# 1AC

### 1AC – Framing

#### *Ethics must begin a priori*

#### A] The rules of logic claim that the only time a statement is invalid is if the antecedent is true, but the consequent is false.

SEP [Stanford Encyclopedia of Philosophy.] “An Introduction to Philosophy.” Stanford University. <https://web.stanford.edu/~bobonich/dictionary/dictionary.html> TG Massa

Conditional statement: an “if p, then q” compound statement (ex. If I throw this ball into the air, it will come down); p is called the antecedent, and q is the consequent. A conditional asserts that if its antecedent is true, its consequent is also true; any conditional with a true antecedent and a false consequent must be false.  For any other combination of true and false antecedents and consequents, the conditional statement is true.

#### If the aff is winning, they get the ballot is a tacit ballot conditional which means denying the premise proves the conclusion that I should get the ballot.

#### B] Bonini affirms

Wikipedia summarizes Dutton and Starbuck [Brackets Original. John M. Dutton (He enrolled in Harvard Business School in 1955, graduated with an M.B.A. in 1957, and embarked on an academic career that culminated as professor of business administration. He stayed on at Harvard as a research associate and taught at Northeastern University. He taught at Purdue University Krannert School of Industrial Engineering in Lafayette, IN from 1960 to 1968. His research included organizational behavior, computer simulation of human behavior, history of business technology, progress-principal studies, and strategic changes in the energy industry. He was elected to membership in the American Academy of Arts & Sciences. He was the Lucas Visiting Professor at the University of Birmingham in England from 1963 to 1964. He went on to teach at Southern Methodist University Business School in Dallas, TX from 1968 to 1971. In 1971 he moved to Manhattan where he taught and was Associate Dean at New York University, Stern Graduate School of Business Administration retiring in 1998. While at NYU he helped develop and teach the executive M.B.A. programs in France and Japan). William Haynes Starbuck (graduated from Harvard University and the Carnegie Institute of Technology. He is an organizational scientist who has held professorships in social relations, sociology, business administration, and management). “Bonini's paradox”. Wikipedia. No Date. <https://en.wikipedia.org/wiki/Bonini%27s_paradox> //Houston Memorial DX]

In modern discourse, the paradox was articulated by John M. Dutton and William H. Starbuck[2] "As a model of a complex system becomes more complete, it becomes less understandable. Alternatively, as a model grows more realistic, it also becomes just as difficult to understand as the real-world processes it represents".[3] This paradox may be used by researchers to explain why complete models of the human brain and thinking processes have not been created and will undoubtedly remain difficult for years to come. This same paradox was observed earlier from a quote by philosopher-poet Paul Valéry, "Ce qui est simple est toujours faux. Ce qui ne l’est pas est inutilisable".[4] ("A simple statement is bound to be untrue. One that is not simple cannot be utilized."[5]) Also, the same topic has been discussed by Richard Levins in his classic essay "The Strategy of Model Building in Population Biology", in stating that complex models have 'too many parameters to measure, leading to analytically insoluble equations that would exceed the capacity of our computers, but the results would have no meaning for us even if they could be solved.[6] (See Orzack and Sober, 1993; Odenbaugh, 2006)

#### C] Empirical Uncertainty – evil demon could deceive us and inability to know others experience make empiricism an unreliable basis for universal ethics. Outweighs since it would be escapable since people could say they don’t experience the same.

#### D] Transcendental Idealism – what we see is not what is, but our representations of reality – only a priori knowledge is a lane to truth as perception is the lane to truth insofar as a lack of the subject removes material constitution and abstracts sensibility as it is then unknown.

#### E] Constitutive Authority – The meta-ethic is bindingness. Practical reason is the only unescapable authority because to ask why I should be a reasoner concedes it’s authority since you’re actively reasoning.

#### F] Naturalistic fallacy – experience 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 to make a moral theory.

#### G] Decision Making Paradox- in order to judge we need a decision-making procedure to determine it is a good decision. But to chose a decision-making procedure requires another meta level decision making procedure leading to infinite regress so just vote aff to break the paradox.

#### That justifies universality –a priori principles like reason apply to everyone since they are independent of human experience and – any non-universalizable norm justifies someone’s ability to impede on your ends i.e. if I want to eat ice cream, I must recognize that others may affect my pursuit of that end.

#### Additionally:

#### [A] Resource disparities—focusing on evidence privileges debaters with the most prep excluding lone-wolfs. A debater under my framework can easily be won without any prep since minimal evidence is required. That pre-req to accessing the activity.

#### [B] Practical identities – we find our lives worth living under practical identities such as student but that presupposes agency.

**Korsgaard 92** CHRISTINE M. Korsgaard 92 [I am a Professor of Philosophy at Harvard University, where I have taught since 1991. From July 1996 through June 2002, I was Chair of the Department of Philosophy. (The current chair is Sean Kelly.) From 2004-2012, I was Director of Graduate Studies in Philosophy. (The current DGS is Mark Richard.) Before coming here, I held positions at Yale, the University of California at Santa Barbara, and the University of Chicago, as well as visiting positions at Berkeley and UCLA. I served as President of the Eastern Division of the American Philosophical Association in 2008-2009, and held a Mellon Distinguished Achievement Award from 2006-2009. I work on moral philosophy and its history, practical reason, the nature of agency, personal identity, normativity, and the ethical relations between human beings and the other animals], “The Sources of Normativity”, THE TANNER LECTURES ON HUMAN VALUES Delivered at Clare Hall, Cambridge University 16-17 Nov 1992, BE

The Solution: Those who think that the human mind is internally luminous and transparent to itself think that the term “self-consciousness” is appropriate because what we get in human consciousness is a direct encounter with the self. Those who think that the human mind has a reflective structure use the term too, but for a different reason. The reflective structure of the mind is a source of “self-consciousness” because it forces us to have a conception of ourselves. As Kant argues, this is a fact about what it is like to be reflectively conscious and it does not prove the existence of a metaphysical self. From a third person point of view, outside of the deliberative standpoint, it may look as if what happens when someone makes a choice is that the strongest of his conflicting desires wins. But that isn’t the way it is for you when you deliberate. When you deliberate, it is as if there were something over and above all of your desires, something that is you, and that chooses which desire to act on. This means that the principle or law by which you determine your actions is one that you regard as being expressive of yourself. To identify with such a principle or law is to be, in St. Paul’s famous phrase, a law to yourself.6 An agent might think of herself as a Citizen in the Kingdom of Ends. Or she might think of herself as a member of a family or an ethnic group or a nation. She might think of herself as the steward of her own interests, and then she will be an egoist. Or she might think of herself as the slave of her passions, and then she will be a wanton. And how she thinks of herself will determine whether it is the law of the Kingdom of Ends, or the law of some smaller group, or the law of the egoist, or the law of the wanton that is the law that she is to herself. The conception of one’s identity in question here is not a theoretical one, a view about what as a matter of inescapable scientific fact you are. It is better understood as a description under which you value yourself, a description under which you find your life to be worth living and your actions to be worth undertaking. So I will call this a conception of your practical identity. Practical identity is a complex matter and for the average person there will be a jumble of such conceptions. You are a human being, a woman or a man, an adherent of a certain religion, a member of an ethnic group, someone’s friend, and so on. And all of these identities give rise to reasons and obligations. Your reasons express your identity, your nature; your obligations spring from what that identity forbids.

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

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

#### [2] Consequences Fail: a] Yes act/omission distinction – there are infinite events occurring over which you have no control, so you can never be moral b] Every action has infinite stemming consequences so we can’t predict. c] Induction is circular because it assumes nature will hold uniform d] aggregation impossible – impossible to measure pain and pleasure e] Every action is infinitely divisible, only intents unify

### Advocacy

#### Thus, the plan – Resolved: The appropriation of outer space by private entities is unjust. Definitions and enforcement in the doc and I’ll clarify in cross.

#### Exemptions destroy the coercive power of legal regimes – causes circumvention across the board.

Hickman and Dolman 2 – John and Everett, 2002, Associate professor in the Department of Government and International Studies at Berry College in Mt. Berry, [“Resurrecting the Space Age: A State–Centered Commentary on the Outer Space Regime,” Volume 21 Number 1, <https://doi.org/10.1080/014959302317350855>] Elmer Recut Justin

Thus a state party need merely announce its intention to withdraw and then wait one year. Withdrawal of a single state party to the treaty, however, would not necessarily terminate the treaty between the other state parties. Yet, the decision of an important state not to be bound by a regime–creating treaty obviously endangers the entire treaty. The decision of the United States or China to withdraw from the OST would have far greater implications for the survival of the international space regime than the same decision by Bangladesh, Burkina Faso, or Papua New Guinea—the equality of states under international law remains nothing more than a useful  ction. For the OST to remain good international law, it must be accepted as such by the major space faring states of the 21st Century: the United States, Russia, the European Union, Japan, and China. One defection from the regime by a member of this group would no doubt lead to its effective collapse, as the remaining space faring states are unlikely to use the kind of coercion necessary to enforce the regime. A more likely response to such a defection is a scramble to make similar claims to sovereignty, based on historical precedent and effective occupation. Similar rushes to stake claims for territory sovereignty in other celestial bodies might follow.

To clarify we’ll defend implementation and a revision to the Outer Space Treaty that explicitly bans appropriation of outer space by private entities.

Private entities are non-governmental.

Dunk 11 – Frans G. von der Dunk, 2011, [“The Origins of Authorisation: Article VI of the Outer Space Treaty and International Space Law,” University of Nebraska] Justin

4. Interpreting Article VI of the Outer Space Treaty One main novel feature of Article VI stood out with reference to the role of private enterprise in this context. Contrary to the version of the concept applicable under general international law, where “direct state responsibility” only pertained to acts somehow directly attributable to a state and states could only be addressed for acts by private actors under “indirect,” “due care”/“due diligence” responsibility,18 Article VI made no difference as to whether the activities at issue were the state’s own (“whether such activities are carried on by governmental agencies” . . .) or those of private actors (. . . “or by non-governmental entities”). The interests of the Soviet Union in ensuring that, whomever would actually conduct a certain space activity, some state or other could be held responsible for its compliance with applicable rules of space law to that extent had prevailed. However, the general acceptance of Article VI as cornerstone of the Outer Space Treaty unfortunately was far from the end of the story. Partly, this was the consequence of key principles being left undefined.

Outer Space is everything 60 miles above the earth’s surface

Howell 17 Elizabeth Howell [Elizabeth Howell, Ph.D., is a contributing writer for Space.com since 2012. As a proud Trekkie and Canadian, she tackles topics like spaceflight, diversity, science fiction, astronomy and gaming to help others explore the universe. Elizabeth's on-site reporting includes two human spaceflight launches from Kazakhstan, and embedded reporting from a simulated Mars mission in Utah. She holds a Ph.D. and M.Sc. in Space Studies from the University of North Dakota, and a Bachelor of Journalism from Canada's Carleton University. Her latest book, NASA Leadership Moments, is co-written with astronaut Dave Williams. Elizabeth first got interested in space after watching the movie Apollo 13 in 1996, and still wants to be an astronaut someday.] “What is Space?” June 07, 2017 https://www.space.com/24870-what-is-space.html

From the perspective of an Earthling, outer space is a zone that occurs about 100 kilometers (60 miles) above the planet, where there is no appreciable air to breathe or to scatter light. In that area, blue gives way to black because oxygen molecules are not in enough abundance to make the sky blue.

### Offense

#### 1] Privatization is bad

#### a] The OST allows for regions that could be under the exclusive control of corporations, while no government has authority.

Ward 19 Peter Ward (Peter Ward studied journalism at the University of Sheffield before moving to Dubai, where he reported on the energy sector. After three years in the Middle East, he earned his master’s degree in business journalism from the Columbia University Graduate School of Journalism. His work has appeared in GQ, Bloomberg Buisnessweek, The Economist, and Newsweek. He lives in New York City.) “The unintended consequences of privatising space,” ScienceFocus (Online version of BBC Science Focus Magazine). Nov. 6th, 2019. <https://www.sciencefocus.com/space/the-unintended-consequences-of-privatising-space/> SJMS

Imagine a colony on [the Moon](https://www.sciencefocus.com/tag/the-moon/) or [Mars](https://www.sciencefocus.com/space/mars-facts-figures-fun-questions-red-planet/) run by a corporation. That one company would control everything the colonists need to survive, from the water to the oxygen to the food. That’s a dangerous amount of power for any company, but it’s a very real scenario. So what stops a major corporation landing on the Moon and setting up a colony? One very old document. [The Outer Space Treaty](http://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/outerspacetreaty.html) was signed in 1967 by all of the major space-faring nations, and explicitly states nobody can go to another planet or the Moon and claim that territory for their own. It’s a very important document, but it’s flawed. For one thing, the private space sector wasn’t around when the treaty was written so it’s not clear how some of the rules would be applied to private companies. And secondly, given the ambitions of many countries and corporations, there’s no way it’s going to last much longer. Anyone with a plan to land on the Moon or Mars and stay there is going to run into the Outer Space Treaty, and the smart money is on the wealthy and powerful winning out against an old loophole-ridden document. Politicians such as Ted Cruz in the United States have [already called for changes](https://spacenews.com/cruz-interested-in-updating-outer-space-treaty-to-support-commercial-space-activities/) to be made to the treaty, and given the increasing amounts of money private space companies spend on lobbying in the United States, more such attempts will follow. It’s imperative that the space community as a whole takes this issue on to ensure the needs of all, and not just the private sector, are taken into account should any alterations be made. The further we look into the future of humans in space, the more reality resembles science fiction. That’s why it’s difficult to make people take the issues which could potentially arise seriously. But now is the time to consider the problems that could arise from a commercially-led space race, and take the necessary small steps now to avoid potentially disastrous consequences in the future.

#### b] That’s an instance of a unilateral will governing individuals while universal decision making is absent. This is an unjust state which violates people’s freedoms and violates the categorical imperative.

Cordelli 16 Chiara Cordelli [Chiara Cordelli is an associate professor in the Department of Political Science at the University of Chicago. Her main areas of research are social and political philosophy, with a particular focus on theories of distributive justice, political legitimacy, normative defenses of the state, and the public/private distinction in liberal theory. She is the author of The Privatized State (Princeton University Press, 2020), which was awarded the 2021 ECPR political theory prize for best first book in political theory. She is also the co-editor of, and a contributor to, Philanthropy in Democratic Societies (University of Chicago Press, 2016). -- [cordelli@uchicago.edu](mailto:cordelli@uchicago.edu)] “WHAT IS WRONG WITH PRIVATIZATION?”, University of Chicago, Political Science & the College, https://www.law.berkeley.edu/wp-content/uploads/2016/01/What-is-Wrong-With-Privatization\_UCB.pdf

The intrinsic wrong of privatization, I will suggest, rather consists in the creation of an institutional arrangement that, by its very constitution, denies those who are subject to it equal freedom. I understand freedom as an interpersonal relationship of reciprocal independence. To be free is not to be subordinated to another person’s unilateral will. By building on an analytical reconstruction of Kant’s Doctrine of Right, I will argue that current forms of privatization reproduce (to a different degree) within a civil condition the very same defects that Kant attributes to the state of nature, or to a pre-civil condition, thereby making a rightful condition of reciprocal independence impossible. Importantly, this is so even if private actors are publicly authorized through contract and subject to regulations, and even if they are committed to reason in accordance with the public good. The reason for this, as I will explain, derives from the fact that private agents are constitutionally incapable of acting omnilaterally, even if their actions are omnilaterally authorized by government through some delegation mechanism, e.g. a voluntary contract. Omnilateralness, I will suggest, must be understood as a function of 1) rightful judgment and 2) unity. By rightful judgment I mean the capacity to reason publicly and to make universal rules that are valid for everyone, according to a juridical ideal of right, as necessary to solve the problem of the unilateral imposition of private wills on others. By unity I mean the capacity to make rules and decisions that change the normative situation of others, as a part of a unified system of decision-making. The condition of unity is crucial, as I shall later explain, insofar as there might be multiple interpretations compatible with rightful judgment, which would still problematically leave the definition of people’s rightful entitlements indeterminate. Further, the practical realization of the juridical idea of an omnilateral will, I will contend, requires embeddedness within a shared collective practice of decision-making. In practice, rightful judgment can only obtain when certain shared background frameworks that structure practical reasoning and confer unity to that reasoning are in place. The rules of public administration and the authority structure of bureaucracy should be understood as playing this essential function of giving empirical and practical reality to the omnilateral will, as far as the execution of rules and the concrete definition of entitlements are concerned. Together, these two requirements are necessary, (whether they are also sufficient is a different question), to make an action the omnilateral action of a state, which has the moral power to change the normative situation of citizens, by fixing the content of their rights and duties in accordance with the equal freedom of all. The phenomenon of privatization thus raises the fundamental questions of why we need political institutions to begin with, and what makes an action an action of the state. Insofar as private agents make decisions that fundamentally alter the normative situation (the rights and duties) of citizens, and insofar as, by definition, private agents are not public officials embedded in that shared collective practice, their decisions, even if well intentioned and authorized through contract, cannot count as omnilateral acts of the state. They rather and necessarily remain unilateral acts of men. Hence, I will conclude, for the very same reasons that we have, following Kant, a duty to exit the state of nature so as to solve the twofold problems of the unilateral imposition of will on others and the indeterminacy of rights, we also have a duty to limit privatization and to support, on normative grounds, a case for the re-bureaucratization of certain functions. Therefore, my paper provides foundational reasons to agree with Richard Rorty’s nonfoundational defense of bureaucracy as stated in the opening epigraph, since only agents who are appropriately embedded within a bureaucratic structure, properly understood, are, in many cases, capable of acting omnilaterally. The “bosses” I am here concerned with are not primarily those who can unilaterally impose their will on us in their capacity as private employers, but rather any private actor who acts unilaterally while in the garb of the state. This essay is structured as follows. In Section I, I assess and reject what I take to be the most powerful non-instrumental arguments against privatization. In Section II, through an interpretation of Kant, I explain in what sense the state, defined as an omnilateral system of rules, is a constitutive condition of freedom, rather than merely an instrument to promote it. In Section III, through an analytical reconstruction, based on a theory of collective action, of the conditions that make a system of rules an omnilateral system of laws rather than an aggregation of unilateral acts of men, I show that privatization constitutes a regression to the state of nature, understood as a normative condition of unfreedom. I then present some reflections on the broader implications of my argument, as it posits an expansive conception of the juridical order as an appropriate object of analysis for political philosophy. Before moving to the next section, let me first clarify what I mean by privatization. In a general sense, privatization can be defined as the devolution of public responsibilities to private actors. This however entails a baseline against which the idea of public responsibilities must be specified. Here I defend a normative, rather than, as is commonly the case, a historical or economic baseline.11 I will assume that in a just society government ought to bear, on grounds of justice, the primary responsibility to secure not only a fair distribution of general resources, including income and wealth, through tax and transfers, but also an adequate provision of particular in-kind goods, including police protection, defense, criminal justice, education and healthcare.12 This does not per se entail, however, that government should provide these goods directly. Government may fund the production of in-kind goods, while delegating their provision to private actors. I thus define privatization as the implementation of public, justice-based responsibilities through private agents.

### 1AC – Underview

#### 1] The role of the ballot is to determine whether the resolution is a true or false statement

#### Aff flex – other frameworks moots the entire aff and exacerbates the fact that the 1nc is reactionary since I should be able to compensate by choosing Collapses – you must say it is true that a world is better than another in order to compare the two.

#### Scalar methods rely on intervention – the persuasion of certain DA or advantages sway decisions – only a binary resolves that and prevents intervention which is the biggest impact under fairness.

#### Substantive skews – there is always a more correct side of the topic but we compensate for flaws in the lit.

#### Most inclusive because other ROBs allow for oppression Olympics allowing personal lives and experiences to factor in decisions.

#### The ballot says vote aff or neg based on a topic – five dictionaries[[1]](#footnote-1) define to negate as to deny the truth of and affirm[[2]](#footnote-2) as to prove true which means it’s constitutive and jurisdictional – that outweighs – all your arguments presume the judge evaluates them and controls the IL to topic ed and fairness since the rules of the activity is what we base our arguments on.

#### Logical arguments aren’t justified in a vacuum – they’re in the context of the resolution so we only defend the resolutional application – misapplications are infinitely regressive since every argument can be used to justify something bad so you should frame this debate through specificity

#### 2] 1AR theory is legit – anything else means infinite abuse – drop the debater, competing interps, no rvis– 1AR is too short to make up for the time trade-off – no RVIs or 2NR theory and paradigm issues– 6 min 2NR means they can brute force me every time. Aff theory first – it’s a much larger strategic loss because 1min is ¼ of the 1AR vs 1/7 of the 1NC which means there’s more abuse if I’m devoting a larger fraction of time.

#### 5] The neg can only gain offense from one unconditional route to the ballot- Forces the neg to engage in the AC rather than just uplayering. Fairness outweighs: 1] testing – if we can’t answer their arguments we don’t know if they’re right 2] minority debaters will just quit if the activity is unfair which supercharges abuse

### 1AC – Advantage

#### The advantage is debris:

#### Massive satellite development incoming and cascades debris – lack of regulations raises the risk and turns any reason satellites are good.

Hattenbach 19. Jan Hattenbach sat down with Stijn Lemmens, Senior Space Debris Mitigation Analyst at the European Space Agency (ESA) in Darmstadt, Germany, to talk about how Starlink plays into the space junk problem. 6/3/19. [Sky Telescope, “DOES STARLINK POSE A SPACE DEBRIS THREAT? AN EXPERT ANSWERS,” <https://skyandtelescope.org/astronomy-news/starlink-space-debris/>] Justin

Jan Hattenbach: The recent launch of the first 60 “Starlink” satellites has sparked outrage on social media. Some critics claim the “mega-constellation” of satellites by the U.S. company SpaceX will increase the risk of creating more space junk, even calling it a threat to space flight itself. What is your opinion — is this criticism justified or exaggerated?

Web around the worldWhen up and running Starlink will provide internet access to locations across the planet. SpaceX

Stijn Lemmens: We're talking about a constellation that — if it ever comes to full fruition — would include up to 12,000 members. Several nations have launched almost 9,000 satellites over the past six decades. Of these, about 5,000 are still in orbit. So we are talking about doubling the amount of traffic in space over a couple of years, or over a decade at most, compared to the last 60 years.

However, the space debris issue is mostly caused by the fact that we leave objects behind in orbit, which are then a target for collisions either with fragments of a previous collision event or with big, intact objects. Currently, most space debris comes from explosive break-up events; in the future, we predict collisions will be the driver. It's like a cascade event: Once you have one collision, other satellites are at risk for further collisions.

Over the past two decades, there has been a lot of effort to establish guidelines and codes of conduct. For low-Earth orbit (LEO), there is a well-known guideline to take out your spacecraft, satellite, or launch vehicle upper stage, within 25 years after the end of mission.

To have a reasonable shot at having a stable space environment, the goal is to have at least 90% of the satellites and launch-vehicle upper stages with lifetimes longer than 25 years take themselves out of orbit, or put themselves into orbits with lifetimes less than 25 years.

However, we are not really good at doing this at the moment. We’re talking about success rates of 5% to 15% for satellites (launch vehicle orbital stages do notably better, with success rates of 40-70% in low-Earth orbit). Already with current traffic, we have reasonable concerns that we're creating a real debris issue out there.

If we're now thinking about putting another couple of thousands of satellites up there, with levels of compliance similar to what we've been doing so far, then we're talking about a possible catastrophe.

Operators of any type of large satellite constellation would have to behave far better than most current actors in spaceflight have been doing. And this is the concern: Before you launch, operators can of course say and demonstrate that they are going to comply with all international norms and guidelines. But it's only after launch that we know how responsible their behavior actually was.

JH: Do you have the impression that SpaceX is aware of their responsibility?

SL: They are certainly aware of the problem. For example, to get a license to launch in the U.S. with a mission like theirs, where they are exchanging data between the mainland, space, and other operators, you need to request a license, in this case from the Federal Communications Commission (FCC). To obtain this license, they must demonstrate what they will do with respect to space debris mitigation. So they needed to demonstrate a certain adherence to the norms.

But the real question is whether the current norms are actually sufficient for large constellations, or if we are putting the bar too low with respect to future sustainability. We are talking about thousands of new satellites — the risk is that the cumulative effect is not captured in the current level of guidelines. So SpaceX would have to voluntarily demonstrate higher levels of commitment.

JH: When asked about these issues, SpaceX responded that they believe they have the “most advanced system” for space debris mitigation, e.g. that the Starlink satellites are “designed to be capable of fully autonomous collision avoidance – meaning zero humans in the loop.” Are you confident that such a system will work, especially considering the numbers?

SL: I have no technical visibility on how they implement their system, so I cannot make a judgment if it will work with their satellites or not. What I can say is that it will require a certain improvement on the current state-of-the-art. On the other hand, if a pair of Starlink satellites does collide within the operation orbit, SpaceX will be the first one who will be badly affected by the fragmentation cloud the collision generates. It's in their own best interest to make sure their system works.

JH: You mentioned the launch license issued by the FCC, which is a federal commission of the United States. However, space is not the property of the U.S. or any other country. Is there an international body that has a say in these matters?

SL: Five outer space treaties, established in the 1960s, 70s and 80s, do not mention space debris. Instead, there is a lot of coordination, first of all on the agency level. The Inter-agency Space Debris Coordination Committee coordinates 13 of the world's space agencies, including the ESA, NASA, the China National Space Administration, and Russia’s Roscosmos,to come up with debris mitigation guidelines, share best practices, and try to address the problem in a way that makes sense to everyone. The United Nations Committee on the Peaceful Uses of Outer Space has taken on these guidelines . This committee includes politicians from many countries, including those not currently flying in space. Industries in many countries likewise discuss these issues within the International Organization for Standardization.

So there is a lot of coordination internationally to make sure that we play by the same rules and implement the same set of standards. But right now there is no way to directly interface with any nation's sovereignty over what it launches — the outer space treaties make nation states responsible for the behavior of their individuals or private companies.

#### Democratization of technology spurs rapid development – feedback loops ensures debris cascades

BERNAT 20. Pawel @ Military University of Aviation. 11/4/20. [SAFETY ENGINEERING OF ANTHROPOGENIC OBJECTS, “ORBITAL SATELLITE CONSTELLATIONS AND THE GROWING THREAT OF KESSLER SYNDROME IN THE LOWER EARTH ORBIT,” Volume 4, PDF] Justin

The second decade of the 21st century has brought a dynamic and somewhat surprising development of the space industry. Since 1972 – the Apollo 17 crew mission to the Moon, the humankind has not left the safe environment of Earth’s orbit, and for years the global space sector has been progressing in slow but steady pace run by a few largest space agencies like American NASA, European ESA, Japanese JAXA, and Chinese CNSA. The most significant achievement of the “old ways” of managing outer space exploration is the International Space Stations (ISS) that has facilitated more than 20 years of continuous crewed operations.

The situation started to change at the turn of the century when new generations of private entrepreneurs began to invest in and develop space technologies like rocket boosters, spaceships, and what most important for the subject of the paper – satellites and their constellations. This new shift is known among the space industry as “Space 2.0”, and its emergence is dated around 2000-2002 when the companies like SpaceX, Blue Origin, and Virgin Galactic were established. (Pyle, 2019). The real change, however, came in 2012 when the first SpaceX commercial mission was successfully launched to the ISS (NASA, 2012).

Since then, the participation of the private sector in the space industry has skyrocketed, especially in the United States. Today, SpaceX is the only entity that provides reusable rockets (first stage and fairings) that is capable of vertical launch and landing. Their current flagship rocket – Falcon 9 has carried out 23 successful missions in 2020 (SpaceX, 2020) and another four are planned for December of that year (Weitering, 2020). Moreover, thanks to Crew Dragon spaceship developed by the company, Americans have regained this year the capacity of sending astronauts from their own soil after nine years of buying the seats on Russian Soyuz capsule. SpaceX is now in the process of building a communication satellites constellation that will be addressed and analyzed in the paper.

Nowadays, in the space industry, we witness a very productive cybernetic feedback look between the development of space technologies, the democratization of those technologies, and a substantial reduction of prices. The latter is even more significant if we compare the cost of launching cargo into orbit now and 20 years ago – Falcon 9 is over ten times cheaper than Space Shuttle (Jones, 2018). This, of course, directly translates into the mass and number of objects that we are able to put in the orbit viably. Once the constellations consisting of thousands of satellites were unthinkable, but in the current environment, they become a reality.

Space 2.0 also has brought new threats and challenges in the sphere of national and international security. The increase in launch capacity, among other factors, has led to progressive militarization and weaponization of space and new arms race (Bernat, 2019), which has also contributed to the growing numbers of orbiting objects.

The goal of the paper is to present the argumentation that the threat posed by the cascading collisions in the Earth’s orbit (Kessler syndrome) is becoming more severe due to the construction of orbital satellite constellations; the threat that presents a real danger for people during their EVAs and orbital infrastructure, which may bare immediate consequences for safety and security systems on Earth. In order to provide the theoretical context for the above claim, the following issues will be presented and discussed: (1) space debris, (2) the Kessler syndrome, (3) orbital debris models, (4) the legal issues related to space debris and mitigation actions against their proliferation, and (5) the planned and being currently developed orbital satellite constellations and how they contribute to the growing threat of the Kessler syndrome.

#### Privatization drive rivalries and exponentially increases debris – lack of regulations spikes it.

BERNAT 20. Pawel @ Military University of Aviation. 11/4/20. [SAFETY ENGINEERING OF ANTHROPOGENIC OBJECTS, “ORBITAL SATELLITE CONSTELLATIONS AND THE GROWING THREAT OF KESSLER SYNDROME IN THE LOWER EARTH ORBIT,” Volume 4, PDF] Justin

5. Orbital satellite constellations and the growing threat of the Kessler syndrome

Space 2.0 – the new era of space exploration that we witness now in the 21st century means, in words of Buzz Aldrin, “moving human enterprise into space” (Pyle, 2019, p. xiv). The process of commercialization of outer space has already begun and is not limited to private companies providing technologies and services for national or international space agencies, as it was in the past. On the contrary, private companies from the space sector have now matured to carry out their own independent projects.

As for 2020, SpaceX is a company that serves as the best example – it launches satellites to the orbit, both for state and private contractors, it successfully realized two crew missions to the International Space Station, and is in the process of constructing Starlink satellite constellation that will provide high-speed internet access across the planet.

Each satellite weighs around 260 kg, is equipped with an ion propulsion system, autonomous collision avoidance system, and orbits Earth at approximately 540-560 km altitude (Starlink, 2020). At the beginning of November 2020, more than 860 Starlink satellites were orbiting the Earth (Jewett, 2020). Immediate plans include launching 12,000 satellites, but they assume a potential later extension to 42,000 (Henry, 2019a). Of course, SpaceX has employed, at least declaratively, all necessary measures to keep the space clean – the satellites are equipped with the deorbiting system, and in the event of inoperability of the propulsion system (Starlink, 2020). The orbital collisions are, however, inevitable. As it was shown before, the possibility of collisions grows with the number of orbital objects. Bastida Virgili with the team compared (2016, p. 154-155) orbital debris environment development without and with a large hypothetical constellation consisting of merely 1080 satellites, distributed across 20 orbital planes at 1,100 km altitude (Fig. 5).

Chart, line chart

Description automatically generated

Figure 5. Comparison of long term evolution of the number of objects in LEO with and without the constellation (Virgili et al., 2016, p. 155)

It has to be noted that although SpaceX’s Starlink is the only constellation that is being built in orbit, it is not the only one planned. There are at least a few initiatives aiming at the same goal – to construct internet infrastructure at the Earth’s orbit. The planned Kuiper Systems LLC, which is a subsidiary of Amazon and intends to place 3,236 broadband satellites in the LEO, is one of Starlink’s biggest competitors (Henry, 2019b). Now, there is even a rivalry between the two companies because Kuiper’s lowest orbital shell is planned to be 590 km, with a tolerance of 9 km either above or below (Cao, 2020), which is the altitude of Starlink satellites. Moreover, the race for space in orbit is now at the beginning.

The outer space is vast. It increasingly becomes more cluttered with both operational satellites and space debris. The threat of collisions increases and no institution or body has enough power to license, coordinate and regulate what is sent to the orbit. The UNOOSA has not such power. National states decide what the companies from the space industry can launch to space. In the United States, which is most advanced in the area of private constellations, it is the Federal Aviation Administration (FAA) that issues the appropriate approvals. The race to put broadband internet satellites bears similarities to the gold rush – there are no rules, at the global level, apart from first-come, first-served.

#### Models are rigorous—inserted below.

Virgili et al. 16. Bastida, J.C. Dolado, H.G. Lewis, J. Radtke, H. Krag, B. Revelin, C. Cazaux b , C. Colombo, R. Crowther, M. Metz. 4/26/16. [Act Astranautica “Risk to space sustainability from large constellations of satellites,” <https://sci-hub.se/10.1016/j.actaastro.2016.03.034>.] Justin

1.3. Simulation approach and result analysis A Monte Carlo (MC) approach was used to simulate the evolution of the object population over a period of 200 years under different post-mission disposal requirements, with four different tools (MEDEE – Modelling the Evolution of Debris on Earth's Environment [9], LUCA – Long Term Utility for Collision Analysis [10], DAMAGE – Debris Analysis and Monitoring Architecture to the Geosynchronous Environment [11] and DELTA – Debris Environment Long Term Analysis [12]). For analysis purposes, the effective number of objects was used where the contribution to the population by each object was weighted by the proportion of the orbital period spent in LEO. In a first step, four different evolutionary models performed an analysis of two reference scenarios. One scenario considered only the evolution of the background population and non-constellation traffic. The second scenario augmented the first with the addition of the representative constellation, with the requirement that 90% of the constellation satellites achieved post-mission disposal to orbits with remaining lifetimes of 25 years. The manoeuvres performed at the mission end to meet the disposal requirement are assumed to be impulsive (i.e. instantaneous) and result in an eccentric orbit with the apogee near the original (constellation) altitude and the perigee at an altitude such that the effects of atmospheric drag would cause the orbit to decay within 25 years. Two of the models considered an apogee remaining at the operational constellation altitude, while the other two reduced the apogee by 50 km. The purpose of these scenarios is to provide a cross-comparison of the models in terms of their predictions of the total object population, which take into account the effects of the constellation. As the distribution of the MC results for the models is of the same nature and the results are independent, a bootstrapping [20] approach is used to derive the mean, the standard deviation and the confidence levels at 95% of the combined results of all the MC runs from the four models (cf. Fig. 1), although not all the models performed the same number of MC runs (see Table 1). The main source of variation inside a particular model's MC runs included the randomness in collision activity, while the different models used their own solar activity forecast.

#### Debris triggers miscalculated war.

Acton and McDonald 21. James M. Acton is co-director of the Nuclear Policy Program and holds the Jessica T. Mathews Chair at the Carnegie Endowment for International Peace. Thomas D. MacDonald is a fellow in the Nuclear Policy Program. 12/10/21. [Defense One, “Nuclear Command-and-Control Satellites Should Be Off Limits,” <https://www.defenseone.com/ideas/2021/12/nuclear-command-and-control-satellites-should-be-limits/187472/>] Justin

When Russia blew up an old satellite with a new missile on November 15, it created an expanding cloud of debris that will menace the outer space environment for years to come.

Hypersonic fragments from the collision with Moscow’s ground-launched, anti-satellite weapon risk destroying other satellites used for communications, meteorology, and agriculture. They even pose a danger to China’s Tiangong Space Station and the International Space Station, where personnel—including Russia’s own cosmonauts—were forced to don spacesuits and flee into their escape capsules ahead of approaching debris.

But the greatest danger that this careless stunt highlighted is to a different potential target: high-altitude satellites used for nuclear command and control. Those critical satellites face the threat of being attacked by co-orbital anti-satellite weapons, that is, other spacecraft with offensive capabilities. Destroying a nuclear command-and-control satellite, even unintentionally, could lead a conventional conflict to escalate into a nuclear war. As such, the United States, China, and Russia have a shared interest in ensuring the security of each other’s high-altitude satellites.

Satellites are integral to the United States’ nuclear command-and-control system. They would be the preferred means to transmit a presidential order to use nuclear weapons and would provide the first warning of an incoming nuclear attack. Russia uses satellites for similar purposes, even if it appears not to rely on them quite as much as the United States. While little is publicly known about China’s nuclear command-and-control system, the U.S. Department of Defense has assessed that China is in the process of developing a space-based early-warning system.

The most important nuclear command-and-control satellites—those for communications and early warning—are located in high-altitude orbits. Fortunately, most are strung out about 22,500 miles above the equator—far above the debris from Russia’s ground-launched anti-satellite weapon test. These satellites, however, are growing more vulnerable, particularly to co-orbital anti-satellite weapons.

Nuclear command-and-control satellites might be attacked deliberately, as the prelude to a nuclear war.

#### Any nuclear war causes extinction – ice age and famine.

Steven Starr 15 [Director of the University of Missouri’s Clinical Laboratory Science Program, as well as a senior scientist at the [Physicians for Social Responsibility](http://www.psr.org/). He has worked with the Swiss, Chilean, and Swedish governments in support of their efforts at the United Nations to eliminate thousands of high-alert, launch-ready U.S. and Russian nuclear weapons. “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](http://climate.envsci.rutgers.edu/pdf/RobockToonSAD.pdf). 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.

1. <http://dictionary.reference.com/browse/negate>, <http://www.merriam-webster.com/dictionary/negate>, <http://www.thefreedictionary.com/negate>, <http://www.vocabulary.com/dictionary/negate>, <http://www.oxforddictionaries.com/definition/english/negate> [↑](#footnote-ref-1)
2. *Dictionary.com – maintain as true, Merriam Webster – to say that something is true, Vocabulary.com – to affirm something is to confirm that it is true, Oxford dictionaries – accept the validity of, Thefreedictionary – assert to be true* [↑](#footnote-ref-2)