

Table of Contents

Contents

Resolution	2
Contention 1: Capitalism & the Space Industrial Complex	3
1. Private Entities Rely on Hopes of Profit for upfront investment into Space Travel. Kramer 22	3
The impact of structural violence cumulatively outweighs – challenging the structures that facilitate inequality is necessary	7
Impact 2) Colonialism	8
Solvency	12
Contention 2: Satellite Collisions	15
Subpoint A) Accidents	15
Unregulated mining causes asteroid deflection and astroterror	16
Contention 3: Space Wars	18
Impact) Space wars go nuclear	21
Nuclear war causes extinction.	23

Resolution

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

Contention 1: Capitalism & the Space Industrial Complex

1. Private Entities Rely on Hopes of Profit for upfront investment into Space Travel.

Kramer 22

(Miriam Kramer is the space reporter for Axios. She is the author of the weekly Axios Space newsletter and covers the science and business of space. "Private space companies' 2022 promises to keep." Axios. January 4, 2022.

<https://www.axios.com/private-human-spaceflight-2022-8ec6082a-e3ae-4d6b-8073-3f8af3e7e2a5.html>)

The private human spaceflight industry delivered on long-held promises in 2021, but 2022 is the year where it will need to prove itself to the public. Why it matters: The space industry is predicted to be worth more than \$1 trillion within the next 10 years. But for that to happen, companies will need to turn the extraordinary feats of the last year into routine operations. What's happening: Last year, Blue Origin and Virgin Galactic both launched their founders — Jeff Bezos and Richard Branson respectively — to space for the first time. Blue Origin followed that up with two more suborbital human flights in 2021. Those missions marked the culmination of decades of work for the two companies and delivered on a promise of sending more non-professionals to space. SpaceX also consistently launched crewed missions to the International Space Station for NASA, a major customer that will influence the continued growth of the company, and had a huge success with four non-professionals flying to orbit without a pro-astronaut onboard on the Inspiration4 mission. What to watch: Now, those companies are trying to demonstrate they can consistently deliver these services — and turn a profit from them. That means flying more. Blue Origin, Virgin Galactic and SpaceX are expected by space watchers to fly people to space consistently and safely this year. That will be key to determining whether the successes of the last year are one-offs or if they can get into "some sort of rhythm and make some money." Carissa Christensen, founder and CEO of BryceTech, told Axios. SpaceX is planning to launch the Axiom Mission-1 mission to the International Space Station early in 2022, which will act as a followup to the Inspiration4 mission and could be an indicator of the market for more amateur orbital flights. It's hard to gauge whether private companies like Blue Origin are profitable — because their finances aren't open to the public — but routinely launching, which is expensive, can act as a proxy for it, Christensen said. Yes, but: Transforming these missions into routine services won't be easy. It will require companies to increase launch cadence, which is challenging because they're working with relatively newly-developed technology and within complicated regulatory frameworks. The big picture: The public demand for these types of services could also become more clear this year. Studies indicate there is "substantial demand" for suborbital spaceflight, Christensen says. "You have a larger pool of people that can afford it now." According to a May 2021 note sent to investors by analysts Ken Herbert and Austin Moeller, of Canaccord Genuity, the suborbital tourism market could reach \$8 billion by 2030 with 1 million potential customers. Between the lines: Demonstrating they can turn a profit will be important for the companies working to make consistent, private human spaceflight a reality, but it's likely a small portion of the revenue for the space industry overall. However, human spaceflight will be one of the most important public-facing elements of the overall industry. Major failures and successes will shift the way the public sees the industry, adding to its support or detracting from it. The bottom line: Last year, the private spaceflight industry showed what it can do, but this year, these companies will need to capitalize on it.

Private space enterprise *requires* massive inequality-it's viewed as a *spatial fix* that allows infinite expansion of state backed colonialism

Penny 20

(Eleanor Penny is a writer, poet and essayist based in London. She is a senior editor at Novara Media,

<https://inthesetimes.com/article/space-privatization-future-technology-silicon-valley-elon-musk-jeff-bezos, 12-17>)

The eye-watering upfront costs of these exploratory, high-risk, high-reward endeavors can be absorbed by Silicon Valley venture capitalists and the personal fortunes of its aristocracy. A concentration of capital stands ready to risk big money to secure a stake in future markets (which will double down on its power in existing ones). The point is to ensure a slice of the territory everyone else will be clamoring for. This form of "creative destruction"—an idea developed by economist Joseph Schumpeter, understood in neoliberalism to describe the boom-bust cycle of innovation — is often packaged in the mythology of moonshot genius that drives human progress.

But Schumpeter's theory has a less discussed underbelly: Such creative destruction is usually **twinned with market capture**. As competitors are tossed onto the **scrap heap of history** by their own sudden irrelevance, **oligarchies and monopolies flourish**. The riches of the asteroid belt make earthly mining look positively parochial. The problem is that **a sudden, vast supply** of (formerly) precious metals **would make market prices plummet**. Journalist Aaron Bastani, author of Fully Automated Luxury Communism, notes that satellite-delivered digital information has the potential to replace our earthbound Internet networks with "space-based global Internet" — the way music streaming has replaced CDs and CDs replaced cassettes and vinyl — or to at least render them much cheaper (through, for example, open-access 3D printing). SpaceX and Blue Origin surely share a goal to make space transport cheaper. The question is, for whom? **These ventures train their sights on infinite excess**, with dwindling marginal costs as the supply of key materials and digital resources expands. This paradigm is great for those interested in the advancement of human civilization, but not so much for a grinning billionaire's fixation on the bottom line. At first glance, **expanding industry beyond Earth sounds like a pragmatic fix to the earth-shatteringly simple dilemma faced by capitalism**: that it **must grow to survive, but the planet it grows upon is finite**. But **to maintain profit margins** in conditions of plenty (a demand of industry), **legal and political fixes are required**. If you **exclusively own mining rights to asteroids rich in platinum** — and precious little platinum is left on Earth — **you can charge whatever you like for platinum**. The diamond industry perfected this technique decades ago. (Elon Musk's family fortune comes partially from a Zambian emerald mine.) Hence, **the focus of the new space race is not on the production of goods or their most efficient sourcing, but on ownership of land and transport networks**. In this latest phase of capitalism, **as national growth slows**, productive industries dwindle and **wealth concentrates in fewer hands**. As economist Thomas Piketty has observed, this phase is accompanied by a pivot toward rent-seeking as a profit mechanism. In other words, **the scramble for space is the scramble to own satellites and "starways," gatekeep the riches of the solar system and charge rent on the moon**. Against this backdrop, Space Force might seem retrograde, a warped nostalgia for a time when the space race was about petty terrestrial wars rather than Musk's supposedly enlightened vision to colonize Mars. **In reality, the two visions go hand in hand. Military might physically captures and secures territory, enforces the American political and legal apparatus and ensures business can function** (even on the moon). The darlings of this new space age paint their vision as daring futurism, a wild-eyed libertarian dream of human elevation. **But history repeats and the story is old**. Like Bezos and Musk, Cecil Rhodes — mining magnate and premier villain of the British Empire — also succumbed to dreams of wealth in the night sky. **"Expansion is everything"**, Rhodes said. **"I would annex the planets if I could."** Where technology opens up the yawning unknown of new territory glittering with potential profit, **private enterprises hustle for dominance** — backed by the military and legal capacities of earthbound nations. **Colonialism in space is not some post-humanist utopia, but the age-old dominion of land barons and mining magnates, billionaires sloughing off the wreckage of one planet** and setting out for the stars.

Capitalism is not natural or inevitable, extending it to space is a political choice.

Empirics prove it will be disastrous

Penny 20

(ELEANOR PENNY is a writer, poet and essayist based in London. She is a senior editor at Novara Media, <https://inthesetimes.com/article/space-privatization-future-technology-silicon-valley-elon-musk-jeff-bezos>, 12-17)

Space is our birthright. "Americans should have the right to engage in commercial exploration, recovery and use of resources in outer space," President Donald Trump wrote April 6, 2020, issuing the "Executive Order on

Encouraging International Support for the Recovery and Use of Space Resources.” In the stroke of a pen, Trump planted the U.S. flag on “the Moon, Mars and other celestial bodies.” As Trump declared these space lands and resources open for business, you could hear the cheers — mostly from “moonshot” corporations that have clamored to sweep away the patchy, unregularized Cold War-era space law in favor of new, unregulated corporate plunder of the solar system. While the institution of private land ownership is now widely taken for granted, it was — like many so-called natural things — invented. Before the muddled, grueling transition from feudalism to capitalism, peasants in Britain and much of Western Europe depended on their right to farm, forage and harvest on common, community lands. The land was controlled by local lords, but it belonged (in a loose, de facto sense) to the communities living on it and dependent upon it. Eventually, common lands were “enclosed” and became the private property of aristocrats. This exclusive right to land use (to own and profit from land) was the contrivance that established the new economic order. No longer held in common, the planet’s resources were parceled off to strictly private hands. No longer could peasants scrape by, subsisting on the commons. Instead, they depended on the grace and favor of a wage. Life in feudal times was no bucolic idyll, but enclosure was synonymous with disaster, destitution and death for many people. This model was mirrored in the capture, theft and enclosure of colony lands, the people (and resources) of which fueled the early capitalist transition and later the industrial revolution. Capitalism must grow to persist, and as it grows it must transform ripe, unregularized commons into private fiefdoms — at home and afar. So it seems only “natural” to carve up the moon into stretches of valuable real estate, just like Manhattan and the metal mines in the Democratic Republic of Congo. After all, Earth’s resources dwindle by the day, and boundless resources beyond the stratosphere could be a backstop for planetary scarcity. Never mind that our crisis of resources is, in part, the result of this system of private ownership that rewards ruthless, short-term profiteering at the expense of the long-term survival of the natural commons. This future access to a new natural commons is now a stress test on governmental priorities. As Trump proclaimed, “Outer space is a legally and physically unique domain of human activity, and the United States does not view it as a global commons.” Trump’s executive order to “encourage international support for the public and private recovery and use of resources in outer space” heralds yet another public-private boondoggle, where nominally public institutions thrash out fresh boundaries of corporate activity. As an example, look no further than SpaceX’s Crew Dragon capsule, which successfully transported NASA astronauts Bob Behnken and Doug Hurley to the International Space Station on May 31, 2020. The NASA-SpaceX crossover branding leaves no room for misinterpretation: The next small steps for mankind will be giant leaps for corporate America. Elon Musk, who founded SpaceX in 2002, talks misty-eyed about a relatively near future when humanity will have risen out of the mud, setting its sights on colonizing Mars — with SpaceX transportation rocketing there. In 2020, Musk began launching a cavalcade of thousands of satellites into low-Earth orbit to form the Starlink satellite system. As of November 2020, nearly 900 satellites had been launched (42,000 are planned in total). This network will potentially seed an extraplanetary monopoly for key economic infrastructure, such as domestic internet access. Fellow billionaire escapist Jeff Bezos, Amazon CEO, has been romanced by the wealth among the stars as well, founding his own aerospace company, Blue Origin, back in 2000. “We are going to build a road to space,” Bezos said in 2019. “And then, amazing things will happen.” Bezos has invited us all to cosplay his daydreams with the Amazon-funded, interplanetary sci-fi thriller The Expanse, in which a roll call of stock anti-heroes (the rogue policeman, the war-beleaguered pilot, etc.) tumble through a far future when only wise plutocratic innovators can plumb interstellar riches and deliver the solar system from interstellar war. Microsoft, too, has its fingers in the intergalactic pie, launching Azure Orbital in September 2020 to enable satellite operators on its cloud computing platform, along with a SpaceX partnership the following month. According to Forbes, 2019 was a record year for private space investments, with “venture capitalists [investing] \$5.8 billion in 178 commercial space startups worldwide.” As Earth’s billionaires burnish the power of new stratospheric tech, Trump launched Space Force, the first new branch of the U.S. military in more than seven decades. “Space is the world’s newest war-fighting domain,” Trump said. “Amid grave threats to our national security, American superiority in space is absolutely vital.” Space exploration has long been tied to military ambition. From its Cold War founding, NASA’s task was to advance the practical interests of the American state as it squared off against the Soviet behemoth. The new field of battle included space-guided missiles and satellite technology. Astronauts are still generally selected from the ranks of the military. Grumman (now better known as half of Northrop Grumman) made parts for both the NASA spacecraft that leapt into the great unknown and the military machines that waged war in Vietnam. As the shadow of nuclear war retreats in the bright light of a digital dawn, the mission of Space Force is to protect the economic and military infrastructure (communications and surveillance technology) seemingly threatened by rival

global powers (namely, Russia and China) gearing up their own military space operations. The 1967 Outer Space Treaty, signed by the United States, the United Kingdom and the Soviet Union, attempted to guard against the militarization and the privatization of our shared stratosphere. The treaty limited governmental (and non-governmental) bodies from sending nuclear weapons into space and prohibited the annexation of the moon and temptingly mineral-rich asteroids. As the treaty outlined, any country could use and explore outer space but there could be no “appropriation” of astral territory. It was, at heart, a disarmament treaty — one whose ropey legalities were enforced by the now-defunct Cold War brinkmanship between its main two signatories. The treaty never foresaw the dizzying rise of private enterprise clamoring for a slice of the sky. Nor did it foresee the slow shelving of publicly funded U.S. space exploration (especially the manned variety) that would allow venture capitalists to stake their claim in a new space scramble.

Impact 1) Statistically economic inequality outweighs war

Richter, PhD/EMT, 15

(Roxane, *Disaster Types and their Consequences for Women in Medical Outcasts: Gendered and Institutionalized Xenophobia in Undocumented Forced Migrant's Emergency Health Care*)

As we see above in Galtung's "Typology of Violence" from 1969 (Table 2.1), the "need groups" may be disadvantaged to such an extent that they starve, become terminally ill from the result of illness or disease, or die. The second category, Exploitation B, leaves the underprivileged in a constant involuntary state of poverty, usually comprising malnutrition and illness. These effects all occur within and at the culmination of multifaceted social and economic structures, and obscured legislative cycles. A noted successor of Galtung's benchmark work in structural violence, James Gilligan began a quest to look closely at the ties between structural violence and its effects on individuals' health, violent behavior, and society. As a prison psychiatrist and director of the Center for the Study of Violence at Harvard Medical School, Gilligan observed that structural violence differs from behavioral violence in three major respects: In addition to its virtual invisibility, structural violence functions more or less independently of individual behaviors: further, its problematic effects operate continuously, not just sporadically (1996). In his book *Violence: Reflections on a National Epidemic*, James Gilligan defines structural violence as "the increased rates of death and disability suffered by those who occupy the bottom rungs of society, as contrasted with the relatively lower death rates experienced by those who are above them" (1996, 192). Gilligan largely describes these "excess deaths" as "non-natural" and attributes them to the stress, shame, discrimination, and denigration that results from lower status. Gilligan paralleled the worldwide summations of structural violence to direct (armed conflict, military or political wars) violence thusly: Every fifteen years, on the average, as many people die because of relative poverty as would he killed in a nuclear war that caused 232 million deaths: and every single year, two to three times as many people die from poverty throughout the world as were killed by the Nazi genocide of the Jews over a six-year period. This is, in effect, the equivalent of an ongoing, unending, in fact accelerating, thermonuclear war, or genocide on the weak and poor every year of every decade, throughout the world. . . . The question as to which of the two forms of violence—structural or behavioral—is more important, dangerous, or lethal is moot, for they are inextricably related to each other, as cause to effect. (Gilligan 1996. 195-96) When we fix and focus our view on structural violence through the lens of healthcare, we see that every country is marked by suffering, illnesses, and death, to one extent or another. But it is the distribution of the preventable and manageable illnesses and diseases in underprivileged countries that tip the scales of parity in suffering. It is these "social conditions"—these imbalances of influence—if you will, that affect and influence social justice in healthcare, and creates a poverty of lifesaving access to medication, supplies, treatment, training, and equipment to stave off human suffering from avoidable and unnecessary illness and disease. Didier Fassin in his book *Humanitarian Reason* quotes Margaret Lock concerning social sentiment on human suffering: "Efforts to reduce suffering have habitually focused on control and repair of individual bodies. The social origins of suffering and distress, including poverty and discrimination, even if fleetingly recognized, are set aside" (2012, 21). (24-5)

Framework

The impact of structural violence cumulatively outweighs – challenging the structures that facilitate inequality is necessary

Ansell 17 - David A. Ansell, Senior Vice President, Associate Provost for Community Health Equity, and Michael E. Kelly Professor of Medicine at Rush University Medical Center (The Death Gap: How Inequality Kills, p. 7-10)

There are many different kinds of violence. Some are obvious: punches, attacks, gunshots, explosions. These are the kinds of inter-personal violence that we tend to hear about in the news. Other kinds of violence are intimate and emotional. But **the deadliest and most thoroughgoing kind of violence is woven into the fabric of American society. It exists when some groups have more access to goods, resources, and opportunities than other groups, including health and life itself. This violence delivers specific blows against particular bodies in particular neighborhoods.** This unequal advantage and violence is built into the very rules that govern our society. In the absence of this violence, large numbers of Americans would be able to live fuller and longer lives. This kind of violence is called **structural violence**, because it **is embedded in the very laws, policies, and rules that govern day-to-day life.**⁸ It is the cumulative impact of laws and social and economic policies and practices that render some Americans less able to access resources and opportunities than others. This inequity of advantage is not a result of the individuals' personal abilities but is built into the systems that govern society. Often **it is a product of racism, gender, and income inequality.** The diseases and premature mortality that Windora and many of my patients experienced were, in the words of Dr. Paul Farmer, "biological reflections of social fault lines."⁹ As a result of these fault lines, a disproportional burden of illness, suffering, and premature mortality falls on certain neighborhoods, like Windora's. Structural violence can overwhelm an individual's ability to live a free, unfettered, healthy life. As I ran to evaluate Windora, I knew that her stroke was caused in part by lifelong exposure to suffering, racism, and economic deprivation. Worse, the poverty of West Humboldt Park that contributed to her illness is directly and inextricably related to the massive concentration of wealth and power in other neighborhoods just miles away in Chicago's Gold Coast and suburbs. That concentration of wealth could not have occurred without laws, policies, and practices that favored some at the expense of others. Those laws, policies, and practices could not have been passed or enforced if access to political and economic power had not been concentrated in the hands of a few. Yet these political and economic structures have become so firmly entrenched (in habits, social relations, economic arrangements, institutional practices, law, and policy) that they have become part of the matrix of American society. The rules that govern day-to-day life were written to benefit a small elite at the expense of people like Windora and her family. These rules and structures are powerful destructive forces. **The same structures that render life predictable, secure, comfortable, and pleasant for many destroy the lives of others** like Windora **through suffering, poverty, ill health, and violence.** These structures are neither natural nor neutral. The results of structural violence can be very specific. In Windora's case, stroke precursors like chronic stress, poverty, and uncontrolled hypertension run rampant in neighborhoods like hers. Windora's illness was caused by neither her cultural traits nor the failure of her will. Her stroke was caused in part by inequity. She is one of the lucky ones, though, because even while structural violence ravages her neighborhood, it also abets the concentration of expensive stroke-intervention services in certain wealthy teaching hospitals like mine. If I can get to her in time, we can still help her. Income Inequality and Life Inequality Of course, Windora is not the only person struggling on account of structural violence. Countless neighborhoods nationwide are suffering from it, and people are dying needlessly young as a result. The magnitude of this excess mortality is mind-boggling. In 2009 my friend Dr. Steve Whitman asked a simple question, "How many extra black people died in Chicago each year, just because they do not have the same health outcomes as white Chicagoans?" When the Chicago Sun-Times got wind of his results, it ran them on the front page in bold white letters on a black background: "health care gap kills 3200 Black Chicagoans and the Gap is Growing." The paper styled the headline to look like the declaration of war that it should have been. In fact, **we did find ourselves at war** not long ago, **when almost 3,000 Americans were killed. That was September 11, 2001.** That tragedy **propelled the country to war. Yet when it comes to the premature deaths of urban Americans, no disaster area has been declared.** No federal troops have been called up. No acts of Congress have been passed. **Yet this disaster is even worse: those 3,200 black people were in Chicago alone, in just one year. Nationwide each year, more than 60,000 black people die prematurely because of inequality.**¹⁰ While blacks suffer the most from this, it is not just an issue of racism, though racism has been a unique and powerful transmitter of violence in America for over four hundred years.¹¹ **Beyond racism, poverty and income inequality** perpetuated by exploitative market capitalism **are singular agents of transmission of disease and early death.** As a result, there is a new and alarming pattern of declining life expectancy among white Americans as well. Deaths from drug overdoses in young white Americans ages 25 to 34 have exploded to levels not seen since the AIDS epidemic. This generation is the first since the Vietnam War era to experience higher death rates than the prior generation.¹² White Americans ages 45 to 54 have experienced skyrocketing premature death rates as well, something not seen in any other developed nation.¹³ White men in some Appalachian towns live on average twenty years less than white men a half-day's drive away in the suburbs of Washington, DC. Men in McDowell County, West Virginia, can look forward to a life expectancy only slightly better than that of Haitians.¹⁴ But those statistics reflect averages, and **every death from structural violence is a person.** When these illnesses and deaths are occurring one at a time in neighborhoods that society has decided not to care about—neighborhoods populated by poor, black, or brown people—**they seem easy to overlook, especially if you are among the fortunate few who are doing incredibly well. The tide of prosperity in America has lifted some boats while others have swamped.** Paul Farmer, the physician-anthropologist who founded Partners in Health, an international human rights agency, reflects on the juxtaposition of "unprecedented bounty and untold penury": "It stands to reason that **as beneficiaries of growing inequality,**

we do not like to be reminded of misery of squalor and failure. Our popular culture provides us with no shortage of anesthesia."15 That people suffer and die prematurely because of inequality is wrong. It is wrong from an ethical perspective. It is wrong from a fairness perspective. And it is wrong because we have the means to fix it.

Impact 2) Colonialism

Private Corporations are the new “West India Company” Colonizing the New World. Indentured Servitude, Slavery, Company Towns, and Settler Colonialism will be replicated in the galaxy.

Allowing them to control space guarantees the worst aspects of exploitative capitalism take over the galaxy

Spencer 19

(Keith A. Spencer is a senior editor at Salon who edits Salon's science and health vertical. His book, "A People's History of Silicon Valley: How the Tech Industry Exploits Workers, Erodes Privacy and Undermines Democracy," was released in 2018. <https://www.salon.com/2019/07/28/earths-robber-barons-are-salivating-over-bringing-authoritarian-capitalism-to-space/>)

If the Nazis were to follow imperialism to the next logical step, and establish human colonies on other worlds — asteroids, moons, space stations, or on planets like Mars — a social and political system rooted in oppression, hierarchy and racial superiority would spread, like an infection, to other distant bodies where they would be far more difficult to extract. Part of that is due to an intractable communication problem: even between the most distant regions of Earth, the speed of light is not a noticeable constraint on the amount of time it takes to communicate. The same is not true in space. Authoritarians, of both the Nazi and the corporate variety, are not necessarily fond of free speech nor free communication; they are powerful tools for upsetting the social and political order. Even here in the United States, supposed bastion of liberal democracy, we've seen this play out before. In 2011, the Bay Area Rapid Transit (BART) public transit system suppressed communications networks in order to stifle dissent. As protests over the BART police shooting of Charles Blair Hill spread around the Bay Area, the regional transit system literally turned off the underground cell phone towers that would allow cell and data transmission while underground. The agency, unwisely, openly admitted it: "Organizers planning to disrupt BART service stated they would use mobile devices to coordinate their disruptive activities and communicate about the location and number of BART Police," the transit agency said. "A civil disturbance during commute times at busy downtown San Francisco stations could lead to platform overcrowding and unsafe conditions for BART customers, employees and demonstrators." The American Civil Liberties Union issued a harsh rebuke, and questioned whether the move was even legal for a government agency to do this. "All over the world, people are using mobile devices to protest oppressive regimes, and governments are shutting down cell phone towers and the Internet to stop them," said Michael Risher, a staff attorney for the American Civil Liberties Union of Northern California. "It's outrageous that in San Francisco, BART is doing the same thing." If this is how an American governmental agency behaves when confronted with the prospect of a legitimate peaceful protest, imagine how pro-Martian colonizer Elon Musk — who notoriously detests labor — will behave when his Martian dishwashers strike for higher wages. My point is, if you think that social and political struggles are difficult on Earth, where oxygen is free and the outside is traversable without an airtight suit, just wait until you see what happens when you bring humans to Mars — a planet where round-trip communication with Earth takes forty minutes at a minimum, and nighttime surface temperatures vary between -100 and -195° Fahrenheit. On our capitalist planet, there are no workers whose employers can threaten to leave them stranded, 80 million miles from home, if they don't do their bidding. On Mars, a disgruntled worker's employer could compel them to work by threatening to ever let them go home to Earth again. The potential for slavery on the red planet cannot be underestimated. Historically, the worst capitalist labor abuses on Earth happen to the most powerless workers in situations where no one is looking. Horrific tales of sexual harassment in Antarctica made sense inasmuch as its barrenness makes it an ideal place to be manipulative without anyone noticing. Mines, given their remote nature, are often rife with exploitation — and the history of miner treatment

should give us pause as to how workers on Mars or on one of Jeff Bezos's space stations might be treated. This warning is prescient currently because of the intense focus of both government and private actors on the potential to privatize space travel. NASA Administrator Jim Bridenstine wants to create a "robust commercial marketplace" for space travel, has proposed a public-private partnership for the moon, and has spoken of privatizing the international space station. Elon Musk, one of NASA's suppliers in the brave new privatized world, is fervid about building a Mars colony. Jeff Bezos, the richest human in the world, plans to build giant space stations; his rationale for space colonization is that "we are in the process of destroying this planet," something he actually stated with no palpable sense of irony. There are many who adulate Musk and Bezos, and view them as our generation's heroes. Yet the fact that these men honestly believe they are the ones to lead humans to space has nothing to do with any of their unique qualifications; it is due to a series of historical accidents that randomly thrusts sociopaths to the top of the capitalist food chain. Five decades of deregulation, neoliberal economic policy, and reduced taxation on the highest tax bracket have led us to a unique point in human history, where a few individuals are so wealthy that they have the ability to fund space travel. Again, this is not because these individuals are uniquely competent, nor qualified, to jumpstart colonization; it is an accident of history and economics that makes this situation possible. Nothing more. My fear with space colonization is that humans tend to think of it as inherently different than other political struggles, merely because humans haven't gone to space yet. The idea of space colonization as a cool, fun, exciting, sci-fi thing inhibits our ability to think critically about what it would actually mean to let a bunch of tech CEOs unilaterally colonize the solar system. There are precedents for the political aftereffects of space colonization: we have seen situations where a controlling institution tries to stifle communication on their property to prevent protest; we have seen how workers are exploited in cordoned spaces where their employers think no one is paying attention; we have seen how corporations entrap workers in hostile environments by giving them housing and food, and using that as a wedge to prevent dissent; and we have seen how corporations harvest the labor of the poor and vulnerable in order to avoid paying first-world wages to people who expect benefits. All of these scenarios seem likely to play out in our future if we don't fight back against the space imperialists. If you thought capitalism on Earth was horrific, wait till you see what it looks like in a vacuum.

Private Mars colonization re-intrenches existing ecological problems on Earth, evades adoption of an environmental ethic, and serves only a few

Calanchi 21 [Alessandra Calanchi, Cultural Studies @ The University of Urbino, "An Interplanetary Transplantation, Or, Reloading the Anthropocene on the Red Planet," Green Letters: Studies in Ecocentrism,

<https://www.tandfonline.com/doi/abs/10.1080/14688417.2021.1982401>]

In the beginning was the word – and it was a future President's word. Many would agree that – after the long preparatory phase of the 1950s (Hollings 2008) – the age of space colonisation started with J.F. Kennedy's New Frontier Speech, on 15 July 1960.⁵ It had then a first climax with the moon landing on 20 July 1969 and is now on the verge of a new phase which will feature manned crews getting onto planet Mars. And now, reality and storytelling mix together – according to the Mars TV docudrama series (2016–18, two seasons) **6 human missions will leave Earth directed to Mars as soon as 2033**. Since the end of 2019, newspapers, booklets, and websites have kept announcing a 'rush to Mars in 2020'.⁷ The conditions seemed perfect because Mars was getting closer to Earth in October. The global pandemic and following economic crises have delayed space activities; nonetheless, NASA's Perseverance rover landed on Mars on 18 February 2021, after completing a seven-month journey to the red planet; and the United Arab Emirates and China have successfully delivered Mars orbiters too. **Space exploration is now a hot issue**, and we have to keep monitoring the ongoing debate. **In the 1960s the expansion in the outer space was mainly wished for by governments, linked as it was to the cold war between the USA and the USSR, while today more and more funding comes from private enterprise**. Given the strong interrelationships between politics and economics, private sponsoring will undoubtedly open new markets, jobs, and opportunities worldwide. **Private ventures may even bypass current legislation** (the Outer Space Treaty), which states that

nations – governments – cannot claim ownership of other planets. Many groups are currently working on the definition and limitation of the outer space and other issues within the recently established Committee on the Peaceful Uses of Outer Space (2020). This changed scenario is as challenging as it is hazardous. Australian researcher Jai Galliot has explained that space travel is no longer limited to an élite group of trained military officers and pilots – commercial space travel is imminent, and this demands serious attention to the ethical, legal, social and environmental aspects of space exploration (2015). The dark side of transplantation **The intertwined projects of Terraforming/colonization/transplantation, whether public or private, have some inescapable drawbacks. First, we can legitimately question if ethics and ecology will be respected. An authentically ecological approach cannot approve a radical intervention on a different bio-system, which could alter an alien environment. Second, obviously not all human kind will be able to benefit from Terraforming.**

Moreover, **though we can be fairly sure that no human-like forms of life exist on Mars, an ethical approach cannot approve of colonizing, a term which implies the superiority of the human 'race' over other possible forms of life – a subject over other subjects – whatever they might be.** Third, human beings ought to be sure that their cultural heritage is included in the project. To quote the Mars TV series again, we find scientists, doctors, engineers, psychologists, botanists, but no philosophers, artists, writers, and scholars there; we can admire a huge and nice bar lounge, but no books (not even e-books) neither movies or paintings or photo exhibitions are ever shown or recollected. Nobody seems to remember politics, religion, history. From time to time, the colonists have visions of green gardens and blue skies; but they never remember a library, a theatre, or a music concert. Of course, this is just one example. In reality, much work has been done in preserving cultural heritage. Efforts are even being made to develop cultural projects about colonisation and Terraforming, such as the international design contest announced by The Mars Society in 2020: 'The goal of the contest was to create the best plan for a Mars city state of 1,000,000 people, focusing on making a sizable human urban settlement on the Red Planet as self-supporting as possible and developing the city state's economy, politics, society, culture and so forth'. Nonetheless, **this is the picture of the situation – planet Earth marching towards self-destruction (due to climate change, pollution, wars, pandemics, and growing social and economic inequality) – and the promise of a possible post-Anthropocene plan B for the human race on planet Mars.** I wrote 'human race', **but of course it will only be the few lucky ones who will be able to afford the stellar costs of interplanetary travel, possibly through hibernation or artificially induced torpor or other extremely expensive means.**

Less expensive ways of travelling are currently under consideration, since they could open new markets to space tourism. American spaceflight company Virgin Galactic is working on it, but its competitor, Space Perspective, is actually expected to be able to take people into space for just 120,000 dollars, which is considered low cost (Benacchio 2020). Robert Zubrin is one of the most eager supporters of colonization. In a recent book chapter (in T. James, ed. 2018), by analysing the economic viability of the various phases of colonisation, from Terraforming to Intrplanetary Commerce and Real-Estate, he builds a narration in the future tense. By illustrating the prospects for interstellar exploration technologies, the search for habitable planets, the motivations for space travel and colonisation, and the financial mechanisms required to fund such enterprises, he matches a powerful storytelling with the search for profit at any cost. What is missing is – not unexpectedly – any reference to ecology and ethics. I was therefore quite surprised to find the word 'ethical' repeated twice in a self-published book by inventor and magician Andrew Mayne (2016), where, however, the word 'profit' recurs as many as 31 times. Many authors do mention either ethics or the environment (or both) from different perspectives. To name a few, Robert Sparrow in 'The Ethics of Terraforming' denounces 'arrogant vandalism' (1999, 227); Richard York in 'Toward a Martian Land Ethic' (2005) extends Leopold's intuitions on land ethics (1949) and argues that 'it is unjustified to limit the land ethic to the Earth alone' (2005, 73). James S. J. Schwartz in 'On the moral permissibility of Terraforming', on the contrary, produces an anthropocentric argument and insists that 'On the assumption that the candidate planet is lifeless, nonanthropocentric views have little, if nothing, to say' (2013, 3). More recently, Matthew S. Williams in 'Making Green on the Red Planet: How Might We Build an Economy on Mars?' assumed a more controversial stand: In the coming decades, space agencies and private ventures want to begin sending humans to Mars. Some of these organizations are actively planning on establishing the first human settlement there. With all this planning, it's fair to say that the idea of colonizing Mars may be moving from the realm of science fiction into the realm of true possibility. However, this also raises all kinds of issues, which go far beyond the usual technical hurdles and cost assessments. There are also valid questions about whether or not humans could survive on Mars in the long-term. And there are ethical questions concerning how humans might transform

Mars' environment - not just through full-scale terraforming, but through any and all alterations to the Martian landscape. [...] (Williams 2019) Matthew S. **Williams defines Mars as [is] the 'new frontier' and declares that 'Putting aside the many ugly aspects of that phase in our history (i.e. conquest, genocide, and slavery), which are in any case not likely to be replicated on Mars,** there is a clear logic to this approach' (Williams 2019). Not likely is not enough for me, but it is something anyway. Putting aside, on the contrary, continues to bother me. I think that **nothing in history can be put aside, forgotten, or forgiven, especially when it caused thousands of deaths.**

Quite expectedly, the author of the article then embraces billionaire Elon Musk's techno- utopian attitude, by affirming that the 'first base' will be built before 2028, and 'a full-fledged Martian city with a population of one million inhabitants' will be completed by 2050 (ibidem). Williams rejects the traditional harvesting and exporting models and thinks that we should be looking to build an economy "from the ground up" (ibidem). On that matter, he quotes a study by Matthew Weinzierl, where we read that colonists should be able 'to build a local economy and political/social systems from scratch [...] After all, it

will be our best chance in human history to create and study economic societies from a (nearly) blank slate' (Weinzierl 2018). The idea of a 'blank slate' – something very similar to Crossley's 'tabula rasa' (2011) – is both disconcerting and naïve, since it postulates an anthropocentric vision that almost erases the environment – in this case, Mars – to a sort of nothingness, or a primeval matter to be moulded at will. Apart from mineral extraction, one of the many projects listed by Williams is a travel infrastructure between Earth and Mars that could make round-trips less expensive, including a working fleet of reusable spacecraft. In his own words, 'This would likely lead to the development of a true interplanetary economy and the end of scarcity as we know it!' (2019). In reality, the problem known as 'scarcity' – which refers to the gap existing between limited resources and theoretically limitless wants – is unlikely to be solved by colonising Mars or other planets, in the same way as the purpose of the New World colonisation in the 17th century was not equality and wellness for all. When he dreams of a booming economy on the red planet Williams seems to echo the botanical metaphor used by De Crèvecoeur about Europeans who migrated to America – 'they withered, and were mowed down by want, hunger, and war; but now by the power of transplantation, like all other plants they have taken root and flourished!' (1782) – yet I doubt that a Martian transplantation would assure that resources would be managed so efficiently as to satisfy the

basic needs of all people. More likely, scarcity would continue and the gap between the poor and the rich would only increase. One thing is certain: **if humans really want to colonise Mars, they need to avoid producing so much waste and using so much water as they have done on Earth.** This is the mission of the Amsterdam-based social enterprise Circle Economy, an organisation

that promotes the transition to a more sustainable economy (Milne 2019). Nonetheless, **sustainability is a minefield** or, at best, a territory with very blurred borders. Hence the [. . .] absolute necessity of adopting a truly sustainable and multidisciplinary vision which involves a deeply ethical, ecological, and cultural approach. By ethical we mean that we ought to be aware that a new phase in the Anthropocene has come, since we are challenged to enlarge the semiosphere so as to include the Outer Space, which means proposing new ecosophic paradigms; by "ecological" we mean that owing to a change in our Umwelt we should follow an ethical management of the environment, that is respectful of Mars territories as well as of those we will continue to inhabit on Earth; by "cultural" we mean that it has to take into account all of the following: the literary narrations of the past, both utopian and dystopian; the intuitions of Sci Fi fandom and scholarship; and the perspective of post- colonial studies, which problematize the cultural legacy of colonialism and imperialism and analyze the consequences of external control and economic exploitation of people and lands. (Barbanti, Calanchi and Farina 2017, 205-06)

Solvency

Nationalization of space replaces dystopian, militaristic visions with educational, valiant ones. Space has the possibility to transform national competition but must be vested from private hands

Roberts 21

(Spencer Roberts is a science writer, musician, ecologist, and rooftop solar engineer from Colorado.

<https://www.jacobinmag.com/2021/09/socialist-space-exploration-publicly-funded-nasa-education-futurism> , 9-8)

In 1961, Soviet cosmonaut Yuri Gagarin flew higher and orbited longer than Richard Branson and Jeff Bezos combined aboard Vostok 1, the world's first piloted space flight. Upon his return to Earth, Gagarin became a global celebrity, traveling the world and recounting what it felt like to drift weightless and see the planet from above. For a brief moment, he transcended the boundaries of the Cold War, greeting cheering crowds in both Soviet and US-allied countries, capturing our collective fascination with the cosmos. The Vostok mission was meticulously planned and engineered, its cosmonauts trained for years. Its successor, Soyuz 1, was a different story. The 7K-OK spacecraft had been hastily constructed, its three unmanned flight tests all ending in failure. According to one account, Gagarin helped detail over two hundred structural concerns in a report urging the flight be called off. It's rumored that he even tried to take his fellow cosmonaut Vladimir Komarov's place piloting the doomed mission. In the end Komarov's parachute failed to deploy and he burst into flames on reentry, plummeting at forty meters per second into the Earth. In aeronautics, the margin between triumph and tragedy is narrow. While hubris may have been Soyuz 1's fatal flaw, the pursuit of profit has similarly incentivized corner cutting in the US space program. NASA, once the crown jewel of the public sector, has been slowly sold off to private contractors in the neoliberal era. Since 2020, NASA astronauts have ridden SpaceX Falcon 9 rockets into orbit, a model that has raised safety concerns among engineers and logged more failures since its debut in 2006 than the space shuttle did in thirty years. Recently, another NASA contractor, Virgin Galactic, was grounded for investigation by the Federal Aviation Administration after its pilots failed to notify the agency that its celebrated Unity flight was veering into commercial airspace. Mission objectives have changed as well. While perhaps always mythic, the once allegedly valiant aspirations of the space program have given way to openly touristic and militaristic goals. Corporations pursuing commercial space flight have received billions in public financing, and the US Space Force alone already has nearly three quarters the total budget of NASA. The true ethos of space exploration, however, is one of public works and education. Peering into the void of space inspires the deepest questions facing humanity: Who are we? Where do we come from? Where are we going? While a space program catering to the science fiction fantasies of billionaires is decidedly dystopian, conceptualizing space exploration as an educational mission to remotely probe the depths of the galaxy can help animate a more equitable vision of futurism. Space Exploration for the People How can space exploration serve society? Our first priority must be to decarbonize space flight. Without achieving this, the emissions that space flight generates are hardly justifiable given the state of our planet. Like the space blanket and cochlear implant, the applications of zero-carbon jet fuel would go far beyond the space program that developed it. Commercial aviation contributes an estimated 3.5 percent of effective radiative forcing — a figure that space tourism could skyrocket. Due to the weight of batteries and other logistical challenges, hydrogen fuel cells are considered one of the few viable pathways to decarbonizing long-distance flight. While some private space corporations have begun incorporating hydrogen, the fuel production is likely emissions-intensive and the technology remains proprietary. A publicly directed moonshot research program, coupled with tight restrictions on fossil-fueled rocket launches, could greatly accelerate the implementation of green hydrogen fuel cells in aviation and other difficult-to-decarbonize sectors. In addition to our atmosphere, we must respect the sanctity of orbital space, which we have littered with trash. The Defense Department's Space Surveillance Network currently estimates there are more than twenty-seven thousand pieces of debris orbiting Earth. Yet even as their own ships run a

gauntlet of garbage. **billionaires are trashing space more than ever.** While perhaps none match the vanity of the Tesla Roadster, **competing commercial satellite networks** like Musk's Starlink and Bezos' Project Kuiper actually **pose a much greater collision threat** and are also egregious **sources of light pollution and electromagnetic interference.** **These** redundant and dangerous **monuments to the egos of oligarchs** **ought to be taken down from our skies** along with other forms of space trash. Rather than granting billions in subsidies to enable this pollution, **governments should** instead **collect the taxes** that corporations like SpaceX, Blue Origin, and Virgin Galactic have evaded **and use them to create public sector careers** cleaning up their mess. To the extent that it is useful, **publicly sponsored infrastructure** in private hands **should be nationalized and made accessible to all.** The trade-offs between telecommunications infrastructure and preservation of dark skies highlight another core failure of NASA's past: the **lack of a planetary internationalism.** In 2013, the Bolivian Space Agency and the China National Space Administration collaboratively launched the Túpac Katari 1 satellite (TKSat 1), demonstrating how easy it could be to **close the space infrastructure gap** between the Global North and South. The same year that the United States proposed to desecrate a Hawaiian sacred site for a telescope, Bolivia used space technology to bring internet and cell service for the first time to millions of Andean and Amazonian citizens. Since then, TKSat 1 has boosted education and development initiatives and even helped defend Bolivian democracy by relaying the transmissions of campesinos resisting the US-backed coup government in real time. **Satellites can serve** many other **public interests** such as **facilitating research** that helps scientists monitor problems like **climate change, deforestation, and forced labor.** While today's satellite infrastructure is used to commercialize communication and fuel mass surveillance, an international consensus to treat telecommunications and information access as public rights could instead provide free global broadband coverage with minimal infrastructure, **balancing scientific advancement with our collective view of the stars.** Finally, **a socialist vision** for space exploration **could enable us to reach our full potential** to venture into the unknown. History enshrines the intrepid explorers, but the true heroes of the space age are the **workers at ground control.** Yuri Gagarin made it home safely because of his command crews stationed from Baikonur to Khabarovsk. Apollo 13 famously called on Houston when they had a problem. Today **many of our** brightest **astrophysicists** and aerospace engineers **are swept up by military departments** and weapons manufacturers. **We should use their talents for science and education instead.** **That doesn't mean** however, **colonizing** Mars. The Red Planet is a cosmic wonder, but a dreadful place for Earthlings. It has very little carbon dioxide, and no amount of terraforming will reinstate the magnetic dynamo that once deflected the solar winds now stripping away its depleted atmosphere. In fact, **everything we have learned from researching Mars has reinforced the importance of protecting the fragile atmosphere of our home planet.** While piloted space flights may be useful in some situations, we should place far more emphasis on collaboratively building robots like the ones that have taught us about our planetary neighbors. **In today's space race, these initiatives compete for funding. By prioritizing cooperation over colonization,** however, **we could pursue them all.** We could attempt to retrieve raw materials for green energy infrastructure from decommissioned satellites and uninhabited asteroids instead of mines in the Global South. We could search the solar system for extraterrestrial life by flying rotorcrafts into the hydrocarbon-rich atmosphere of Titan and boring submarines into the icy subsurface ocean of Europa. We could strive for the first landing on Pluto, Eris, or even beyond — not to plant a flag, but **seed a concept of what we can collectively achieve.** Visions of Hopeful Futures In his final years of reflection on our Pale Blue Dot, astronomer Carl Sagan pondered, "Where are the cartographers of human purpose? Where are the visions of hopeful futures of technology as a tool for human betterment and not a gun on hair trigger pointed at our heads?" Sagan's legacy — including the world's first and only interstellar mission — offers a glimpse of this vision. **We can choose to collaboratively probe into the depths of the cosmos, conveying collections of human knowledge, or to taxi billionaires to spend four minutes at the edge of space, indulging their fantasy of escaping the planet they're poisoning with**

the very fuel propelling them. In either case, the financial, intellectual, and human costs will be borne by the public. Fortunately, if there's one thing that space exploration has taught us, it's that **fate isn't written in the stars.** That happens down here on Earth.

Contention 2: Satellite Collisions

Subpoint A) Accidents

Growing commercialization of space activities is causing satellite numbers to triple—this increases the risk of space debris

Undseth 21 [Marit Undseth, OECD Space Forum, Claire Jolly, OECD Space Forum, Mattia Olivari, OECD Space Forum, “The Economics of Space Debris in Perspective,” 8th European Conference on Space Debris,

<https://conference.sdo.esoc.esa.int/proceedings/sdc8/paper/12/SDC8-paper12.pdf>]

In the last fifteen years, the challenge of space debris has become more pressing. First, because the use of Earth's orbits, in particular the low-Earth orbits, has intensified, and second, because of the increase in the orbital debris population. 3.1 More intensive use of Earth's orbits The use of Earth's orbits has significantly increased in the last few years, following growing institutional applications and commercialisation of space activities (Fig. 1). However, the real game changer will be the full deployment of several broadband mega-constellations that are under preparation. With the deployment of several of the announced broadband mega constellations (e.g. SpaceX's Starlink, OneWeb),

the number of operational satellites in orbit could double or even triple in the next five years. When taking into account all existing satellite filings, **there could be several tens of thousands of operational objects in orbit by 2030** (from today's 3000). **With this level of orbital density,** according to multiple modelling efforts, **it is not a question of if a defunct satellite will collide with debris, but when** (see for instance [4] and [5]).

In addition to space debris, the intensifying use of the low-earth orbits raises a number of additional issues ranging from radio interference to light pollution for astronomic observations[6].

Impact 1)

Satellite crashes cause a laundry list of problems

Haroun 21 [Fawaz Haroun, Law @ University of Lagos, Shalom Ajibade, Law @ University of Lagos, Philip Oladimeji, Law @ University of Lagos, John Igbozurike, Law @ University of Lagos, “Toward the Sustainability of Outer Space: Addressing the Sustainability of Space Debris,” New Space, <https://www.liebertpub.com/doi/pdf/10.1089/space.2020.0047>]

Debris pose risks to both Earth and space. With respect to access to space and space resources, debris endangers both current and prospective space missions. NASA notes that **most space debris can reach speeds *8,046.72 meter per second (almost 7 times**

faster than a bullet), fast enough for a relatively small piece of orbital debris to inflict severe damages on a spacecraft or satellite. Majority of the world's population rely on satellite technologies and applications every

day.¹¹ Indeed, satellites have many essential uses, including communications, photograph and mapping, remote sensing and Geographic Information System (essential to geographical studies), weather forecast, global positioning system, and the defense industry.¹² When pieces of space debris increase, they pose a great threat not only to the orbital paths of these satellites, but also to their operational span, due to possible collisions.¹¹ In the same vein, debris also affect safety of humans in space. The prospects of more human presence in orbit are becoming more realistic every day. Organizations are planning space missions for tourism. For example, both SpaceX and Virgin Galactic

intend to begin private passengers' flights to space in early 2020s decade.¹³ Moreover, **current manned missions such as the International Space Station (ISS) are always considered to be at risk of debris situations.**

Unsurprisingly, **NASA records that the ISS has made 3 collision avoidance maneuvers in 2020**

alone. Besides the effects of debris in space, there is also direct danger to Earth. **Large items from space can re-enter Earth successfully without totally burning up in the atmosphere, and this can result in nuclear contamination of Earth's surface.**¹⁵ This danger was made apparent when a **Soviet satellite fell to Earth in 1978, scattering radioactive particles over northern Canada; this**

crash required extensive cleanup of the area.¹⁶ There are other instances of debris falling onto Earth. On April 27, 2000, 3 different places in South Africa experienced space debris crashes.¹⁷ Similarly, on May 13, 2020, a Chinese rocket falling back to Earth uncontrollably may have dropped debris in 2 nearby Ivorian villages.¹⁸

These events force us to consider where the next debris drop will be, perhaps somebody's roof, or in a field of playing kids. There is no doubt that something needs to be done in light of the aforementioned risks.

Subpoint B) Terrorist Hijacking

Unregulated mining causes asteroid deflection and astroterror

Drmola and Mareš 15 - Jakub Drmola is a PhD student and Miroslav Mareš professor, at the Division of Security and Strategic Studies, Masaryk University, Czech Republic, "Revisiting the deflection dilemma", *Astronomy & Geophysics*, Volume 56, Issue 5, October 2015, Pages 5.15–5.18, <https://academic.oup.com/astrogeo/article/56/5/5.15/235650>

There are two basic ways to go **about moving the resources contained within a given asteroid to the Earth. They can be extracted from the asteroid during its natural orbit and then transported to the Earth, or the entire asteroid might be moved closer to a more convenient location before starting mining. Thus repositioned, it might even be used as a shielded habitat, once hollowed out (Ostro 1999).** There are different speculative costs and benefits associated with either option, which would vary with the size, orbit and composition of the asteroid. But, crucially, the second option would entail putting **asteroids into orbit around the Earth, the** Moon or possibly at one of the Earth's Lagrangian points. Indeed, NASA has already planned a mission to capture a small asteroid and place it in a high cislunar orbit, where it would serve as a destination for future manned missions and experiments. This "Asteroid Redirect Mission" is to take place in the next decade and is being pitched mainly as a stepping stone **towards a future mission to Mars (see box "NASA's Asteroid Redirect Mission"; Brophy et al. 2012, Burchell 2014, Gates et al. 2015).** Programmes to redirect asteroids and, especially, plans to mine asteroids on an industrial scale essentially resurrect the deflection dilemma. But it is no longer a matter of superpowers intentionally misusing technology designed to prevent dangerous impacts. It becomes an issue of **proliferation among private entities. Once private mining companies acquire the technical ability to redirect suitable NEOs (Baoyin et al. 2011) in order to extract platinum or** water from them, perilous inflections become more likely. The **probability of accidents will rise with the number of asteroids whose trajectories we decide to manipulate.** Such accidents might be very

unlikely, but **even a tiny technical or human error in** the execution of an inflection meant to place an asteroid into the lunar or geocentric orbit **might send it crashing into the Earth with potentially devastating consequences.** And while we might find solace in the low probabilities associated with such an accident, even contemporary industries which are considered very safe suffer from unlikely tragedies. Despite being dependable and reliable, airliners do crash; there are a lot of them flying and very improbable accidents do happen if the dice are rolled often enough. Undoubtedly, we will not be steering as many asteroids as we steer planes any time soon, but industries tend to be more accident-prone during their infancy. Furthermore, a single asteroid can do a lot more damage than a single plane.

And who is to say how much metal or water we are going to need in space over the course of the 21st century, or the next? **The second**

source of risk is the intentional misuse, similar to the original deflection dilemma. But the **entry barrier for asteroid weaponization gets much lower if mining them and moving them around becomes a common industrial activity**. This is in stark contrast to the original scenario which envisioned this technology to be used solely for planetary

defence and under control of a very small number of the most powerful countries (Morrison 2010). **If such a powerful technology becomes widely and commercially available, even rogue states and wellfunded terrorist groups might be tempted to use it for an unexpected and devastating attack. In addition, an active asteroid mining industry would make it more difficult to detect any hostile inflection attempts among the number of legitimate and benign ones.** Policy implications Considering these possible future dangers, it seems prudent to consider what to do about them sooner

rather than later. **The most obvious “solution” would be a blanket ban** on the development of any technology that might lead to artificially inflected asteroids crashing into the Earth. However, such a ban would be incompatible with the dream of increased presence of humans in the solar system. It would stymie both scientific exploration and economic development here on Earth, which is increasingly dependent on precious metals and spacebased technologies. Furthermore, this approach would leave us more vulnerable to natural impacts which, in the long view, seems less than desirable. Another approach might be similar to the current regime of non-proliferation of nuclear weapons, aiming to support peaceful civilian use of nuclear power while at the same time prohibiting the spread of weapons of mass destruction. The regime mostly works (with caveats, see Wood et al. 2008) because these applications require different infrastructures and fissile materials enriched to different levels of purity. This makes it possible, at least in principle, to tell apart operations meant for the production of electricity and those designed to create weapons. Unfortunately, the difference between legitimate and hostile trajectory modification would lie only in the acceleration imparted on the asteroid and not in the technical means to do it. As the spacecraft launched with the intent to cause impact with the Earth might be identical to those sent off to retrieve resources, telling them apart would be nearly impossible, until it was too late. And this approach makes no difference to the chances of an industrial accident. If monitoring equipment on Earth is unhelpful, the focus changes to space. In other words, all asteroid movement missions should be constantly monitored. For an attacker, it would make most sense to delay the final course adjustment for as long as possible in order to give the least warning and make the timeframe for reaction as short as possible. So an asteroid might head towards a safe orbit fit for resource extraction for most of its altered flight time, but be further accelerated at the last possible moment onto an impact trajectory, perhaps mere days before it hits a major city. Our current programmes cataloguing NEOs (such as CSS or Pan-STARRS), which look for new, previously unknown objects, are not ideally suited for the task of constantly tracking a number of different, already known asteroids. New instruments would be needed to track them in order to immediately detect any hazardous inflection, whether intentional or accidental. Once such a detection is made, emergency measures to evacuate the population or, preferably, to “re-deflect” the incoming object can be executed right away, regardless of the cause. Accidents and hostilities could be treated the same way and countered by the same system (initially, at least). Such a system would be more akin to an air traffic control than a non-proliferation regulation, offering security through vigilance, rather than absence. Additionally, development of a system able to deflect incoming objects at relatively short notice would be beneficial in case of an impending natural impact. Conclusion Perhaps none of these concerns will become relevant. Maybe the idea of asteroid mining will soon fizzle out because we will discover cheaper and more efficient local alternatives. Maybe humanity will lose the will or the capability to explore space any further. Or perhaps manipulating asteroid trajectories will prove impractical or too costly. Certainly, it would not be the first time that a promising and seemingly obvious future does not come about. In the 1960s it seemed almost self-evident that by the second decade of the 21st century we would have flying cars and a base on the Moon. Yet we do not. **Asteroid mining might be a similar case of unfulfilled promises and misplaced visions. On the other hand, there are examples of industries that developed surprisingly fast despite being considered unrealistic, not too long ago:** air travel, nuclear power generation, or commercial satellites. The spread of

the internet and the accompanying digital information revolution is another example; **hardly anyone anticipated having virtually the entire repository of human knowledge at our fingertips** at all times (except Douglas Adams). Whether the deflection dilemma forever remains an unmaterialized threat or it becomes a palpable problem, **it is something to be mindful of now, as the foundations of the prospective asteroid mining industry are being laid.** In the end, the purpose of this paper is not to predict the future. Instead it aims to merely update a conscientious warning which called for our diligence more than 20 years ago. While the world has changed somewhat, the basic idea remains valid. Whether the danger comes from warring superpowers, terrorists or negligent corporations, we must be aware of the realistic risks in order to avoid being either stumped by unforeseen catastrophes or paralysed by unwarranted fear. Either extreme would be harmful for our future.●

Contention 3: Space Wars

Resource wars are worse than other types of conflict causing disease, disability, structural violence and more – historically resource wars have killed millions

Klare 11 [Michael T. Klare, PhD, Barry S. Levy, MD, MPH, corresponding author and Victor W. Sidel, MD, 09/2011, “The Public Health Implications of Resource Wars” NCBI, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3154227/>] /Triumph Debate

Resource wars are violent conflicts that are largely driven by competition for control over vital or valuable natural materials, such as oil, water, land, timber, animals (or animal products), gold, silver, gems, and other key minerals.

Resource wars can occur between states as (1) wars of conquest, in which a state or empire employs force to acquire resource-rich territories or colonies; **(2) territorial disputes**, in which 2 or more states fight over a border region or offshore territory with valuable resource deposits; or **(3) access wars**, in which a state fights to gain access to a critical resource deposit in another country. Resource wars can also occur within states, when groups fight for control over key sources of raw materials or over the allocation of the fees and royalties (or “rents”) obtained by governments from private entities that extract resources from areas owned or controlled by the state. **A desire to gain control over a valuable resource supply or the wealth it generates is a dominant factor**

leading to war; however, conflicts over resources are usually driven by other factors as well, such as ethnic animosities and historical grievances.^{4,5} In the current article, we examine what makes resource wars distinctive and an important issue for public health, and we outline ways in which public health workers and the organizations and professional associations with which they are affiliated can minimize the consequences of these wars and contribute to their prevention. Much of this article is focused on wars fought over petroleum; in a recent commentary we examined armed conflicts over water and what public health workers can do to address them.⁶ Go to: WHY RESOURCE WARS ARE RELEVANT TO PUBLIC HEALTH We believe that resource wars are relevant to public health because of their profound consequences for public health and because public health workers have potential roles and responsibilities to minimize these consequences and to help prevent resource wars. Public health has been defined as what we, as a society, do collectively “to assure the conditions in which people can be healthy.”⁷ **Resource wars threaten the conditions in which people can be healthy.** Although public health is a societal function, it is a function performed mainly by public health workers in government agencies, academic institutions, nongovernmental organizations, and private-sector entities who work to assure the conditions in which people can be healthy. Although most public health workers do not address resource wars, some have the opportunity—and the responsibility—to help document the health consequences of resource wars, to raise awareness of these consequences, and to advocate for policies and programs for minimizing these consequences and for helping to prevent resource wars. Public health has a responsibility to address the fundamental causes of disease and to prevent adverse health outcomes.⁸ **War is a major cause of disease, disability, and death; thus, war is a major public health problem.**^{1,9} The Public Health Oath, which some public health students recite at orientation and graduation, includes the declaration: I will work to ensure that people have the chance to live full and productive lives, free from avoidable disease and disability.¹⁰ **Resource wars threaten people's ability to live full and productive lives**; they also provide opportunities for public health workers to help prevent avoidable disease, disability, and death. Go to: HISTORICAL CONTEXT

Competition for control over vital, valuable raw materials has been a source of violent conflict since prehistoric times.¹¹ **Conflict over resources, such as gold, silver, spices, furs, timber, and slaves, was especially prominent and violent in the colonial wars and interimperial clashes that culminated in World War I.** However, during World War II and the Cold War, conflict over resources was rarely a central issue. With the end of the Cold War, resource conflicts have again become prominent. Some of these wars, similar to those of the past, have involved efforts by the major powers to dominate sources of energy and safeguard the flow of oil, such as the interventions by the United States in the Persian Gulf area. Others have involved internal conflicts. **For example, the ongoing conflict in the Democratic Republic of the Congo—perhaps the most lethal conflict of the post-Cold War era, with approximately 4 million people dead—has largely been fueled by competition for control of valuable mines in the eastern part of the country.**¹² The fighting between northern and southern Sudan, another notably lethal conflict, has been driven in part by a struggle for control over valuable oil fields.¹³ The future of

this struggle is unclear, given the recent separation of Sudan into 2 countries. Go to: RESOURCE WARS ARE DISTINCTIVE **Resource wars have some distinctive features of relevance to public health.** They are often extremely intense because they frequently result from both ethnic animosities (or historical grievances) and disputes over distribution of or access to vital—and often commercially valuable—materials. **This intensity may lead to the conflict having adverse consequences for human health and the environment that are more widespread and more serious than are those resulting from wars fought for other purposes.** **They occur in remote, forbidding areas occupied largely by poor and indigenous people.** Today, most oil production is concentrated in areas largely avoided by advanced cultures, such as deserts, tropical forests, steep mountainsides, and polar or near-polar regions. These areas, however, are often inhabited by indigenous peoples and those too poor to live elsewhere. Governments often allow the use of extractive practices in these areas—such as unsafe mining and environmentally insensitive oil extraction—that would not be permitted elsewhere. In the Niger Delta region of Nigeria, for example, lax government oversight of oil drilling has led to widespread contamination of local fields and fishing grounds, further harming the health and livelihoods of the already impoverished inhabitants, who have revolted against the oil companies and the federal government.¹⁴ **The invasion of remote areas to secure access to fresh supplies of vital resources also threatens the modes of living of the few remaining indigenous peoples who still practice their traditional ways of life. Such invasions threaten not only indigenous peoples’ ability to survive as distinct cultures but also their physical and psychological health, as adaptive communal lifestyles give way to rootless urban or reservation life.** This pattern is painfully evident in the history of Native Americans, Canadian First Nations peoples, and Australian Aborigines, all of whom have suffered from widespread alcoholism, depression, and inadequate health care after being driven from their ancestral lands. A similar pattern is being repeated today as oil and mining firms penetrate into the Amazonian heartland, central Africa, New Guinea, Borneo, the Arctic, and other areas previously exempted from large-scale development.¹⁵ **Resource wars often target noncombatant civilians and violate their human rights through slavery, child labor, rape, kidnapping, and other inhumane practices that cause injury, illness, and death.** Many recent wars in Africa, areas of South America, and Southeast Asia have been driven by warlords and rogue government officials trying to maintain or gain control over a valuable resource. **Lacking funds or structural capacity to recruit and build professional armies, they typically force boys and young men into their ragtag militias, usually at gunpoint, paying them with drugs and the services of female sexual slaves kidnapped from nearby villages, while impressing poor men, women, and children to work in their mines (and paying them little, if anything).**^{16,17} This scenario is particularly evident in northeastern Congo, where the militia of the Democratic Forces for the Liberation of Rwanda employs a vast slave army to mine gold and coltan (columbite and tantalite, the source of the lightweight metals used in most cell phones and other handheld electronic devices).¹⁸ This militia and other similar groups also employ mass rape as a tactic of intimidation and coercion.^{19,20} Aside from the physical harm and psychological trauma they cause, these tactics contribute to the spread of HIV/AIDS in Africa. **In resource wars, military or insurgent forces sometimes target resources or related infrastructure over which these conflicts are fought, often with significant public health consequences. In the Persian Gulf War of 1990–1991, for example, retreating Iraqi military forces set fire to more than 600 oil wells in Kuwait; the fires burned for weeks, causing respiratory disorders and environmental damage.**²¹ Many wars in which the control of oil or oil rents is a significant factor involve attacks on oil pipelines, refineries, and other infrastructure, often producing fires and oil spills that adversely affect civilian populations. The rebels in Colombia, for example, often sabotage the country’s oil pipelines, causing oil spills that contaminate local water supplies.²²

Space race is inflaming militarization of space

Thorne 21 [Stephen J. Thorne is a Writer/Photographer/Editor at Legion Magazine, 10/20/2021, “Militarization, not commercialization, is the problem in space” Legion Magazine, <https://legionmagazine.com/en/2021/10/militarization-not-commercialization-is-the-problem-in-space/>] /Triumph Debate

Recent jaunts into near space by entrepreneurs, actor William Shatner and the ultra-wealthy have inspired waves of criticism among those who claim their fortunes could be better spent on Earth. How, they say, can Jeff Bezos and Elon Musk spend billions on next-generation space technology when so many in the world are starving? How can the privileged few blow US\$250,000 a head for 10 minutes outside Earth’s atmosphere—barely long enough to say they’ve been there—when others are in need? Even Prince William spoke out against space tourism

and, apparently, exploration. “We need some of the world’s greatest brains and minds fixed on trying to repair this planet, not trying to find the next place to go and live,” he told BBC. “[It] really is quite crucial to be focusing on this [planet] rather than giving up and heading out into space to try and think of solutions for the future.” But commercializing space travel, as Bezos and Musk are doing, is just one more step toward other lofty goals: space-based technology development (including systems that could help save the planet), exploration and resettlement—potential keys to the ultimate survival of the human race. **The unmentioned threat confronting humanity seven decades after the Soviets’ Sputnik launched the space race is the militarization of the skies beyond Earth’s atmosphere.** That’s according to a team of three space experts—two of them from McGill University in Montreal—who have released an essay cautioning against space-based conflict. **“The desire to counter the space ambitions of others and to achieve superiority in space seems to have re-emerged,”** said the essay. “Despite the proliferation and commercialization of space activities, and **the recognition of space as an essential part of every country’s economic, social and scientific progress, there is an alarming build-up of counter-space capabilities worldwide.**” The writers are Kuan-Wei Chen, executive director of McGill’s Centre for Research in Air and Space Law; Ram S. Jakhu, acting director of McGill’s Institute of Air and Space Law; and Steven Freeland, emeritus professor of international law at Western Sydney University in Australia. Their essay on the militarization of space appeared Oct. 11 in *The Conversation*, a continuing series of online think pieces written by academic experts and researchers and distributed by a network of not-for-profit media outlets. “Even **as private citizens can now crew space missions, military strategists are warning the competitive and congested nature of space will lead to an outbreak of conflict in outer space,**” they wrote. **“Simmering tensions on Earth increase the risk that humanity may somehow lurch into an unimaginable space war, destroying economies and critical civilian and military infrastructure that have become so heavily space-dependent.”** In April, the International Committee of the Red Cross warned that **“the human cost of using weapons in outer space that could disrupt, damage, destroy or disable civilian or dual-use space objects is likely to be significant.”** And in September, General John Raymond, chief of the fledgling U.S. Space Force, said the security of the final frontier is facing a “full spectrum of threats” from China that must be countered through international co-operation. **The Chinese have developed and are designing “everything from reversible jammers of our GPS system—which provides navigation and timing with precision—to jamming of communications satellites,”** Raymond told the Nikkei Asia news service. “They’ve got missiles they can launch from the ground and destroy satellites. I’m convinced that these capabilities that they’re developing would be utilized by them in their efforts in any potential conflict.” The Space Force was established as the U.S. military’s sixth branch by the Trump administration in 2019. Space science tracks weather patterns, enhances land use and advances humankind’s understanding of the planet and its place in the universe, the writers noted. Raymond said space also underpins “all of our instruments of national power, whether it’s diplomatic, economic, information, and national security.” “Great power competition is broader than just competition among the militaries,” he added. “It goes across all facets of governments. Space is critical to that.” Speaking at last spring’s virtual Ottawa Conference on Security and Defence, Lieutenant General Stephen Whiting, head of U.S. Space Operations Command, said humankind is entering “a second golden age of space” but, like all things human, it brings unwanted baggage along with it. **“The space domain...has become congested, contested and competitive,”** said Whiting. He claimed that the U.S., Canada and their allies are monitoring some 30,000 scraps of debris and other objects in Earth’s orbit. **Whiting described growing interactions between rival satellites that call for a more co-ordinated defence among like-minded nations. “The number of active satellites is literally booming,” he said. “From 2019 to 2020, the number of payloads launched increased by almost 300 per cent,** from just over 400 payloads in calendar year ‘19 to over 1,200 payloads in calendar year ‘20. “Additionally, the average number of payloads on each launch increased from just over four payloads per launch in 2019 to almost 12 payloads per launch in 2020.” **It’s a new space race, as rival countries clamour to gain dominance over the high ground and all the opportunities—both commercial and military—that come with it.** Raymond said he expects China or Russia would launch a debilitating attack on U.S. satellites should war ever break out. He is especially concerned about **China, which is developing “killer satellites” with robotic arms to incapacitate other satellites.** All such developments appear to run contrary to international treaties prohibiting the weaponization of space and U.S. President John F. Kennedy’s September 1962 declaration at Rice University in Houston that essentially told the Soviets the rules of the race. “There is no strife, no prejudice, no national conflict in outer space as yet. Its hazards are hostile to us all. Its conquest deserves the best of all mankind, and its opportunity for peaceful co-operation may never come again.” G7 nations agreed in June on a plan to advance international rulemaking at the United Nations and other global bodies. China and Russia have expressed willingness to co-operate and have called for limits on space weapons. The *Conversation* writers did sound a note of optimism, saying war is not inevitable and citing years of efforts to avoid it. **“In an era when humanity is faced with climate change, a global pandemic and the rapid exhaustion of resources, there is no room for assertions of**

dominance and superiority,” they wrote. “Rather, the common interests in peace that we all share are even more important, both on Earth and in outer space.”

Impact) Space wars go nuclear

Grego 18 – Laura, Senior Scientist in the Global Security Program at the Union of Concerned Scientists, Postdoctoral Researcher at the Harvard-Smithsonian Center for Astrophysics, PhD in Experimental Physics at the California Institute of Technology, Space and Crisis Stability, Union of Concerned Scientists, 3-19-18,
<https://www.law.upenn.edu/live/files/7804-grego-space-and-crisis-stabilitypdf>

Why **space is a particular problem for crisis stability** For a number of reasons, space poses particular challenges in preventing a crisis from starting or from being managed well. Some of these are to do with the physical nature of space, such as the short timelines and difficulty of attribution inherent in space operations. Some are due to the way space is used, such as the entanglement of strategic and tactical missions and the prevalence of dual-use technologies. Some are due to the history of space, such the absence of a shared understanding of appropriate behaviors and consequences, and a dearth of stabilizing personal and institutional relationships. While some of these have terrestrial equivalents, taken together, they present a special challenge. The vulnerability of satellites **and first strike incentives** **Satellites are inherently fragile and difficult to protect; in the language of strategic planners, space is an “offense-dominant” regime. This can lead to a number of pressures to strike first** that don’t exist for other, better-protected domains. **Satellites travel on predictable orbits, and many pass repeatedly over all of the earth’s nations. Low-earth orbiting satellites are reachable by missiles much less capable than those needed to launch satellites into orbit, as well as by directed energy which can interfere with sensors or with communications channels. Because launch mass is at a premium, satellite armor is impractical. Maneuvers on orbit need costly amounts of fuel,** which has to be brought along on launch, limiting satellites’ ability to move away from threats. And so, these very valuable satellites are also inherently vulnerable and may present as attractive targets. Thus, **an actor with substantial dependence on space has an incentive to strike first if hostilities look probable, to ensure these valuable assets are not lost. Even if both (or all) sides in a conflict prefer not to engage in war,** this weakness may provide an incentive to approach it closely anyway. A RAND Corporation monograph commissioned by the Air Force¹⁵ described the issue this way: First-strike stability is a concept that Glenn Kent and David Thaler developed in 1989 to examine the structural dynamics of mutual deterrence between two or more nuclear states.¹⁶ It is similar to crisis stability, which Charles Glaser described as —a measure of the countries’ incentives not to preempt in a crisis, that is, not to attack first in order to beat the attack of the enemy,¹⁷ except that it does not delve into the psychological factors present in specific crises. Rather, first strike stability focuses on each side’s force posture and the balance of capabilities and vulnerabilities that could make a crisis unstable should a confrontation occur. For example, in the case of the United States, the fact that conventional weapons are so heavily dependent on vulnerable satellites may create incentives for the US to strike first terrestrially in the lead up to a confrontation, before its space-derived advantages are eroded by anti-satellite attacks.¹⁸ Indeed, **any actor for which satellites or space-based weapons are an important part of its military posture, whether for support missions or on-orbit weapons, will feel “use it or lose it” pressure** because of the inherent vulnerability of satellites. Short timelines and difficulty of attribution The **compressed timelines** characteristic **of crises combine with these “use it or lose it” pressures to shrink timelines. This dynamic couples dangerously with the inherent difficulty of determining the causes of satellite degradation, whether malicious or from natural causes, in a timely way.** Space is a difficult environment in which to operate. Satellites orbit amidst increasing amounts of debris. A collision with a debris object the size of a marble could be catastrophic for a satellite, but objects of that size cannot be reliably tracked. So a failure due to a collision with a small piece of untracked debris may be left open to other interpretations. Satellite electronics are also subject to high levels of damaging radiation. Because of their remoteness, satellites as a rule cannot be repaired or maintained. While on-board diagnostics and space surveillance can help the user understand what went wrong, it is difficult to have a complete picture on short timescales. Satellite failure on-orbit is a regular

occurrence¹⁹ (indeed, many satellites are kept in service long past their intended lifetimes). In the past, when fewer actors had access to satellite-disrupting technologies, satellite failures were usually ascribed to “natural” causes. But increasingly, even during times of peace operators may assume malicious intent. More to the point, in a crisis when the costs of inaction may be perceived to be costly, there is an incentive to choose the worst-case interpretation of events even if the information is incomplete or inconclusive. Entanglement of strategic and tactical missions During the Cold War, nuclear and conventional arms were well separated, and escalation pathways were relatively clear. While space-based assets performed critical strategic missions, including early warning of ballistic missile launch and secure communications in a

crisis, there **was a relatively clear sense that these targets were off limits, as attacks could undermine nuclear deterrence. In the Strategic Arms Limitation Treaty, the US and Soviet Union pledged not to interfere with each other’s —national technical means of verifying compliance with the agreement, yet another recognition that attacking strategically important satellites could be destabilizing.**²⁰ There was also restraint in building the hardware that could hold these assets at risk. However, where the **lines between strategic satellite missions and other missions are blurred**, these norms can be weakened. For example, the satellites that provide early warning of ballistic missile launch are associated with nuclear deterrent posture, but also are critical sensors for missile defenses. Strategic surveillance and missile warning satellites also support efforts to locate and destroy mobile conventional missile launchers. **Interfering with an early warning sensor satellite might be intended to dissuade an adversary from using nuclear weapons first by degrading their missile defenses and thus hindering their first-strike posture. However, for a state that uses early warning satellites to enable a “hair trigger” or launch-on-attack posture, the interference with such a satellite might instead be interpreted as a precursor to a nuclear attack. It may accelerate the use of nuclear weapons rather than inhibit it.** **Misperception and dual-use technologies** Some space technologies and activities can be used both for relatively benign purposes but also for hostile ones. It may be difficult for an actor to understand the intent behind the development, testing, use, and stockpiling of these technologies, and see threats where there are none. (Or miss a threat until it is too late.) This may start a cycle of action and reaction based on

misperception. For example, relatively low-mass satellites can now maneuver autonomously and closely approach other satellites without their cooperation; this may be for peaceful purposes such as satellite maintenance or the building of complex space structures, or for more controversial reasons such as intelligence-gathering or anti-satellite attacks. Ground-based lasers can be used to dazzle the sensors of an adversary’s remote sensing satellites, and with sufficient power, they may damage those sensors. The power needed to dazzle a satellite is low, achievable with commercially available lasers coupled to a mirror which can track the satellite. Laser ranging networks use low-powered lasers to track satellites and to monitor precisely the Earth’s shape and gravitational field, and use similar technologies. ²¹ Higher-powered lasers coupled with satellite-tracking optics have fewer legitimate uses. Because midcourse missile defense systems are intended to destroy long-range ballistic missile warheads, which travel at speeds and altitudes comparable to those of satellites, such defense systems also have inherent ASAT capabilities. In fact, while the technologies being developed for long-range missile defenses might not prove very effective against ballistic missiles—for example, because of the countermeasure problems associated with midcourse missile defense— they could be far more effective against satellites. This capacity is not just theoretical. In 2007, China demonstrated a direct-ascent anti-satellite capability which could be used both in an ASAT and missile defense role, and in 2009, the United States used a ship-based missile defense interceptor to destroy a satellite, as well. US plans indicated a projected inventory of missile defense interceptors with capability to reach all low earth orbiting satellites in the dozens in the 2020s, and in the hundreds by 2030.²² Discrimination The consequences of interfering with a satellite may be vastly different depending on who is affected and how, and whether the satellite represents a legitimate military objective. However, it will not always be clear who the owners and operators of a satellite are, and users of a satellite’s services may be numerous and not public. Registration of satellites is incomplete²³ and current ownership is not necessarily updated in a readily available repository. The identification of a satellite as military or civilian may be deliberately obscured. Or its value as a military asset may change over time; for example, the share of capacity of a commercial satellite used by military customers may wax and wane. A potential adversary’s satellite may have different or additional missions that are more vital to that adversary than an outsider may perceive. An ASAT attack that creates persistent debris could result in significant collateral damage to a wide range of other actors; unlike terrestrial attacks, these consequences are not limited geographically, and could harm other users unpredictably. In 2015, **the Pentagon’s annual wargame**, or simulated conflict, involving space assets focused on a future regional conflict. The

official report out²⁴ warned that it was hard to keep the conflict contained geographically when using anti-satellite weapons: As the wargame unfolded, a regional crisis quickly escalated, partly because of the interconnectedness of a multi-domain fight involving a capable adversary. The wargame participants emphasized the challenges in containing horizontal escalation once space control capabilities are employed to achieve limited national objectives. Lack of shared understanding of consequences/proportionality States have fairly similar understandings of the implications of military actions on the ground, in the air, and at sea, built over decades of experience. The United States and the Soviet Union/Russia have built some shared understanding of each other's strategic thinking on nuclear weapons, though this is less true for other states with nuclear weapons. But in the context of nuclear weapons, there is an arguable understanding about the crisis escalation based on the type of weapon (strategic or tactical) and the target (counterforce—against other nuclear targets, or countervalue—against civilian targets).

Because of a lack of experience in hostilities that target space-based capabilities, it is not entirely clear what the proper response to a space activity is and where the escalation thresholds or "red lines" lie.

Exacerbating this is the asymmetry in space investments; not all actors will assign the same value to a given target or same escalatory nature to different weapons.

Nuclear war causes extinction.

Starr '17 (Steven; director of the University of Missouri's Clinical Laboratory Science Program, senior scientist at the Physicians for Social Responsibility, Associate member of the Nuclear Age Peace Foundation, expert in the environmental consequences of nuclear war; 1/9/17; "Turning a Blind Eye Towards Armageddon — U.S. Leaders Reject Nuclear Winter Studies"; <https://fas.org/2017/01/turning-a-blind-eye-towards-armageddon-u-s-leaders-reject-nuclear-winter-studies/>; Federation of American Scientists; accessed 11/24/18; TV) [AV]

The detonation of an atomic bomb with this explosive power will instantly ignite fires over a surface area of three to five square miles. In the recent studies, the scientists calculated that the blast, fire, and radiation from a war fought with 100 atomic bombs could produce direct fatalities comparable to all of those worldwide in World War II, or to those once estimated for a "counterforce" nuclear war between the superpowers. However, the long-term environmental effects of the war could significantly disrupt the global weather for at least a decade, which would likely result in a vast global famine. The scientists predicted that nuclear firestorms in the burning cities would cause at least five million tons of black carbon smoke to quickly rise above cloud level into the stratosphere, where it could not be rained out. The smoke would circle the Earth in less than two weeks and would form a global stratospheric smoke layer that would remain for more than a decade. The smoke would absorb warming sunlight, which would heat the smoke to temperatures near the boiling point of water, producing ozone losses of 20 to 50 percent over populated areas. This would almost double the amount of UV-B reaching the most populated regions of the mid-latitudes, and it would create UV-B indices unprecedented in human history. In North America and Central Europe, the time required to get a painful sunburn at mid-day in June could decrease to as little as six minutes for fair-skinned individuals. As the smoke layer blocked warming sunlight from reaching the Earth's surface, it would produce the coldest average surface temperatures in the last 1,000 years. The scientists calculated that global food production would decrease by 20 to 40 percent during a five-year period following such a war. Medical experts have predicted that the shortening of growing seasons and corresponding decreases in agricultural production could cause up to two billion people to perish from famine. The climatologists also investigated the effects of a nuclear war fought with the vastly more powerful modern thermonuclear weapons possessed by the United States, Russia, China, France, and England. Some of the thermonuclear weapons constructed during the 1950s and 1960s were 1,000 times more powerful than an atomic bomb. During the last 30 years, the average size of thermonuclear or "strategic" nuclear weapons has decreased. Yet today, each of the approximately 3,540 strategic weapons deployed by the United States and Russia is seven to 80 times more powerful than the atomic bombs modeled in the India-Pakistan study. The

smallest strategic nuclear weapon has an explosive power of 100,000 tons of TNT, compared to an atomic bomb with an average explosive power of 15,000 tons of TNT. Strategic nuclear weapons produce much larger nuclear firestorms than do atomic bombs. For example, a standard Russian 800-kiloton warhead, on an average day, will ignite fires covering a surface area of 90 to 152 square miles. A war fought with hundreds or thousands of U.S. and Russian strategic nuclear weapons would ignite immense nuclear firestorms covering land surface areas of many thousands or tens of thousands of square miles. The scientists calculated that these fires would produce up to 180 million tons of black carbon soot and smoke, which would form a dense, global stratospheric smoke layer. The smoke would remain in the stratosphere for 10 to 20 years, and it would block as much as 70 percent of sunlight from reaching the surface of the Northern Hemisphere and 35 percent from the Southern Hemisphere. So much sunlight would be blocked by the smoke that the noonday sun would resemble a full moon at midnight. Under such conditions, it would only require a matter of days or weeks for daily minimum temperatures to fall below freezing in the largest agricultural areas of the Northern Hemisphere, where freezing temperatures would occur every day for a period of between one to more than two years. Average surface temperatures would become colder than those experienced 18,000 years ago at the height of the last Ice Age, and the prolonged cold would cause average rainfall to decrease by up to 90%. Growing seasons would be completely eliminated for more than a decade; it would be too cold and dark to grow food crops, which would doom the majority of the human population.

NUCLEAR WINTER IN BRIEF The profound cold and darkness following nuclear war became known as nuclear winter and was first predicted in 1983 by a group of NASA scientists led by Carl Sagan. During the mid-1980s, a large body of research was done by such groups as the Scientific Committee on Problems of the Environment (SCOPE), the World Meteorological Organization, and the U.S. National Research Council of the U.S. National Academy of Sciences; their work essentially supported the initial findings of the 1983 studies. The idea of nuclear winter, published and supported by prominent scientists, generated extensive public alarm and put political pressure on the United States and Soviet Union to reverse a runaway nuclear arms race, which, by 1986, had created a global nuclear arsenal of more than 65,000 nuclear weapons. Unfortunately, this created a backlash among many powerful military and industrial interests, who undertook an extensive media campaign to brand nuclear winter as "bad science" and the scientists who discovered it as "irresponsible." Critics used various uncertainties in the studies and the first climate models (which are primitive by today's standards) as a basis to criticize and reject the concept of nuclear winter. In 1986, the Council on Foreign Relations published an article by scientists from the National Center for Atmospheric Research, who predicted drops in global cooling about half as large as those first predicted by the 1983 studies and described this as a "nuclear autumn."