### 1NC – OFF

#### 1] Interp – Unjust refers to a negative action – it means contrary.

Black Laws No Date "What is Unjust?" <https://thelawdictionary.org/unjust/> //Elmer

Contrary to right and justice, or to the enjoyment of his rights by another, or to the standards of conduct furnished by the laws.

#### 2] Violation – The Aff is a positive action – it creates a new concept for Space i.e. the treating of Space as a “Global Commons”.

#### 3] Standards –

#### a] Limits – making the topic bi-directional explodes predictability – it means that Aff’s can both increase non-exist property regimes in space AND decrease appropriation by private actors – makes the topic untenable.

#### b] Ground – wrecks Neg Generics – we can’t say appropriation good since the 1AC can create new views on Outer Space Property Rights that circumvent our Links since they can say “Global Commons” approach solves.

#### 4] TVA – just defend that space appropriation is bad.

#### a] Topicality is Drop the Debater – it’s a fundamental baseline for debate-ability.

#### b] Use Competing Interps – 1] Topicality is a yes/no question, you can’t be reasonably topical and 2] Reasonability invites arbitrary judge intervention and a race to the bottom of questionable argumentation.

#### c] No RVI’s - 1] Forces the 1NC to go all-in on Theory which kills substance education, 2] Encourages Baiting since the 1AC will purposely be abusive, and 3] Illogical – you shouldn’t win for not being abusive.

### 1NC – OFF

#### Climate change makes water shortages inevitable – that causes hydro-political conflict escalation which goes nuclear

Jamail 19 [(Dahr, writes for *Truthout* about climate change issues, recipient of the 2008 Martha Gellhorn Prize for Journalism, frequent guest on *Democracy Now!*) “The World Is on the Brink of Widespread Water Wars,” Truth Out, 2/11/2019] JL

Mark’s words should be a call to attention, and a call to action. The plight of farmers in Australia illustrates a larger reality: As planetary temperatures continue to increase and rainfall patterns shift due to human-caused climate disruption, our ability to grow crops and have enough drinking water will become increasingly challenged, and the outlook is only going to worsen.

The most recent United Nations Intergovernmental Panel on Climate Change report warned of increasingly intense droughts and mass water shortages around large swaths of the globe.

But even more conservative organizations have been sounding the alarm. “Water insecurity could multiply the risk of conflict,” warns one of the World Bank’s reports on the issue. “Food price spikes caused by droughts can inflame latent conflicts and drive migration. Where economic growth is impacted by rainfall, episodes of droughts and floods have generated waves of migration and spikes in violence within countries.”

Meanwhile, a study published in the journal Global Environmental Change, looked at how “hydro-political issues” — including tensions and potential conflicts — could play out in countries expected to experience water shortages coupled with high populations and pre-existing geopolitical tensions.

The study warned that these factors could combine to increase the likelihood of water-related tensions — potentially escalating into armed conflict in cross-boundary river basins in places around the world by 74.9 to 95 percent. This means that in some places conflict is practically guaranteed.

These areas include regions situated around primary rivers in Asia and North Africa. Noted rivers include the Tigris and Euphrates, the Indus, the Nile, and the Ganges-Brahmaputra.

Consider the fact that 11 countries share the Nile River basin: Egypt, Burundi, Kenya, Eritrea, Ethiopia, Uganda, Rwanda, Sudan, South Sudan, Tanzania and the Democratic Republic of Congo. All told, more than 300 million people already live in these countries, — a number that is projected to double in the coming decades, while the amount of available water will continue to shrink due to climate change.

For those in the US thinking these potential conflicts will only occur in distant lands — think again. The study also warned of a very high chance of these “hydro-political interactions” in portions of the southwestern US and northern Mexico, around the Colorado River.

Potential tensions are particularly worrisome in India and Pakistan, which are already rivals when it comes to water resources. For now, these two countries have an agreement, albeit a strained one, over the Indus River and the sharing of its water, by way of the 1960 Indus Water Treaty.

However, water claims have been central to their ongoing, burning dispute over the Kashmir region, a flashpoint area there for more than 60 years and counting.

The aforementioned treaty is now more strained than ever, as Pakistan accuses India of limiting its water supply and violating the treaty by placing dams over various rivers that flow from Kashmir into Pakistan.

In fact, a 2018 report from the International Monetary Fund ranked Pakistan third among countries facing severe water shortages. This is largely due to the rapid melting of glaciers in the Himalaya that are the source of much of the water for the Indus.

To provide an idea of how quickly water resources are diminishing in both countries, statistics from Pakistan’s Islamabad Chamber of Commerce and Industry from 2018 show that water availability (per capita in cubic meters per year) shrank from 5,260 in 1951, to 940 in 2015, and are projected to shrink to 860 by just 2025.

In India, the crisis is hardly better. According to that country’s Ministry of Statistics (2016) and the Indian Ministry of Water Resources (2010), the per capita available water in cubic meters per year was 5,177 in 1951, and 1,474 in 2015, and is projected to shrink to 1,341 in 2025.

Both of these countries are nuclear powers. Given the dire projections of water availability as climate change progresses, nightmare scenarios of water wars that could spark nuclear exchanges are now becoming possible.

#### Asteroid mining solves water access – only NEOs are sufficiently proximate and hydrated – independently, storing launch fuel on asteroids reduces space debris – turns case

Tillman 19 [(Nola Taylor, has been published in Astronomy, Sky & Telescope, Scientific American, New Scientist, Science News (AAS), Space.com, and Astrobiology magazine, BA in Astrophysics) “Tons of Water in Asteroids Could Fuel Satellites, Space Exploration,” Space, 9/29/2019] JL

When it comes to mining space for water, the best target may not be the moon: Entrepreneurs' richest options are likely to be asteroids that are larger and closer to Earth.

A recent study suggested that roughly 1,000 water-rich, or hydrated, asteroids near our planet are easier to reach than the lunar surface is. While most of these space rocks are only a few feet in size, more than 25 of them should be large enough to each provide significant water. Altogether, the water locked in these asteroids should be enough to fill somewhere around 320,000 Olympics-size swimming pools — significantly more than the amount of water locked up at the lunar poles, the new research suggested.

Because asteroids are small, they have less gravity than Earth or the moon do, which makes them easier destinations to land on and lift off from. If engineers can figure out how to mine water from these space rocks, they could produce a source of ready fuel in space that would allow spacecraft designers to build refuelable models for the next generation of satellites. Asteroid mining could also fuel human exploration, saving the expense of launching fuel from Earth. In both cases, would-be space-rock miners will need to figure out how to free the water trapped in hydrated minerals on these asteroids.

"Most of the hydrated material in the near-Earth population is contained in the largest few hydrated objects," Andrew Rivkin, an asteroid researcher at Johns Hopkins University Applied Physics Research Laboratory in Maryland, told Space.com. Rivkin is the lead author on the paper, which estimated that near Earth asteroids could contain more easily accessible water than the lunar poles.

According to the United Nations Office for Outer Space Affairs, more than 5,200 of the objects launched into space are still in orbit today. While some continue to function, the bulk of them buzz uselessly over our heads every day. They carry fuel on board, and when they run out, they are either lowered into destructive orbits or left to become space junk, useless debris with the potential to cause enormous problems for working satellites. Refueling satellites in space could change that model, replacing it with long-lived, productive orbiters.

"It's easier to bring fuel from asteroids to geosynchronous orbit than from the surface of the Earth," Rivkin said. "If such a supply line could be established, it could make asteroid mining very profitable."

Hunting for space water from the surface of the Earth is challenging because the planet's atmosphere blocks the wavelength of light where water can be observed. The asteroid warming as it draws closer to the sun can also complicate measurements.

Instead, Rivkin and his colleagues turned to a class of space rocks called Ch asteroids. Although these asteroids don't directly exhibit a watery fingerprint, they carry the telltale signal of oxidized iron seen only on asteroids with signatures of water-rich minerals, which means the authors felt confident assuming that all Ch asteroids carry this rocky water.

Based on meteorite falls, a previous study estimated that Ch asteroids could make up nearly 10% of the near-Earth objects (NEOs). With this information, the researchers determined that there are between 26 and 80 such objects that are hydrated and larger than 0.62 miles (1 km) across.

Right now, only three NEOs have been classified as Ch asteroids, although others have been spotted in the asteroid belt. Most NEOs are discovered and observed at wavelengths too short to reveal the iron band that marks the class. Carbon-rich asteroids, which include Ch asteroids and other flavors, are also darker than the more common stony asteroids, making them more challenging to observe.

Although Ch asteroids definitely contain water-rich minerals, that doesn’t necessarily mean that they will always be the best bet for space mining. It comes down to risk. Would an asteroid-mining company rather visit a smaller asteroid that definitely has a moderate amount of water, or a larger one that could yield a larger payday but could also come up dry?

"Whether getting sure things with no false positives, like the Ch asteroids, is more important or if a greater range of possibilities is acceptable with the understanding that some asteroids will be duds is something the miners will have to decide," Rivkin said.

In addition to estimating the number of large, water-rich asteroids might be available, the study also found that as many as 1,050 smaller objects, roughly 300 feet (100 meters) across, may also linger near Earth. Their small bulk will make them easier to mine because their low gravity will require less fuel to escape from, but they will produce less water overall, and Rivkin expects that the handful of larger space rocks will be the first targets.

"It seems likely that the plan for these companies will be to find the largest accessible asteroid with mineable material with the expectation that it will be more cost-effective than chasing down a large number of smaller objects," Rivkin said. "How 'accessible' and 'mineable material' and 'cost-effective' are defined by each company is to be seen."

### 1NC – OFF

#### CP: Space-faring nations should

#### Establish a unified system of space traffic management modeled after the International Telecommunication Union

#### Collaborate on techniques to track and display the location of objects in real time and AI to automate debris-avoidance maneuvers

#### The United States Federal Government should:

#### Shift responsibility for the Space-Track catalogue to the civilian Department of Commerce, allocating necessary funds

Nature 8/11 [(Nature Editorial Board, peer-reviewed, comprises experimental scientists and data-standards experts from across different fields of science) “The world must cooperate to avoid a catastrophic space collision,” Nature, 8/11/2021] JL

But there are no traffic cops in space, nor international borders with clearly delineated areas of responsibility. To avoid further damage, it’s crucial that satellite operators have an accurate and up-to-date list of where objects are in space. At present, the main global catalogue of space objects is published at Space-Track.org by the US Space Command, a branch of the military. The catalogue is the most widely used public listing available, but it lacks some satellites that countries — including the United States, China and Russia — have not acknowledged publicly. In part because of this lack of transparency, other nations also track space objects, and some private companies maintain commercially available catalogues.

Rather than this patchwork of incomplete sources, what the world needs is a unified system of space traffic management. Through this, spacefaring nations and companies could agree to share more of their tracking data and cooperate to make space safer. This might require the creation of a new global regime, such as an international convention, through which rules and technical standards could be organized. One analogy is the International Telecommunication Union, the United Nations agency that coordinates global telecommunications issues such as who can transmit in which parts of the radio spectrum.

It won’t be easy to create such a system for space traffic. For it to succeed, questions of safety (such as avoiding smashing up a satellite) will need to be disentangled from questions of security (such as whether that satellite is spying on another nation) so that countries can be assured that participating in such an effort would not compromise national security. Countries could, for instance, share information about the location of a satellite without sharing details of its capabilities or purpose for being in space.

One near-term move that would help would be for the United States to complete a planned shift of responsibility for the Space-Track.org catalogue from the military to the civilian Department of Commerce. Because this catalogue has historically been the most widely used around the world, shifting it to a civilian agency could start to defuse geopolitical tensions and so improve global efforts to manage space debris. It might one day feed into a global space-traffic agreement between nations; even the nascent space superpower China would have a big incentive to participate, despite rivalries with the United States. The transition was called for in a 2018 US presidential directive that recognizes that companies are taking over from national governments as the dominant players in space, but it has yet to occur, in part because Congress has not allocated the necessary funds.

On 25 August, the UN Committee on the Peaceful Uses of Outer Space will meet to discuss a range of topics related to international cooperation in space. The UN is the right forum through which spacefaring nations can work together to establish norms for responsible space behaviour, and that should include how the world can track objects to make space safer. It should continue recent work it has been doing emphasizing space as a secure and sustainable environment, which at least brings countries such as the United States and China into the same conversation.

Basic research has a role, too: innovations such as techniques to track and display the locations of orbiting objects in real time, and artificial intelligence to help automate debris-avoidance manoeuvres, could bolster any global effort to monitor and regulate space.

If governments and companies around the world do not take urgent action to work together to make space safer, they will one day face a catastrophic collision that knocks out one or more satellites key to their safety, economic well-being or both. Space is a global commons and a global resource. A global organization responsible for — and capable of — managing the flow of space traffic is long overdue.

## 1NC-Off

#### Their view of “junk” as a threat to techno-capital expansion is an attempt to bury their co-constitutive ecology. It is only the image of the objects of our accumulation remaining to haunt us.

Ivakhiv 18 [(Adrian, Professor of Environmental Thought and Culture at the University of Vermont) Shadowing the Anthropocene: Eco-Realism for Turbulent Times, 2018] TDI

The signs are there for those who pay attention to them. Reports of melting glaciers and impending crashes. Crashes of the ocean’s fish stocks, mass extinctions on a scale not seen in 65 million years. Stock market crashes, internet seizures and data breaches, doomsday viruses online and off. Plane crashes and mysterious disappearances in Indian or Mediterranean seas. Rising sea levels and strengthening storms, with tag-teamed hurricanes battering and flooding coastal areas. Hundred-year droughts arriving in back to back years. Swirling accumulations of trash in the middles of the world’s oceans. Accumulations of toxic particles, radioactive dust, and microscopic plastic pellets in the bodies and bloodstreams of every living thing on Earth. Accumulations of space junk in the atmosphere. Mountains of waste, electronic and otherwise, building up to WALL·E-like sce- narios, but without Disney/Pixar’s (or the Buy-N-Large corpo- ration’s) interstellar cruise-ship escape.

Sooner or later, the trash will hit the fan, the crash will burst the dam, the supercollider will hit with the full force of its im- pact. The mad rush for land, for survival, for salvation, will begin in earnest, even for the most protected of us. These are among the material ecologies that make up the era tendentiously and contentiously called the Anthropocene, the New Era of the Human. There are other kinds of ecologies be- sides these material ones: social ecologies, and perceptual ecologies. I’ll explain why it’s better to think in threes than in twos, and why the social, the material, and the perceptual make a useful frame for thinking of the ecologies that constitute the world.

Our social ecologies work the same way as our material ecologies, with blowback to widening inequalities and horrific injustices coming in the form of movements of growing refugee populations—economic refugees, climate refugees, refugees from wars fought over the stakes of all these crashes and the political violence and terror that accompanies them.

Between the material and the social are the fleshy, intersensorial dynamics from which the material and the social, or the “objective” and the “subjective,” continually emerge. Drawing from the ecosophies of Félix Guattari and Gregory Bateson, I will call these our mental or perceptual ecologies. Blowback there comes as guilt, bad dreams, ghostly observances fractur- ing our sensory perceptions, inarticulate rage against those who question the tacitly held consensus. This is the hauntedness of the present by the abyss of an ungraspable and inconceivable future. It is these affective undercurrents that are our responses to the eyes of the world haunting us from out of the corners of our vision. (More on those eyes later.) They are what makes us feel that things aren’t right—a hint at the traumatic kernel of real- ity that both psychoanalyst Jacques Lacan and, with a different inflection, Buddhist philosophers have placed at the origin of the self, but which in a collective sense is coming back to haunt us globally.

We misperceive the nature of the world for the same reasons that we misperceive the nature of our selves. Every social and linguistic order interpellates its members—it shapes and hails them into existence with a call of “Hey you!” Each does it differ- ently. But over the course of the storied history of humans — not the meta-narrative of the Anthropos, just the patchy tale of humanity in its quiverings and coruscations—most such or- ders have incorporated into that interpellation some sense of responsibility to more-than-human entities or processes. In whatever way they were conceived—as spirits or divinities, or as kin, or in terms of synthetic narrative or conceptual meta- phors like life-force, the Way, the path, li and ren, 礼 and 仁, the four directions, Muntu and Ubuntu, Buen Vivir, Nepantla, some gift-giving and life-renewing sacrifice, and so on—these have typically borne a central connection to the kinds of relations we now categorize as ecological. (At least for those social orders that worked.)

Modern western capitalism has fragmented these relations, setting us up individually in relation to the products of a seem- ingly limitless marketplace. But it has left us collectively rudder- less. So if scientists, the empirical authorities of our time, tell us we are fouling our habitat, we have yet to figure out how to respond to that, at least at the global scales where most of the problems become manifest.

This is why it is the relational, more than the substantive or “objectal,” that humans, especially westerners, need to come to terms with. That is in part the argument of this book. Commodity capitalism has been profoundly successful at encouraging us to think that objects are real, and at projecting value into those objects so that they serve the needs of individuals, even if they never manage to do that (which is, of course, the point). The effects of our actions, on the other hand, are systemic and relational, and we won’t understand them unless we come to a better appreciation of how systems and relational ecologies work and of how we are thoroughly enmeshed within them.

At the same time, it is the objects that haunt us: the refuse swirling around in the middle of the Pacific, the mountains of excreted e-waste, the stuff we send down our chutes, out our drains, off to the incinerator, the river, the ocean, the atmosphere—the black holes, out of sight and out of mind, from which we hope they never re-emerge. When they do re-emerge, in our fantasies and nightmares, we reify them as the Thing, a Demon, a Host—as in Bong Joon-Ho’s thriller of that name, about a river monster embodying the legacy of industrial pollution in South Korea’s Han River. The objects become sublime. If our consumptive, commodity-captivated and spectacle- enraptured society has privileged the object over the process, the thing at the center of our attention over the relations that constitute it, this thing-centeredness should not surprise us. In part, it is an effect of the human perceptual apparatus, with its heavy reliance on vision, a sensory modality that shows clear edges to objects and that facilitates distanced observation and predation. Where traditional cultures de-emphasized the visual in favor of the auditory or multisensorial, the narrative, and the relational, societies like ours—fragmented and individualized, intensely visually mediated, and ecologically and historically disembedded societies (in the sense described by Karl Polanyi in his paradigm defining The Great Transformation)1 — push the ontological objectivism, literally the “thing-ism,” about as far as it can go.

#### The impact is a state of permanent war—their political discourses surrounding space make militarization inevitable and turns the case.

Dickens and Ormrod 16 [(Peter Dickens, Senior Research Associate in the Department of Sociology at the University of Cambridge, member of the Red-Green Study Group in London, James S Ormrod, Principal Lecturer in Sociology at the University of Brighton), “The Future of Outer Space”, *The Palgrave Handbook of Society, Culture and Outer Space*] TDI

An argument can be made that the conquest of outer space has represented the ultimate victory of abstract space (see also Shaw, 2008, p. 115). Any meaningful distinction between terrestrial space and the rest of the cosmos has been eroded. This is not to say that the whole of outer space has been humanized, which of course it has not, but that space has come to be reconceptualized and re-experienced as a space for accumulation like any other. It is a space thoroughly colonized by terrestrial knowledge and practice (whether considered primarily capitalist, male, white or anything else).

For Benjamin and a host of others (from Klerkx, 2005, to Parker, 2009), the disinvestment in outer space exploration and development came as a result of the bureaucratization of NASA, and its engulfment within the military-industrial complex. With the development of the International Space Station (ISS) and the Space Shuttle (which according to some accounts were each the rationale for the development of the other), space exploration became routine and unexciting. Nothing fundamentally new appeared to be happening in space. Whether or not this is seen as true depends a great deal on perspective. Even if NASA budgets were being cut, this volume has hopefully made clear that a great deal was still happening in space. New space technologies continued to be developed, and these technologies were being integrated into terrestrial life in innumerable ways. But we believe it is also true (and this has been the emphasis of our work elsewhere, see Dickens and Ormrod, 2007) that these developments represent the continuation of terrestrial power relations and social dynamics. Space development is, to put it one way, business as usual. And crucially, any novelty to these developments was undermined by the representation of outer space in similar terms to the representation of terrestrial space. As evidenced in this book, political scientists, geographers and legal scholars had begun to talk about outer space as a knowable, if not actually known, space. The origins of this representation of space can be traced to Copernicus (MacDonald, 2009) and/or Kepler (Zubrin, 1996). But with the routinization of outer spatial practices (from increasing launch rates to the proliferation of satellite-receiving terminals, to the everyday use of satellite services to underpin military operations, communications, entertainment, navigation and so on), these representations were made manifest in the creation of a new social space.

The central problem with the final victory of abstract space was that it obliterated the very ‘absolute spaces’ on which it was founded, and from which it derived its emotional appeal. It is in a way surprising that the development of modern spaceflight was from its inception anchored in a religious or spiritual cosmology. This was true of both Russian and American contexts (see also Geppert, 2007, p. 599). The Russian programme has long roots in the tradition of Russian cosmism (Kohonen, 2009; Siddiqi, 2010). And, as Pop notes, Richard Nixon said to the Apollo 11 astronauts; ‘Because of what you have done, the heavens have become a part of man’s world.’ Pop goes on:

‘Are we today turning mythology into fact?’ – asked Joseph Campbell on the occasion of the Apollo programme. The astronauts walked on the real astronomical moon, as it was; but they walked on the mythical moon of each culture, as thought to be, as imagined. Their trip was physical and metaphysical. They walked through different cosmogonies; through different models of the universe.

(Pop, 2012, personal communication, see also ‘High Flight: A Spiritual History of the Space Age’, in preparation)

This continued relationship was not coincidental. As a number of contributions here show, the appeal of outer space lay in the promise of conquering the wondrous or Godly and hence the elevation of the status of humanity (or, rather more specifically, white men). This is not necessarily that dissimilar to the process Sims describes in his chapter, whereby myths ‘record time’. Ormrod illustrates this in his chapter through analysis of Tsiolkovsky’s science fiction in which the best human beings are able to fly like angels in space. As Kilgore notes in his chapter, Carl Sagan owed his continued appeal to his simultaneous reproduction of wonder as well as knowledge. The British celebrity cosmologist Brian Cox (see Mellor, this volume, for more on him) has arguably taken this even further, such that his popular shows and writing dedicate more time to what is unknown than to knowledge itself. These lacunae became spaces for wild imaginative projects – projects more captivating than any empirical knowledge. It is no wonder that the continued disenchantment and re-enchantment of the universe have become a major theme in recent work. Based largely on studies of astronauts’ experiences, Kilbryde (2015) argues that space exploration can potentially be a means of overcoming the dualism through which outer space is constructed as an object, and thus of experiencing unity. This is provided that the sense of awe and wonder it engenders is not sought as a ‘possession’ of the individual or as something to be subsequently rationalized.

It is the invocation of obstacles that produces space as something potentially unconquerable, and hence worth conquering. And yet the obliteration of the irrational or wondrous sweeps the ground from underneath such a project. To the extent that outer space has become an abstract space, it has been foreclosed as a frontier. It is a frontier, but a frontier without a future. In removing the possibility of an elsewhere, it serves only to secure terrestrial hegemony. In their own ways, both Baudrillard and Virilio present such a view of outer space. For Baudrillard, it was in any case a frontier that served as a model for terrestrial life, which set the permissible limits for struggle and confrontation within it. He concludes,

Through the orbital inscription of a spatial object, it is the planet earth that becomes a satellite, it is the terrestrial principle of reality that becomes eccentric, hyperreal, and insignificant. Through the orbital installation of a system of control like peaceful coexistence, all the terrestrial microsystems are satellized and lose their autonomy. (p. 35)

Everyone on Earth is neutralized and homogenized. The proliferation of space technology since he was writing, and the blurring of civilian and military technologies, has only broadened the potential of such an understanding. Parks and Schwoch (2012, p. 4), in the context of the ‘satellization’ of global security, refer to the satellites as ‘the ultimate rationalization and instrumentalization of the quest for global security and domination’.

For Virilio, there was such a homology between the technologies of war, the image of space as a battlefield and the political discourses about space that the future seemed equally foreclosed. He makes the claim that any space is constituted ‘from the outside’ (cited in Bormann, 2009, p. 80). That is to say, it is perceived on the basis of that which precedes it. Bormann is therefore able to argue that ‘nothing about outer space is “out there”, what we get to know about outer space is always socially, spatially and locally embedded’ (p. 80). Bormann, following Virilio, seems to believe that this is especially true of the vacuum of outer space:

[O]ther than the view there is no physical or physiological contact. No hearing, no feeling in the sense of touching materials, with the exception of an actual Moon landing. Thus the conquest of space, of outer space – isn’t it more the conquest of the image of space?

(Virilio & Ujica, 2003, cited in Bormann, 2009, p. 84)

Bormann reaches the pessimistic conclusion that ‘the perpetuation of outer space as a sphere of permanent war and its claims to weaponization will soon make no alternative possible’ (p. 84). This is the product, in the large part, of her assumption that ‘[w]hat we get to know about the space of outer space is dominated by information provided through the possibilities (and limits) of military technology’ (p. 81).

#### The alternative is to see that nature is us—recognizing the logic of the 1AC as the primary barrier to overcoming challenges to our environment and beyond.

Baskin 15 [(Jeremy, Senior Fellow at the Melbourne School of Government where he focuses on the legitimacy and accountability of knowledge) Paradigm Dressed as Epoch: The Ideology of the Anthropocene, 2015, Environmental Values] TDI

Even the limited examples from the literature already cited suggest that the assumptions of proponents of the Anthropocene about managerialism, technology and expertise are transparent and explicit. In almost all major accounts of the concept it is assumed that responding to the end of nature, and the challenges of the Anthropocene, requires a trinity of techniques: clear management of the Earth and Earth-systems, guided by experts (and scientists/engineers in particular), using the most advanced technology possible (including large- scale technology).

The challenges themselves are typically framed by a sense of emergency. The great weight of accumulating scientific data is recruited, to show how the human species and its planet are at risk. Landscapes and seascapes are being transformed, boundaries are being breached, non-linear processes have been unleashed, system pressures are rising and tipping points are either happening or looming; and all of this is both unprecedented in human history and fundamentally anthropogenic in cause.

Certainly recognition of the made-ness of the natural world means acknowledging that this carries responsibilities for the relevant human socie- ties, even a degree of conscious management. For leading proponents of the Anthropocene, the scale of management required is commonly seen, implicitly or explicitly, as global: since we face global problems, global management is needed to run the Earth in the Anthropocene. But what does it mean to frame policies within a global, universalist goal of ‘running the Earth’, and what condition are we trying to manage it towards?

Those of a more Aidosean inclination have spoken of the need to manage a return to the Holocene, or Holocene-like conditions, since this is ‘the only global environment that we are sure is “safe operating space” for the complex, extensive civilization that Homo sapiens has constructed’ (Steffen et al., 2011b: 747). This is the best way to manage the risks we face as we increasingly cross the planetary boundaries. The Prometheans, by contrast, argue that we should manage our way towards ‘a better Anthropocene’ (Ellis, 2011). The internal logic of the argument surely lies with the Prometheans. If humanity acknowledges and embraces its role as Earth-manager, and if we are indeed ‘post-nature’ and ‘nature is us’, then it is clearly impossible to return the Earth to the Holocene (or at least it would take millennia to do so). Why not aim for a ‘better’ Earth, or a more benign climate in which Norwegians are less cold, and Saudi Arabians less hot? For our purposes, however, the point is that the Aidosean and Promethean versions differ over the direction and goals of plan- etary management, rather than the need for it.

Managing the Anthropocene is also understood to come with special responsibilities for the scientific and engineering community (Crutzen, 2002). Only they are likely to have the knowledge, data and skills required in this new Age of Humans. At one level, one should not read too much into this, since the key proponents of the concept happen to be scientists and, not surprisingly, are more alert to the extent of their own knowledge and insights. Certainly sci- entists in the Anthropocene would have a key role as diagnosticians and, with engineers, as generators of specific technologies. But there is something troubling in the idea of scientists as both informants and saviours. Whilst policy needs to be informed by science, experience teaches that we should remain wary of the idea that policy can or should be guided by the science (Jasanoff, 1990; Pielke, 2007). As we know from the ‘climate wars’, the barriers to bringing down carbon-dioxide concentrations are almost entirely related to global and local politics, vested interests, deep-rooted values, economic structures and so on. For well over a decade they have been almost entirely unrelated to there being a lack of scientific data or new technologies (see Pielke, 2007: 71–2).

Proponents of the Anthropocene almost always draw a link between the concept and the need for (or, at least, the need to research and consider) large-scale technological interventions, and, in particular, geo-engineering. Geo-engineering, or climate engineering, involves the large-scale, intentional manipulation of the climate system, to regulate the Earth’s chemistry and the global temperature. The most commonly cited scheme involves solar radia- tion management by stratospheric aerosol injection: in practice, shrouding the upper atmosphere of the planet in a fine layer of sulphuric particles, on an ongoing basis, with the aim of cooling the earth to offset the warming effects of rising greenhouse-gases. Most key articles from the scientific community which advocate the Anthropocene concept either endorse geo-engineering, call for the capability to be developed, or simply make it imaginable (for example: Crutzen, 2002, 2006; Ellis and Haff, 2009). A minority clearly find the idea uncomfortable and incompatible with planetary stewardship, even whilst re- taining it as an option (for example: Steffen et al., 2011a).

A LEGITIMATING IDEOLOGY?

We now see the emerging shape of the mainstream Anthropocene paradigm, and its narrative. The idea (and the evidence) that humanity is now the dominant earth-shaping force combines with the data showing that the condition of the patient is serious, possibly terminal. Humanity and its planet are now in a critical and exceptional state. This both generates and draws upon an attrac- tion to global-scale technological ‘solutions’ and earth management, under the guidance of the scientists/engineers best placed to understand, interpret and help shape the necessary interventions. These are responses aimed either at bringing us back from the brink, or at taking us to a new and better-managed future Earth. In both versions, the Anthropocene is both diagnosis and cure, both description and prescription.

It is important to note the deeply authoritarian and de-politicising tendencies of Anthropocene discourse. Proponents regularly talk of a ‘global sustainability crisis’ (Steffen et al., 2011b: 740) and a ‘climate emergency’, and suggest that humanity and its planet are now in ‘operating in a no-analogue state’ (Crutzen and Steffen, 2003: 253). This is not uncommon in much envi- ronmental discourse. But its effect, in the context of the Anthropocene, is that framing through exceptionality can legitimate the need for exceptional rule and authoritarian responses. This is enhanced by the promise of technology (machines, techniques, human-centred risk management) as the basis of action and ‘salvation’. The emphasis on ‘the rule of experts’, and the associated endorsement of a technocratic consciousness, depoliticises society and tends to reduce the political to the technical, justifying decisions on technical grounds. It also helps explain a related interest by many Anthropocene proponents in notions of Earth governance, which is not explored here.

This Promethean version is the one likely to be most attractive to the powerful and the privileged in the event that nature starts tipping, and as ‘the period of consequences’, to use Churchill’s memorable phrase, becomes in- creasingly apparent. It can also be thought of as ‘full-belly Anthropocene’, or the ‘Anthropocene of the rich’, to adapt Guha and Martinez-Alier’s resonant phrase (1997).7

Discourses of the Anthropocene certainly may have some ability to chal- lenge the notion of human ‘progress’ and ‘the belief systems and assumptions that underpin neo-classical economic thinking, which in turn has been a major driver of the Great Acceleration’ (Steffen et al., 2011a: 861–2). But, as a con- cept, it appears overall to legitimate the dominant order, even if unintentionally. In my argument, it does this in three major ways: by universalising/normalisng the affluent contemporary consumer as the human of the Anthropocene (thereby obscuring the social reality of unequal responsibility for impacts, and the pathological pursuit of endless and unequal growth); by its elevation and sacralisation of this particular humanity (reinserting it into nature only to reelevate it within and above it as a force of nature); and by its ability to legitimise a range of major and potentially highly dangerous interventions into the workings of the earth, and some deeply authoritarian state practices, none of which are likely to be exercised in the interests of most of the world’s people.

## 1NC-Case

## 1NC-Coorperation

#### Rhetoric’s on Space colonization comes from racist ideologies against indigenous cultures and forgets about violent history against those communities

Drake 18 [(NADIA DRAKE, science journalist and contributing writer at National Geographic.), “We need to change the way we talk about space exploration”, National Geographic, https://www.nationalgeographic.com/science/article/we-need-to-change-way-we-talk-about-space-exploration-mars, NOVEMBER 9, 2018] SS

When discussing space exploration, people often invoke stories about the exploration of our own planet, like the European conquest and colonization of the Americas, or the march westward in the 1800s, when newly minted Americans believed it was their duty and destiny to expand across the continent.

But increasingly, government agencies, journalists, and the space community at large are recognizing that these narratives are born from racist, sexist ideologies that historically led to the subjugation and erasure of women and indigenous cultures, creating barriers that are still pervasive today.

To ensure that humanity’s future off-world is less harmful and open to all, many of the people involved are revising the problematic ways in which space exploration is framed. Numerous conversations are taking place about the importance of using inclusive language, with scholars focusing on decolonizing humanity’s next journeys into space, as well as science in general.

“Language matters, and it’s so important to be inclusive,” NASA astronaut Leland Melvin said recently during a talk at the University of Virginia.

Lucianne Walkowicz, an astronomer featured in National Geographic’s docudrama series Mars, spent the last year studying the ethics of Mars exploration as the Chair of Astrobiology at the U.S. Library of Congress. We recently spoke with Walkowicz to examine the problems associated with old-fashioned verbiage and to discuss some solutions. What follows is a record of that conversation, edited for length and clarity.

Why is it so crucial to consider the words we use when describing space exploration?

The language we use automatically frames how we envision the things we talk about. So, with space exploration, we have to consider how we are using that language, and what it carries from the history of exploration on Earth. Even if words like “colonization” have a different context off-world, on somewhere like Mars, it’s still not OK to use those narratives, because it erases the history of colonization here on our own planet. There’s this dual effect where it both frames our future and, in some sense, edits the past.

What are some of the problematic narratives the term “colonization” brings up?

One narrative that comes up a lot draws on the history of Europeans coming to the Americas.

I’ve seen people talk about the arrival of the first European settlers as this romantic, heroic story of people making it in a harsh environment. But of course, there were already people here, in the Americas, when those historical events happened.

Furthermore, a lot of the Europeans’ ability to live throughout the Americas came at the cost of genocide for indigenous people. I think it’s not intuitive, particularly when we talk to white Americans, for example, to think of the history of Columbus’s journey as a story of genocide. But it’s important to realize that’s what it is.

A lot of those historical narratives are also bound up in the history of slavery, for example, so when we talk about how colonies in Virginia grew from being a few settlers to becoming tens of thousands of people, it’s also important to realize that roughly half of those people came against their own will, and many died along the way.

#### Capitalism solves environmental crisis - industrial development, technological advances, and any alternative fails

Zitelmann 20 [(Dr. Rainer, a historian and sociologist. He is also a world-renowned author, successful businessman and real estate investor. Zitelmann has written a total of 24 books and has a doctorate in political science and sociology) “‘System Change Not Climate Change’: Capitalism And Environmental Destruction” Forbes, 7/13/2020] BC

The Price Of Growth—Destruction Of The Environment?

But isn’t there a price for this growth: environment devastation? Of course, nobody would deny that industrialization causes environmental problems. But the assertion that growth automatically leads to ever accelerating environmental degradation is simply false. Yale University’s Environmental Performance Index (EPI) uses 16 indicators to rank countries on environmental health, air quality, water, biodiversity, natural resources and pollution. These indicators have been selected to reflect both the current baseline and the dynamics of national ecosystems. One of the Index’s most striking findings is that there is a strong correlation between a state’s wealth and its environmental performance. Most developed capitalist countries achieve high environmental standards. Those countries with the worst EPI scores, such as Ethiopia, Mali, Mauritania, Chad and Niger, are all poor. They have both low investment capacity for infrastructure, including water and sanitation, and tend to have weak environmental regulatory authorities.

Contrary to prevailing perceptions, industrial development and technological advances have contributed significantly to relieving the burden on the environment. Both Indur Goklany in his book The Improving State of the World and Steven Pinker in chapter ten (“The Environment”) of his book Enlightenment Now demonstrate that we are not only living longer, healthier lives in unprecedented prosperity, but we are also doing so on a comparatively clean planet.

Researchers have confirmed that economic freedom—in other words, more capitalism—leads to higher, not lower, environmental quality.

Every year, the Heritage Foundation compiles its Index of Economic Freedom, which analyzes individual levels of economic freedom, and thus capitalism, in countries around the world. The Heritage Foundation’s researchers also measure the correlation between each country’s environmental performance and its economic freedom. The results couldn’t be clearer: the world’s most economically free countries achieve the highest environmental performance rankings with an average score of 76.1, followed by the countries that are “mostly free,” which score an average of 69.5. In stark contrast, the economically “repressed” and “mostly unfree” countries all score less than 50 for enviro

nmental performance.

Is Government The Best Solution To Environmental Problems?

Anti-capitalists frequently claim that central government is the best solution to environmental problems. And there is no doubt that state regulations to safeguard the environment are important. But state regulations, cited by anti-capitalists as a panacea for environmental issues, often achieve the opposite of what they were intended to do. Hardly any other country in the world touts its green credentials as much as Germany. According to even the most conservative estimates, Germany’s so-called “energy transition” is set to cost a total of almost €500 billion by 2025.

But the results of this massive investment is sobering, as an analysis by McKinsey reveals, “Germany is set to miss several key energy transition targets for the year 2020, and the country’s high power supply security is at risk unless new generation capacity and grid infrastructure are built in time for the coal and nuclear exit and electrification of transportation networks is accelerated.”

For decades, environmentalists in Germany focused on shutting down nuclear power plants. However, the phasing out of nuclear power has left Germany in a poor position in terms of CO2 emissions compared to other countries. It is not without good reason that Germany’s energy policy has been described as the dumbest in the world.

The latest generation of nuclear power plants are much safer than their predecessors. Despite what environmentalists might claim, impartial calculations have confirmed that it is impossible to meet the world’s energy needs from solar and wind power alone. Enlightened environmentalists are therefore now calling for nuclear power to be rightfully included in the fight against climate change. And yet, this is precisely what is being prevented in Germany by politicians—not capitalism. This example, just one of many, shows that government environmental policy is often ineffective. In some instances, it even achieves the opposite of what it was originally intended to, i.e. it exacerbates existing environmental problems.

It is also wrong to think that capitalism necessarily leads to ever greater waste of limited natural resources. Just take the smartphone for example, one of the most environmentally friendly of capitalism’s many achievements. With just one small device, a whole plethora of devices that used to consume resources in the past, such as the telephone, camera, calculator, navigation system, dictation machine, alarm clock, flashlight and many others, have been replaced. Smartphones also help to reduce the consumption of paper as many people choose not to take notes on paper and, for example, use their iPhone instead of a calendar to enter appointments.

Those who call for “system change” instead of “climate change” do not usually say which system they would prefer. All they are really sure of is that any new system should not be based on free market economics and that the state should play the decisive role. The simple fact is that socialism has failed in every country every time it has been tried—and socialism has damaged the environment more than any capitalist system. Murray Feshbach documents examples of the environmental destruction wrought by socialism in his book Ecological Disaster. Cleaning Up the Hidden Legacy of the Soviet Regime. As the book progresses through chapters such as “A Nuclear Plague,” “Dying Lakes, Rivers, and Inland Seas” and “Pollution of the Air and Land,” it becomes clear that this non-capitalist system was responsible for the greatest environmental destruction in history. Anti-capitalists may well reply that they do not want a system like the Soviet Union. And yet, they cannot name a single real-world system—at any time in the history of mankind—that provides better environmental solutions than capitalism.

## 1NC-Debris

### Mining good

#### Mars colonization is feasible, but requires water and hydrogen mining – private sector profit motives and innovation are key to make mining viable

Martin 3/10 [(Neil, Media & Content Coordinator at UNSW, internally cites Serkan Saydam, Professor of Engineering at UNSW Sydney with focuses on Ground Control in Mining, Mining Systems, Mine Planning and Design, Advanced Mining Technologies and Off Earth Mining, Sc, MSc and PhD degrees in Mining Engineering from the Dokuz Eylul University, Izmir, Turkey) “Mars settlement likely by 2050 says UNSW expert – but not at levels predicted by Elon Musk,” UNSW Newsroom, 3/10/2021] JL

Mars will be colonised by humans by the year 2050, as long as autonomous mining processes quickly become more commercially viable.

That’s the view of Professor Serkan Saydam from UNSW Sydney in the wake of the amazing landing on Mars by NASA’s Perseverance rover.

Perseverance is expected to provide answers about whether forms of life ever existed on the red planet, but it is also designed to help address the challenges of future human expeditions there.

Professor Saydam, from the School of Mineral Energy Resources Engineering, says the main focus in terms of creating a colony on Mars is finding water – and being able to extract it and process it using robots before humans land.

“Everything is all about water,“ Prof. Saydam says. “You use water as a life support, plus also being able to separate out the hydrogen to use as an energy source.

“The process for having humans on Mars will be to set up operations, go there and produce water with robots first, and then be able to extract the hydrogen to make the energy ready before people arrive.

“Innovation in robotics and autonomous systems are clearly important so that we have the water ready and the hydrogen separated and ready for when human beings land.

“At the moment, we don’t have ability to do it. There are significant research efforts, specifically here at UNSW under ACSER (Australian Centre for Space Engineering Research), about the best way to do it, but there is no consensus yet. It also depends on how many people we expect to be living on Mars. Is it five, or 5000, or 50,000, or even more?“

Entrepreneur Elon Musk has claimed he’s confident there will be a city of 1 million on Mars by 2050, transported there by 1000 Starships proposed by his SpaceX venture, with plans for up to three rocket launches per day.

Prof. Saydam says that may be unrealistic in the specific timeframe, but admits that demand for travel and a potential colonisation of Mars is what’s needed to drive the technological developments required.

“I think the technology is ready and we already have the knowledge, but the main problem is having the focus,“ says Prof. Saydam, who is organising an International Future Mining Conference in December 2021 that will feature former NASA astronaut Pamela Melroy and Honeybee Robotics vice-president Kris Zacny.

“It’s a bigger question: ‘Why don’t we do that already on earth? Why are we still using human beings for physical work in mining here?’ We have huge experience in mining, but still heavily depend on humans.

“One issue is that demand is not there. For companies to get involved in developing products (for Mars missions), they need to be able to produce minerals or something that can be used for manufacturing goods and then sell it.

“At the moment, everything is just a cost and there is no revenue for companies.“

However, that could be starting to change. United Launch Alliance, a joint venture between Lockheed Martin and Boeing who are heavily invested in the rockets used to launch spaceships, has publicly announced they will pay $500 per kilogram for fuel – derived from water – supplied on the moon. That rises to $3000 per kilogram if the fuel is available in a low-earth orbit.

“That immediately creates a market,“ Prof. Saydam says. “Plus, if Elon Musk does what he says and puts people on the surface of Mars in 20 years, then that also creates a market.

“I believe a colony on Mars is going to happen, but between 2040 and 2050 is more feasible. This could be shortened depending on the technological advances that can reduce the costs or from stronger motivation.

### Debris

#### Alt cause – broad space privatization and existing debris.

Muelhapt et al 19 [(Theodore J., Center for Orbital and Reentry Debris Studies, Center for Space Policy and Strategy, The Aerospace Corporation, 30 year Space Systems Analyst and Operator, Marlon E. Sorge, Jamie Morin, Robert S. Wilson), “Space traffic management in the new space era,” Journal of Space Safety Engineering, 6/18/19, https://doi.org/10.1016/j.jsse.2019.05.007] TDI

The last decade has seen rapid growth and change in the space industry, and an explosion of commercial and private activity. Terms like NewSpace or democratized space are often used to describe this global trend to develop faster and cheaper access to space, distinct from more traditional government-driven activities focused on security, political, or scientific activities. The easier access to space has opened participation to many more participants than was historically possible. This new activity could profoundly worsen the space debris environment, particularly in low Earth orbit (LEO), but there are also signs of progress and the outlook is encouraging. Many NewSpace operators are actively working to mitigate their impact. Nevertheless, NewSpace represents a significant break with past experience and business as usual will not work in this changed environment. New standards, space policy, and licensing approaches are powerful levers that can shape the future of operations and the debris environment.

2. Characterizing NewSpace: a step change in the space environment

In just the last few years, commercial companies have proposed, funded, and in a few cases begun deployment of very large constellations of small to medium-sized satellites. These constellations will add much more complexity to space operations. Table 1 shows some of the constellations that have been announced for launch in the next decade. Two dozen companies, when taken together, have proposed placing well over ~~20,000~~ [twenty thousand] satellites in orbit in the next ~~10~~ [10]years. For perspective, fewer than ~~8100~~[eight thousand one hundred] payloads have been placed in Earth orbit in the entire history of the space age, only 4800 [1] remain in orbit and approximately 1950 [2] of those are still active. And it isn't simply numbers – the mass in orbit will increase substantially, and long-term debris generation is strongly correlated with mass.

[Table 1 Omitted]

This table is in constant flux. It is based largely on U.S. filings with the Federal Communications Commission (FCC) and various press releases, but many of the companies here have already altered or abandoned their original plans, and new systems are no doubt in work. Although many of these large constellations may never be launched as listed, the traffic created if just half are successful would be more than double the number of payloads launched in the last 60 years and more than 6 times the number of currently active satellites.

Current space safety, space surveillance, collision avoidance (COLA) and debris mitigation processes have been designed for and have evolved with the current population profile, launch rates and density of LEO space.

By almost any metric used to measure activity in space, whether it is payloads in orbit, the size of constellations, the rate of launches, the economic stakes, the potential for debris creation, the number of conjunctions, NewSpace represents a fundamental change.

3. Compounding effects of better SSA, more satellites, and new operational concepts

The changes in the space environment can be seen on this figurative map of low Earth orbit. Fig. 1 shows the LEO environment as a function of altitude. The number of objects found in each 10 km “bin” is plotted on the horizontal axis, while the altitude is plotted vertically. Objects in elliptical orbits are distributed between bins as partial objects proportional to the time spent in each bin. Some notable resident systems are indicated in blue text on the right to provide an altitude reference. The (dotted) red line shows the number of objects in the current catalog tracked by the U.S. Space Surveillance Network (SSN). All the COLA alerts and actions that must be taken by the residents are due to their neighbors in the nearby bins, so the currently visible risk is proportional to the red line.

The red line of the current catalog does not represent the complete risk; it indicates the risk we can track and perhaps avoid. A rule of thumb is that the current SSN LEO catalog contains objects about 10 cm or larger. It is generally accepted that an impact in LEO with an object 1 cm or larger will cause damage likely to be fatal to a satellite's mission. Therefore, there is a large latent risk from unobserved debris. While we cannot currently track and catalog much smaller than 10 cm, experiments have been performed to detect and sample much smaller objects and statistically model the population at this size [3]. The (solid) blue line represents the model of the 1 cm and larger debris that is likely mission-ending, usually called lethal but not trackable. If LEO operators avoid collisions with all the objects in the red line, they are nonetheless inherently accepting the risk from the blue line. This risk is already present.

The (dashed) orange line is an estimate of the population at 5 cm and larger and is thus an estimate of what the catalog might conservatively be a few years after the Space Fence, a new radar system being built by the Air Force, comes on line (currently planned for 2019) [4]. Commercial companies offering space surveillance services, such as LeoLabs, ExoAnalytics, Analytic Graphics Inc., Lockheed, and Boeing, might also add to the number of objects currently tracked. Space Policy Directive 3 (SPD-3) [13] specifically seeks to expand the use of commercial SSA services.

Existing operators can expect a sharp increase in the number of warnings and alerts they will receive because of the increase in the cataloged population. Almost all the increase will come from newly detected debris [5].

The pace of safety operations for each satellite on orbit will significantly change because of the increase in the catalog from the Space Fence. This effect is compounded because the NewSpace constellations described in Table 1 will drastically change the profile of satellites in LEO. The green bars in Fig. 1 represent the number of objects that will be added to the catalog (red or orange lines) from only the NewSpace large LEO constellations at their operational altitudes. This does not include the rocket stages that launch them, or satellites in the process of being phased into or removed from the operational orbits. Neighbors of one of these new constellations may face a radically different operations environment than their current practices were designed to address.

Satellites in these large LEO constellations typically have planned operational lifetimes of 5–10 years. Some companies have proposed to dispose of their satellites using low thrust electric propulsion systems, which would spiral satellites down over a period of months or years from operating altitudes as high as 1500 km through lower orbits where the Hubble Space Telescope, the International Space Station, and other critical LEO satellites operate [6]. Similar propulsive techniques would raise replacement satellites from lower launch injection orbits to higher operational orbits. These disposal and replenishment activities will add thousands of satellites each year transiting through lower altitudes and posing a risk to all resident satellites in those lower orbits. More importantly, failures will occur both among transiting satellites and operational constellations, potentially leaving hundreds more stranded along the transit path.

1. **Probability – 0.1% chance of a collision.**

**Salter 16** [(Alexander William, Economics Professor at Texas Tech) “SPACE DEBRIS: A LAW AND ECONOMICS ANALYSIS OF THE ORBITAL COMMONS” 19 STAN. TECH. L. REV. 221 \*numbers replaced with English words] TDI

The probability of a collision is currently low. Bradley and Wein estimate that the maximum probability in LEO of a collision

over the lifetime of a spacecraft remains below one in one thousand, conditional on continued compliance with NASA’s deorbiting guidelines.3 However, the possibility of a future “snowballing” effect, whereby debris collides with other objects, further congesting orbit space, remains a significant concern.4 Levin and Carroll estimate the average immediate destruction of wealth created by a collision to be approximately $30 million, with an additional $200 million in damages to all currently existing space assets from the debris created by the initial collision.5 The expected value of destroyed wealth because of collisions, currently small because of the low probability of a collision, can quickly become significant if future collisions result in runaway debris growth.