSTEIN 15**

#### **Arthur Ripstein (Professor of Law and Philosophy at the University of Toronto). “Just War, Regular War, and Perpetual Peace” (2015). AS 7/16/15**

Sophisticated **contemporary legal systems work** either **implicitly or explicitly with** some version of **this Kantian idea of the state as a public rightful condition. Constitutional courts review legislation to make sure** that **it is properly within the state's legitimate mandate, and** throughout the world recent **awareness of** problems of **institutional corruption reflect the recogni[ze]**tion **of the fundamental** importance of the **distinction between properly public and improperly private purposes in** the internal **management of states.** Conversely, **its widely appreciated that the proper role of the state is not simply to bring about as much good as possible** in the world**, and that states have a special responsibility to their** own **citizens** and residents.

#### 

#### **Reject consequentialism –**

#### **A) Action theory: Actions are defined by their aims so you can’t evaluate action absent the intent. The aim acts as a unifier e.g. to drink, I must raise the glass and then swallow, which then have different constituent parts, making actions infinitely divisible. The only way to judge the topical action is by looking to intent.**

#### B**) Induction fails – single inductions require prior inductions to verify its truth but that’s circular since the framework of induction presupposes its own method of justification. Also, there is no logical basis for induction – just because the moon came up last night, does not mean there is a sound justification for why it ought to come up tomorrow.**

#### **C) Infinite consequences-every action has an infinite number of consequences proven by the butterfly effect- this means that there’s an infinite obligation triggering infinite regression.**

### **Plan**

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

#### **Enforcement through banning constellations in the LEO by claiming they violate Article II of the OST, Johnson 20**

[Christopher D. Johnson, 2020, "The Legal Status of MegaLEO Constellations and Concerns About Appropriation of Large Swaths of Earth Orbit", Secure World Foundation, https://swfound.org/media/206951/johnson2020\_referenceworkentry\_thelegalstatusofmegaleoconstel.pdf, date accessed 1-23-2022] //Lex AT

**Are Constellations Appropriation? The astronomy community has already voiced concerns about the impact that constellations will have on astronomy** (AstronomyNow 2019). **Constellations also bring potential risks from space debris and radiofrequency interference, both of which will have an effect on space sustainability**. Starlink’s 1584 satellites in the 550 km region would effectively triple the number of satellites in the 400–600 km region, for example. Leaving these important concerns aside, **constellations should also be considered in the context of their general legal status – and specifically whether large swaths of Low Earth Orbit are being impermissibly claimed and possessed by individual actors** (whether the commercial actor itself, or by the authorizing national government). For example, and as mentioned above, the OneWeb constellation will be in 12 orbital planes at 1200 km. Phase 1 of the SpaceX Starlink constellations will fly 66 satellites in 24 orbital planes, for a total of 1584 satellites in its initial constellation. Do these megaconstellations constitute an impermissible appropriation (or ownership) of particular regions of outer space? Without offering a definitive conclusion, the following sections first argue why, and then why not, these large constellations in LEO constitute impermissible appropriations of sections of outer space. The reader can consider for themselves which of the following opposing arguments they find more convincing. Yes, **This Is Impermissible Appropriation Article II of the Outer Space Treaty**, discussed above, **is clear on the point that the appropriation of outer space, including the appropriation of either void space or of celestial bodies,** is an impermissible and prohibited action under international law. No means or methods of possession of outer space will legitimize the appropriation or ownership of outer space, or subsections thereof. Excludes Others **The constellations above, because they seem to so overwhelmingly possess particular orbits through the use of multiple satellites to occupy orbital planes, and in a manner that precludes other actors from using those exact planes, constitute an appropriation of those orbits.** **While the access to outer space is nonrivalrous** – in the sense that anyone with the technological capacity to launch space objects can therefore explore space – it is also true that **orbits closer to Earth are unique, and when any actor utilizes that orbit to such an extent to these proposed constellations will, it means that other actors simply cannot go there.** The Legal Status of MegaLEO Constellations and Concerns About Appropriation... 15 To allow SpaceX, for example, to so overwhelmingly occupy a number of altitudes with so many of their spacecraft, essentially means that SpaceX will henceforth be the sole owner and user of that orbit (at least until their satellites are removed). No other actors can realistically expect to operate there until that time. No other operator would dare run the risk of possible collision with so many other spacecraft in that orbit. Consequently, the sole occupant will be SpaceX, and if “possession is 9/10th of the law,” then SpaceX appears to be the owner of that orbit. Done Without Coordination Additionally, SpaceX and other operators of **megaconstellations are doing so without any real international conversation or agreement, which is especially egregious and transgressive of the norms of outer space**. Compared to the regime for GSO, as administered by the ITU and national frequency administrators, Low Earth Orbit is essentially ungoverned, and SpaceX and others are attempting to seize this lack of authority to claim entire portions of LEO for itself; and before any international agreement, consensus, or even discussion is had. They are operating on a purely “first come, first served” basis that smacks of unilateralism, if not colonialism. Governments Are Ultimately Implicated As we know, under international space law, what a nongovernmental entity does, a State is responsible for. **Article VI of the Outer Space Treaty requires that at least one State authorize and supervise its nongovernmental entities and assure their continuing compliance with international law. As such**, the prohibition on **nonappropriation** imposed upon States under Article II of the Outer Space Treaty **applies equally to nongovernmental private entities** such as SpaceX. Nevertheless, through the launching and bringing into use of the Starlink constellation, SpaceX will be the sole occupant, and thereby, possessor, both fact and in law, of 550 km, 1100 km, 1130 km, 1275 km, and 1325 km above our planet (or whatever orbits they finally come to occupy). The same is true for the other operators of these large constellations which will be solely occupying entire orbits.

### **Offense**

#### **1] Appropriation of mineral resources in outer space constitutes property rights**

Amanda M. **Leon**, Associate\*, Caplin & Drysdale, Chtd., **’18**, Virginia Law Review [“MINING FOR MEANING: AN EXAMINATION OF THE LEGALITY OF PROPERTY RIGHTS IN SPACE RESOURCES” Vol. 104:497 2018]

Furthermore, **state practice** **relevant to the question of property rights under the OST goes beyond these examples and analogies of ownership** of resources taken from commons. State practice regarding property rights in general must be considered. For example, Professor Fabio **Tronchetti disagrees with the oft-cited notion that state practice affirms the SREU Act.**

214 According to the professor, “**under international law, property rights require a superior authority, a State, entitled to attribute and enforce them**.”215 **By granting property rights** in the SREU Act, **the United States impliedly claims that it has the authority to confer property rights over space resources**—an authority traditionally reserved for the owner of a resource. **This notion clashes with the nonappropriation principles of the OST.** Though there is no consensus regarding whether the nonappropriation principle prohibits claims of sovereignty over resources, **a strong consensus at least exists that the principle prohibits states from claiming sovereignty over real property in space**.216 **In** some **traditional systems of mineral ownership**, however, **ownership over resources ran with ownership over land**.217 For example, **under Roman law, property rights over subsurface minerals belonged to the landowner**.218 Thus, **if the United States cannot have title in space lands under the nonappropriation principle, it cannot have title to the space resources in those lands either.** **Without title to the resources, the United States cannot bestow such title to its citizens** under traditional international property law; by claiming that it can bestow such title, the United States is abrogating Article II of the OST. One could also argue that **the in situ resources the Act grants rights in are actually still part of the celestial bodies; thus, the resources are real property prior to their removal, and are off limits** under the Treaty.219 Given the limited import of the cited examples of state practice (limited quantity and scientific versus large-scale and commercial), the **traditional practice of property rights being conferred from a sovereign to a citizen become incredibly compelling and suggest the SREU Act may abrogate the United States’ treaty obligations.**

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

Notes

\*\* only way to understand ethics is through an Omnilateral will to resolve unilateral wills – outer space lacks any sort of govnt then any claim to outer space that came in a form of property rights would be unjust

\*\* Common owner ship of the earth -

**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. Only conditional use is universalizable which private appropriation of scarce resources contravenes**

**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] 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 since it leads to an inconceivable world where everyone lies and there is no conception of truth.**

#### **4] Initial acquistion impose normative obligations on others.**

**Ripstein** [Ripstein, Arthur. Force and Freedom: Kant’s Legal and Political Philosophy. United Kingdom, Harvard University Press, 2010.]//Lex AKu

Second, **Kant argued against the thesis that property rights are to be understood as extensions of rights to one's own person**. Variants of this thesis can be found in the otherwise differing accounts of property in Locke and Hegel. Locke's example of eating an apple involves explicit incorporation; Hegel's more abstract analysis in terms of putting your will into a thing captures the same intuitive idea. **These accounts of property submerge the significance of acquisition for others**, by representing the obligation to respect the property of another as an instance of the obligation to respect that person. As we saw, the Lockean/Hegelian strategy cannot explain why such acts of self-relation change the rights of others. Locke incorporates a "proviso" requiring that "enough and as good" be left for others through any appropriation. No saving clause of this sort can address the basic issue, however. **Even if it restricts unilateral acquisition to cases in which doing so does not worsen the ability of others to provide for themselves**, **it fails to address the question of how one person can place another under an obligation**. It may be worse to have others impose obligations on you if those obligations are onerous, but **your right to freedom is at issue when others change your normative situation, even if you have other options so that the situation is not burdensome**. Third, Kant introduced an account of unilateral acquisition: **the transition from an object's being unowned to its being owned depends on a unilateral act of appropriation**. The acquisition of property is nothing more than the change in the status from being subject to the choice of no person to being subject to the choice of some particular person, its owner. The affirmative act required to acquire an object is simply taking control of it and giving a sign that you intend to continue controlling it. **Acquisition requires taking control, giving a sign, and bringing your act into conformity with a "general will." Although a person acquiring an object does so** on his or her own initiative **without consulting others**, **the power to do so requires an omnilateral will to make the unilateral act binding on others**.' Kant thus treats initial acquisition as a special case of political authority.

5] **AFC or ACC – you can contest the framework or the offense but not both. The standard is strat skew – 1AR is too time crunched to answer the framework and your contention in an in depth fashion because of the 7-4, 6-3 time skew, going all in on one doesn’t solve because then the 6 minute 2NR can dump and bracket out the 4 minute 1AR.**

### adv

#### **Private sector activity is driving LEO congestion and its set to get 100 times worse – the plan reverses this trend.**

**Smith 8/18** [Adam Smith, “Loopholes in Space Debris Law Might Stop Humanity from Leaving Earth.” *The Independent*, Independent Digital News and Media, 18 Aug. 2021, [https://www.independent.co.uk/life-style/gadgets-and-tech/space-debris-planet-legal-loophole-earth-government-b1897082.html.]//Lex](https://www.independent.co.uk/life-style/gadgets-and-tech/space-debris-planet-legal-loophole-earth-government-b1897082.html.%5d/Lex) AKu

If this is not addressed, **the scale of the problem is only going to get worse**. **SpaceX has launched more than 1,700 of its Starlink satellites into space in the last two years, which has almost singlehandedly doubled the active number of satellites in orbit. There are plans to launch tens of thousands more by commercial companies**, nation states or groups of nations **into Low Earth Orbit, adding to the congestion even more.** The **advent of mega constellations could also see the number LEO satellite increase by a factor of 100 fold to nearly 100,000 satellites orbiting the Earth by 2030, leading to vastly more potential collisions which would result in the generation of significant amounts of debris**, Peter Hadinger and Mark Dickinson, the Chief Technology Officer and Head of Satellite Operations at British satellite telecommunications company Inmarsat, told *The Independent*. The average impact speed of a piece of orbital debris colliding with another object is approximately 36,000 km per hour – seven times faster than a speeding bullet. “The parallels with climate change are clear, and as a space community we should learn the lessons that proactive and early management is required ensuring we don’t wait until the damage is done”, they added. Fortunately, **there is time left for humanity to rectify its situation**. Low altitude space (550 kilometres) can recover from a series of fragmentations over approximately half a decade, Aaron C. Boley, associate physics professor at The University of British Columbia, told The Independent – although higher altitudes (700 kilometres) can take ten times as long to recover.

#### **Privatization of space will increase space debris collisions, Muelhaupt 19**

[Theodore J. Muelhaupt, June 2019, "Space traffic management in the new space era", [Journal of Space Safety Engineering](https://www.sciencedirect.com/science/journal/24688967), https://www.sciencedirect.com/science/article/pii/S246889671930045X?via%3Dihub, date accessed 1-23-2022] //Lex AT

**The last decade has seen rapid growth and change in the space industry, and an explosion of commercial and private activity**. Terms like NewSpace or democratized space are often used to describe this global trend to develop faster and cheaper access to space, distinct from more traditional government-driven activities focused on security, political, or scientific activities. The easier access to space has opened participation to many more participants than was historically possible. **This new activity could profoundly worsen the space debris environment, particularly in low Earth orbit (LEO),** but there are also signs of progress and the outlook is encouraging. Many NewSpace operators are actively working to mitigate their impact. Nevertheless, NewSpace represents a significant break with past experience and business as usual will not work in this changed environment. New standards, space policy, and licensing approaches are powerful levers that can shape the future of operations and the debris environment. 2. Characterizing NewSpace: a step change in the space environment In just the last few years, commercial companies have proposed, funded, and in a few cases begun deployment of very large constellations of small to medium-sized satellites. These constellations will add much more complexity to space operations. Table 1 shows some of the constellations that have been announced for launch in the next decade. **Two dozen companies, when taken together, have proposed placing well over 20,000 satellites in orbit in the next 10 years.** **For perspective, fewer than 8100 payloads have been placed in Earth orbit in the entire history of the space age, only 4800 [1] remain in orbit and approximately 1950** [2] **of those are still active**. **And it isn't simply numbers – the mass in orbit will increase substantially, and long-term debris generation is strongly correlated with mass**. This table is in constant flux. It is based largely on U.S. filings with the Federal Communications Commission (FCC) and various press releases, but many of the companies here have already altered or abandoned their original plans, and new systems are no doubt in work. Although many of these large constellations may never be launched as listed, **the traffic created if just half are successful would be more than double the number of payloads launched in the last 60 years and more than 6 times the number of currently active satellites.** Current space safety, space surveillance, collision avoidance (COLA) and debris mitigation processes have been designed for and have evolved with the current population profile, launch rates and density of LEO space. By almost any metric used to measure activity in space, whether it is payloads in orbit, the size of constellations, the rate of launches, the economic stakes, the potential for debris creation, the number of conjunctions, NewSpace represents a fundamental change. 3. Compounding effects of better SSA, more satellites, and new operational concepts The changes in the space environment can be seen on this figurative map of low Earth orbit. Fig. 1 shows the LEO environment as a function of altitude. The number of objects found in each 10 km “bin” is plotted on the horizontal axis, while the altitude is plotted vertically. Objects in elliptical orbits are distributed between bins as partial objects proportional to the time spent in each bin. Some notable resident systems are indicated in blue text on the right to provide an altitude reference. The (dotted) red line shows the number of objects in the current catalog tracked by the U.S. Space Surveillance Network (SSN). All the COLA alerts and actions that must be taken by the residents are due to their neighbors in the nearby bins, so the currently visible risk is proportional to the red line. Fig 1 Download : Download full-size image Fig. 1. Objects in LEO orbit by altitude per 10 km altitude bin. Elliptical orbit objects distributed by portion spent in each bin. Some notable existing resident systems are listed on the right. New residents, including some replacement systems, are on the left. (For interpretation of the references to color in this figure, the reader is referred to the web version of this article.) The red line of the current catalog does not represent the complete risk; it indicates the risk we can track and perhaps avoid. A rule of thumb is that the current SSN LEO catalog contains objects about 10 cm or larger. **It is generally accepted that an impact in LEO with an object 1 cm or larger will cause damage likely to be fatal to a satellite's mission**. Therefore, there is a large latent risk from unobserved debris. While **we cannot currently track and catalog much smaller than 10 cm**, experiments have been performed to detect and sample much smaller objects and statistically model the population at this size [3]. The (solid) blue line represents the model of the 1 cm and larger debris that is likely mission-ending, usually called lethal but not trackable. If LEO operators avoid collisions with all the objects in the red line, they are nonetheless inherently accepting the risk from the blue line. This risk is already present. The (dashed) orange line is an estimate of the population at 5 cm and larger and is thus an estimate of what the catalog might conservatively be a few years after the Space Fence, a new radar system being built by the Air Force, comes on line (currently planned for 2019) [4]. Commercial companies offering space surveillance services, such as LeoLabs, ExoAnalytics, Analytic Graphics Inc., Lockheed, and Boeing, might also add to the number of objects currently tracked. Space Policy Directive 3 (SPD-3) [13] specifically seeks to expand the use of commercial SSA services. Existing operators can expect a sharp increase in the number of warnings and alerts they will receive because of the increase in the cataloged population. Almost all the increase will come from newly detected debris [5]. The pace of safety operations for each satellite on orbit will significantly change because of the increase in the catalog from the Space Fence. This effect is compounded because the NewSpace constellations described in Table 1 will drastically change the profile of satellites in LEO. The green bars in Fig. 1 represent the number of objects that will be added to the catalog (red or orange lines) from only the NewSpace large LEO constellations at their operational altitudes. This does not include the rocket stages that launch them, or satellites in the process of being phased into or removed from the operational orbits. Neighbors of one of these new constellations may face a radically different operations environment than their current practices were designed to address. Satellites in these large LEO constellations typically have planned operational lifetimes of 5–10 years. Some companies have proposed to dispose of their satellites using low thrust electric propulsion systems, which would spiral satellites down over a period of months or years from operating altitudes as high as 1500 km through lower orbits where the Hubble Space Telescope, the International Space Station, and other critical LEO satellites operate [6]. Similar propulsive techniques would raise replacement satellites from lower launch injection orbits to higher operational orbits. These disposal and replenishment activities will add thousands of satellites each year transiting through lower altitudes and posing a risk to all resident satellites in those lower orbits. More importantly, failures will occur both among transiting satellites and operational constellations, potentially leaving hundreds more stranded along the transit path. Aerospace studies [7–9] have shown that failed satellites, whether they fail during operations or fail during disposal, can pose as great or even greater risk than the many thousands of operational satellites (Fig. 2). Given the rapid flux in the proposed large LEO constellations (LLC), we created a Future Constellations Model (FCM) with elements that represented the characteristics of the different systems being proposed. In our models, almost all the collisions and the resulting debris from those collisions occur because of failed systems. Most large constellation operators intend to perform active collision avoidance for active systems, whether operational or in some stage of check-out or disposal, but failed satellites are assumed to be incapable of maneuver. Fig. 2 also shows that satellites in the disposal phase can contribute to collisions similarly to satellites in the operational phase. Fig 2 Download : Download full-size image Fig. 2. Collisions during operations and disposal over 10 years for various NewSpace Future Constellation Models (FCMs). 4. A notional illustration of workload **The highest risk to operational satellites comes from the lethal but non-trackable debris** that is depicted in the blue line in Fig. 2. However, **operators perform collision avoidance only on the objects that can be tracked and cataloged**. Advances in tracking and NewSpace launches will both act to increase this workload. A key element of the problem is that an **increase in the LEO population will lead to an increase in close approaches to existing satellites [5], and the potential for accidental collisions**. Conjunction prediction, collision probability (Pc), and maneuver planning for most existing satellite operators is a time- and personnel-intensive operation. Orbit analysts, and propulsion, navigation, and communications systems personnel are involved in evaluating and planning maneuvers over several days and must do so even if the ultimate decision is to “fly through” a close approach. Since most existing systems have small numbers of vehicles and the number of conjunctions any given operator experiences is relatively small, COLA remains a manual process. For systems not designed with automated maneuver planning, a COLA assessment that progresses all the way to a maneuver plan can consume considerable effort, whether or not the maneuver is executed. If a large constellation is deployed next to an existing resident system, the existing system may experience many conjunctions and alerts due to its close proximity of the dense new constellation. A sufficiently large constellation will, in effect, form a “shell” where frequent opportunities for conjunctions will be created. For example, Fig. 3 depicts a fictional scenario where 1225 “New” satellites are distributed in 35 planes in circular orbits at 1000 km altitude, at 98° inclination. These are placed near a hypothetical “Old” six-satellite constellation operating in a nearly circular orbit at the same altitude and 63° inclination. Following a common operations practice, we assume that the Old satellite operators flag a conjunction at Pc> 10−7, start COLA assessment with additional tracking at Pc> 10−6, and plan a COLA maneuver when the Pc> 10−5. A conjunction with Pc > 10−4 would typically be considered a significant risk leading most operators to maneuver. Fig 3 Download : Download full-size image Fig. 3. “New” large LEO constellation at same average altitude as “Old” existing constellation. Currently, the Old system in this example would typically see a warning (Pc > 10−6) a few times a month at this altitude, and of those, a few per year might cross the maneuver threshold. For the operations center, this would be multiplied by the number of satellites in the constellation. When the New system parks nearby, the number of COLA alerts jumps substantially. But the number of alerts depends entirely on the error bubble, (covariance) used. If the typical errors of the public external tracking data and the orbit propagation methods that are widely available (General Perturbations, or GP) are used for both constellations, over a 30-day period we see 129 conjunctions that cross the threshold for COLA assessment (Pc> 10−6), and 53 that cross the maneuver planning threshold (Pc> 10−5) (Fig. 4). This is nearly 2 per day. This could be an enormous workload for a manual process. If a high accuracy catalog (Special Perturbations, or “SP”) and a high-fidelity propagator with its typical covariances is used, the number of conjunctions goes from 129 to a more manageable 10. SP data is maintained by the Air Force, but it is not widely available. It is interesting to note that nine of those 10 crossed the maneuver-planning threshold, and of those, four crossed the Pc> 10−4 where many operators would choose to execute a maneuver. Compared to GP, the SP-quality data resulted in far fewer warnings and flagged four very close conjunctions. The operations center would have been able to concentrate on fewer “false alarms”. We also computed the case where GPS-quality owner-operator data was used for both systems, in which we assumed near-real-time owner-operator position data of very high quality was provided by both operators and used in the collision analysis. In this case, NONE of the conjunctions resulted in a warning and no COLA alerts were generated. The closest approach was 99 m, with a Pc of 3.7 × 10−7 using SP. But because of the quality of the GPS-based position data, this conjunction did not raise an alert because the fully-informed operators could be confident that a collision would not occur. Fig 4 Download : Download full-size image Fig. 4. Number of COLA alerts in 30 days for various qualities of position knowledge when a fictional new system is deployed near an existing one. In the example, an operations center for the Old constellation of six satellites could go from about one COLA assessment a week to nearly one per day per satellite, if only the published satellite catalog is available. If a new constellation operates too close to an existing system, the operator workload may become unreasonable using existing processes. But high accuracy data makes this manageable, and GPS-quality owner-operator data for both systems makes the problem vanish. Since these constellations are likely to be operated by different companies or governments, sharing high-quality position data would likely require an active space traffic management organization. Existing operators will not necessarily have large constellations parked nearby, but they will nonetheless be affected by the new activity. The new large constellations’ satellites typically will have relatively short lifetimes and will need frequent replenishment. The traffic transiting up and down will be substantial, and failures could leave stranded objects at intermediate altitudes, permanently increasing the collision risk. 5. **Conjunction warning overload** NewSpace operators will face a different challenge **due to the vast increase in numbers of satellites**. While there are likely as many operational plans as there are operators, a large constellation must consider close approaches with itself. Even if there are no neighboring systems, self-conjunctions can occur between two members of the same constellation. Depending on the configuration, **a given operator could see hundreds to thousands of self-conjunctions that cross typical warning thresholds each day using current practices.** This could be an issue for a space traffic management (STM) agency, even if it is not an issue for the operator. Aerospace models show that for one possible NewSpace constellation, **more than 500,000 self-conjunctions each year could result that cross the typical Pc > 10−6 warning threshold. If no action were taken, we would expect 2–3 collisions per year.** This is clearly unacceptable. **Thus, current tracking accuracy and processes might produce millions of warnings per year** for NewSpace operators to prevent half a dozen actual collisions. Under current practices **operators would need to sort through an enormous haystack to find the needles, and because a handful of actual collisions will occur, the warnings cannot be ignored.** Note that predictions such as the ones above are based on the current process of using non-cooperative external tracking and observation (i.e., skin tracking), and the resulting covariances. The number of warnings could be drastically reduced by using more accurate owner-operator information, but that is not currently universally done. The Space Data Association provides such a service, but only uses owner-operator data from members. In any case, current practices will need to change to avoid an unreasonable number of warnings. Recognizing this, many NewSpace operators are planning extensive automation to operate their constellations and mitigate the workload of manual COLA assessments, particularly for self-conjunctions. Most are also taking steps to obtain much higher quality position data than external observation permits. While automation may mitigate the COLA assessment workload for new operators, current operators may have to continue their labor-intensive assessments. The interaction between a NewSpace constellation and a nearby existing or a second large NewSpace constellation will create new challenges for operators. 6. **The problem with maneuvers** **Recent years have seen a steady growth in the use of low-thrust propulsion via ion thrusters.** These highly efficient systems have the feature of long, even continuous thrusting. A feature of the automation planned by some of the NewSpace operators is to make extensive use of low-thrust systems for both transit and station-keeping. One approach is to launch into low LEO orbit, transition to the higher LEO operational altitude via low-thrust, and at end-of-life, deorbit the same way. During automated operations, the individual vehicles may autonomously maneuver as needed. Orbit insertion at low LEO altitudes for functional check-out testing has the advantage of allowing early satellite failures to more safely occur in very low, “self-cleaning” orbits. But the slow spirals up to the operational altitude and down for disposal create numerous opportunities for conjunctions with all the resident satellites between the injection altitude and the operational altitude. **Existing catalog and COLA processes have no effective way of dealing with frequent or continuous maneuvers, since they are based on predictions generated days in advance**, with no assumption of maneuvers. **If an existing constellation is operating in proximity to one of these automated constellations, its current COLA process breaks down**. The automated maneuvers may move one vehicle in the constellation out of a conjunction, or it could create a new problematic conjunction. **The existing practices have an inherent lag and data latency, and a small maneuver will at the very least add to the covariance error. The timelines of the current catalog process and automated maneuvers for a large constellation are fundamentally incompatible.**

#### **Kessler Syndrome destroys all satellites and traps us on earth, Ratner 18**

[Paul Ratner, 8-29-2018, "How the Kessler Syndrome can end all space exploration and destroy modern life", Big Think, https://bigthink.com/surprising-science/how-the-kessler-syndrome-can-end-all-space-exploration-and-destroy-modern-life/, date accessed 1-23-2022] //Lex AT

What makes that situation possible is the fact that there are millions of micrometeoroids as well as man-made debris that is already orbiting Earth. The danger posed by even a small fragment that’s traveling at high speeds is easy to see. **As** [**calculated by NASA**](https://www.businessinsider.com/space-junk-kessler-syndrome-chain-reaction-prevention-2018-3)**, a 1-centimeter “paint fleck” traveling at 10km/s (22,000 mph) can cause the same damage as a 550-pound object traveling 60 miles per hour on Earth. If the size of the shard was increased to 10 centimeters, such a projectile would have the force of 7 kilograms of TNT**. Now imagine thousands of such objects flying around at breakneck speeds and crashing into each other. If a chain reaction of exploding space junk did occur, filling the orbital area with such dangerous debris, the space program would indeed be in jeopardy. Travel that goes beyond the LEO, like the planned mission to Mars, would be made more challenging but still conceivably possible. What would, of course, be affected if the Kessler Syndrome’s worst predictions came to pass, are all the services that rely on satellites. Core aspects of our modern life—GPS, television, military and scientific research—all of that would be under threat. NASA experienced a small-scale Kessler Syndrome incident in the 1970s when Delta rockets that were left in orbit started to explode into shrapnel clouds. This inspired Kessler, an astrophysicist, to show that there is a point when the amount of debris in an orbit gets to critical mass. At that point, the collision cascading would start even if no more things are launched into space. And once the chain of explosions begins, it can keep going until the orbital space can no longer be used. In Kessler’s estimate, it would take 30 to 40 years to get to such a threshold. [NASA says](https://www.nasa.gov/centers/wstf/site_tour/remote_hypervelocity_test_laboratory/micrometeoroid_and_orbital_debris.html) that its experts caution that we are already at critical mass in the low-Earth orbit, which is about 560-620 miles (900 to 1,000 kilometers) out. According to NASA estimates, the Earth’s orbit currently has [500,000 pieces of space debris](http://orbitaldebris.jsc.nasa.gov/faqs.html#3) up to 10cm long, over 21,000 pieces of debris longer than 10cm, and more than 100 million pieces of space debris smaller than 1cm. A 2009 incident dubbed the [Cosmos-Iridium collision](http://www.spacesafetymagazine.com/space-debris/kessler-syndrome/iridium-33-cosmos-2251-years-later-learned-then/)featured a space collision between Russian and American communication satellites that provided a preview of potential attractions in the massive debris field it created. The accident resulted in more than 2,000 pieces of relatively large space junk.

#### **Debris triggers nuclear miscalculation—uniquely likely in space, Blatt 20**

[[Talia M. Blatt](https://hir.harvard.edu/author/talia/), May 26th, 2020, "Anti-Satellite Weapons and the Emerging Space Arms Race", Harvard International Review, https://hir.harvard.edu/anti-satellite-weapons-and-the-emerging-space-arms-race/, date accessed 1-23-2022] //Lex AT

Despite their deterrent functions, ASATs are more likely to provoke or exacerbate conflicts than dampen them, especially given the risk they [pose](https://thebulletin.org/2019/06/arms-control-in-outer-space-the-russian-angle-and-a-possible-way-forward/) to early warning satellites. These satellites are a crucial element of US ballistic missile defense, capable of [detecting missiles](https://www.globalsecurity.org/space/world/japan/warning.htm) immediately after launch and tracking their paths. **Suppose a US early warning satellite goes dark, or is shut down**. **Going dark could signal a glitch, but in a world in which other countries have ASATs, it could also signal the beginning of an attack**. Without early warning satellites, the United States is much more susceptible to nuclear missiles. **Given the strategy of counterforcing—**[**targeting**](https://www.belfercenter.org/sites/default/files/files/publication/isec_a_00273_LieberPress.pdf) **nuclear silos rather than populous cities to prevent a nuclear counterattack—the Americans might believe their nuclear weapons are imminently at risk**. **It could be** [**twelve hours**](https://books.google.com/books?id=ET8lDwAAQBAJ&pg=PA1&lpg=PA1&dq=%22Protecting+Space+Assets%22+johnson-freese&source=bl&ots=6Oq0IdeBjw&sig=ACfU3U1G6Hj8QdP4JlCRNxA6i5XplZwHyg&hl=en&sa=X&ved=2ahUKEwj1n-jT2YzpAhUugnIEHUuMCu4Q6AEwA3oECAkQAQ#v=onepage&q=%22Protecting%20Space%20Assets%22%20johnson-freese&f=false) **before the United States regains satellite function, which is too long to wait to put together a nuclear counterattack. The United States, therefore, might move to mobilize a nuclear attack against Russia or China over what might just be a piece of debris shutting off a satellite**. Additionally, accidental warfare, or strategic miscalculation, is uniquely likely in space. It is [much easier](https://books.google.com/books?id=VyXTDwAAQBAJ&pg=PA339&lpg=PA339&dq=space+offense+dominant&source=bl&ots=Mw0bgJ51qf&sig=ACfU3U3DeZiEHpr9nfszlCbJZIoyyssIpg&hl=en&sa=X&ved=2ahUKEwjrs-WD3IzpAhVulHIEHbL0AE4Q6AEwCXoECAoQAQ#v=onepage&q=space%20offense%20dominant&f=false) to hold an adversary’s space systems in jeopardy with destructive ASATs than it is to [sustainably defend](https://www.cnas.org/publications/commentary/the-us-military-should-not-be-doubling-down-on-space) a system, which is expensive and in some cases not technologically feasible because of limitations on satellite movement. Space is therefore [considered](https://books.google.com/books?id=VyXTDwAAQBAJ&pg=PA339&lpg=PA339&dq=space+offense+dominant&source=bl&ots=Mw0bgJ51qf&sig=ACfU3U3DeZiEHpr9nfszlCbJZIoyyssIpg&hl=en&sa=X&ved=2ahUKEwjrs-WD3IzpAhVulHIEHbL0AE4Q6AEwCXoECAoQAQ#v=onepage&q=space%20offense%20dominant&f=false) offense-dominant; offensive tactics like weapons development are prioritized over defensive measures, such as [improving GPS](https://www.politico.com/story/2018/04/06/outer-space-war-defense-russia-china-463067) or making satellites more resistant to jamming. As a result, countries are left with poorly defended space systems and rely on offensive posturing, which increases the risk that their actions are perceived as aggressive and incentivizes rapid, risky counterattacks because militaries cannot rely on their spaced-based systems after first strikes.

#### **Extinction – nuke war fallout creates Ice Age and mass starvation**

Steven **Starr 15**. “Nuclear War: An Unrecognized Mass Extinction Event Waiting To Happen.” Ratical. March 2015.<https://ratical.org/radiation/NuclearExtinction/StevenStarr022815.html> TG

**A war fought with 21st century** strategic **nuclear weapons would be more than just a great catastrophe in human history. If we allow it to happen, such a war would be a mass extinction event that** [**ends human history**](https://ratical.org/radiation/NuclearExtinction/StarrNuclearWinterOct09.pdf)**. There is a profound difference between extinction and “an unprecedented disaster,” or even “the end of civilization,” because even after such an immense catastrophe, human life would go on.**

But **extinction, by definition, is an event of utter finality, and a nuclear war that could cause human extinction should really be considered as the ultimate criminal act**. It certainly would be the crime to end all crimes.

**The world’s leading climatologists now tell us that nuclear war threatens our continued existence as a species**. Their **studies predict that a large nuclear war, especially one fought with strategic nuclear weapons, would create a post-war environment in which for many years it would be too cold and dark to even grow food**. Their findings make it clear that **not only humans, but most large animals and many other forms of complex life would likely vanish forever in a nuclear darkness** of our own making.

**The environmental consequences of nuclear war would attack the ecological support systems of life at every level. Radioactive fallout produced not only by nuclear bombs, but also by the destruction of nuclear power plants and their spent fuel pools, would poison the biosphere. Millions of tons of smoke would act to** [**destroy Earth’s protective ozone layer**](https://www2.ucar.edu/atmosnews/just-published/3995/nuclear-war-and-ultraviolet-radiation) **and block most sunlight from reaching Earth’s surface, creating Ice Age weather conditions that would last for decades.**

Yet the political and military leaders who control nuclear weapons strictly avoid any direct public discussion of the consequences of nuclear war. They do so by arguing that nuclear weapons are not intended to be used, but only to deter.

Remarkably, the leaders of the Nuclear Weapon States have chosen to ignore the authoritative, long-standing scientific research done by the climatologists, **research** that **predicts virtually any nuclear war, fought with even a fraction of the operational and deployed nuclear arsenals, will leave the Earth essentially uninhabitable.**

#### **Kessler syndrome ensures cascading impacts – turns every impact.**

**Dvorsky 15** George Dvorsky 6-4-2015 “What Would Happen If All Our Satellites Were Suddenly Destroyed?”<https://io9.gizmodo.com/what-would-happen-if-all-our-satellites-were-suddenly-d-1709006681> (Senior staff reporter at Gizmodo specializing in astronomy, space exploration, SETI, archaeology, bioethics, animal intelligence, human enhancement, and risks posed by AI and other advanced tech.)//Elmer

**Lastly, there’s the** [**Kessler Syndrome**](http://www.spacesafetymagazine.com/space-debris/kessler-syndrome/) **to consider. This scenario was portrayed in the 2013 film Gravity. In the movie, a Russian missile strike on a defunct satellite inadvertently causes a cascading chain reaction that formed an ever-growing cloud of orbiting space debris. Anything in the cloud’s wake — including satellites, space stations, and astronauts — gets annihilated. Disturbingly, the Kessler Syndrome is a very real possibility, and the likelihood of it happening** [**is steadily increasing as more stuff gets thrown into space**](http://io9.com/how-to-clean-up-deadly-space-junk-before-disaster-strik-1443463338)**. Given these grim prospects, it’s fair to ask what might happen to our civilization if any of these things happened. At the risk of gross understatement, the complete loss of our satellite fleet would instigate a tremendous disruption to our current mode of technological existence — disruptions that would be experienced in the short, medium, and long term, and across multiple** [**domains**](https://io9.gizmodo.com/what-would-happen-if-all-our-satellites-were-suddenly-d-1709006681)**. Compromised Communications Almost immediately we’d notice a dramatic reduction in our ability to communicate, share information, and conduct transactions. “If our communications satellites are lost, then bandwidth is also lost,”** [**Jonathan McDowell**](http://planet4589.org/) **tells io9**. He’s an astrophysicists and Chandra Observatory scientist who works out of the [Harvard-Smithsonian Center for Astrophysics](http://planet4589.org/jcm/cfa-www.harvard.edu). McDowell says that, with telecommunication satellites wiped out, the burden of telecommunications would fall upon undersea cables and ground-based communication systems. But while many forms of communication would disappear in an [instant](https://io9.gizmodo.com/what-would-happen-if-all-our-satellites-were-suddenly-d-1709006681), others would remain. **All international calls and data traffic would have to be re-routed, placing tremendous pressure on terrestrial and undersea lines. Oversaturation would stretch the capacity of these systems to the limit, preventing many calls from going through. Hundreds of millions of Internet connections would vanish, or be severely overloaded. A similar number of cell phones would be rendered useless. In remote areas, people dependent on satellite for television, Internet, and radio would practically lose all service. “Indeed, a lot of television would suddenly disappear,” says McDowell.** “