# Speech 1NC Harvard Rd 6 vs San Mateo 2-20 8AM

## 1 [00:40]

#### Interp – the affirmative must specify their epistemology of approaching outer space within a delineated text in the 1AC.

#### Epistemology is flexible – squo debates further dogma by smokescreening ideological differences.

Schwartz and Milligan summarize in 21 [Dr. James S.J. Schwartz (Assistant Professor of Philosophy at Wichita State University and author of The Value of Science in Space Exploration) and Dr. Tony Milligan (Senior Researcher in the Cosmic Visionaries Project, a member of the Department of Theology and Religious Studies at King’s College London). ‘“Space ethics” according to space ethicists’. The Space Review. February 1, 2021. Accessed 1/23/2022. <https://www.thespacereview.com/article/4117/1> //Xu]

3. Not only does space ethics help us figure out what is worth doing in space, it also helps us figure out the best way to do those things. Suppose, for example, we have agreed that there is an ethical obligation to exploit the water ice deposits in the permanently shadowed regions on the Moon. At that point we would face an entirely new set of ethical questions: How should this exploitation be conducted? What is a tolerable extraction efficiency level? Who should be permitted to conduct the exploitation? And so on. However, just because we agree on an outcome doesn’t mean we have figured out how to actually secure or bring about that outcome. If the legitimate goal of space resource exploitation is to improve human well-being, then not every mechanism or mining regime will be equally likely to accomplish this. If there are multiple legitimate goals, then how do we reach a consensus when they clash? Can either the state or an unfettered free market be trusted to produce reasonably just outcomes? Is the whole “market-versus-state” discourse the kind of thing that we want to be taking into space in the first place? Space ethics reminds us that dogmatic adherence to preferred economic and political systems will not help us resolve these kinds of disputes, one way or the other. Enthusiasm is no substitute for analysis, especially when lives and billions of dollars of public money are at stake.

#### Violation – they didn’t

#### Prefer –

#### 1] Stable Advocacy – they can shift out in the 1AR to reclarify their orientation on things like state-based policies, IR relations, or space control good which kills high-quality engagement, but we force them to defend the entirety of the 1AC instead of just a six second plan text – triggers presumption since their epistemology influences effective policy and is a prior question to the passing of the plan.

#### 2] Real World – policy makers aren’t born from the judge’s referendum on a hypothetical plan, but real-world movements are influenced by the subjectivity and scholarship introduced in debate.

#### ESpec isn’t regressive – its core topic lit for implementation, and you had infinite prep to choose your epistemology.

## 2 [00:40]

#### **Interp: Debaters must not defend the hypothetical implementation of an explicit actor or action**

#### Violation: They defend private entiteis as the actor and fiat them stop appropriating which isn’t resolutional since the rez uses “is” which describes a facet of what is happening in the status quo and doesn’t have an explicit actor or action

#### 1] Limits and Ground - justifies infinite unpredictable aff advantage ground and extra topical enforcement mechanisms which wreck research burdens while spiking core generics.

#### 2] precision o/w –

#### a] predictability – they can arbitrarily jettison words which decks ground and preparation because there is no stasis point

#### b] Jurisdiction – the judge doesn’t have the authority to vote aff if it wasn’t legitimate

#### 3] Phil Ed – creates better ethical subjectivity and critical thinking that o/ws on uniqueness to LD, switch to policy and LARP on the water topic – solves all your offense

#### TVA: Read a phil aff that affirms that private appropriation is unjust with a util FW and don’t defend implementation

#### Fairness – it’s a prereq to judge evaluation and substantive engagement

#### Education – it’s the only portable impact and why schools fund debate

#### CI – a) brightlines are arbitrary and self-serving which doesn’t set good norms b) it collapses since weighing between brightlines rely on offense defense

#### DTD – its key to deter future abuse and the abuse has already occurred

#### No RVI’s- a) chilling effect – people will be too scared to read theory because RVI’s encourage baiting theory b) clash – people go all in on theory which decks substance engagement c] Norm-setting—I shouldn’t be forced to keep advocating for a bad norm d] Illogical—doesn’t make sense to win just for being fair

## 3

#### Outer space policy has always been of militarization – debates between civilian and military use are two sides of the same coin that affectively polices society, culminating in total war.

Craven 19 [Brackets Original. Matt Craven (Professor of International Law, SOAS University of London, United Kingdom). “‘Other Spaces’: Constructing the Legal Architecture of a Cold War Commons and the Scientific-Technical Imaginary of Outer Space”. European Journal of International Law, Volume 30, Issue 2, May 2019, Pages 547–572, Accessed 1/12/22. <https://academic.oup.com/ejil/article/30/2/547/5536739> //Xu]

There was little doubt to any of the observers of the launch of Sputniks I and II in 1957 that, despite their overtly ‘scientific’ purposes, the arms race had taken a decisive new turn. The exploration of outer space clearly offered a range of potential benefits; alongside the possibility of research into the physics of the atmosphere, it also would facilitate the collection of a host of meteorological, geophysical and cartographic data, enable enhanced capacity for radio communication and television broadcasting, facilitate safe navigation and, finally, open up the possibility of experimental flights to the moon and beyond. No one, however, was blind to the military implications.60 Within the USA, in particular, there was a widespread belief that command over outer space was an imperative that could not be missed: ‘[W]hoever controls outer space’, it was often said, ‘controls the world’.61 In the wilder speculations, thus, it was imagined that a nuclear power might be in a position to launch guided missiles from a space platform to any point on earth with barely any possibility of response, that outer space would be filled with ‘orbiting bombers’ or that the moon would become the site of military rocket installations. ‘Control’ of outer space, thus, was immediately conceived as being vital as a matter of security. Such concerns seemed to place a premium upon ensuring that the ‘use’ of outer space was exclusively peaceful – a view that seemed to be affirmed not merely by the establishment of COPUOS and successive proposals put to the UN by both the USA and Soviet Union. It was also recognized in the US National Aeronautics and Space Act of 1958, which created a civilian space agency (NASA) and declared, in the process, that ‘it is the policy of the United States that activities in space should be devoted to peaceful purposes for the benefit of all mankind’.62 This theme was carried through into the code for outer space – UN General Assembly Resolution 1962 recognizing ‘the common interest of all mankind in the progress of the exploration and use of outer space for peaceful purposes’ and the Outer Space Treaty that added in Article 4 that states should not place nuclear weapons or weapons of mass destruction in orbit and that the moon and other celestial bodies shall be used by all states parties ‘exclusively for peaceful purposes’ (military bases and fortifications, in particular, being prohibited). Indeed, President Lyndon B. Johnson described the Outer Space Treaty as ‘the most important arms-control development since the limited test-ban treaty of 1963’.63 In an immediate sense, then, outer space was configured as a space radically distinct from atmospheric space and was placed at once beyond the field of both sovereignty and of war. These, however, were by no means co-terminous. The preferred analogy when discussing the status of outer space was often that of the high seas – like the seas, outer space should be marked by the principle of freedom of access and movement, a res communis incapable of being ‘enclosed’. In fact, this was the analogy used by the USA when defending its use of satellites for reconnaissance purposes; ‘reconnaissance’ from space, it was argued, was the functional equivalent of surveillance from the high seas.64 It is clear, however, that this analogy was problematic precisely because the high seas themselves were not immune from being brought within the field of military conflict.65 And, with that in mind, alternative modes of analysis were often proffered to ensure that the ‘commons’ was not to be equated with a potential field of battle.66 Nevertheless, there was always a certain equivocation running through discussions within the UN and elsewhere as to whether the military/non-military distinction was one that could be effectively held in place. Not only were the Declaration on Outer Space and Outer Space Treaty silent on certain vital matters – on the equipping of satellites, for example, with conventional weaponry or the militarization of the ‘extracelestial void’ – but the inclusion of Article 3, which instructed states to ‘carry on activities’ in accordance with international law and the UN Charter ‘in the interest of maintaining international peace and security’, gave expression to the idea, vaunted at various moments, that outer space may nevertheless be the site of military action in self-defence.67 ‘Peaceful’ use, on such a measure, was not to be calibrated by reference to the equipment or personnel put into space – whether military or civilian – but, rather, by reference to the ends or motivation of the actors in question.68 In the case of the USA, this was to resolve itself in the idea that ‘peaceful use’ should not be equated with ‘non-military use’ but, instead, with ‘non-aggressive’ use. As Senator Albert Gore was to put it, when speaking before the UN First Committee in 1962: [i]t is the view of the United States that outer space should be used only for peaceful – that is, non-aggressive and beneficial – purposes. The question of military activities in space cannot be divorced from the question of military activities on earth. To banish these activities in both environments we must continue our efforts for general and complete disarmament with adequate safeguards. Until this is achieved, the test of any space activities must not be whether it is military or non-military, but whether or not it is consistent with the United Nations Charter and other obligations of law.69 The same general tenor was maintained in the discussion over Article 4 of the Outer Space Treaty concerning the demilitarization of the moon and celestial bodies. In this treaty, it was admitted that the use of military personnel ‘for scientific research or other peaceful purposes shall not be prohibited’, largely in recognition of the fact that for both space powers it was the military, not civilian agencies, who were responsible for developing rocket and other outer space capabilities. What one might see in this is a straightforward determination, on the part of both space powers, to continue the practice of exploiting outer space for purposes of defence whilst holding on, at the same time, to the general idea that outer space was a space of peaceful endeavour. Defensive militarization, here, was to be conceptualized as the functional equivalent of total demilitarization. Yet ‘defence’ was also an unstable category in circumstances of a bipolar military standoff that depended upon a balance of forces. For not only might an effective defence depend upon first strike capability (as the doctrine of ‘mutually assured destruction’ was to suggest),70 but also, as was later to become evident following the announcement of the US Strategic Defense Initiative in 1983,71 even the construction of an overtly ‘defensive’ system could assume an offensive cast if only one party possessed that capacity.72 There was, however, also a much deeper problematic at work here, which related to the persistence of a governmental rationality that was held over from the earlier decades of the 20th century, that understood the necessity of bringing all social resources – economic, technical, scientific and human – to bear in defence of the state against an existential threat. This was articulated in the interwar years in the theories of total war developed by the likes of Erich Ludendorff73 and Ernst Jünger,74 but was carried forward, well into the aftermath of World War II.75 Even if, at Nuremberg, the tribunal had associated the practice of total war with the pathologies of National Socialism,76 as the likes of Georg Schwarzenberger and Josef Kunz were to observe, it was a method of waging war that was only, in small part, to be associated with the problem of totalitarianism. For both, the phenomenon of total warfare was a much more general one – associated with technological developments in arms, indiscriminate modes of warfare and the mobilization of the civilian population – and was as much in play in the 1950s as it had been in earlier decades.77 If the prospect of nuclear annihilation meant that no element of society would be spared, so also, it seemed to follow, no element of society should be excluded from preparations to ward off that eventuality. Whilst, in the case of the Soviet Union, the ethos of centralized planning and a party bureaucracy equipped with an ideology of collective ownership and class warfare naturally dissolved any operative distinctions between the civil and the military establishment,78 the same was also apparent in the USA where, as was recognized as early as 1945, the ongoing development of new technologies of offence and defence, in conditions of competition, would require ‘the participation of every element of the civilian population’ and, in particular, the enlistment of the countries research capabilities.79 Alongside the development of what Dwight Eisenhower later described as a ‘military-industrial complex’, guided by a ‘scientific-technological elite’,80 the rationalities of the Cold War were to envelop US society in a much more profound way – from the mobilization of the media in defence of free thought, the enlistment of corporations, unions and research establishments in defence of national security and the co-option of cultural institutions (from Hollywood to the universities81) in the affective management and policing of public life.82 The significance of this in the context of outer space was the almost total loss of any way to distinguish effectively between military and civilian activities. Just as the requirements of resourcing a technologically dependent military armature increasingly depended upon a civilian infrastructure of research, industry and economic management,83 so also was it clear that prospective civilian and scientific activities in space (such as meteorology, remote sensing, navigation systems and telecommunications) all had military dimensions. If, for example, developments in meteorological knowledge and environmental science seemed to open up the possibility of weather control for the purposes of combating drought, improving agriculture or the avoidance of natural disasters, so also could that same science assist in the development of military communications and ballistic missile capability (which depended upon information about the lower and upper atmosphere, ionospheric behaviour, geodesy and geomagnetism).84 Such knowledge also opened up new possibilities for manipulating weather systems in order to procure military advantage (such as the manipulation of thunderstorms to disable communication systems or the creation of fog or cloud).85 But it was not just about scientific knowledge enabling new avenues of military innovation; it was also about the purposes to which the same technology might be put. Thus, for example, the camera-equipped satellite programmes (Tiros, CORONA), with the auxiliary systems of information recovery and reproduction, were virtually identical (give or take a few degrees of resolution) whether they were used for the purposes of geodetic measurement and weather prediction or military reconnaissance. In some cases, furthermore – such as the US Galactic Radiation Background satellite – intelligence-gathering electronics was incorporated within the same instrument used for the measurement of solar radiation.86

#### Climate change is a product of white culture and means the extinction of minorities – neutral representations make warming inevitable.

Wynter, ‘07 [2007, Sylvia, Professor Emeritus in Spanish and Romance Languages at Stanford Univeristy, “The Human being as noun? Or being human as praxis? Towards the Autopoietic turn/overturn: A Manifesto,” otl2.wikispaces.com/file/view/The+Autopoetic+Turn.pdf]

For if, as Time magazine reported in January 2007 (Epigraph 2), a U.N. Intergovernmental panel of Natural Scientists, were soon to release "a smoking-gun report which confirms that human activities are to blame for global warming" (and thereby for climate change), and had therefore predicted "catastrophic disruptions by 2100," by April, the issued Report not only confirmed the above, but also repeated the major contradiction which the Time account had re-echoed. This contradiction, however, has nothing to do in any way with the rigor, and precision of their natural scientific findings, but rather with the contradiction referred to by Derrida's question in Epigraph 3—i.e., But who, we? That is, their attribution of the non-natural factors driving global warming and climate change to, generic human activities, and/or to "anthropocentric forcings"; with what is, in effect, this mis-attribution then determining the nature of their policy recommendations to deal with the already ongoing reality of global warming and climate change, to be ones couched largely in economic terms. That is, in the terms of our present mode of knowledge production, and its "perceptual categorization system" as elaborated by the disciplines of the Humanities and Social Sciences (or "human sciences") and which are reciprocally enacting of our present sociogenic genre of being human, as that of the West's Man in its second Liberal or bio-humanist reinvented form, as homo oeconomicus; as optimally "virtuous Breadwinner, taxpayer, consumer, and as systemically over-represented as if it, and its behavioral activities were isomorphic with the being of being human, and thereby with activities that would be definable as the human-as-a-species ones. Consequently, the Report's authors because logically taking such an over-representation as an empirical fact, given that, as highly trained natural scientists whose domains of inquiry are the physical and (purely) biological levels of reality, although their own natural-scientific order of cognition with respect to their appropriate non-human domains of inquiry, is an imperatively self-correcting and therefore, necessarily, a cognitively open/open-ended one, nevertheless, because in order to be natural scientists, they are therefore necessarily, at the same time, middle class Western or westernized subjects, initiated 15 as such, by means of our present overall education system and its mode of knowledge production to be the optimal symbolically encoded embodiment of the West's Man, it its second reinvented bio-humanist homo oeconomicus, and therefore bourgeois self-conception, over-represented as if it were isomorphic with the being of being human, they also fall into the trap identified by Derrida in the case of his fellow French philosophers. The trap, that is, of conflating their own existentially experienced (Western-bourgeois or ethno-class) referent "we," with the "we" of "the horizon of humanity." This then leading them to attribute the reality of behavioral activities that are genre-specific to the West's Man in its second reinvented concept/self-conception as homo oeconomicus, ones that are therefore as such, as a historically originated ensemble of behavioral activitiesas being ostensibly human activities-in-general. This, in spite of the fact that they do historicize the origin of the processes that were to lead to their recent natural scientific findings with respect to the reality of the non-naturally caused ongoing acceleration of global warming and climate change, identifying this process as having begun with the [West's] Industrial Revolution from about 1750 onwards. That is, therefore, as a process that can be seen to have been correlatedly concomitant in Great Britain, both with the growing expansion of the largely bourgeois enterprise of factory manufacturing, as well with the first stages of the political and intellectual struggles the British bourgeoisie who were to spearhead the Industrial Revolution, to displace the then ruling group hegemony of the landed aristocracy cum gentry, and to do so, by inter alia, the autopoetic reinvention of the earlier homo politicus/virtuous citizen civic humanist concept of Man, which had served to legitimate the latter's traditionally landed, political, social and economic dominance, in new terms. This beginning with Adam Smith and the Scottish School of the Enlightenment in the generation before the American, French, and Haitian (slave) revolutions, as a reinvention tat was to be effected in now specifically bourgeois terms as homo oeconomicus/and virtuous Breadwinner. 116 That is as the now purely secular genre of being human, which although not to be fully (i.e., politically, intellectually, and economically) institutionalized until the mid-nineteenth century, onwards, when its optimal incarnation came to be actualized in the British and Western bourgeoisie as the new ruling class, was, from then on, to generate its prototype specific ensemble of new behavioral activities, that were to impel both the Industrial Revolution, as well as the West's second wave of imperial expansion, this based on the colonized incorporation of a large majority of the world's peoples, all coercively homogenized to serve its own redemptive material telos, the telos initiating of global warming and climate change. Consequently, if the Report's authors note that about 1950, a steady process of increasing acceleration of the processes of global warming and climate change, had begun to take place, this was not only to be due to the Soviet Revolution's (from 1917 onwards) forced march towards industrialization (if in its still homo oeconomicus conception, since a march spearheaded by the 116 See the already cited essay by J.G.A. Pocock "symbolic capital," education credentials owning and technically skilled Eastern European bourgeoisie)—as a state-directed form of capitalism, nor indeed by that of Mao's then China, but was to be also due to the fact that in the wake of the range of successful anti-colonial struggles for political independence, which had accelerated in the wake of the Second World War, because the new entrepreneurial and academic elites had already been initiated by the Western educational system in Western terms as homo oeconomicus, they too would see political independence as calling for industrialized development on the "collective bovarysme "117 model of the Western bourgeoisie. Therefore, with the acceleration of global warming and climate change gaining even more momentum as all began to industrialize on the model of homo oeconomicus, with the result that by the time of the Panel's issued April 2007 Report the process was now being driven by a now planetarily homogenized/standardized transnational "system of material provisioning or mode of techno-industrial economic production based on the accumulation of capital; as the means of production of ever-increasing economic growth, defined as "development"; with this calling for a single model of normative behavioral activities, all driven by the now globally (post-colonially and post-the-1989-collapse-of-the-Soviet Union), homogenized desire of "all men (and women) to," realize themselves/ourselves, in the terms of homo oeconomicus. In the terms, therefore, of "its single (Western-bourgeois or ethno-class) understanding" of "man's humanity," over-represented as that of the human; with the well-being and common good of its referent "we"—that, not only of the transnational middle classes but even more optimally, of the corporate multinational business industries and their financial networks, both indispensable to the securing of the Western-bourgeois conception of the common good, within the overall terms of the behavior-regulatory redemptive material telos of ever-increasing economic growth, put forward as the Girardot-type "cure" for the projected Malthusian-Ricardo transumed postulate of a "significant ill" as that, now, ostensibly, of mankind's threatened subordination to [the trope] of Natural Scarcity, this in the reoccupied place of Christianity of its postulate of that "ill" as that of enslavement to Original Sin."' With the result that the very ensemble of behavioral activities indispensable, on the one hand, to the continued hegemony of the bourgeoisie as a Western and westernized transnational ruling class, is the same ensemble of behaviors that is directly causal of global worming and climate change, as they are, on the other, to the continued dynamic enactment and stable replication of the West's second reinvented concept of Man; this latter in response to the latter's existential imperative of guarding against the entropic disintegration of its genre of being human and fictive nation-state mode of kind. Thereby against the possible bringing to an end, therefore, of the societal order, and autopoetic living Western and westernized macro world system in it bourgeois configuration, which is reciprocally the former's (i.e., its genre of being human, and fictive modes of kind's condition of realization, at a now global level. This, therefore, is the cognitive dilemma, one arising directly from the West's hitherto unresolvable aporia of the secular, that has been precisely captured by Sven Lutticken in a recent essay. Despite, he writes, "the consensus that global warming cannot be ascribed to normal fluctuations in the earth's temperature... [the] social and political components of this process have been minimized; man-made nature is re-naturalized, the new (un)natural history presented as fate." And with this continuing to be so because (within the terms, I shall add, of our present "single understanding of man's humanity" and the unresolvable aporia which it continues to enact), "[t]he truly terrifying notion is not that [global warming and climate change] is irreversible, but that it actually might be reversible—at the cost of radically changing the economic and social order..."119 The changing, thereby, of the now globally hegemonic biologically absolute answer that we at present give to the question to who we are, and of whose biohumanist homo oeconomicus symbolic life/death (i.e., naturally selected/dysselected) code's intentionality of dynamic enactment and stable replication, our present "economic and social order" is itself the empirical actualization.

#### Scientific innovation is conscripted as a tool to further militaristic ends.

Craven 19 [Matt Craven (Professor of International Law, SOAS University of London, United Kingdom). “‘Other Spaces’: Constructing the Legal Architecture of a Cold War Commons and the Scientific-Technical Imaginary of Outer Space”. European Journal of International Law, Volume 30, Issue 2, May 2019, Pages 547–572, Accessed 1/12/22. <https://academic.oup.com/ejil/article/30/2/547/5536739> //Xu]

For the most part, the integrated utility of scientific and military technology came to be expressed through the language of ‘dual use’; just as nuclear science was capable of use for both pacific and military purposes, so also were satellites, rockets and space stations equally capable of deployment in pursuit of scientific, as well as military, ends.87 Overtly, of course, the notion of dual use took as its starting point an idea of ‘pure science’ being concerned with the discovery or production of politically innocent knowledge, which might then be put to ‘use’ or be ‘applied’ for either civilian or military purposes. Aside from the fact that the degree of control and influence exercised by defence establishments over the direction of science within research institutions put in question any idea of there being such a thing as ‘innocent’ scientific knowledge,88 it was, as Marcuse has observed, a conception of science that was already fully instrumentalized. Its very claim to objectivity was a sign of its subordination to technology and to an instrumental logic of ends. As he put it: True, the rationality of pure science is value-free and does not stipulate any practical ends, it is ‘neutral’ to any extraneous values that may be imposed upon it. But this neutrality is a positive character. Scientific rationality makes for a specific societal organization precisely because it projects mere form … which can be bent to practically all ends.89 Whilst the scientific method allowed nature to be brought under human domination through the medium of an enabling technology, it was, in the same measure, a means for the domination ‘of man by man’ insofar as the human subject would always appear before it as a mere ‘object of organization’. Both the human and the natural worlds would thus become the calculable objects of a technological rationality that knew no limits – ‘in which society and nation, mind and body are kept in a state of permanent mobilization for the defense of this universe’.90 Marcuse’s critique of the totalitarian rationalities of what he saw to be the Cold War regimes of ‘total administration’ found particular expression in the fact that scientific knowledge itself was understood to be a facet of ideological competition in its own right.91 What was at stake was not just ballistic missiles and warheads but also a capacity for scientific or technological innovation that would, itself, demonstrate to the world at large the superior social merits of capitalism or communism, respectively. The shock experienced at the launch of Sputnik I, after all, was not that the Soviet Union had suddenly acquired command over outer space or imminently threatened the USA with annihilation but, rather, that it demonstrated the superiority of its scientific and technical expertise. It was apparent to both powers at that moment that such spectacular demonstrations of scientific achievement92 were an essential part of a competitive ideology of rule that required the broad enlistment of the population to enable it to function.93 Science had its part to play, in that sense, in the affective production of fear, awe and loyalty, all of which were necessary for the operations of the Cold War to remain in place.94

#### Militarism necessitates a sovereign subject of mastery and individualization that creates international necro-zones of racialized sacrific.

Agathangelou 11 [Anna M. Agathangelou (political scientist from York University in Toronto. She is the co-director of Global Change Institute, Cyprus and was a visiting fellow in the Program of Science, Technology and Society at John F. Kennedy School of Government, Harvard). “Bodies to the Slaughter: Global Racial Reconstructions, Fanon's Combat Breath, and Wrestling for Life”. Somatechnics, March 2011, vo. 1, No. 1 : pp. 209-248. Accessed 1/22/22. <https://www.euppublishing.com/doi/full/10.3366/soma.2011.0014> //recut Xu]

Fanon scales colonisation to the level of the slave and colonised body. He illustrates the incommensurability of the intimate encounter of black flesh with the body of the coloniser and focuses on the structuring processes required to make it possible. He begins his critique with the normative imperial order of slavery and colonisation and those humanist interventions claiming to protect the sovereign subject. He tells us that the constitution of this sovereign subject depends on an asymmetrical segregated-order: This world divided into compartments, this world cut in two is inhabited by two different species ... When you examine at close quarters the colonial context, it is evident that what parcels out the world is to begin with the fact of belonging to a given race, a given species ... The cause is the consequence; you are rich because you are white, you are white because you are rich. (Fanon 1967d: 39–40, emphasis in original) Fanon points out that this order’s constitution depends on direct violence that turns a species into slaves, black, and colonised. This violence makes it possible for zones to become ‘civil’ spaces of ‘generalized trust’ and security for the sovereigns; the species occupying them possess ‘generalized trust’ and are racially white. This relation ends up being taken for granted: belonging to a given race of property relations is the precondition for any ‘civil’ encounter. Indeed, as Wilderson argues, ‘Fanon makes clear how some are zoned, a priori, beyond the borders of generalized trust’ (Wilderson 2010: 33). The establishment of gratuitous violence zones, positions and constitutes simultaneously the species and the colonised. Further, ‘the condition of possibility upon which subjectivity’ (Fanon 1967d: 39–40) is based must be recognised and theorised. The creation of colonised zones, the interstate state system, racialised whiteness, and property relations require theorising if we are to disrupt those relations which unify and entify a normative ‘ethical order’. Fanon, of course, is clear: without the vertical existence of breath, that is, giving one’s breath as nourishment for blackness, slavery, and colonisation, there is no such order. This order, even when it claims inclusion, segregates subjects of recognition from ‘species’. Subjects are positioned into the interstate structure of worlds with sovereign protection, able to take by force and accumulate anything, from things to life itself. Fanon seems to have anticipated Foucault who argues: ‘Power is employed and exercised through a net-like organisation. And not only do individuals circulate between its threads; they are always in the position of simultaneously undergoing and exercising power ... The individual ... is not the vis-a`-vis of power; it is I believe, one of its prime effects’ (Foucault 1980: 98). However, Fanon does not begin with this prime effect of power, as he wants us to learn to read social relations, racism, and economies of violence as if experiencing our own gratuitous violence, in an attempt to think the impossible place of the slave, the black body, and the colonised – in other words, the living being whose existence is already assumed as structurally impossible and, hence, as breath which can never be synonymous with life. The basis of the (inter) state structure, Fanon recognises, is already the juristic sovereign person whose essence, or what Goodrich calls the sovereign that the state has a right to kill, is already secured from the threat of mutilation. On the one hand, Foucault (1990: 138) asks this about state power: ‘How could power exercise its highest prerogative by putting people to death, when its main role was to ensure, sustain, and multiply life, to put this life in order?’ On the other hand, Fanon makes explicit the matrix of violence which requires and makes sure that species are zoned as black and colonised: ‘Individualism is the first to disappear ... the colonialist bourgeoisie had hammered into the native’s mind the idea of a society of individuals where each person shuts himself up in his own subjectivity, and whose only wealth is individual’ (Fanon 1967d: 47): Their first encounter was marked by violence and their existence together – that is to say the exploitation of the native by the settler – was carried on by a dint of a great array of bayonets and cannons. The settler and the native are old acquaintances. In fact, the settler is right when he speaks of knowing ‘them’ well. For it is the settler who has brought the native into existence and who perpetuates his existence. The settler owes the fact of his very existence, that is to say, his property, to the colonial system. (Fanon 1967d: 36) But why such insistence? What tension does Fanon want to foreground? Fanon actually has a different ‘locus of enunciation’ and insists on a long trajectory of the effects of the imperial, colonial, and slave order and vertical relations of what he calls ‘combat breath’ (Fanon 1967c: 65). By drawing out Fanon’s idea of ‘combat breath’ and articulating it as struggles that disrupt the practices of violence and the final destruction of countries and people, we see that enforcing the right to life of the radical individual (the propertied man of a structure of white supremacy which depends on slavery and colonisation) will authorise thanatopolitics and necroeconomics, not by suspending a right to life but rather by enforcing a right to that ‘liberal’ life. But this minimalist right to life could preclude crucial relations in the everyday continuum-spaces of the human and the non- human, including ecologies and it does by deploying practices of disfigurement and destruction. Fanon exposes the imperial European re-assemblage of power and demonstrates that state power shifts are connected to the emergence of an ‘international’ order and apparatuses that make possible a particular sovereign-master-colonising subject. In his view, colonial power says: ‘Since you want independence, take it and starve ... A regime of austerity is imposed on these starving men; a disproportionate amount of work is required for their atrophied muscles’ (Fanon 1967d: 96). Fanon notes the prevalence of suffocation and starvation in world politics, the devouring of the flesh and the subsequent redistribution of its existential vital energy that is turned into wealth. Amelioration requires more than changing working conditions and setting up less exploitative structures (such as socialism and communism). Rather, it requires ‘regime[s] which [are] completely oriented toward the people as a whole’ which prioritise the principle ‘that man is the most precious of all possessions’.8 Such a locus will preclude ‘that caricature of society where all economic and political power is held in the hands of the few who regard the nation as whole with scorn and contempt’ (Fanon 1967d: 98).

#### Against the continuous threat of war from prolif, the 1AC ignores ongoing militarism via IR.

Grove2019 [Jairus Victor Grove – Associate Professor at the University of Hawai’I Manoa in the Department of Political Science. "Savage Ecology: War and Geopolitics at the End of the World” *Duke University Press*. Accessed 12/24 BMC]

In our contemporary era of networks, counterinsurgencies, and indiscernible zones of peace and conflict, war enters the battlefield more obviously at odds with sovereign warfare. It may help to work in reverse, as the contemporary conflicts demonstrate quite starkly how “rigorous” definitions of war fall apart, before working our way through some of the slower, more subtle historical attractors of war such as annihilation. The examples in the contemporary memory are not hard to find. Consider the soldiers of My Lai who did their jobs horrifically too well, and the absent without official leave (awol) soldiers who refuse to fight in Israel or elsewhere. The tragic irony of the global war on terrorism cannot be understood until we grasp the relationship of war to the state of affairs rather than the relationship between warfare and the state of which much ink has been spilled. For instance, war is not initially apparent in the seeming strategic deployment of the Mujahedin—mercenaries armed and trained by the Central Intelligence Agency (cia) against the Soviet army—until the Mujahedin’s character of war exceeds and escapes the state apparatus’s strategic proxy warfare to return as civil wars in the Congo or the networked logistics of Al Qaeda. The U.S. attempt to break the deadlock of bipolar deterrence via nonstate actors did not fail to disrupt the bipolar balance of power. Instead, it worked too well, unleashing a new mode of organization for violence and warfare. Instead of the nitpicking debates over personalities and financial connections that try to prove or disprove that the cia “created” Osama bin Laden, we should map the ways new organizations of violence were let loose, imitated, reinvented, and then echoed across the planet.43 Whether by conspiracy or imitation, the Mujahedin reterritorialized in the post–Cold War, creating a veritable franchise of warlords throughout Africa and Central Asia, and not just with the name brands of Al Qaeda, Boko Haram, and the Islamic State in Iraq and Syria (isis) but the numbers of other novel forms of warfare taking place in conflict far outside the civilizational drama of the war on terrorism. Drug cartels in Mexico, neo-Nazis, Christian militias, and even neo-Nazi sympathizers within the German military are using the decentralized structures of information sharing, improvised precision weapons, social media recruiting, weapons development, and on and on—a new order congealed out of a previous order already containing the vestigial structures necessary for what would come next. Similar to the globalization of Mujahedin-like organizational types and techniques, the U.S. invasion of Iraq in 2003 could not be contained or instrumentally directed despite the great power status and traditional state form of the United States. The funding of opposition militias, both Sunni and Shia, against the Revolutionary Guard, combined with the dramatic assault of shock and awe, succeeded in the successful overthrow of the Baathist regime of Saddam Hussein. Yet the fighting did not stop there. It continued and it multiplied. The new assemblage of opposition created by the U.S. invasion, while not unified or even organized, successfully forced the U.S. to give up on permanent military bases and, for a time, enter a state of withdrawal asymptotically approaching zero. However, U.S.-led warfare returned and at the time this book is going to press is gaining momentum. In writing this manuscript over a period of six years, I have wondered whether I would need the past tense to describe the on-again, off-again conflict in Iraq and Afghanistan. So far the past tense seems indef­initely postponed. While it is impossible to identify strict causal relations between events, the actions of the United States in Iraq severely undermined its ability to gain support for its military intervention in Libya, Afghanistan, Yemen, and beyond, and the organizational types set loose during the Cold War have entered into fecund relations for the multiplication of species of war making. The frequent riots in Mosul against continued U.S. drone violence and special ops assassinations reverberates throughout the on-again, off-again uprisings and state captures of Arab uprisings are now almost forgotten outside the region. The wars in Iraq and Afghanistan continue to return home to the U.S. territory in the form of debt, unemployment, and hundreds of thousands of soldiers with traumatic brain injuries, each further amplifying the reach of war long after any particular temporal segment of warfare has ended.

#### The impact is *unending war* and *environmental catastrophe*.

Craven 19 [Matt Craven (Professor of International Law, SOAS University of London, United Kingdom). “‘Other Spaces’: Constructing the Legal Architecture of a Cold War Commons and the Scientific-Technical Imaginary of Outer Space”. European Journal of International Law, Volume 30, Issue 2, May 2019, Pages 547–572, Accessed 1/12/22. <https://academic.oup.com/ejil/article/30/2/547/5536739> //Xu]

Even in the aftermath of the pronounced ‘closure’ of the Cold War, the residue of the formation that was brought into play in space remains very much with us today. On the one hand, outer space has been progressively enveloped within the technological infrastructure of warfare and policing actions – the first Gulf War of 1990 ushering in a new era of ‘smart’ weaponry and GPS-configured surgical violence139 – anticipating, in the process, the ‘remote’ operations of the drone and cyber warfare of the contemporary era. The blurring of the demarcation between the (outer space) technologies of war and peace finds its contemporary parallels in the collapse of a range of other operative distinctions – between the virtual and the real, the combatant and the civilian, the battlefield and the battle space, the interstate and the intra-state. The juridical formations on which these depend, furthermore, have themselves become enveloped within the same strategic operations – ‘lawfare’ becoming the adjunct to a new form of totalized warfare stripped of any spatial determinacy. On the other side, outer space has increasingly become the terrain of speculative capitalism, which, following the growth of space tourism (pioneered by the Russian space administration in the 1990s140), has seen the active development of a range of commercial projects from the construction of sub-orbital ‘space planes’ to asteroid and lunar mining undertaken by both public and private agencies. The imaginative resources for such projects have come from various directions, but a common theme is that impending resource depletion on earth will soon bring such resources within commercial and technological reach, and that outer space will therefore provide a ‘spatial fix’ for a system of global capitalism that might otherwise run into the ground.141 There is, as Katarina Damjanov has noted,142 a deep parallelism here between the juridical opening of the seas (mare liberum), which served to stabilize the system of sovereignty within Europe in the 17th century by extroverting the site of conflict and competition,143 and the opening of outer space three centuries later as another prophylactic measure, even if, in this case, that which was to be guarded against was a planetary-wide, environmental catastrophe. Perhaps the deepest irony, here, is that the mode of salvation on offer is precisely the same as that which is the extant cause of crisis, which one may take to be a remorseless instrumentalization of nature.

#### The alternative is *Worldism* – the refusal of international relations dictated by militarism in favor of interventions into space as ungoverned.

Agathangelou and Ling 09 Anna M. Agathangelou is an Associate Professor in the Departments of Political Science and Women’s Studies at York University, Canada and co-director of the Global Change Institute, Nicosia, Cyprus, L.H.M. Ling is an Associate Professor in the Graduate Program in Inter- national Affairs at The New School, New York, USA., Transforming World Politics: From empire to multiple worlds, The New International Relations Series, 2009.

MAIN ASPECTS Worldism presents world politics as a site of multiple worlds. These refer to the various and contending ways of being, knowing, and relating that have been passed onto us from previous generations. Histories, languages, myths, and memories institutionalize and embody multiple worlds through simple daily acts like cooking and eating, singing and dancing, joking and playing but also through larger events like trade, development, conflict, and war. Worldism registers not only the “difference” that comes from multiple worlds (see Inayatullah and Blaney 2004) but also their entwinements. Selves and others reverberate,2 producing multi- and trans-subjectivities that leave us legacies of reinforcement and conflict, reconstruction and critique, reconciliation and resistance. Such syncretic engagements belie seeming oppositions and contradictions among multiple worlds to reveal their underlying connections despite hegemony’s violent erasures. On this basis, communities have opportunities to heal and recuperate so they can build for another day, for another generation. Worldism as everyday life enacts self–other reverberations and syncretic engagements, especially by communities at the margins. Worldism as an analytical framework theorizes about them. Both types of worldist activity expose the problematic of empire in practice and logics. Building on the postcolonial notion that all parties make history, albeit with unequal access to power, worldism leads to an undeniable conclusion: our mutual embeddedness makes us mutually accountable. One cannot escape from the other. Mutual accountability brings with it duties and responsibilities, to be sure, but also possibilities: that is, (a) an internal dialectic of constant questioning to check and problematize hegemony, so that (b) we can expand our visions, strategies, and approaches beyond the narrow, hegemonic confines of realism/liberal internationalism, in order to (c) arrive at a more inclusive, conciliatory, and democratic world politics. In brief, worldism consists of two simultaneous processes: descriptive and analytical. Worldism-as-description features the following: (a) multi- and trans-subjectivities that institutionalize the social and structural reverberations between selves and others; (b) the agency of all parties, despite inequities and injustices, to create, build, and articulate multiple worlds; (c) syncretic engagements that consolidate the entwinements of multiple worlds into concrete strategies for change, adjustment, adaptation, refor- mulation, and transformation; and (d) community-building that integrates and accretes these syncretic engagements despite denials of such efforts from hegemonic elites and their ideologies. Worldism-as-analysis draws on the struggles and learning undertaken in worldist daily life to emphasize: (a) accountability as a hallmark of worldist inquiry that ensures (b) an internal criticality to question, contest, and challenge hegemony, so that we may (c) arrive at emancipatory construction even as we critique and resist. The critical reader may interject: Couldn’t “agency” and “accountabil- ity” in worldism be taken as a fancy way of blaming the victim? Are Jews, for example, responsible for the Holocaust; slaves for their enslavement; or any oppressed people for their oppression? Worldism as a politics of multiple relations subsumes this liberal, individualist understanding of responsibility. Multiple relations produce a web of effects and consequences to any kind of decisions and/or set of practices. Accountability in worldism asks: Who’s involved, under what conditions, and through which processes can we redress or transform the violence? What kinds of understanding are generated to account for these relations and/or to make them invisible? Without the painful concession that all of us, “abusers,” “victims,” and “innocent bystanders” alike, contribute to the production of hegemonic violence, whether it results in domestic abuse (see Adler and Ling 1995) or state violence (see Ling 1994), we may never realize how violence is conceived, generated, and sustained. By extension, we will never understand ways to end it. Instead, in our injuries and (self ) alienation, we may reproduce time and again the same conditions of violence or hegemony that afflicted us in the past and which seems the only option for the present. Suspended political ideals, in this case, could also block us from action and change. Worldist agency and accountability compel us to face the complicities (including our own) that sustain violence in the making of history, so that we may, as Marx exhorted, change it. Where do these ideas come from?, our reader may ask. Let us delineate the intellectual precedents to worldism. INTELLECTUAL PRECEDENTS Worldism draws on constructivism and postmodernism but also differs from them. Worldism shares with constructivism its emphasis on intersubject- ivity, and with postmodernism its insights on asymmetrical difference: that is, the norms, institutions, practices, and behaviors that set up certain subjects and subjectivities as more privileged and protected than others. Power, then, cannot be reduced to an objectified, reified condition of who’s “on top” or who “has more” but instead results from agents contributing to macro-political structures like ideology, organization, and capitalist relations. Power redefined in these terms stems from an intersubjective consensus within a context of material conditions and relations. The crux here lies in the framing. Since narration as a process is never complete, the story can always change.3 However, worldism departs from constructivism by asking: What kinds of intersubjectivity are constructed, by whom, and for what purpose, and how do theories of subjectivity restructure the world “otherwise”? And is this how we want the world to be? Not probing into the social relations of intersubjectivity, according to worldism, effectively erases the power politics of meaning, including the political economy behind such constructions. And unlike postmodernism, worldism distinguishes power from the resistance it induces. Contra Foucault (1994), we differentiate between the colonizer and colonized in their experiences of colonial power (see Stoler 2002) and the entwinements that follow, both reinforcing and conflicting complicity (see Ling 2002b). Not doing so implicitly reinforces the imperialist assertion that “this is the way the world is”: that is, it is not open to alternative concepts, discourses, strategies, or ways of being. These gaps in constructivism and postmodernism return us to the conventional treatment of power as domination, pure and simple. Ronen Palan (2000), for instance, finds a strain of conservative realism in Alexander Wendt’s “naturalist” version of constructivism, primarily because he claims to offer a method only, and not an interpretation, of politics. Wendt (2005) himself admits as much. For similar reasons, Samir Amin (2004) calls postmodernism an “ideological accessory” to elite, bourgeois interests just as Aijaz Ahmad (1992) considers post-structuralist theories serve as alibis for imperialism. Both post- modernism and poststructuralism value critique and deconstruction over political action, thereby keeping de facto power intact. We note that although critical theories like postmodernism and con- structivism open up spaces to think about shifting power politics, they fall short of transforming the very asymmetries they critique. Inattention to structural, material interest and lack of integrating the Other analytically – that is, as a substantive maker of the world – undermines their claims of emancipatory social theory. Ultimately, the Other becomes a repository of raw materials for hegemonic actors and sites in the North to process. Worldism acknowledges a deep intellectual debt to postcolonial studies. Here, race, gender, sexuality, class, and nationality serve as analytics and substance in examinations of power relations. Postcolonial studies demystify empire’s boast, like Kipling’s “White Man’s Burden,” that the imperial Self makes the world for all Others. And that world is unidimensional (top- down state power), unilateral (center dominates periphery), and unilinear (past–present–future). Postcolonial studies record a more nuanced and multiple history by problematizing the ways colonial power is imposed on the colonized. That is, colonization involves more than a unilateral and mechanical domination of the subjugated by colonizers and their states. As documented by postcolonial studies, tensions and contradictions emerge from these relations (Said 1979; Spivak 1999), leading to adaptations and integrations between hegemonic selves and subaltern others. From this inter- action, “colonizers” and “colonized” produced something together over the course of time that neither anticipated nor perhaps desired but which all learned to live with, and eventually called their own. Divides along lines of property, race, class, language, religion, and ideology did not disappear. They fused, rather, into hybrid, creole, or mélange cultures that, nonethe- less, contested these categories constantly (Ashcroft, Griffiths, and Tiffin 1995; Lewis and Mills 2003). In recognizing that colonizer and colonized mutually construct their sub- jectivities, postcolonial studies attribute to both the legacies of power that we face today. Note, for example, Britain’s principal instrument of colonial and imperial power: the East India Company. Sudipta Sen (1998) shows that, contrary to claims that the British brought capitalism to India, the East India Company had to adjust to pre-existing market structures and political relations to gain access to the thriving trade already in place in northern India.4 Only through this kind of entry could the East India Company later redirect the trade to its favor. L.H.M. Ling (2002b) traces how institutional elites in East Asia learned syncretically and “interstitially” between two world orders – the agrarian-based, cosmo-moral universe of Confucian governance and the Westphalian inter-state system of commerce and trade – to cumulate into what we know as Asian capitalism today. Walter Mignolo (2000) highlights the “gnosis” of thought and action, Self and Other, that comes from centuries of transgressing and reformulating the colonial boundaries that comprise Latin America. Of course, those subjected to hegemony must accommodate others more than those who perpetrate it. Yet hegemony’s very asymmetry highlights the resilience and creativity of the marginalized. Ordinary people can journey across subjectivities to engage syncretically with others, even under conditions of poverty and inequality, to rebuild, reconstruct, and reorganize communities. Cherrie Moraga and Gloria Anzaldua (1983) characterize their straddling of multiple worlds as life on the “borderlands.” Typically, they point out, women of color from the South must bear the biggest burden of negotiating the multiple worlds of language, culture, class, and gender to survive white- majority society in the North despite systemic discrimination and obstacles. Still, they are able to exercise internal reserves of freedom, thought, and action to sort through hegemony, not simply surrender to it. Similarly, the indigenous populations of the Americas, Australia, and New Zealand have entered into treaties with their white majorities to retain aspects of indigenous ontologies by formalizing them in Western institutions (Shilliam 2008).

# AC

## FW

#### Vlt ow

#### 1] durability

#### 2] probability

## Adv

#### Presumption negates – a) more often false than true since I can prove something false in infinite ways b) real world policies require positive justification before being adopted – there’s alwahys an institutional DA to going through Congress

## Warming

### Lunar

#### Lunar observation fails and interplanetary space observation solves

Siegel 18. Ethan Siegel (Siegel is a Ph.D. astrophysicist, author, and science communicator, who professes physics and astronomy at various colleges. He has won numerous awards for science writing since 2008), 10-25-2018, "Why Don't We Put A Space Telescope On The Moon?," Forbes, https://www.forbes.com/sites/startswithabang/2018/10/25/why-dont-we-put-a-space-telescope-on-the-moon/?sh=78be159a777f sean!

Yet observatories like Hubble, Chandra, Fermi, Spitzer and more have showcased how remarkably effective a space telescope can be. The views and data they've returned to Earth have taught us more than any similar observatory could have revealed from the ground. So why not put a telescope on the Moon, then? Believe it or not, it's a terrible idea in all ways except one. Here's why. The transmittance or opacity of the electromagnetic spectrum through the atmosphere. Note all the... [+] absorption features in gamma rays, X-rays, and the infrared, which is why they are best viewed from space. Over many wavelengths, such as in the radio, the ground is just as good, while others are simply impossible. The transmittance or opacity of the electromagnetic spectrum through the atmosphere. Note all the... [+] NASA The Moon, at first glance, seems like the ideal location for a telescope. There's practically no atmosphere at all, which removes all the light pollution concerns. It's far away from the Earth, which should greatly reduce the interference from any signals that humans produce. The ultra-long nights mean that you can observe the same target, continuously, for as long as 14 days at a time with no interruptions. And because you have solid ground to brace yourself against, you don't need to rely on gyroscopes or reaction wheels for pointing. It sounds like a really good deal. But if you start thinking about the way the Moon orbits the Earth, with the entire Moon-Earth system orbiting the Sun, you might start to realize some of the problems that a setup like this would inevitably encounter. First, if you put your telescope on the Moon, which side do you pick: the near side or the far side? Either one has drawbacks. If you place your telescope on the near (Earth-facing) side of the Moon, you will always have a view of the Earth. This means you can send-and-receive signals, control your telescope, and download-upload data in nearly real-time, with only the light-travel-time of signals across space limiting you. But it also means that Earth-produced interference, like radio broadcast signals, will always be a problem you need to shield yourself from. On the other hand, if you're on the far side of the Moon, you shield yourself from everything coming from Earth quite effectively, but you also have no direct path for data transfer or signal transmittance. There would have to be an additional mechanism set up, like a lunar orbiter or a link to a transmitter/receiver on the near side, just to operate it. The near and far sides of the Moon, as reconstructed with imagery from NASA's Clementine mission. The near and far sides of the Moon, as reconstructed with imagery from NASA's Clementine mission. NASA / CLEMENTINE MISSION / LUNAR & PLANETARY INSTITUTE / USRA Either way, you're going to have a slew of problems to contend with that you wouldn't encounter simply from going into the lonely abyss of interplanetary space. The two biggest are: Moonquakes. You think the Moon's a big deal because it's responsible for Earth's tides? The tidal forces that the Earth exerts on the Moon are more than 20 times greater than the Moon's tidal forces on Earth, enough to cause the Moon to experience considerable moonquakes. Temperature extremes. Because of the Moon's tidal locking to Earth and its extremely slow rotation, it's bathed in sunlight constantly for 14 days at a time, followed by 14 days of total darkness. Daytime temperatures can reach over 200 °F (nearly 100 °C), while night brings cold down to -280 °F (-173 °C). While a space-based telescope can control its temperature through either active or passive cooling (or a combination of both), a telescope must cool down below the temperature of the wavelengths it's trying to observe, or noise will swamp your intended signal. This would be a tremendous drawback for ultraviolet, optical, or infrared astronomy, all of which would have severe problems on the Moon for anything other than the goal of Earth (or Sun) observing. Engineering a telescope that can survive those temperature extremes and still function optimally is an extraordinary challenge. It's no wonder that the only lunar-based telescope we have, at present, is a UV-telescope on the Moon's near side, at wavelengths where the Earth's atmosphere absorbs almost all of the light. For most applications, going to space is going to be a superior option to going to the Moon. The lunar surface, in terms of temperature extremes and difficulties communicating with Earth, offers more drawbacks than having a surface to push against/build on offers.

#### They have two moon key warrants. Their evidence has zero highlighted warrants for either of these so default to 1NC explanation:

#### First, angular rotation – we have that tech already

Siegel 18-2. Ethan Siegel (Siegel is a Ph.D. astrophysicist, author, and science communicator, who professes physics and astronomy at various colleges. He has won numerous awards for science writing since 2008), 10-16-2018, "This Is How Hubble Will Use Its Remaining Gyroscopes To Maneuver In Space," Forbes, https://www.forbes.com/sites/startswithabang/2018/10/16/this-is-how-hubble-will-use-its-remaining-gyroscopes-to-maneuver-in-space/?sh=2427594b2ba8 sean!

In a space telescope, we don't have different components of our bodies to work with, but we do have different components of the telescope. And in the case of Hubble, we have an entire guidance system built on this principle. The reaction wheels allow it to change its orientation, and the fine-guidance sensor allows it to determine how to orient itself. According to NASA itself: To change angles, it uses Newton’s third law by spinning its wheels in the opposite direction. It turns at about the speed of a minute hand on a clock, taking 15 minutes to turn 90 degrees. But keeping the telescope stable needs a key ingredient: gyroscopes. Without those gyroscopes, tiny external forces would cause Hubble's orientation to drift over time, and would make long-exposure images impossible. But with them, we can keep the telescope stable.

#### Second is gas analysis – we have that too:

NASA 18. NASA, 7-11-2018, "NASA’s Webb Telescope to Inspect Atmospheres of Gas Giant Exoplanets," https://www.nasa.gov/feature/goddard/2018/nasa-s-webb-space-telescope-to-inspect-atmospheres-of-gas-giant-exoplanets/ sean!

When a planet crosses in front of, or transits, its host star, the star’s light is filtered through the planet’s atmosphere. Molecules within the atmosphere absorb certain wavelengths, or colors, of light. By splitting the star’s light into a rainbow spectrum, astronomers can detect those sections of missing light and determine what molecules are in the planet’s atmosphere. For these observations, the project team selected WASP-79b, a Jupiter-sized planet located about 780 light-years from Earth. The team expects to detect and measure the abundances of water, carbon monoxide, and carbon dioxide in WASP-79b. Webb also might detect new molecules not yet seen in exoplanet atmospheres.

#### Your authors concluded a year later that lunar observation is infeasible

Guo et al 18. Huadong Guo, Hanlin Ye, Changyong Duo, Jing Huang (All authors are researchers at the Key Laboratory of Digital Earth Science, Institute of Remote Sensing and Digital Earth), 2-28-2018, "Error analysis of exterior orientation elements on geolocation for a Moon-based Earth observation optical sensor," Taylor & Francis, https://www.tandfonline.com/doi/full/10.1080/17538947.2018.1513088 sean!

For a Moon-based optical sensor, the effect of the errors of exterior orientation elements has some characteristics. First, since the Earth–Moon distance is very large, a small error caused by the exterior orientation elements would lead to large geolocation errors and the image distort. Actually, one-second position error in both latitudinal and longitudinal direction can lead to geolocation error on kilometres level (Figure 7). One-second angular error of a Moon-based sensor will also result in thousands of metres error (Figures 8 and 9), while 0.1° angular error of an optical sensor onboard space-borne platform can only cause hundreds of metres geolocation error (Dou et al. 2014). Second, with the orbit and attitude of the Moon changing, the observation geometry is also different. The geolocation error varies with the changing Earth–Moon distance and angle (Figures 11 and 12). It’s worth noting that, the sensors can be equipped in the near-side of the Moon. The different locations on the lunar surface, the different look vector that the Moon-based optical sensor would have (Ye, Guo, and Liu 2017a). Similar to the look vector, equipping sensors at different positions of the Moon will also lead to different geolocation error (Figures 5 and 6). Third, some unique factors can lead to the error of the exterior orientation elements, such as lunar position and lunar libration (Folkner et al. 2014; Yang et al. 2017). A very small angular error (0.1″) of lunar libration can result in significant geolocation error (Figure 15). With the increasing concern of the lunar exploration, more and more sensors have been equipped on the lunar orbit or on the surface of the Moon, such as Lunar-based Ultraviolet Telescope (LUT) and Moon-based Extreme Ultraviolet (EUV) imager (He et al. 2011; Wen et al. 2014). Some researchers studied the geolocation error. Qi presented the astrometric solution of LUT devised to solve the problem of accurate pointing and tracking of celestial objects (Qi et al. 2015). Yan analysed the observational data from EUV onboard Chang’E-3 mission (Yan et al. 2016). The effect of exterior orientation elements on geolocation here is different as from those studies. Since the observation target isn’t the same, when observing the Earth surface features, the EUV or LUT cannot offer the direct reference value for Moon-based optical sensors. According to the effect analysis of the exterior orientation elements, the results that we obtained can further give support to the study of the Moon-based Earth observation optical sensor from the perspective of the observation geometry and geolocation error. 5. Conclusions Geolocation error analysis, based on the observation geometry of the Moon-based platform and the Moon-based geometric image model, is proposed. We first performed a detailed image model applied to the Moon-based Earth observation. According to the model, a detailed explanation for the peculiarities of the observation geometry including the observation distance and the observation angle are shown. To analyse the geolocation error caused by the errors of the exterior orientation elements, we utilised some parameters such as RMSE and MAE to measure the offsets. Our analysis showed that equipping sensors at different positions of the Moon has different geolocation error under the condition of the same error of exterior orientation elements (Figure 6). The effect of the position errors showed the systematic feature in the image (Figure 7). The geolocation error will be larger when equipping sensors near the centre of the lunar disc under the condition of the same pointing error (Figures 6 and 7). We analysed the geolocation error variation during one orbital period and drew the conclusion that the geolocation error is not obviously influenced by the observation distance and Earth–Moon angle, especially in the mid-high latitude of the Moon. In addition, the spatial resolution magnitude associated with the geolocation error is investigated so as to give support to the image geometric correction and the spatial resolution determination. We find that, the image offsets have significant linear correlation with the increasing errors of exterior orientation elements. According to this regularity, a suitable spatial resolution can be evaluated from the perspective of error estimation. We also evaluated the error effects of the lunar position and lunar libration on geolocation and discussed the characteristics of the error effect of exterior orientation elements. Compared to the space-borne platform case, Moon-based Earth observations have larger distance and require higher pointing accuracy of the optical sensor. Besides, some unique factors need to be considered, such as lunar position and lunar libration. The effect of these errors cannot be neglected. Overall, these results and analysis reveal the pecularities of the error effect on geolocation for a Moon-based optical sensor. This will provide evidence for the study of the Moon-based optical sensors in the following.

### Adaption

#### Numerous thumpers – adaption fails.

Knittel 16 [Nina Knittel (junior researcher at the Wegener Center for Climate and Global Change in Graz. In her field of research so far, she focussed on climate change related policy strategies such as adaptation and mitigation. She studied economics at the University of Graz and obtained a Master of Arts in Economics). “Climate Change Adaptation: Needs, Barriers and Limits”. Climate Policy Info Hub (The Climate Policy Info Hub has been created within the POLIMP project which has received funding from the European Union's Seventh Framework Programme for Research, Technological Development and Demonstration). 10 February 2016. Accessed 1/29/2022. <https://climatepolicyinfohub.eu/climate-change-adaptation-needs-barriers-and-limits.html> //Xu]

3.1 Barriers to adaptation decision-making

Since public and private actors are involved in the implementation of adaptation measures, decision-making barriers may reduce the desired level of adaptation. From an economic point of view, there are several barriers that prevent governments from adaptation decision-making, such as transaction costs. Other barriers emerge due to market failures such as externalities, information asymmetries, and moral hazards. The 5th Assessment Report of the International Panel on Climate Change (IPCC) (2014) provides a comprehensive literature survey identifying the following economic barriers to adaptation decision-making6:

Transaction costs. These are mainly divided into information and adjustment costs. The former referring to the costs that occur when acquiring information and the latter to the costs that come along with replacement decisions of long-lived capital.

Market failures and missing markets. These include externalities, information asymmetries, and moral hazards. This is particularly the case when considering maladaptation if adaptation actions of one economic unit negatively affect the damages of one other unit (individual, firm, country, or sector). These market failures also include the problems that arise with insufficient incentive structure and therefore assign a major role to public authorities.

Behavioural obstacles to adaptation. Includes all behavioural issues that lead to irrational decisions without using all the available information and are time inconsistent. Social norms and cultural factors also have an inadequate influence on adaptation-decision making.

#### Data not key to solve warming – and it’s not used anwyays

Starr 14 - psychologist, journalist, and professor emeritus at the City University of New York, Brooklyn College (Bernard, “Our Oceans Are Dying: Mobilizing an Indifferent Public to Confront This Crisis,” Huffington Post, 6-27-14, http://www.huffingtonpost.com/bernard-starr/our-oceans-are-dying\_b\_5533322.html)

After an eighteen-month investigation, the Commission, made up of former heads of state, government officials, and prominent business leaders concluded that our oceans are dying from climate change, pollution, and over-fishing. The Commission proposes an eight point program to rescue the oceans over the next five years. Why should we be concerned? José María Figueres, Co-chair of the Commission and former president of Costa Rica, has summed up the dire situation with these words: "The ocean provides 50 percent of our oxygen and fixes 25 percent of global carbon emissions. Our food chain begins in that 70 percent of the planet." He added that "a healthy ocean is key to our well-being, and we need to reverse its degradation." He warned: "Unless we turn the tide on ocean decline within five years, the international community should consider turning the high seas into an off-limits regeneration zone until its condition is restored." A Commission video states the crisis even more starkly: "No ocean, no us!" In his brief talk at the reception, David Miliband, also co-chair of the Ocean Commission and former UK Foreign Secretary, urged politicians, scientists, journalists, and ordinary citizens to rally behind the salvation of our oceans and the planet -- and to get the message out to others. Will getting the message out turn the tide in the battle to save the planet? I doubt it. **We are swimming in information and messages**. Earlier the this year leading scientists declared that we are fast approaching the critical point of no return for climate change -- a point with predictable devastating consequences. But **who is listening?** The public continues to be **frighteningly indifferent**. Who among the public is willing to place the salvation of the planet over immediate personal concerns? That question was dramatically called to my attention recently when I presented a list of critical issues to a group of seniors enrolled in a life-long learning program and asked them which one they would place first. The list included: terrorism and national defense, global warming, jobs, vanishing icebergs, protecting Social Security, income inequality, ocean pollution, sustaining Medicare, protecting the Amazon rain forests, reducing fossil fuel emissions, regulating Wall Street and the banks, stopping fracking (shale gas drilling), protecting wildlife (elephants, lions, whales, etc.), eliminating genetically modified foods (GMOs), campaign finance reform, free college education for all, national healthcare (Medicare for all). I was particularly interested in the seniors' answers since popular wisdom says that seniors are more concerned than other age groups with the welfare of children, grandchildren, and future generations. And no issue is more vital for the well-being of future generations than the viability of life on the planet. Psychologist Erik Erikson called this concern of older adults "generativity." But the seniors defied conventional wisdom. Jobs, Social Security, and income inequality topped their listings. Only one person, toward the end of the discussion, cited climate change -- and his response seemed almost gratuitous in recognition that we were about to screen a documentary on the melting of icebergs. Perhaps I should not have been surprised. Politicians avoid talking about environmental issues for fear of losing favor with their constituents, who are clamoring for jobs, mortgage relief, and financial security. During the 2012 presidential debates between Barack Obama and Mitt Romney environmental issues took a far **back** seat; in fact, they were barely mentioned. Both candidates knew instinctively that in the throes of an economic crisis placing the salvation of the planet high on the national agenda would not generate votes. It might even take away votes from people who feared the candidate would be indifferent to their personal struggles. So where does this leave us? If more environmental studies and more alarming news will not mobilize leaders and the public for an all-out commitment to the preservation of our small vulnerable corner of the universe, what will? Perhaps we need to shift our focus from information to changing human behavior. Let's enlist leading behavioral scientists and psychological associations to address how to awaken the public to the urgency of protecting the planet. Let's launch a campaign to make this the number-one priority. And let's adopt these mantras: No planet, no jobs; no planet, no Social Security; no planet, no mortgages; no planet, no corporate bonus packages. No planet, no us.

#### Rood and Gibbons says adaptation is good, not that it solves warming

#### Their evidence concedes adaptation doesn’t solve – Memorial reads yellow

1AC Sears (, N., 2021. Great Powers, Polarity, and Existential Threats to Humanity: An Analysis of the Distribution of the Forces of Total Destruction in International Security. [online] ResearchGate. Available at: <https://www.researchgate.net/publication/350500094> [Accessed 22 November 2021] Nathan Alexander Sears is a PhD Candidate in Political Science at The University of Toronto. Before beginning his PhD, he was a Professor of International Relations at the Universidad de Las Américas, Quito. His research focuses on international security and the existential threats to humanity posed by nuclear weapons, climate change, biotechnology, and artificial intelligence. His PhD dissertation is entitled, “International Politics in the Age of Existential Threats”)-re-cut rahulpenu

Climate Change Humanity faces existential risks from the large-scale destruction of Earth’s natural environment making the planet less hospitable for humankind (Wallace-Wells 2019). The decline of some of Earth’s natural systems may already exceed the “planetary boundaries” that represent a “safe operating space for humanity” (Rockstrom et al. 2009). Humanity has become one of the driving forces behind Earth’s climate system (Crutzen 2002). The major anthropogenic drivers of climate change are the burning of fossil fuels (e.g., coal, oil, and gas), combined with the degradation of Earth’s natural systems for absorbing carbon dioxide, such as deforestation for agriculture (e.g., livestock and monocultures) and resource extraction (e.g., mining and oil), and the warming of the oceans (Kump et al. 2003). While humanity has influenced Earth’s climate since at least the Industrial Revolution, the dramatic increase in greenhouse gas emissions since the mid-twentieth century—the “Great Acceleration” (Steffen et al. 2007; 2015; McNeill & Engelke 2016)— is responsible for contemporary climate change, which has reached approximately 1°C above preindustrial levels (IPCC 2018). Climate change could become an existential threat to humanity if the planet’s climate reaches a “Hothouse Earth” state (Ripple et al. 2020). What are the dangers? There are two mechanisms of climate change that threaten humankind. The direct threat is extreme heat. While human societies possesses some capacity for adaptation and resilience to climate change, the physiological response of humans to heat stress imposes physical limits—with a hard limit at roughly 35°C wet-bulb temperature (Sherwood et al. 2010). A rise in global average temperatures by 3–4°C would increase the risk of heat stress, while 7°C could render some regions uninhabitable, and 11–12°C would leave much of the planet too hot for human habitation (Sherwood et al. 2010). The indirect effects of climate change could include, inter alia, rising sea levels affecting coastal regions (e.g., Miami and Shanghai), or even swallowing entire countries (e.g., Bangladesh and the Maldives); extreme and unpredictable weather and natural disasters (e.g., hurricanes and forest fires); environmental pressures on water and food scarcity (e.g., droughts from less-dispersed rainfall, and lower wheat-yields at higher temperatures); the possible inception of new bacteria and viruses; and, of course, large-scale human migration (World Bank 2012; Wallace-Well 2019; Richards, Lupton & Allywood 2001). While it is difficult to determine the existential implications of extreme environmental conditions, there are historic precedents for the collapse of human societies under environmental pressures (Diamond 2005). Earth’s “big five” mass extinction events have been linked to dramatic shifts in Earth’s climate (Ward 2008; Payne & Clapham 2012; Kolbert 2014; Brannen 2017), and a Hothouse Earth climate would represent terra incognita for humanity. Thus, the assumption here is that a Hothouse Earth climate could pose an existential threat to the habitability of the planet for humanity (Steffen et al. 2018., 5). At what point could climate change cross the threshold of an existential threat to humankind? The complexity of Earth’s natural systems makes it extremely difficult to give a precise figure (Rockstrom et al. 2009; ). However, much of the concern about climate change is over the danger of crossing “tipping points,” whereby positive feedback loops in Earth’s climate system could lead to potentially irreversible and self-reinforcing “runaway” climate change. For example, the melting of Arctic “permafrost” could produce additional warming, as glacial retreat reduces the refractory effect of the ice and releases huge quantities of methane currently trapped beneath it. A recent study suggests that a “planetary threshold” could exist at global average temperature of 2°C above preindustrial levels (Steffen et al. 2018; also IPCC 2018). Therefore, the analysis here takes the 2°C rise in global average temperatures as representing the lower-boundary of an existential threat to humanity, with higher temperatures increasing the risk of runaway climate change leading to a Hothouse Earth. The Paris Agreement on Climate Change set the goal of limiting the increase in global average temperatures to “well below” 2°C and to pursue efforts to limit the increase to 1.5°C. If the Paris Agreement goals are met, then nations would likely keep climate change below the threshold of an existential threat to humanity. According to Climate Action Tracker (2020), however, current policies of states are expected to produce global average temperatures of 2.9°C above preindustrial levels by 2100 (range between +2.1 and +3.9°C), while if states succeed in meeting their pledges and targets, global average temperatures are still projected to increase by 2.6°C (range between +2.1 and +3.3°C). Thus, while the Paris Agreements sets a goal 6 that would reduce the existential risk of climate change, the actual policies of states could easily cross the threshold that would constitute an existential threat to humanity (CAT 2020).

#### Adaptation is only as effective as policy implementation – even if fantastic adaptation exists post aff they have not read uq that says states are going to use them

## Neutrinos

### Detection

#### 1AC Lee cites Goldblum– Memorial Reads Green

Lee 20 Thomas Lee "Can tiny, invisible particles help stop the spread of nuclear weapons?" <https://engineering.berkeley.edu/news/2020/03/can-tiny-invisible-particles-help-stop-the-spread-of-nuclear-weapons/> (Associate Adjunct Professor, Research Scientist Operations & IT Management.)//Elmer

The key to preventing nuclear proliferation may depend on a little bit of ghost hunting. Scientists have long been interested in a device that can detect neutrinos, ghost-like particles that have no electric charge and nearly no mass — and therefore can pass through matter. Now, researchers are closer than ever to deploying technology that can spot those elusive subatomic particles and, in doing so, alert international authorities to the illicit production of plutonium, a key fuel for nuclear bombs. The technology may provide a “way to monitor the plutonium content in a nuclear reactor in real time that we just don’t have right now,” said Bethany Goldblum (M.S.’05, Ph.D.’07 NE), a top researcher with UC Berkeley’s Department of Nuclear Engineering. Goldblum, the executive director of the Berkeley-based Nuclear Science and Security Consortium, co-wrote a study published this week in the Review of Modern Physics that examines the feasibility of neutrino detectors in nuclear nonproliferation efforts. The study’s co-authors include Adam Bernstein and Nathaniel Bowden from Lawrence Livermore National Laboratory, Patrick Huber from Virginia Tech, Igor Jovanovic from the University of Michigan and John Mattingly from North Carolina State University. The study ultimately concludes that such technology deployed outside nuclear reactors could prove effective in ensuring that countries are not making weapons-related material under the guise of peaceful civilian energy production. The report also advances the idea that researchers could one day use the technology to discover or exclude the presence of reactors at distances of a few hundred kilometers. “Over several decades, physicists have conceived many ideas for using ﬁssion neutrinos in nuclear security,” the study says. “Some ideas remain in the realm of pen and paper, constrained by basic physical and practical considerations. For other concepts, demonstrated technology is catching up with real opportunities.” The ghost particle Neutrinos are the most abundant particles in the universe, having been formed by large nuclear explosions like the Big Bang, supernovas and the fusion process that happens inside the sun. They travel near the speed of light, have little mass and carry no electric charge. Because of these attributes, neutrinos can pass through matter and are incredibly difficult to detect, which is why scientists often refer to them as “ghost particles.” For example, if 10 trillion neutrinos struck the Earth, all but one would pass through the planet without having interacted with anything at all. In 1956, Clyde Cowen and Frederick Reins, two scientists at the Los Alamos National Laboratory in New Mexico, confirmed the neutrino’s existence, work that eventually earned the Nobel Prize in Physics. The duo placed two large water tanks near a nuclear reactor, which produces electron antineutrinos in huge quantities, as part of the fission process. As it turns out, neutrinos can collide with protons in the water and produce a neutron and a positron through a process called inverse beta decay. When the positron moves through the water, it produces a flash of light that special sensors can detect. Up to this point, scientists were primarily interested in finding neutrinos because the particles might offer clues to the universe’s origin and the formation of stars and galaxies. But starting around the turn of the 21st century, the idea that neutrino detectors could be used in nuclear nonproliferation efforts started to gain real traction. In 2000, Adam Bernstein, then a postdoctoral fellow at the Sandia National Laboratory in Livermore, California, wrote a paper exploring the idea of using detectors filled with purified water to spot neutrinos produced from nuclear explosions. In many ways, water is a great medium to detect neutrinos because it is easy to purify, cheap and is transparent to light produced by neutrinos colliding with water molecules. The key would be to build detectors big enough to hold enough water to see the neutrino signal above background radiation. However, finding neutrinos in water is still pretty hard. Bernstein found that adding small amounts of gadolinium — a rare earth metal with unusual nuclear properties — to the water could significantly boost the detector’s chances of spotting neutrinos. In gadolinium-doped water, neutrino interactions produce a much stronger signal than neutrinos in water alone. Bernstein eventually abandoned the idea to monitor explosions because the cost and size of such neutrino detectors would make the technology impractical, especially compared to existing, cheaper technologies like seismic detectors, he said. Instead, Bernstein turned his attention to using the gadolinium-doped technology to catch neutrinos from nuclear reactors. “Since we’re still mostly using water, it is possible to build large detectors, up to 100 kilotons in size or more, to spot these reactor neutrinos,” said Bernstein, now a staff physicist at the Lawrence Livermore National Laboratory (LLNL) and director of the lab’s Rare Event Detection group in the Nuclear and Chemical Sciences division. “The neutrino signature would stand out much more readily above background radiation even in a big detector,” he said. LLNL is the lead laboratory for a proposed United States/United Kingdom experiment, called WATCHMAN, to demonstrate remote monitoring of nuclear reactors using a kiloton-scale antineutrino detector. This experiment has already “exceeded my expectations,” Bernstein said. “The idea that the nonproliferation community might one day be able to use this technology that until now has been the exclusive province of fundamental science is an exciting motivation for this work.” Halting the spread of nukes Since 1970, nearly 200 nations signed the landmark Treaty of the Non-Proliferation of Nuclear Weapons (NPT), which seeks to limit the spread of nuclear weapons. Through a combination of remote monitoring and on–the–ground inspections, containment and surveillance, the International Atomic Energy Agency (IAEA) commands plenty of tools to figure out if countries are using nuclear energy for peaceful purposes, Goldblum said. But what happens if the line between civilian and military use of nuclear energy is not so clear? For example, the United States has long accused Iran of trying to make nuclear weapons, but Iran says it wants to develop nuclear capabilities for civilian power generation. The knowledge to construct a nuclear bomb is actually pretty well known. The hard part is getting enough materials — either enriched uranium or plutonium — to fuel the weapon. A country can reprocess the spent fuel from a civilian nuclear reactor and extract plutonium for a weapon. And a nuclear bomb only requires about 10 kilograms of plutonium. The so-called “dual-use” capabilities of nuclear reactors presents a significant challenge to the IAEA. “None of the countries now embarking on civil nuclear power programs say they are planning to acquire reprocessing capabilities,” according to a 2017 report by the Brookings Institute think tank. “But many of them are unwilling to forswear what they consider to be their ‘right’ eventually to have dual-use capabilities.” The neutrino detection technology could offer a solution. In addition to the large systems like WATCHMAN, scientists have constructed much smaller detectors that can be deployed close to reactor cores — provided operators allow such access. Optimizing reactor power levels to produce plutonium, a telltale sign that a country is trying to build a bomb, will change the rate and energy spectrum of antineutrinos that a device parked outside of the reactor can detect. And since these particles can pass through matter, the operator can’t shield the reactor’s release of antineutrinos the same way lead blocks X-rays. So if a country wants to operate a civilian nuclear power program, an antineutrino detector could provide an effective tool to continuously verify the reactor is only producing energy for peaceful purposes. For now, a detector must stay within tens of meters of the reactor to be effective. But in the future, could such technology spot antineutrinos from longer distances and even across borders? For distances 100 kilometers or beyond, the Review of Modern Physics study shows detectors would need to be 10 to 100 times bigger than WATCHMAN. But researchers hope WATCHMAN will demonstrate the basic technology and provide a platform for study of a range of possible enhancements to improve standoff and overall sensitivity. And in any case, the mere knowledge that such technology has become a reality could prove to be a powerful deterrent to nuclear proliferation in itself.

#### This is the original authors of your study.

Huber et al 20 [1AC Lee 20 summarizes Bethany Goldblum’s research with Huber, which is the study Huber summarizes in the card above. Adam Bernstein, Nathaniel Bowden, Bethany L. Goldblum, Patrick Huber, Igor Jovanovic, and John Mattingly. “Colloquium: Neutrino detectors as tools for nuclear security”. Rev. Mod. Phys. 92, 011003 – Published 12 March 2020. Accessed 1/29/2022. <https://journals.aps.org/rmp/abstract/10.1103/RevModPhys.92.011003> //Xu]

Colloquium: Neutrino detectors as tools for nuclear security

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#### Doublebind – either prolif risks are ramping down because of international cooperation, which is a neg ballot because of a non-inherent advantage, or neutrinos are thumped.

Huber 20 [Patrick Huber (Director of the Center for Neutrino Physics, Roger Moore and Mojdeh Khatam-Moore Faculty Fellow, Virginia Tech). “Neutrinos for peace”. CERN Courier. 10 November 2020. Accessed 1/29/2022. <https://cerncourier.com/a/neutrinos-for-peace/> //Xu]

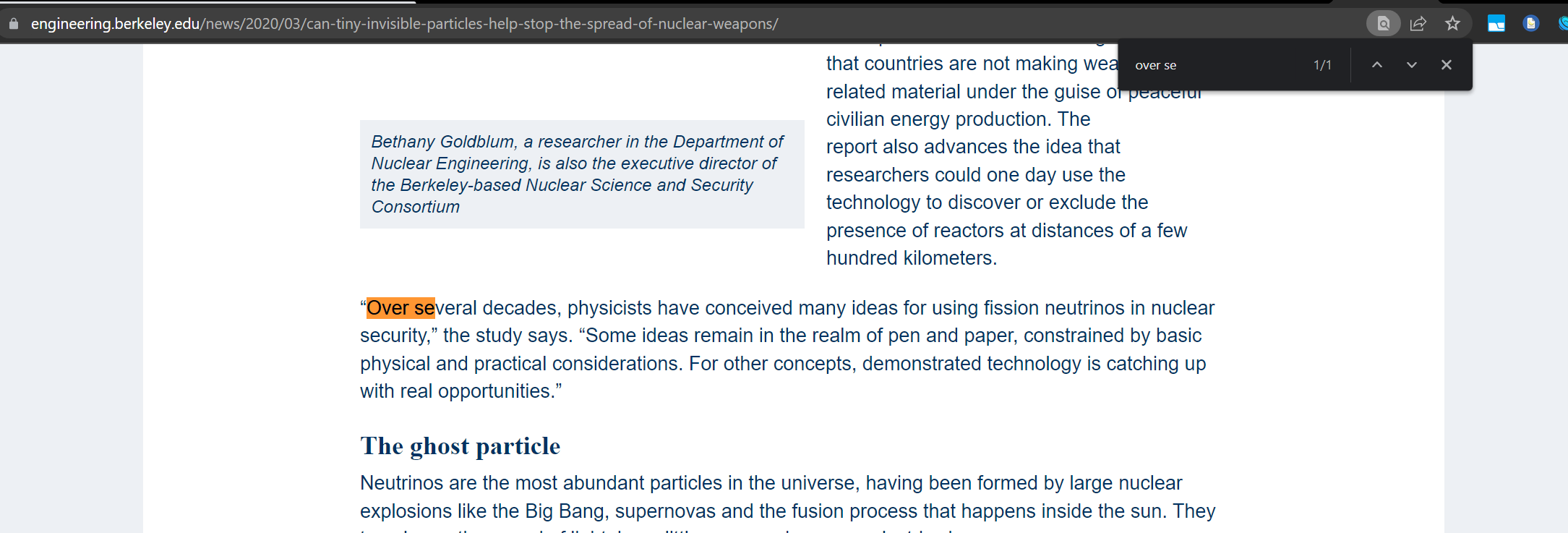
In 2019 the US Department of Energy chartered and funded a study (which I co-chair) with the goal of determining the utility of the unique capabilities offered by neutrino detectors for nuclear security and energy applications. This study includes investigators from US national laboratories and academia more broadly, and will engage and interview nuclear security and policy experts within the Department of Energy, the State Department, NGOs, academia, and international agencies such as the IAEA. The results are expected early in 2021. They should provide a good understanding of where neutrinos can play a role in current and future monitoring and verification agreements, and may help to guide neutrino detectors towards their first real-world applications. The idea of using neutrinos to monitor reactors has been around for about 40 years. Only very recently, however, as a result of a surge of interest in sterile neutrinos, has detector technology become available that would be practical in real-world scenarios such as the JCPOA or a new North Korean nuclear agreement. The most likely initial application will be near-field reactor monitoring with detectors inside the fence of the monitored facility as part of a regional nuclear deal. Such detectors will not be a panacea to all verification and monitoring needs, and can only be effective if there is a sincere political will on both sides, but they do offer more room for creative diplomacy, and a technology that is robust against the kinds of political failures which have derailed past agreements.

#### Huber did a study – it fails – scientific consensus.

Huber et al 20 [Haghighat, Alireza and Huber, Patrick and Li, Shengchao and Link, Jonathan M. and Mariani, Camillo and Park, Jaewon and Subedi, Tulasi "Observation of Reactor Antineutrinos with a Rapidly Deployable Surface-Level Detector" Physical Review Applied , v.13 , 2020 <https://www.nsf.gov/awardsearch/showAward?AWD_ID=1924433&HistoricalAwards=false> //Xu]

Our I-Corps Team, titled Neutrino Technologies, is based on our reactor neutrino detector technology, invented at Virginia Tech. Neutrinos are produced in large numbers as a by-product of nuclear fission. When a massive nucleus, like uranium fissions, it splits into two lighter nuclei, which have too many neutrons to be stable, neutrinos are produced when these neutron-rich nuclei decay to more stable forms, converting neutrons to protons. Neutrinos are subatomic particles that can easily pass through the reactor shielding material, carrying information about the reactions that produced them in the core of a reactor. Their highly penetrating nature also makes them very difficult to detect, but there are so many that detecting even a tiny fraction cam convey detailed information about reactions in the core that may otherwise be inaccessible. Our group has developed a new reactor neutrino detector technology that is designed to be highly efficient, to work in the high background environment above ground, and to be robust and mobile for deployment at nuclear reactors without a significant impact on site operations. The purpose of our I-Corps study was to identify possible applications of this technology of interest to the commercial nuclear industry. It has been shown that neutrino detectors can be used to remotely measure reactor power. In addition, a careful measurement of the energy spectrum of reactor neutrinos can be used to determine the composition of fissionable isotopes in the core. This includes tracking the production of plutonium isotopes that may be used to build nuclear weapons. Our I-Corps team was interested to determine if these capabilities of neutrino detectors might be commercially viable. For example, the Nuclear Non-proliferation Treaty obligates signatory nations to prevent the proliferation of nuclear weapons. Verification of this treaty subjects nuclear facilities around the world to onerous inspections and tracking of the nuclear fuel cycle to ensure that plutonium produced in an active core is not diverted for use in weapons. Is it possible to use neutrinos to reduce the intrusive impacts of inspections on commercial nuclear facilities, while maintaining their effectiveness? During our seven-week I-Corps cohort we spoke with 129 individuals from 26 different organizations which included companies, national labs, industry trade groups, regulators and universities. We covered 12,045 miles by land and air, visited 11 US states, the District of Columbia and one Canadian Province. The data we collected highlights significant commercial potential, which we are pursuing, it also very clearly shows that to bring new nuclear technology to market requires years, perhaps decades, to penetrate the conservative utilities market, and run the regulatory gauntlet. We identified our most promising opportunity to be as instrumentation for advanced reactors, which must come to market themselves to create a viable market for our technology. Thus, we can estimate our time to market by tracking the historical progress and prospects of these companies, and we have concluded that the best path forward is to remain in an academia for now. We will engage with funding agencies focused on engineering and commercialization and pursue partnerships with existing companies who may be end users, or who have an interest in bringing it to market. We found I-Corps to be an invaluable tool to assess the needs of the nuclear industry and to determine where our best opportunities lay. Going into the I-Corps, we embraced the notion that failure was an option. As much as we may have wished, it was by no means certain that neutrino detectors would add value as nuclear instrumentation. Along the way we invalidated many of our initial hypotheses. Through our discussions with industry insiders, we identified new opportunities. We articulated and tested hypotheses around these opportunities. For the opportunities that have thus far survived this scrutiny, the next step is clear: we must to go back into the laboratory to determine the ultimate performance of our technology, so that can then be compared to the required specifications of each potential application.

#### Yes cooption - first result and application of 1AC Lee is literaly the DoD



A screenshot of a computer

Description automatically generated with medium confidence

### Prolif

#### Horizontal & vertical prolif raises the threshold for conventional wars—those are more probable and deadly

Leah & Lowther 17 (Christine Leah, Former Chauncey Postdoctoral Fellow in Grand Strategy at Yale University and Adam B Lowther, Director, School of Advanced Nuclear Deterrence Studies Spring 2017. “Conventional Arms and Nuclear Peace,” Strategic Studies Quarterly. Volume 11. Issue 1. pg. 14-24. <http://www.airuniversity.af.mil/Portals/10/SSQ/documents/Volume-11_Issue-1/Leah.pdf>)

The acquisition of nuclear weapons by a weaker state significantly complicates the decision-making calculus of a militarily superior state. For these reasons, power-projecting states fear nuclear proliferation to both allied and enemy states.5 This is a point worth underscoring and one that is often overlooked when nonproliferation is discussed and its rationale and purposes debated. These factors demonstrate that the “more may be better” view of nuclear weapons proffered by political scientist Kenneth Waltz is entirely relevant and accurate.6 Waltz famously argued that more nuclear weapons in the world would tend to increase deterrence among states. That logic is turned on its head in a world with far fewer nuclear weapons and a greater reliance on conventional systems, which may actually be destabilizing. This was true even before the advent of the atomic bomb. The awesome destructive power of nuclear weapons tended to overshadow the failure of conventional deterrence in the decades and centuries preceding the first use of nuclear weapons.7 Thomas Schelling, an economist and foreign policy scholar, also argued very specifically that more nuclear weapons might enhance strategic stability by increasing the survivability of a nation’s nuclear forces.8 Because states might be more risk acceptant with conventional forces and concepts of first and second strikes are much less well defined in the conventional realm, stability was much more fragile in the pre-nuclear age and would likely prove fragile in a world with fewer, or zero, nuclear weapons. Advocates of a world free of nuclear weapons often overlook this point. A world with fewer nuclear, but more conventional, forces is likely to bring forth new dynamics for arms races, which increase the likelihood of disputes and wars.9 Reducing or eliminating nuclear weapons does not remove proliferation problems from the agenda. Might we fear arms races in the second conventional age less because of the subnuclear consequences of an advanced conventional missile system, or should we fear it more because of the lower threshold to the use of armed force that might be involved? A world not anxious about nuclear proliferation is more likely to be anxious about the proliferation of advanced conventional systems. In that world, the knowledge that war might escalate to the use of an immediate and devastating nuclear strike is gone. This also raises new issues influencing the extent to which a conventional war may be more controllable than a nuclear one. As Lawrence Freedman, the doyen of British strategic studies, writes, “In principle, denial is a more reliable strategy than punishment because, if the threats have to be implemented, it offers control rather than continuing coercion. With punishment, the [adversary] is left to decide how much more to take. With denial, the choice is removed.”10 Nuclear Reductions, Nonproliferation, and Disarmament Nuclear abolitionists have very different views on the nature of deterrence. Their efforts are based largely on a fundamental ideological dislike of nuclear weapons rather than a deep understanding or appreciation of them. Global nuclear disarmament, if considered in a vacuum, would make the world safer for US conventional power projection but would not necessarily promote strategic stability. This observation is made repeatedly by Russian and Chinese analysts, who clearly understand American conventional superiority. On this basis an argument can indeed be made that global disarmament disproportionately benefits the United States, not regional or global competitors like Russia and China. The effects of conventional capabilities are certainly a neglected topic when compared to the focus on nuclear arms control over the past seven years. They are generally said to bear, or lack, significance in comparison to WMDs. But does this argument still hold in a world with no nuclear weapons? A great deal of analysis is still needed to assess whether and how reductions could be managed to the point that no nuclear-armed state has more than a minimum deterrent. For even further reductions to occur, the process would necessarily have to be multilateral, including China, India, and Pakistan. While China and other states have indicated that they would potentially be willing to enter into negotiations once the United States and Russia reduce their arsenals, they have not specified at what level of forces this might conceivably take place. In any case, the process would involve complex calculations of deterrence equations involving changing sets of multiple actors as well as conventional imbalances that are, again, a major source of concern for many countries that may find themselves at odds with the United States. For the “P5” nuclear weapons states (those with permanent seats on the United Nations’ Security Council) such as Russia and China who are members of the Nuclear Nonproliferation Treaty (NPT), the issue of conventional imbalance compounds the difficulty they face in shaping the perception of some states who suggest that the P5 failed to take significant steps toward nuclear disarmament. Pakistan, for instance, has recently accused the United States and other countries of nuclear hypocrisy, with the Pakistani ambassador to the United Nations saying that a handful of nuclear-weapon states advocate abstinence for others but are unwilling to give up their large inventories of nuclear weapons or cease modernization efforts. The ambassador also stressed that double standards were not only evident on nuclear issues but also in the area of conventional arms: “While professing strict adherence to responsible arms transfers, some powerful states continue to supply increasing numbers of conventional weapons in our region, thereby aggravating instability in South Asia.”11 Indeed, from the Pakistani perspective, the international community does not give enough attention to the issue of vertical proliferation (arms buildup). Certainly, it should come as no surprise that Pakistan continues to stress the importance of nuclear weapons in acting as a deterrent to perceived Indian conventional military superiority.12 Pakistan has made efforts at addressing issues of conventional force imbalances with India in the past, but New Delhi has traditionally dismissed these efforts, instead focusing on its larger regional competitor, China.13 The problem in South Asia is therefore at least a trilateral one. However, the issue speaks to a much larger problem, and that is multilateral conventional arms control. If the India-Pakistan strategic situation offers any lesson, it is that weaker states (such as Pakistan) may desire to develop a “great equalizer” to achieve the security that they cannot find through traditional (conventional) means. With the United States and Russia undertaking a 90 percent reduction in their nuclear arsenals since the end of the Cold War, it is fair to say that these efforts have promoted neither goodwill nor a peaceful posture in countries like China or North Korea. We are not suggesting that American nuclear force reductions have pushed Beijing to expand its antiship ballistic missile inventory, place multiple warheads on its DF-41 ballistic missiles, build artificial islands with deployed military capabilities, or build bases in northern Africa. Nevertheless, it does show that there is little evidence to suggest that nuclear cuts necessarily lead to a more peaceful security environment. If anything, regional and global security evolve independently of the size and shape of one country’s nuclear arsenal. North Korea, in particular, has pursued a nuclear weapons program as a means of countering American conventional superiority, paying little or no attention to the United States’ declining nuclear arsenal. Conventional Arsenals, Crisis Stability, and Arms Race Stability Nuclear reductions have important consequences for both crisis stability and arms race stability. Conventional forces differ tremendously from nuclear forces in the way they are organized and operate and in their destructiveness. These distinctions influence the way in which arms-control arrangements aimed at conventional arms-race stability and crisis stability must be conceptualized in a world free of nuclear weapons but safe for conventional conflict. To be highly destructive, conventional forces need to be used en masse. Their successful application requires well-organized cooperation between many military units, often between different types of military forces (land, air, naval, cyber, and space), and, due to the globalization of conflict, also the participation of several allied states granting military support and access. Conventional forces most often seek military victory, which requires they first defeat adversarial forces before the political objectives of the conflict can be achieved. Also, to be militarily effective, conventional forces need upto-date technology and well-trained troops that are capable of effectively employing weapons of war. Crisis stability is a term that was perfected in its use during the nuclear age. Crisis stability aims at developing incentives for using the lowest level of military force possible—all while seeking to prevent escalation. It also seeks to control the emotions that are prevalent in conflict, providing procedures to cope with a crisis. Nuclear reductions and disarmament may make a paradoxical and undesired contribution; reducing expected levels of death and destruction if war comes might actually increase the probability of the onset of war. Even if two states went to war, one would expect the nuclear sword of Damocles to incentivize them to end the conflict as soon as possible. In addition, the historical record clearly shows there is not the same taboo or norm against using conventional missiles and bombers as there is against using an atomic version.14 Not a single nuclear warhead has been delivered by any delivery system since 1945. By contrast, over the past 45 years, ballistic missiles were employed in at least six different conflicts: the Egyptian and Syrian missile attacks on Israel in the 1973 Yom Kippur War, the 1980–88 war between Iraq and Iran, the Afghan civil war of 1988–91, the 1991 Persian Gulf War, the Yemen civil war of 1994, and the 2003 US-led invasion of Iraq. Indeed the duration and controllability of a war becomes important here. As antinuclear advocate Randall Forsberg admits, The main role of nuclear weapons has always been to deter conventional war among the world’s “big powers” (the USA, the USSR, the UK, France, West Germany, China, and Japan) by posing a clear risk that such a war would escalate to nuclear war. If ballistic missiles were abolished, raising again the prime strategic question of the 1950s—could a conventional war be fought without going nuclear, and if it went nuclear, could it be won?—it would diminish nuclear deterrence of conventional war.15 (emphasis in original) The fog of war could become much thicker. Even if lower-yield nuclear weapons were used, they could still significantly disrupt command, control, communication, and intelligence. In the conventional world this would be less of an issue because of the smaller level of destruction, over a much more protracted amount of time, thus enabling more time to react. In the nuclear age, time becomes much more compressed. Moreover, assuming that deterrence was still desirable, states would have to rethink how to reorient their forces toward achieving a conventional second-strike capability. This might lead to a different type of arms race. This concept was already present before the advent of the bomb, in discussions about the importance of airpower and having enough aircraft to deter aggression among European states.16 All these issues raise the importance of focusing on conventional arms control as much as nuclear reductions, especially in the Asia-Pacific. Arms race stability aims at lowering incentives to further build up military forces. Thus we might conceivably ask: if the United States and Russia reduce their nuclear arsenals to a few hundred warheads each— and other nations to a few dozen—might we see a nonnuclear arms race to fill a nuclear void?17 As the 2010 Nuclear Posture Review states, “fundamental changes in the international security environment in recent years—including the growth of unrivaled US conventional military capabilities [and] major improvements in missile defenses . . . enable us to fulfill . . . objectives at significantly lower nuclear force levels and with reduced reliance on nuclear weapons . . . without jeopardizing our traditional deterrence and reassurance goals.18 If one accepts this statement, and if opponents of nuclear modernization are truly concerned about reducing global instability, they should be urging the administration to cancel and eliminate a number of conventional capabilities that are far more concerning to our adversaries. Granted, such a position is irrational, but if stability is the key then this is the logical position to hold. Indeed, even with successful elimination of nuclear weapons, the tasks of strategic deterrence, extended deterrence, and arms control do not go away. Instead, they become more difficult to manage. This is especially true for conventional arms control, because nuclear weapons tend to make deterrence much easier, or so the historical record would seem to indicate. If one argues for further nuclear reductions and nuclear disarmament, then one needs to be responsible and also think seriously about conventional arms control. Conventional imbalances and any remaining system of deterrence would increasingly become the focus of deterrence and would serve as the source of instability.19 This is especially true because, in many instances, the imbalance and insecurity of a conventional-only world have remained obscured during the nuclear age.20 With Article VI of the NPT obliging nuclear-weapon states to work toward general and complete disarmament of nuclear weapons, would such a treaty be required or feasible in a conventional world? This possibility raises an important question: to what extent should nuclearweapon states focus on reducing their arsenals as a precondition for conventional disarmament? We have tended to think that it would first be a good idea to reduce nuclear weapons before reducing conventional forces. However, nuclear weapons are but one component of the overall military balance among states. In an age without nuclear weapons, it is also conceivable that deterrence relationships will simply not work without boosting some aspects of conventional arsenals. The more-maybe-better logic that Schelling (and others) applied to nuclear weapons may also carry into an entirely conventional era. That is, fewer nuclear weapons in the world would likely entail more conventional forces to compensate, which would not necessarily be a stabilizing development. For advocates of “global zero,” the implications of a world free of nuclear weapons are assumed to be inherently positive. However, the reality of such a world may be far less positive because the psychological effect achieved by the understood destructive power of nuclear weapons will no longer push risk-acceptant national leaders to allow caution to prevail. Given that no current leader of a nuclear-weapon state was even alive prior to the development of the atomic bomb, the security and stability of a nuclear-free world should not be taken for granted. Instead, much more work is required to understand the implications of such a fundamental change to a proven and stable approach to constraining great-power conflict. Conclusion If the past offers any lessons for the future, it is not unreasonable to believe that a world free of nuclear weapons is a world in which standing armies grow larger, defense expenditures (as a percentage of gross domestic product) increase, and conflict becomes more frequent as the perceived risks to a nation and its leaders decline. National leaders are not always rational, because they do not effectively weigh costs and benefits or risks and rewards, which would lead them to overvalue the prospect of a loss and undervalue the prospect of a gain. The certain loss caused by any prospective use of nuclear weapons has caused decision makers to exercise great restraint when contemplating the prospective use of force.21 History appears to suggest that, to some degree, nuclear weapons do cause decision makers to see the use of nuclear weapons as ensuring losses, with few gains—causing restraint. Thus, eliminating nuclear weapons may well reduce perceived risks and increase perceived gains from fighting—making the world safe for conventional conflict. Such a state of affairs would not have the same absolute risk associated with it that nuclear warfare poses (that of total annihilation), but it would increase the risks of proliferating conflict, which may lead to a dramatic increase in conflict-related casualties.

## Circumvention

#### Circumvention – no delineated enforcement mechanism of the 1AC – they just fiat that private entities stop doing it but

#### 1] no unified mechanism guts enforcement

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But while the rules of empire are pretty neatly spelled out in the treaty—no nukes, no planting a flag and claiming anything in space as your country’s territory—the rules of commerce aren’t quite as clear-cut. Now, almost 50 years later, with a private space race underway in the United States, lawyers and politicians are starting to really hash out what it means for a government to be responsible for a corporation and what the fair use of space should look like. With President Barack Obama’s signing of the U.S. Commercial Space Law and Competitiveness Act, it’s a discussion that’s likely to grow more heated. Basics of Space Law A fundamental tenet of space law—the concept of governments being responsible for the work of non-governmental actors—has few, if any, precedents. There are places on Earth that are governed by laws similar to those that govern space—the sea, for instance. But no country is inherently responsible for whatever its citizens do when they’re out in international waters, says Joanne Gabrynowicz, professor of space law at the University of Mississippi and editor-in-chief of the Journal of Space Law . If that were the case, every pirate would technically be a privateer—their buckles swashed with official state approval. But you don’t need anything as exotic as the specter of space privateering to see why government responsibility can be a problem. As it currently stands, two private companies operating in space couldn’t even sue each other without the prior approval of their governments, says Michael Listner, an attorney and the principal of Space Law and Policy Solutions, a legal think tank. Currently, this is an issue that primarily affects the U.S. There are lots of countries with commercial, but not necessarily private, operations in space—Russia, China, Canada, Japan. Commercial entities launch rockets and manage satellites all the time. But in most of those cases, “commercial” basically means “revenue generating,” not “private enterprise,” Gabrynowicz says. Some of the corporations operating in space are government-owned, while others are technically private but operate with levels of government control and government money that would be unfamiliar to Americans, says Fabio Tronchetti, associate professor of law at China’s Harbin Institute of Technology. Government Minders The U.S. has the largest and most important private sector operating in space, from launching people and supplies for NASA to more speculative companies dedicated to space tourism and asteroid mining. Many of those companies would prefer there be less government involvement in their business. For instance, Bigelow Aerospace is a company that designs and builds inflatable pods that humans can live in in orbit—one of their pods will be attached to the International Space Station next year—or on a surface like the moon. For many years, Bigelow had to treat its products, legally, as though it were dealing in arms, wrangling with export controls meant to prevent guns, bombs, and valuable military secrets from being sold to the wrong people, stolen, or accidentally exposed. Even the most innocuous, non-weaponizable parts of their system fell under these controls. At one point, the company was forced to have two government officials watching two guards who were protecting a coffee-table-shaped kickstand for their pod. When the company had technical interchange meetings with partners in Moscow, it had to pay to bring along government minders. “If you dropped an alien in the room and said ‘point to the free country,’ they would have pointed to the Russians because we had two government monitors monitoring our every word,” says Mike Gold, Bigelow’s director of operations and business growth. “We spent hundreds of thousands of dollars on that. I would joke that KGB would spy on you, but at least they had the courtesy to do it for free.” That problem was solved by changes to U.S. export control rules in 2013, but cutting back on regulations still remains a popular mantra in the industry. Among several features of the U.S. Commercial Space Law and Competitiveness Act is the extension of a moratorium on regulation for human spaceflight safety requirements. The bill also leaves open a regulatory hole, wherein the Federal Aviation Administration licenses and monitors launches and re-entries, but there is no federal authority in charge of activities that happen in orbit. Gabrynowicz thinks this is problematic because the U.S. government also has a risk-sharing regime with these companies where it indemnifies them beyond their insurance coverage. The bill extends that, as well. So, she says, the government is responsible for the companies by authority of international law, the government will pay for any particularly large financial damages incurred by the companies, and the government is reducing or not establishing regulations on those companies. To Gabrynowicz, that looks like a moral hazard. Privatizing the Space Race The Outer Space Treaty of 1967 did a good job of keeping the space race between the U.S. and the Soviet Union from devolving into something out of a James Bond movie. But it didn’t do a very good job of planning for future races to claim resources found in space. Article II of the treaty is just 30 words long. It says, “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.” Today, space lawyers are spending an awful lot of time debating what, exactly, that means. Lawyers are split pretty evenly on whether you can mine an asteroid and profit from it. The debate has been spurred by the handful of companies that have announced an interest in mining asteroids or the moon for minerals and other resources. None of these plans are likely to become reality in the next 20 years. In fact, it’s still debatable whether mining an asteroid is technically feasible or would make financial sense at all. But the companies interested in this business plan—including Planetary Resources and Deep Space Industries—want some kind of assurance that, if they do succeed, they will get to profit off what they dig up. That’s a reasonable request…but it’s assurance that the Outer Space Treaty can’t unequivocally offer. “There’s a spurious argument that, well, the State can’t appropriate, but I can!” Johnson says. “But that’s easily refuted. Property exists as a relationship between citizen and sovereign. You only get property rights based on the State.” We buy and sell property with the help of legal contracts. Those contracts are only real in so much as a state exists to enforce them. At best, say Johnson, Listner, Gabrynowicz, and Tronchetti, you can say that the Outer Space Treaty neither affirms nor denies the right of a private company to mine an asteroid, keep what it mines, and sell those resources for profit. Lawyers, Listner says, are split pretty evenly on whether that means you can do it or you can’t. Which is where the U.S. Commercial Space Law Competitiveness Act comes in, again. One of the most important things the bill does is say, explicitly, that U.S. companies can own and sell resources they mine. But the new law could become a problem, space lawyers say. Essentially, it’s the U.S. trying to unilaterally settle an open question. “It’s really an ideological and intellectual battle,” Listner says. Even more troubling, from the perspective of Gabrynowicz and Tronchetti is the fact that the Space Resource and Utilization Act doesn’t set up any system for licensing those mining activities. Given that the Outer Space Treaty obliges countries to maintain control over companies operating in space, that could be seen as the U.S. refusing to follow international law, Gabrynowicz says. Uncharted Territory Space lawyers can point out many other potential problems with the U.S. Commercial Space Law and Competitiveness Act, but the repercussions depend on what other countries decide to do. Historically, ever since the Outer Space Treaty was signed, countries have worked out their differences off the books, in bilateral negotiations. That happened in 1978, when a Soviet Kosmos satellite, powered by an onboard nuclear reactor, crashed in western Canada. That country initially billed the Soviet Union more than $6 million to cover the costs of cleanup and containment. Ultimately, the two countries came to an agreement where the Soviets paid half that amount and never formally had to acknowledge liability. “More recently, you had a piece of Chinese debris that crashed into a Russian satellite,” Tronchetti says. “Essentially, they just let that go.” So what happens if the United States decides companies can own minerals mined on an asteroid and another country, China say, decides they can’t? “That’s the problem, isn’t it?” Tronchetti says. “Nobody knows. But we should think about international consequences.” Gabrynowicz, for instance, worries that making unilateral decisions about space law could affect efforts to negotiate the rules that manage disputed places here on Earth, like the Arctic, where Russia, the U.S., and other countries are currently jockeying for access to oil and other resources. The geopolitical climate isn’t amenable to a new space treaty. In theory, a new treaty would solve all of these problems. But nobody thinks it would work. The Outer Space Treaty succeeded, Johnson says, because there were really only two parties at the table back then—the U.S. and the Soviet Union. “They just said, ‘Let’s come up with compromise text and then take it to the rest of the world and tell them we’ve agreed. We’re the most important people doing anything in space and everyone else will just go along,’ ” he says. Needless to say, that’s not how things work today. Even just a few years after the passage of the Outer Space Treaty, in 1979, an expanded document known as the Moon Treaty failed to draw any interest from the U.S. or the Soviets. That treaty would have clarified some of the issues the Outer Space Treaty left vague, including banning commercial sale and use of extraterrestrial resources. Only 16 countries are part of the treaty—none of them a major spacefaring nation. The geopolitical climate isn’t amenable to a new space treaty, Johnson says. There are too many stakeholders now and their goals don’t align enough. “The era of treaty making has really been over since the 1980s,” Johnson says. Now, the future of space is in the hands of the diplomats and lawyers who will hash out bespoke compromises in backrooms and boardrooms all over the world.

#### 2] yes circumvention – companies WANT to go to lunar heritage sites which means risk of a loophole or nonbinding plan guts solvency