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

# Framework

#### I value morality. My value criterion is preventing structural violence.

#### You should oppose everyday violence for two reasons- A) social bias underrepresents its effects B) its effects are exponential, not linear which means even if the only causes a small amount of structural violence, its terminal impacts are huge

**Nixon ’11** (Rob, Rachel Carson Professor of English, University of Wisconsin-Madison, Slow Violence and the Environmentalism of the Poor, pgs. 2-3)

Three primary concerns animate this book, chief among them my conviction that we urgently need to rethink-politically, imaginatively, and theoretically-what I call "slow violence." By slow violence I mean a violence that occurs gradually and out of sight, a violence of delayed destruction that is dispersed across time and space, an attritional violence that is typically not viewed as violence at all. Violence is customarily conceived as an event or action that is immediate in time, explosive and spectacular in space, and as erupting into instant sensational visibility. We need, I believe, to engage a different kind of violence, a violence that is neither spectacular nor instantaneous, but rather incremental and accretive, its calamitous repercussions playing out across a range of temporal scales. In so doing, we also need to engage the representational, narrative, and strategic challenges posed by the relative invisibility of slow violence. Climate change, the thawing cryosphere, toxic drift, biomagnification, deforestation, the radioactive aftermaths of wars, acidifying oceans, and a host of other slowly unfolding environmental catastrophes present formidable representational obstacles that can hinder our efforts to mobilize and act decisively. The long dyings-the staggered and staggeringly discounted casualties, both human and ecological that result from war's toxic aftermaths or climate change-are underrepresented in strategic planning as well as in human memory. Had Summers advocated invading Africa with weapons of mass destruction, his proposal would have fallen under conventional definitions of violence and been perceived as a military or even an imperial invasion. Advocating invading countries with mass forms of slow-motion toxicity, however, requires rethinking our accepted assumptions of violence to include slow violence. Such a rethinking requires that we complicate conventional assumptions about violence as a highly visible act that is newsworthy because it is event focused, time bound, and body bound. We need to account for how the temporal dispersion of slow violence affects the way we perceive and respond to a variety of social afflictions-from domestic abuse to posttraumatic stress and, in particular, environmental calamities. A major challenge is representational: how to devise arresting stories, images, and symbols adequate to the pervasive but elusive violence of delayed effects. Crucially, slow violence is often not just attritional but also exponential, operating as a major threat multiplier; it can fuel long-term, proliferating conflicts in situations where the conditions for sustaining life become increasingly but gradually degraded.

#### Additionally prefer:

#### It’s a prerequisite. Morality must be applied equally to everyone, or else it wouldn’t be moral. Oppression excludes minorities from moral consideration.

#### You should use probability weighing – any other model of risk calculus collapses in on itself.

# Definition

#### **Appropriation of outer space by private entities would be the exercise of exclusive control of space by private entities.**

**Trapp 13** (TIMOTHY JUSTIN TRAPP, JD Candidate @ UIUC Law, ‘13, TAKING UP SPACE BY ANY OTHER MEANS: COMING TO TERMS WITH THE NONAPPROPRIATION ARTICLE OF THE OUTER SPACE TREATY UNIVERSITY OF ILLINOIS LAW REVIEW [Vol. 2013 No. 4])//DebateDrills AY

The issues presented in relation to the nonappropriation article of the Outer Space Treaty should be clear.214 The ITU has, quite blatantly, created something akin to “property interests in outer space.”215 It allows nations to exclude others from their orbital slots, even when the nation is not currently using that slot.216 This is directly in line with at least one definition of outer-space appropriation.217 [\*\*Start Footnote 217\*\*Id. at 236 (“**Appropriation of outer space**, **therefore, is ‘the exercise of exclusive control or exclusive use’ with a sense of permanence, which limits other nations’ access to it.**”) (quoting Milton L. Smith, The Role of the ITU in the Development of Space Law, 17 ANNALS AIR & SPACE L. 157, 165 (1992)). \*\*End Footnote 217\*\*]The ITU even allows nations with unused slots to devise them to other entities, creating a market for the property rights set up by this regulation.218 In some aspects, this seems to effect exactly what those signatory nations of the Bogotá Declaration were trying to accomplish, albeit through different means.219 Though the legitimacy of such a regime may be questionable, it remains in effect, showing that it is at least tolerable under the edict of the nonappropriation article of the Outer Space Treaty.220 There must, therefore, be something about the ITU that differentiates it from something like the Bogotá Declaration.221 The most immediate difference is the character of the body promulgating the regulation. The Bogotá Declaration is an agreement between eight countries claiming rights to all space above them.222 The ITU’s regulations are promulgated under the auspices of the U.N.223 While the Bogotá Declaration is an international agreement, it is still a very limited cooperation.224 The ITU, through the U.N., comprises the largest possible cooperation of international actors, giving it an international character as opposed to simply a multinational character.225 Furthermore, the allocation of orbital slots by the ITU is a response to the limited character of geostationary orbits.226 While the Bogotá Declaration was probably promulgated in response to a few nations’ fears that they may be excluded from the space arena,227 **the allocation system of the ITU is a measure to make sure that the GEO resource is efficiently managed for the use of all mankind**.228

# Contention 1: Safety Nets

#### Right now, billionaires are looking to space colonization to escape earth.

Journalist Reed Tucker writes in 2020:

Reed Tucker 20 (Reed Tucker, NY Based Journalist) Jeff Bezos and Elon Musk’s plans to colonize space are even crazier than we thought 8-8-2020 New York Post https://nypost.com/2020/08/08/billionaires-who-plan-to-colonize-space-live-in-a-dream-world/ //DebateDrills TJ

Now **the future of** space is largely **in** his and **the hands of** other free-spending, big-dreaming **billionaires** like him, including Amazon’s Jeff Bezos. But what will this future look like? Some answers can be found in the new book “[Star Settlers: The Billionaires, Geniuses, and Crazed Visionaries Out to Conquer the Universe](https://www.amazon.com/Star-Settlers-Billionaires-Geniuses-Visionaries/dp/1643134485/?tag=nypost-20&asc_refurl=https://nypost.com/2020/08/08/billionaires-who-plan-to-colonize-space-live-in-a-dream-world/&asc_source=web)” (Pegasus Books) by Fred Nadis, out now. “I see [guys like Musk] almost like medieval cathedral builders, with this multi-century project that they’re willing to take their time and their livelihood,” Nadis told The Post. That said, the author thinks these billionaires may be dreaming a bit too big. As Matt Damon found in “The Martian,” the red planet’s atmosphere is much thinner than Earth’s and the planet generates no electromagnetic field, meaning it gets pounded by cosmic rays and other harmful-to-humans energy.©20thCentFox/Courtesy Everett C Musk, the founder of Tesla, **has said** that all of his earthly business ventures are just a way to fund **his true passion: colonizing Mars.** His company, SpaceX, is planning to send humans to the red planet in 2024. Within a century, Musk envisions reusable rockets blasting off every two years and ferrying some 200 passengers at a time, ultimately establishing an outpost of a million people. It’s still unclear how they’ll survive. At its closest, Mars is some 35 million miles from Earth, and a trip would take around nine months. Once they get there, the problem explorers will face is that Mars’ atmosphere is much thinner than Earth’s and the planet generates no electromagnetic field, meaning it gets pounded by cosmic rays and other energy harmful to humans. “It’s really challenging,” Nadis says. “Not quite as simple as SpaceX might make it out to be.” Musk has offered sketchy details of what life off-world might look like. Any Mars colony would have to be self-sustaining and not rely on supplies from Earth. Musk has suggested food be grown on hydroponic farms, either underground or in an enclosed structure to protect the crops from radiation, but because Mars’ surface gets about half the sunlight Earth does, whatever plants that can be grown will likely have to be supplemented with artificial lights — and powering those lights will be no small challenge. Musk has said farms will be powered by solar panels, though he’s offered few details. “Really pretty straightforward,” he told Popular Mechanics last year. Princeton physicist Gerard O’Neill imagined space colonies consisting of giant counter-rotating cylinders, simulating gravity.Rick Guidice/NASA In the same interview, the billionaire suggested Mars’ inhabitants might live under a glass dome with an “outdoorsy, fun atmosphere” until the planet is terraformed — artificially transforming the planet to make it more Earth-like, with a livable atmosphere. But that plan also presents a problem: A 2018 NASA-sponsored study concluded that terraforming Mars is impossible, because there is not enough carbon dioxide locked in the soil to release into the air. Musk, however, isn’t daunted. He has suggested exploding 10,000 nuclear missiles over Mars’ surface in order to melt the planet’s ice reserves, thereby releasing the carbon dioxide locked within. His company has even produced “Nuke Mars” T-shirts. Scientists are divided on whether the idea would work. Penn State climate scientist Michael Mann, for example, told US News and World Report in 2015, “There are so many things that could go wrong here, it is difficult to know where to start.” Meanwhile, **Bezos and his company**, Blue Origin**, are also focused on moving off-world** — but **onto space colonies**. **Bezos is worried that the Earth’s resources will be gone in a few hundred years, spurring the need to leave.** Bezos draws much of his inspiration from the work of Gerard O’Neill, a Princeton physicist who in the 1970s laid out a grand design for space colonies.

#### Space colonization if only done by private entities will be primarily accessible to the extremely wealthy.

Journalist Kevin Maney writes in 2015:

Kevin Maney 15 (Kevin Maney, Contributor to the Atlantic, Fortune, best-selling author, award-winning columnist) 'Star Wars' Class Wars: Is Mars the Escape Hatch for the 1 Percent? 12-14-2015 Newsweek https://www.newsweek.com/2015/12/25/mars-colonies-rich-people-404681.html //DebateDrills TJ

This is the unspoken flip side of Musk's [SpaceX](http://dcinno.streetwise.co/2015/12/07/spacex-2016-elon-musks-internet-satellites-nasa-missions/) and Bezos's [Blue Origin](https://www.businessinsider.com/about-blue-origins-be-4-engine-2015-12). The space travel companies say they are creating a way for the human species to endure by populating other planets. But **the bottom line is that only the wealthy will have the means to move to Mars**. Musk's target ticket price is $500,000 a person in 2015 dollars, and that's just to get there. Imagine the new outfits you'll have to buy to go with that space helmet. So **you can picture a scenario that's something like the 1970s**[**white flight**](http://www.citylab.com/work/2013/11/mapping-60-years-white-flight-brain-drain-and-american-migration/7449/)**from inner cities, when the wealthier classes moved to freshly built suburbs, leaving the declining neighborhoods to the lower classes.** In fact, **the fleeing upper classes sped up the decrepitude of that era's older cities by relocating their money and clout with them**. Today, we're seeing a similar situation in Syria, as the wealthiest and most educated people [escape](https://www.ibtimes.com/europe-refugee-crisis-facts-wealthy-educated-syrians-risking-lives-leave-war-2089018) to the West, which will make the country even harder to stabilize and rebuild.

#### This means that it allows for the extremely wealthy to have a safety net to turn to if things on earth go bad

Journalist Michael Moran writes in 2020:

Michael Moran 20 (Michael Moran, Journalist for the Daily Star, and The Times) Billionaires could leave Earth behind 'for space colony' as 'climate collapses' 2-8-2020 Dailystar.co.uk https://www.dailystar.co.uk/news/weird-news/billionaires-could-leave-earth-behind-21445413 //DebateDrills TJ

But noted American media theorist Douglas Rushkoff has written that **the overall direction of technological development was about creating an escape route for the super-rich**. He pointed out that combat robots would serve very well to guard the bolt-holes of billionaires remaining on Earth **once climate change reached its end-game** and described Elon Musk’s **planned Mars** colony **as “less a continuation of the human diaspora than a lifeboat for the elite.”** They can certainly afford a lifeboat. The world’s richest people have seen their share of the world’s total money supply increase from 42.5% at the height of the 2008 financial crisis to just over 50.% by the end of 2017. That adds up to about or $140trillion (£106tn), according to a report from Credit Suisse.

#### And the wealthy are the ones exploiting earth right now.

Journalist Jess Zimmerman writes in 2015:

Jess Zimmerman 15 (Jess Zimmerman, Guardian US columnist) What if the mega-rich just want rocket ships to escape the Earth they destroy? 9-16-2015 Guardian https://www.theguardian.com/commentisfree/2015/sep/16/mega-rich-rocket-ships-escape-earth //DebateDrills TJ

Of course, **uber-wealthy** tech entrepreneurs **aren’t just buying rockets for their personal amusement.** They’re founding or investing in space travel – they want to get you off-planet, too. Well, not you-you, but someone like you with much, much, much more money. And that’s where the vogue for billionaire space travel magnates gets a little weird –and maybe even sinister. It’s already very true that **money expands your world**; the person with the funds to have a car is less restricted in her movements than the person without one, and the person with a huge plane and the money to fly it is less restricted still. The expansion of rich people’s travel horizons comes at a price for everyone, both rich and poor. With the exception of America’s weirdly-expensive Amtrak system, cost and luxury scale with fossil fuel consumption; travel that costs more and feels more indulgent is also travel that has a cataclysmic effect on the environment. The faster and further you can afford to travel, the greater your environmental footprint. And often, the people less able to travel are the ones left holding the toxic-chemical and pollution-filled bag. **Companies** like Blue Origin **are using** money and **resources to push outwards**, to expand the worlds of their rich customers all the way into space. **But those same customers** – and some of the owners – **are** making their terrestrial money in the classic capitalist terrestrial way: by **working around any obstacle to profit, including environmental regulations and conservation efforts**. Almost **all industry is environmentally disastrous**, after all; truly prioritizing earth-friendliness would destroy most companies. Some people with a great deal of money care more about the fate of the world than others, but they’re all willing to cut corners if it affects the bottom line. You can tell because they have a great deal of money; you can also tell because they’re willing to spend it on a ride in a spaceship. Which raises the question: are they just gearing up to wash their hands of the planet and leave the rest of us to clean up? **By pushing outward while ignoring the problems it causes back on the home turf**, are **they effectively** **creat**ing **a galactic upper class that rests on the backs of the earthbound**? Even if that’s not literally the plan, it may be the ultimate outcome.

#### This leads to worse warming on earth. Billionaires cause climate change and space means there are no consequences. Warming harms the least well off the most.

Editor of the Guardian Laura Paddison writes in 2021:

Laura Paddison 21 (Laura Paddison, Editor of This New World, Editor of the Guardian) How the rich are driving climate change 10-27-2021 No Publication https://www.bbc.com/future/article/20211025-climate-how-to-make-the-rich-pay-for-their-carbon-emissions //DebateDrills TJ

In 2018, Stefan Gössling and his team spent months scouring the social media profiles of some of the richest celebrities, from Paris Hilton to Oprah Winfrey. The tourism professor from Linnaeus University in Sweden was looking for evidence of how much they were flying.  The answer was a lot. Bill Gates, one of the world's most high-profile environmental advocates, took 59 flights in 2017, according to Gössling's [calculations](https://www.sciencedirect.com/science/article/abs/pii/S016073831930132X?via%3Dihub), covering a distance of around 343,500km (213,000 miles) – more than eight times around the world – generating more than 1,600 tonnes of greenhouse gases (that's equivalent to the [average yearly emissions of 105 Americans](https://data.worldbank.org/indicator/EN.ATM.CO2E.PC?locations=US)).  Gössling's aim was to try to uncover **the individual consumption levels of the mega rich**, whose lifestyles **are often shrouded in secrecy**. His research coincided with a growing environmental movement, spearheaded by Greta Thunberg, which put a spotlight on personal accountability. Flying, one of the most carbon-intensive forms of consumption, became a symbol of this new accountability.  "**The bigger your carbon footprint, the bigger your moral duty,**" Thunberg [wrote in the Guardian](https://www.theguardian.com/environment/2019/jan/25/our-house-is-on-fire-greta-thunberg16-urges-leaders-to-act-on-climate) in 2019.  The last few decades have shone a spotlight on global inequality. From the 2008 financial crisis, to the pandemic and the [increasingly severe impacts of climate change](https://www.bbc.com/future/article/20200618-climate-change-who-is-to-blame-and-why-does-it-matter) – disruptive events tend to hit the poorest first and hardest.But in debates about how to solve inequality, over-consumption is often overlooked. "Each unit you overshoot means someone has to give [something] up," says Lewis Akenji, managing director of Hot or Cool Institute, a Berlin-based think tank. As a result, the outsized carbon footprints of society's richest entrench inequality and threaten the world's ability to stave off catastrophic climate change. The statistics are startling. **The world's wealthiest 10% were responsible for around half of global emissions in 2015, according to a 2020**[**report**](https://www.sei.org/wp-content/uploads/2020/09/research-report-carbon-inequality-era.pdf) from Oxfam and the Stockholm Environment Institute. **The top 1% were responsible for** 15% of emissions, **nearly twice as much as the world's poorest 50%,** **who** were responsible for just 7% and **will feel the brunt of climate impacts despite bearing the least responsibility for causing them.**

# Contention 2: Ozone

#### Affirming decreases private companies’ activity in space.

Jonathon Babcock, assisting national Security matters, writes in 2015:

Babcock, 15 -- Jonathan’s practice involves assisting clients in a range of national security matters, including economic sanctions compliance, export controls compliance, and national security reviews before the Committee on Foreign Investment in the United States (CFIUS). Prior to joining Morrison & Foerster, Jonathan practiced in the International Trade and National Security practice groups of a major D.C. law firm.

[Jonathan Babcock, "The Space Review: Encouraging private investment in space: does the current space law regime have to be changed? (part 1)," The Space Review, 1-5-2015, https://www.thespacereview.com/article/2669/1, accessed 6-25-2021]

Space law, derived mainly from the Outer Space Treaty and the Moon Treaty (the latter’s principles carry weight despite having a few signatory states), prohibits national appropriation in space and states that space is a domain for the “common heritage of mankind.” The meaning of these documents, particularly pertaining to their applicability to private actors in space, is ambiguous and contentious, as will be shown in the following section. In any industry, legal uncertainty hinders private investment. Accordingly, a cloudy legal regime in space has hampered the ability of private individuals and firms to raise the capital necessary to fund space activities.16 Moreover, private actors hold that the absence of a legal regime clearly defining the scope of property rights in space deprives them of the assurance that they will reap benefits that will outweigh the capital they invested.17 They argue that the main impediment to further private action in space is that the current legal regime jeopardizes the ability of private actors to make a profit in space.

This is a discouraging climate for private innovation, and will surely discourage future investment in space. The legal regime governing space must be clarified, added to, altered, or changed entirely to encourage private investment in space by allowing actors to realize financial rewards.18 The question then becomes how to accomplish this. In order to better understand the inadequacies of the current legal regime, it is necessary to analyze what exactly the Outer Space Treaty and Moon Treaty state, and how they dictate the climate in which private actors are operating in space.

#### Even getting into space harms the environment by punching holes in the ozone.

Royal Astronomical Society Editor Nicole Mortillaro writes in 2021:

Nicole Mortillaro 21 (Nicole Mortillaro, editor of the Journal of the Royal Astronomical Society of Canada) Rocket launches could be affecting our ozone layer, say experts 4-22-2021 CBC https://www.cbc.ca/news/science/rocket-launches-environment-1.5995252 //DebateDrills TJ

Rocket launches are a breathtaking culmination of human ingenuity as they propel us into the future, but there is a growing concern that not enough research has been done on their effect on the environment. While some may be worried about potential greenhouse gas emissions that's not the main issue. Instead, **it's ozone depletion and the potential effects in our upper atmosphere,** specifically the stratosphere, **along with concerns about toxic fuels.** **The problem has flown under the radar**, according to Martin Ross, an atmospheric scientist at The Aerospace Corporation, **because people still think of rocket launches as rare**.  But it's time to face the fact that we may be entering a boom era, he said. "One of the arguments that people have used in the past was to say that we don't really need to pay attention to rockets or to the space industry, or the space industry is small, and it's always going to be small," Ross said.  "But I think the developments that we're seeing the past few years show that … space is entering this very rapid growth phase like aviation saw in the '20s and '30s." The stratosphere is an important weather driver for Earth's systems, and that's where some particles from rocket launches are ending up. **The ozone layer, which helps protect us from the sun's** harmful ultraviolet **rays**, is also located in the stratosphere. In 1990, the [Montreal Protocol was signed into law](https://ozone.unep.org/treaties/montreal-protocol), banning harmful ozone-depleting substances, such as chlorofluorocarbons (CFCs), used in things like refrigerators and air conditioners, after it was revealed that the ozone layer was being stripped away by these chemicals. While the protocol touched on airlines, there was no mention of the aerospace industry. But now some industry experts are concerned that with no oversight, we could be in for a problem**. There are different types of rocket propellants**. Some, like liquid oxygen and liquid hydrogen, produce mainly water vapour and have little environmental impact. These were used in past shuttle launches and even in the Apollo-era Saturn V vehicles.  Then there are those that produce alumina particles in the stratosphere, such as those in solid rocket boosters, which were also used in past shuttle launches, and are still being used today by some launch companies. Finally, **there are those that deposit black soot in the stratosphere, such as kerosene used in SpaceX's Falcon** 9 and Russia's Soyuz rockets. **It's the alumina and black soot that is most concerning to experts.** "The atmosphere is complex," said Jessica Dallas, a PhD candidate at the Australian Centre for Space Engineering Research, in New South Wales. "We don't have a complete understanding of atmospheric circulation and how all of the mechanisms in the atmosphere actually work. And so that means that we also don't have a good idea of what happens when we're injecting these particles into the stratosphere."

#### Ozone is key to human survival.

The European Commission writes:

**European Commission ND**, “Protection of the ozone layer” European Commission Official Website, <https://ec.europa.eu/clima/eu-action/protection-ozone-layer_en> Livingston RB

**World governments agreed** in the late 1980s **to protect th**e Earth’s **ozone** layer by phasing out ozone-depleting substances emitted by human activities, **under the Montreal Protocol**. In Europe, the Protocol is implemented through EU-wide legislation that not only meets its objectives but also contains stricter, more ambitious measures. Global action taken under the Montreal Protocol has halted the depletion of the ozone layer and allowed it to start recovering, but much remains to be done to ensure a steady recovery. **The ozone layer** is a natural layer of gas in the upper atmosphere that **protects humans and other living things from harmful ultraviolet (UV) radiation from the sun**. Although ozone is present in small concentrations throughout the atmosphere, most (around 90%) exists in the stratosphere, a layer 10 to 50 kilometres above the Earth’s surface. **The ozone** layer filters out most of the sun's harmful UV radiation and **is therefore crucial to life on Earth**. Scientists discovered in the 1970s that the ozone layer was being depleted. Atmospheric concentrations of ozone vary naturally depending on temperature, weather, latitude and altitude, while substances ejected by natural events such as volcanic eruptions can also affect ozone levels. However, these natural phenomena could not explain the levels of depletion observed and scientific evidence revealed that certain man-made chemicals were the cause. These ozone-depleting substances were mostly introduced in the 1970s in a wide range of industrial and consumer applications, mainly refrigerators, air conditioners and fire extinguishers.

# Contention 3: Worker Exploitation

#### There is currently no legal framework for how to treat workers in space

Space reporters Miriam Kramer and Bryan Walsh write in 2021:

Miriam Kramer and Bryan Walsh 21 (Miriam Kramer and Bryan Walsh, Space reporter for Axios) The push to define workers' rights in space 4-13-2021 Axios https://www.axios.com/workers-rights-space-private-companies-4c5605e1-ddd8-480f-a60d-793f2343cb79.html //DebateDrills TJ

What's happening: The UN's Outer Space Treaty classifies astronauts as a protected group that should be considered emissaries of humanity with rights and protections. But **rules around the rights of private astronauts in space aren't clearly defined** in the treaty, and that could complicate things as more companies work to send private citizens to space. In theory, nations licensing the launches of companies like SpaceX are responsible for what those businesses do in space, meaning that people sent to orbit and beyond will be protected by those nations, but that hasn't been put to the test on a wide scale yet. The intrigue: While defining what rights a laborer has off-Earth may seem premature today, experts say that decisions made now will influence what rights look like in orbit for decades to come. **Jeff Bezos has detailed his vision of large, private space stations in orbit that will serve as manufacturing hubs for industry**, keeping that kind of polluting work off of the planet. Elon Musk's **SpaceX has already**[made the broad](https://www.inverse.com/innovation/spacex-mars-city-legal) (and unsupported**) claim that Mars is a "free planet and that no Earth-based government has authority or sovereignty over Martian activities**" as part of its Starlink beta test agreement. "It’s not hard to imagine a 'company town' scenario where **employers can wield incredible leverage over workers by controlling almost every aspect of their existence**," Ed Finn, founding director at the Center for Science and the Imagination at Arizona State University, told Axios. "Staging a walk-out is tricky when the only place to go is the pitiless void on the other side of the airlock." The big picture: "One challenge I see facing private space exploration is that the leaders of space exploration companies will set the objectives, rules, and sanctions that govern space habitations and missions, likely with profit maximization as the goal," David Colby Reed, graduate researcher in the Space Enabled research group at the MIT Media Lab, told Axios. "This is business-as-usual on Earth, but, in space, such **private government becomes totalizing**." That control over both everyday life and work could create a situation where "it's difficult for a free society of equals to take root," Reed added. The bottom line: Sending people to space for the long haul will require tough conversations today about what rights they'll have in space and how they will be enforced hundreds to millions of miles from Earth.

#### Companies that are going to colonize space are committing rampant exploitation on earth.

Casper Gelderblom, PhD researcher at the European University Institute, writes in 2021:

Casper Gelderblom et al 21 (Casper Gelderblom, Coordinator at the Progressive International and a PhD researcher at the European University Institute) Amazon workers are rising up around the world to say: enough 5-26-2021 Guardian https://www.theguardian.com/commentisfree/2021/may/26/amazon-workers-are-rising-up-around-the-world-to-say-enough //DebateDrills TJ

Throughout Amazon’s supply chain, **Bezos**’s behemoth **violates workers’ safety, dignity and privacy**, putting them to work in worksites designed **to squeeze as much labor out of them for as little money as possible**. Workers do not take this lying down. Supported by a myriad of progressive allies, there is labor resistance all over Amazon’s global map, with strikes and protests from Spain to São Paulo, from Delhi to Berlin. On Black Friday last year, as scrutiny over [Amazon’s anti-union practices](https://eur03.safelinks.protection.outlook.com/?url=https%3A%2F%2Fwww.cnbc.com%2F2020%2F10%2F24%2Fhow-amazon-prevents-unions-by-surveilling-employee-activism.html&data=04%7C01%7Ceugenio.villasante%40uniglobalunion.org%7C1dcbba8fc9094a0425f008d87bdbd89c%7C8359b2e0aed64063acb178f9effecd0a%7C0%7C0%7C637395531441993495%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%3D%7C1000&sdata=Pii6wiAhFWICa56gkiBTAaFCCwpxmSCzojO4F28cNsk%3D&reserved=0%22%20%5Ct%20%22_blank), [environmental impact](https://eur03.safelinks.protection.outlook.com/?url=https%3A%2F%2Fwww.wired.com%2Fstory%2Famazon-activists-climate-change-efforts-fall-short%2F&data=04%7C01%7Ceugenio.villasante%40uniglobalunion.org%7C1dcbba8fc9094a0425f008d87bdbd89c%7C8359b2e0aed64063acb178f9effecd0a%7C0%7C0%7C637395531442003485%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%3D%7C1000&sdata=097n3w%2Ba9DCgwKdF9wL%2Fc0c57yL57j16ajTlHxfnEnI%3D&reserved=0%22%20%5Ct%20%22_blank), [tax avoidance](https://eur03.safelinks.protection.outlook.com/?url=https%3A%2F%2Fwww.newsweek.com%2Faoc-condemns-us-system-that-allows-trump-amazon-pay-almost-no-taxes-doesnt-fund-health-care-1535097&data=04%7C01%7Ceugenio.villasante%40uniglobalunion.org%7C1dcbba8fc9094a0425f008d87bdbd89c%7C8359b2e0aed64063acb178f9effecd0a%7C0%7C0%7C637395531442003485%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%3D%7C1000&sdata=Jq7HRHjjeWAeBbn0mKTJdrfHC6AS1OynjEiOIOWPmNs%3D&reserved=0%22%20%5Ct%20%22_blank) and [worker safety](https://eur03.safelinks.protection.outlook.com/?url=https%3A%2F%2Fwww.revealnews.org%2Farticle%2Fhow-amazon-hid-its-safety-crisis%2F&data=04%7C01%7Ceugenio.villasante%40uniglobalunion.org%7C1dcbba8fc9094a0425f008d87bdbd89c%7C8359b2e0aed64063acb178f9effecd0a%7C0%7C0%7C637395531442013474%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%3D%7C1000&sdata=z0oqmL5WCijh8UluJlR9VVR3x7dD0DMFHHfc91YaVzM%3D&reserved=0%22%20%5Ct%20%22_blank) intensified in [Europe](https://eur03.safelinks.protection.outlook.com/?url=https%3A%2F%2Fwww.theguardian.com%2Ftechnology%2F2020%2Foct%2F07%2Feu-lawmakers-ask-jeff-bezos-whether-amazon-spies-on-politicians&data=04%7C01%7Ceugenio.villasante%40uniglobalunion.org%7C1dcbba8fc9094a0425f008d87bdbd89c%7C8359b2e0aed64063acb178f9effecd0a%7C0%7C0%7C637395531442013474%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%3D%7C1000&sdata=f%2FZKzZTEv%2FwM8uA6Dw8gBhV%2FUiwzhTYbo%2BhLYc%2FyKlY%3D&reserved=0%22%20%5Ct%20%22_blank) and the [United States](https://eur03.safelinks.protection.outlook.com/?url=https%3A%2F%2Fwww.nasdaq.com%2Farticles%2Fu.s.-senators-question-amazon-on-concerns-it-tracks-employees-limits-unionization-2020-10&data=04%7C01%7Ceugenio.villasante%40uniglobalunion.org%7C1dcbba8fc9094a0425f008d87bdbd89c%7C8359b2e0aed64063acb178f9effecd0a%7C0%7C0%7C637395531442023470%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%3D%7C1000&sdata=VjWXJXDtVQ78ZPA%2BuM%2BxSFVbRKQGZrkfe482NWkMVnQ%3D&reserved=0%22%20%5Ct%20%22_blank), UNI Global Union, IndustriaALL, [Progressive International](https://www.uniglobalunion.org/news/www.progressive.international), Oxfam, Greenpeace and dozens of civil society organizations, environmentalists and tax watchdogs organized protest actions in 12 countries, uniting under the banner of Make Amazon Pay. Aided by **shocking media reports about**[**dangerous**](https://eur03.safelinks.protection.outlook.com/?url=https%3A%2F%2Fwww.google.com%2Furl%3Fq%3Dhttps%3A%2F%2Fwww.google.com%2Furl%3Fq%253Dhttps%3A%2F%2Fwww.theguardian.com%2Fbusiness%2F2018%2Fmay%2F31%2Famazon-accused-of-treating-uk-warehouse-staff-like-robots%2526amp%3Bsa%253DD%2526amp%3Bsource%253Deditors%2526amp%3Bust%253D1621361884986000%2526amp%3Busg%253DAOvVaw3hm30EqRaOyrKJfbSZHKqS%26sa%3DD%26source%3Deditors%26ust%3D1621361885019000%26usg%3DAOvVaw3VN2r42izZJkOsR0FDdt7x&data=04%7C01%7Ceugenio.villasante%40uniglobalunion.org%7Ce501319943174e733a7c08d91a976556%7C8359b2e0aed64063acb178f9effecd0a%7C0%7C0%7C637570059807744468%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%3D%7C1000&sdata=qwi7J8dRnS0WIU7ogALwTwqx8qUPuTqGl58jU6xDepo%3D&reserved=0)**and even**[**dehumanizing**](https://eur03.safelinks.protection.outlook.com/?url=https%3A%2F%2Fwww.google.com%2Furl%3Fq%3Dhttps%3A%2F%2Fwww.google.com%2Furl%3Fq%253Dhttps%3A%2F%2Fwww.businessinsider.com%2Famazon-drivers-say-peeing-in-bottles-common-despite-company-denials-2021-3%3FIR%25253DT%2526amp%3Bsa%253DD%2526amp%3Bsource%253Deditors%2526amp%3Bust%253D1621361884986000%2526amp%3Busg%253DAOvVaw03VCnsy7bAOwRJtpYWwhY9%26sa%3DD%26source%3Deditors%26ust%3D1621361885019000%26usg%3DAOvVaw0cC-rG7Weo8b5TG1lBlvrF&data=04%7C01%7Ceugenio.villasante%40uniglobalunion.org%7Ce501319943174e733a7c08d91a976556%7C8359b2e0aed64063acb178f9effecd0a%7C0%7C0%7C637570059807754457%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%3D%7C1000&sdata=qxiswMdl7pztTMrxvqmaNaRpnoU6ivf5kZeiA7WJ56Y%3D&reserved=0)**working conditions**, this activism draws attention to Amazon’s treatment of the warehouse workers who stow, store and sort its signature packages. As a result, the **corporation’s efforts to conceal its conduct in this part of its global empire are faltering**. In the UK, where most Amazon workers are employed in the corporation’s so-called “Fulfillment Centers”, a poll late last year found that only 24% of respondents [believed](https://eur03.safelinks.protection.outlook.com/?url=https%3A%2F%2Fwww.google.com%2Furl%3Fq%3Dhttps%3A%2F%2Fwww.google.com%2Furl%3Fq%253Dhttps%3A%2F%2Fwww.independent.co.uk%2Fbusiness%2Famazon-powerful-poll-progressive-international-b1760527.html%2526amp%3Bsa%253DD%2526amp%3Bsource%253Deditors%2526amp%3Bust%253D1621361884987000%2526amp%3Busg%253DAOvVaw23vQKeCZ93hgI5vRxDaGdS%26sa%3DD%26source%3Deditors%26ust%3D1621361885019000%26usg%3DAOvVaw1GcccwhMyHRwBv2RNU8kCk&data=04%7C01%7Ceugenio.villasante%40uniglobalunion.org%7Ce501319943174e733a7c08d91a976556%7C8359b2e0aed64063acb178f9effecd0a%7C0%7C0%7C637570059807754457%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%3D%7C1000&sdata=RM6SrBmg1JjwgOW2p3fIOjNrB9JEgr7KBzA9AFVxwNU%3D&reserved=0) Amazon treated its workers fairly. In the US, where Amazon recently worked to undermine a union campaign in Alabama with tactics that union leaders say [prevented a free and fair election](https://www.cnbc.com/2021/04/19/amazon-prevented-free-and-fair-election-in-alabama-union-alleges.html) and violated federal law, almost 80% of respondents [supported](https://eur03.safelinks.protection.outlook.com/?url=https%3A%2F%2Fwww.google.com%2Furl%3Fq%3Dhttps%3A%2F%2Fwww.google.com%2Furl%3Fq%253Dhttps%3A%2F%2Fwww.alreporter.com%2F2021%2F04%2F06%2Fafl-cio-poll-shows-majority-of-respondents-support-bessemer-union-efforts%2F%2526amp%3Bsa%253DD%2526amp%3Bsource%253Deditors%2526amp%3Bust%253D1621361884988000%2526amp%3Busg%253DAOvVaw2He1hEVYa5LLTuX7zCElE4%26sa%3DD%26source%3Deditors%26ust%3D1621361885019000%26usg%3DAOvVaw0wAxWIpmdHjJFKQ1qm4FIu&data=04%7C01%7Ceugenio.villasante%40uniglobalunion.org%7Ce501319943174e733a7c08d91a976556%7C8359b2e0aed64063acb178f9effecd0a%7C0%7C0%7C637570059807764454%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%3D%7C1000&sdata=GOvC7hkX7zk58Kx8TRAIECYpzjIRha%2F55RmCQ%2BdGvi4%3D&reserved=0) the warehouse workers’ struggle.

#### Companies are already planning arrangements similar to indentured servitude on mars.

Reporter Tim Levin writes in 2021:

Tim Levin 21 (Tim Levin, transportation reporter at Insider) Elon Musk, once again the world's richest person, is selling all his possessions so people know he's serious about colonizing Mars 2-19-2021 Business Insider https://www.businessinsider.com/worlds-richest-person-elon-musk-dedicate-wealth-mars-colony-2021-1 //DebateDrills TJ

The SpaceX founder has said he [plans to send 1 million people](https://www.businessinsider.com/elon-musk-plans-1-million-people-to-mars-by-2050-2020-1) to Mars by 2050 and build a fleet of 1,000 Starships to ferry them there. Musk aims to launch three of the 387-foot rockets SpaceX is developing for deep-space travel each day. And lest you think **a trip to Mars is too expensive for most people**, **Musk** has said he **intends for there to be "loans available for those who don't have money"** **and jobs** on the red planet **for colonists to pay off their debts**. Some [critics](https://twitter.com/elonmusk/status/1217991853615677440/retweets/with_comments) **say Musk's plans resemble an interplanetary form of indentured servitude.**

#### Because private appropriation of space allows for unadulterated exploitation, it makes life way worse for minorities

Kate Bahn, director of labor market policy at the Washington Center for Equitable Growth, writes in 2020:

Kate Bahn et al 20 (Kate Bahn, director of labor market policy and interim chief economist at the Washington Center for Equitable Growth, economist at the Center for American Progress, Ph.D. in economics from the New School for Social Research) Wage discrimination and the exploitation of workers in the U.S. labor market 9-15-2020 Equitable Growth https://equitablegrowth.org/research-paper/wage-discrimination-and-the-exploitation-of-workers-in-the-u-s-labor-market/ //DebateDrills TJ

The human capital model of wage determination is insufficient to explain persistent wage inequality by race, ethnicity and gender. **Personal wealth impacts how workers search for jobs**, since **temporary losses** of income in between jobs **are more manageable with higher wealth levels**. In turn, this means **workers from demographic backgrounds with historical wealth disparities,** particularly Black workers, **face more constrains searching for jobs**. Due to disproportionate burdens for unpaid caretaking within families, **women workers also face more narrow job-search possibilities** as they balance employment with care responsibilities. Constrained job search gives employers the ability to undercut workers’ wages, since workers have fewer suitable job options that would give them more bargaining power to demand higher pay. **Institutions that promote worker power** and collective action, such as labor unions and labor law enforcement, push back against employers’ wage-setting power and help ensure **that workers receive the value they contribute to the economy.**

Thus I affirm.

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#### Innovation only happens under government. Private entities don’t increase innovation.

Robert Frost 17 (Robert Frost, NASA Flight Operations Directorate) The Pros And Cons Of Privatizing Space Exploration 4-4-2017 Forbes https://www.forbes.com/sites/quora/2017/04/04/the-pros-and-cons-of-privatizing-space-exploration/?sh=1457363a3319 //DebateDrills TJ

The role of government in space exploration is to do the things that the market can’t support, but the people agree are beneficial. When we send a spacecraft like New Horizons to take close up pictures of Pluto, we do so because, as a people, we understand that science is important. We understand that learning about the universe is good for our society. We understand that knowledge has value for its own sake and that we often cannot predict how that knowledge may have additional practical value at some later time. This kind of exploration simply isn’t practical for the private sector because there isn’t a way to, in the near term, make a return on the investment.

Imagine how something like the Hubble Space Telescope would work if it was a product of the private sector. In order to be something worth doing, for a private company, there would need to be a way to recoup the cost and to return a profit sufficient to attract the investors that would fund that cost. So, how does one profit from something like the Hubble Space Telescope? One would have to charge researchers to use it and one would have to sell the data obtained from it. Both of those things would impede the progress of science. The American people (via their representatives) decided that we were willing to each pay $1.60 a year to put this giant telescope in space and operate it so that researchers around the world could use it at no cost and so that teachers around the world could uses its images and data, at no cost, to educate their students, and so that every person could gaze upon the wonders that telescope delivered to us and be marveled by our universe. Over 14,000 scientific papers have been published using data from Hubble. Over 1.3 million observations have been made.

There have been profitable technology spinoffs from the Hubble Space Telescope. For example, imaging technology developed for Hubble has found reuse in imaging of breast tissue to make early detections of cancer. But private companies can’t invest the kind of resources needed to build, launch, and operate a spacecraft like New Horizons or a telescope like Hubble with the hope that they’ll find ways to profit, later.

We will continue to need the will of the public to invest in scientific exploration with satisfaction achieved by the knowledge returned. But, there are many ways to utilize space that may be profitable for the private sector and may be inappropriate for government endeavors.

The aviation industry rose up almost overnight during World War I, as the government demanded an ever-growing need for aircraft for war use. But, once the war ended and those contracts started to be canceled, there was a very real risk that the aviation industry would completely implode. There just wasn’t a profitable market in sight. One place where aircraft were needed was postal delivery. The Contract Air Mail Act of 1925 (the Kelly Act) authorized the postmaster general to contract for domestic airmail service with commercial air carriers. This encouraged private companies to startup air freight businesses and compete for contracts. These mail carrying flights became regular and scheduled and bright enterprising entrepreneurs came up with the idea of selling tickets for passengers to ride on these aircraft, along with the mail. Airplanes became larger and as the industry became established and efficient the market grew. People became more trusting and tickets became cheaper, making passenger aviation a normal way to travel. Soon, the air carriers were making enough profit from the passengers that they didn’t really need to carry the mail to stay in business.

The commercial space industry is in a similar early state, today. The government has needs the private sector can fulfill and through those needs is subsidizing the research and development those private entities need to do to develop their technologies to the point where they can affordably meet the appetites of a market. By providing money to companies like SpaceX, Boeing, and Sierra-Nevada to develop human rated spacecraft to ferry our crews to and from ISS, we are helping them develop human rated spacecraft that they can use to take private paying individuals into space. SpaceX recently announced that they have two interested customers willing to pay to ride that Dragon spacecraft to space, around the Moon, and back to Earth.

The more these companies do these things, the more they can amortize the costs. The more they can amortize the costs, the less they need to charge customers. The less they need to charge customers, the larger the potential market of customers. Hopefully, eventually, they will reach a state where they can profit without government business.

At each step along the way, as the public funds the risky and expensive learning process, lessons are learned so that private entities can afford to do similar things. The world’s space agencies have funded the research, development, construction and operation of the International Space Station so that important research that will benefit society can be done. Along the way we have learned a lot about building and operating space stations and private companies like Bigelow have been able to benefit from our investment by using that knowledge to make the first steps into private space stations.

This happens over and over. We learn how to land a probe on a comet or asteroid and the information learned doing that is provided to private entities who have the vision to do similar things for a profit. If we learn how to land on an asteroid, extract a sample, and return it to Earth, they can expand upon that and land on an asteroid, mine that asteroid, and return valuable materials to Earth.

There are areas of space utilization that will be best fulfilled by the private sector and there are areas that are and will continue to be best fulfilled by the public sector. The relationship between the two is symbiotic, not parasitic.

#### Private Companies rely on governments when innovating. Private appropriation leads to private company backlash which destroys investments.

Nayef Al-Rodhan 15 (Nayef Al-Rodhan, Head of the 'Geopolitics and Global Futures Programme', Geneva Centre for Security Policy) The Privatization of Space: When Things Go Wrong 8-1-2015 No Publication https://www.gcsp.ch/global-insights/privatization-space-when-things-go-wrong //DebateDrills TJ

The explosion was likely caused by a failed strut. In October of last year, Orbital Sciences had a rocket destined for the ISS explode for unrelated reasons, just after they were awarded a $1.9 billion contract with NASA. In the wake of these incidents, it may be time to assess the implications of private sector involvement in state-sponsored space programs.

Over the past few years, private companies such as Space X and Virgin Galactic have been hailed as the new major players in space. Indeed, they are effectively changing how space exploration is conducted and how related technology is developed and implemented. From an operational point of view, private companies are able to implement decisions and fund projects much faster than most governments can.

These companies have been able to complete missions that only governments had been able to previously, and have garnered major contracts with NASA. But although this takes pressure off of governments and introduces a more competitive environment for space-related innovation, outsourcing government projects can lead to complications, or at the very least, a shift in how space exploration is conducted.

The most cited benefit of the shift to private space exploration is cost. These companies must bid for NASA contracts, which lowers the taxpayer cost of these missions, as some research and development R&D costs are absorbed by the company. Governments and private companies also function differently in terms of the different interest groups to whom they are responsible. NASA is beholden to the government and the taxpayer, while private companies must deal with a more complex web of investors/shareholders, the bottom line, and the need to keep a secure contract. Yet with these benefits, there are new challenges that must be addressed; perhaps the greatest of which is “what happens when something goes wrong”? Rocket missions and space travel are inherently difficult and risky; it’s only a matter of time before this becomes a bigger issue.

Government space programs are no strangers to failed launches, or to human casualties. In fact, the only space program which has no known casualties to date is China’s. Private companies have yet to amass significant casualties, with the only death occurring during a failed Virgin Galactic test flight in 2014. But because that flight was not part of a mission to the ISS and was not tied to any government contract, the implications were different. If an astronaut from NASA were killed in a launch orchestrated by a private company, there may be far-reaching effects both for NASA and for the company in question.

As aforementioned, governments are most likely not held accountable to the same degree as private companies are, as a government can control to some degree how transparent it wants to be. Furthermore, because there were no alternatives to government space programs, accidents were seen to some degree as par for the course. For instance, while the Challenger and Columbia disasters affected NASA’s operations (including an over two year hiatus form launching shuttles), it did not halt the space program. By comparison, private companies actually have a far more difficult set of issues to face in the case of a mishap. In a worst case scenario, a private company could make an easy scapegoat if ever a government’s legitimacy were to be threatened due to a mishap.

So far, Space X has had a practically flawless track record: under contract with NASA, it has already made seven trips to the ISS. NASA has a strong vested interest in these companies, even geopolitically speaking, as they end the Russian monopoly in supplying the ISS. Space X plans on sending humans to space in 2017, and NASA has publicly said that this last incident will not hinder that goal.

So far, so good. While these companies remain private, they still have to answer to their investors, and to governments, but otherwise have quite a large amount of freedom. What will happen when they go on the market? Overnight, the company would have to answer to its shareholders and function in a very different dynamic. The bottom line for a company is arguably more intensely scrutinized than where a government is investing its tax dollars. Given the benefits of private space exploration, it would behoove the government to stand behind such companies when things do go wrong. Whether in the form of subpar profits or launch explosions, the government should remain supportive of these companies. Either way, the shift to using private companies is well underway, and both companies and governments have a lot to gain from such a partnership. Still, it is important to forsee the change in dynamic that will undoubtedly occur once the going gets tough.

#### \*Private companies face backlash for failed launches. This destroys investments, and innovation won’t increase.

Lou Whiteman 21 (Lou Whiteman, Followed the market for over 2 decades, developed contacts with leaders, consultants, regulators) Investors Beware: Space Is Hard 1-4-2021 Motley Fool https://www.fool.com/investing/2021/01/04/investors-beware-space-is-hard/ //DebateDrills TJ

Lou Whiteman: Shares of Virgin Galactic (NYSE:SPCE) ended down 17% today, and that in and of itself isn't news that Virgin Galactic either went up or down 15%, 20%. What's news is there's actually a reason why today. Over the weekend, this space tourism company did a test flight and it did not go to plan. The onboard computer lost contact with the rocket motor, which caused an auto-abort, and the Unity spacecraft glided to Earth instead of rocketing into space. It's a failed test. That comes just days after SpaceX, Elon Musk's privately held company, saw the demonstration launch of its star ship interplanetary rocket end up in a fireball.

Look, let's not sugarcoat either of these. Neither of these went to plan, but in the grand scheme of things, both companies got a lot of wins from these failures. Virgin Galactic had a system fault but not a mechanical fault, and it ended up being a valuable proof of concept that its safety system works, which is a huge deal if you're going to send tourists into space. It glided down exactly how it was supposed to be. For SpaceX, the craft had a vertical liftoff. It climbed to eight miles. It returned to Earth. The issue there again was the tank pressure got too low, which caused the spacecraft not to decelerate enough, which caused it to crash on entry. But a lot of things went right there, and that's what testing is all about. The important takeaway, the investor lesson here is, as Jason said, space is hard. Virgin Galactic is the publicly traded company here. They have generated zero revenue, zero in each of their last two quarters, but it's valued at $6 billion on its potential. Nothing changed this weekend in terms of that potential, even though the stock is down 17% today. Almost inevitably, since humans started trying to leave this planet, things have not gone to script. There are a lot of tests, there are a lot of failures. This is a public company, so there is a lot of attention on it. It's bleeding edge science. Investors need to understand this. Again, we talked about speculative parts of a diversified portfolio. This is another stock that very much falls into that, but you need to understand that bleeding-edge science is trial and error, and error when you're dealing with rockets can be spectacular. If you're not ready for that, please don't buy the stock, OK? [laughs]