## 1

#### CP Plan text: Private entities

#### should collaborate on a joint mission to colonize mars

#### should ban anti-satellite weapons

#### Should ban the placement of weapons in outer space

## 2

#### Strong commercial space catalyzes tech innovation – progress at the margins and spinoff tech change global information networks

Joshua **Hampson 2017**, Security Studies Fellow at the Niskanen Center, 1-25-2017, “The Future of Space Commercialization”, Niskanen Center, https://republicans-science.house.gov/sites/republicans.science.house.gov/files/documents/TheFutureofSpaceCommercializationFinal.pdf

Innovation is generally hard to predict; some new technologies seem to come out of nowhere and others only take off when paired with a new application. It is difficult to predict the future, but **it is reasonable to expect that a growing space economy would open opportunities for technological and organizational innovation**. In terms of technology, **the difficult environment of outer space helps incentivize progress along the margins.** Because each object launched into orbit costs a significant amount of money—at the moment between $27,000 and $43,000 per pound, though that will likely drop in the future —each 19 reduction in payload size saves money or means more can be launched. At the same time, the ability to fit more capability into a smaller satellite opens outer space to actors that previously were priced out of the market. This is one of the reasons why small, affordable satellites are increasingly pursued by companies or organizations that cannot afford to launch larger traditional satellites. These small 20 satellites also provide non-traditional launchers, such as engineering students or prototypers, the opportunity to learn about satellite production and test new technologies before working on a full-sized satellite. **That expansion of developers, experimenters, and testers cannot but help increase innovation opportunities**. **Technological developments from outer space have been applied to terrestrial life since the earliest days of space exploration**. The National Aeronautics and Space Administration (NASA) maintains a website that lists technologies that have spun off from such research projects**. Lightweight** 21 **nanotubes**, useful in protecting astronauts during space exploration, **are now being tested for applications in emergency response gear and electrical insulation**. The need for certainty about the resiliency of materials used in space led to the development of an analytics tool useful across a range of industries. Temper foam, the material used in memory-foam pillows, was developed for NASA for seat covers. **As more companies pursue their own space goals, more innovations will likely come from the commercial sector. Outer space is not just a catalyst for technological development.** Satellite constellations and their unique line-of-sight vantage point **can provide new perspectives to old industries**. Deploying satellites into low-Earth orbit, as Facebook wants to do, can connect large, previously-unreached swathes of 22 humanity to the Internet. **Remote sensing technology could change how whole industries operate, such as crop monitoring, herd management, crisis response, and land evaluation, among others**. 23 While satellites cannot provide all essential information for some of these industries, they can fill in some useful gaps and work as part of a wider system of tools. **Space infrastructure, in helping to change how people connect and perceive Earth, could help spark innovations on the ground as well. These innovations, changes to global networks, and new opportunities could lead to wider economic growth.**

#### Short innovation cycles mean every contract counts

John J. **Klein 19**, Senior Fellow and Strategist at Falcon Research Inc. and adjunct professor at the George Washington University Space Policy Institute, 1-15-2019, "Rethinking Requirements and Risk in the New Space Age," Center for a New American Security, https://www.cnas.org/publications/reports/rethinking-requirements-and-risk-in-the-new-space-age

Unfortunately, these variances in models between the MDAP’s lengthy development cycle and the commercial space sector’s 18-month innovation cycle are a result of stark differences in thinking about requirements and risk. Requirements and risk for MDAPs commonly focus on ensuring critical mission capabilities at a given cost. In contrast, the commercial space sector tends to focus more on providing innovation quickly using economies of scale. The commercial sector understands that time dynamically shapes decisions related to requirements and risk **because of the relatively short innovation cycle**. **In a highly competitive space sector with tight profit margins, those unable to innovate quickly will likely be out of business soon**. Alternatively, space systems with mission assurance requirements – where failures are detrimental to national security and military operations – often drive DoD’s timelines. Program managers of critical national security space systems commonly require additional time to test and verify that satellites can perform missions with a very low probability of failure.

#### Tech innovation solves every existential threat – cumulative extinction events outweigh the aff

Dylan **Matthews 18**. Co-founder of Vox, citing Nick Beckstead @ Rutgers University. 10-26-2018. "How to help people millions of years from now." Vox. https://www.vox.com/future-perfect/2018/10/26/18023366/far-future-effective-altruism-existential-risk-doing-good

If you care about improving human lives, you should overwhelmingly care about those quadrillions of lives rather than the comparatively small number of people alive today. The 7.6 billion people now living, after all, amount to less than 0.003 percent of the population that will live in the **future**. It’s reasonable to suggest that those **quadrillions** of future people have, accordingly, **hundreds of thousands of times** more moral weight than those of us living here **today** do. That’s the basic argument behind Nick Beckstead’s 2013 Rutgers philosophy dissertation, “On the overwhelming importance of shaping the far future.” It’s a glorious mindfuck of a thesis, not least because Beckstead shows very convincingly that this is a conclusion any plausible moral view would reach. It’s not just something that weird utilitarians have to deal with. And Beckstead, to his considerable credit, walks the walk on this. He works at the Open Philanthropy Project on grants relating to the far future and runs a charitable fund for donors who want to prioritize the far future. And arguments from him and others have turned “long-termism” into a very vibrant, important strand of the effective altruism community. But what does prioritizing the far future even mean? The most **literal** thing it could mean is preventing human **extinction**, to ensure that the species persists as long as possible. For the long-term-focused effective altruists I know, that typically means identifying concrete threats to humanity’s continued existence — like unfriendly artificial intelligence, or a pandemic, or global warming/out of control geoengineering — and engaging in activities to prevent that specific eventuality. But in a set of slides he made in 2013, Beckstead makes a compelling case that while that’s certainly **part** of what caring about the far future entails, approaches that address **specific threats** to humanity (which he calls “**targeted**” approaches to the far future) have to **complement** “**broad**” approaches, where instead of trying to **predict** what’s going to kill us all, you just **generally try to keep civilization running as best it can**, so that it is, as a whole, well-equipped to deal with **potential** extinction events in the **future**, not just in 2030 or 2040 but in 3500 or 95000 or even 37 million. In other words, caring about the far future **doesn’t mean just paying attention to low-probability risks of total annihilation**; it also means **acting on pressing needs now**. For example: We’re going to be **better prepared** to prevent extinction from **AI** or a **supervirus** or **global warming** if society as a whole makes **a lot of scientific progress**. And a significant bottleneck there is that the vast majority of humanity doesn’t get high-enough-quality education to engage in scientific research, if they want to, which reduces the odds that we have enough trained scientists to come up with the breakthroughs we need as a civilization to survive and thrive. So maybe one of the **best thing**s we can do for the **far future** is to improve school systems — here and now — to harness the group economist Raj Chetty calls “lost Einsteins” (**potential innovators** who are thwarted by poverty and inequality in rich countries) and, more importantly, the hundreds of millions of kids in developing countries dealing with even worse education systems than those in depressed communities in the rich world. What if living ethically for the far future means living ethically now? Beckstead mentions some other broad, or very broad, ideas (these are all his descriptions): Help make computers faster so that people everywhere can work more efficiently Change intellectual property law so that technological innovation can happen more quickly Advocate for open borders so that people from poorly governed countries can move to better-governed countries and be more productive Meta-research: improve **incentives** and **norms** in **academic work** to better advance human knowledge Improve education Advocate for political party X to make future people have values more like political party X ”If you look at these areas (economic growth and technological progress, access to information, individual capability, social coordination, motives) a lot of everyday good works contribute,” Beckstead writes. “An implication of this is that a lot of everyday good works are good from a broad perspective, even though hardly anyone thinks explicitly in terms of far future standards.” Look at those examples again: It’s just a list of what normal altruistically motivated people, not effective altruism folks, generally do. Charities in the US love talking about the lost opportunities for innovation that poverty creates. Lots of smart people who want to make a difference become scientists, or try to work as teachers or on improving education policy, and lord knows there are plenty of people who become political party operatives out of a conviction that the moral consequences of the party’s platform are good. All of which is to say: Maybe effective altruists aren’t that special, or at least maybe we don’t have access to that many specific and weird conclusions about how best to help the world. If the far future is what matters, and generally trying to make the world work better is among the best ways to help the far future, then effective altruism just becomes plain ol’ do-goodery.\*

## Case

### Mars Colonization Impossible

#### Terraforming is thousands of years beyond modern tech – Mars is inhospitable without it – this answers the entirety of the AFF because there’s no risk of private companies colonizing Mars or anyone colonizing space or even really trying to

Dvorsky 19 [George, senior staff reporter at Gizmodo,interviewing Louis Friedman, Louis Friedman, co-founder of the Planetary Society and author of [Human Spaceflight: From Mars to the Stars](https://www.amazon.com/Human-Spaceflight-Stars-Louis-Friedman-ebook/dp/B015PSMY0U/ref=sr_1_1?ascsubtag=feef34302a6f72b4900cf2e8c74515f465a2d4e2&keywords=louis%20friedman%20human%20spaceflight&qid=1561146564&s=books&sr=1-1&tag=gizmodoamzn-20) “Humans Will Never Colonize Mars”, July 30 2019, https://gizmodo.com/humans-will-never-colonize-mars-1836316222]

Indeed, there’s the whole terraforming issue to consider. By terraforming, scientists are referring to the hypothetical prospect of geoengineering a planet to make it habitable for humans and other life. For Mars, that would mean the injection of oxygen and other gases into the atmosphere to raise surface temperature and air pressure, among other interventions. A common argument in favor of colonizing Mars is that it’ll allow us to begin the process of transforming the planet to a habitable state. This scenario has been tackled by a number of science fiction authors, including Kim Stanley Robinson in his acclaimed [Mars Trilogy](https://en.wikipedia.org/wiki/Mars_trilogy). But as Friedman told Gizmodo, “that’s thousands of years in the making at least.”

Briony Horgan, assistant professor of planetary science at Purdue University, said Martian terraforming is a pipedream, a prospect that’s “way beyond any kind of technology we’re going to have any time soon,” she told Gizmodo.

When it comes to terraforming Mars, there’s also the logistics to consider, and the materials available to the geoengineers who would dare to embark upon such a multi-generational project. In their 2018 Nature [paper](https://www.nature.com/articles/s41550-018-0529-6.epdf?referrer_access_token=lqERczHSI99c5B_64JaYztRgN0jAjWel9jnR3ZoTv0OEVA2jqQmP7EVNMm-ws-AK2qvV3jqjjKzdN3x5KmRjmQqju09-PjQJ8zCeWpX5cRBf1vFd-yEmo1uJPuaXmvDPws9JVqzbyoFDp346VCec3whkw9iiPnIcbAeDD8uUX9zd-LSpnBLUypHl3m4cvyWC5IONDo6Lad1p4XaikY8S_nWQI6osakR76L4Cnq8XEKS9j2bBP2FKXYwK8iUjT8I5GzL4Y1OrnmKJh2sCP1t73sbZ9lXyJs1dDxTDiIgsjZWHMv4sPRPSPcXBIVgNi81s&tracking_referrer=www.newscientist.com), Bruce Jakosky and Christopher Edwards from the University of Colorado, Boulder sought to understand how much carbon dioxide would be needed to increase the air pressure on Mars to the point where humans could work on the surface without having to wear pressure suits, and to increase temperature such that liquid water could exist and persist on the surface. Jakosky and Edwards concluded that there’s [not nearly enough CO2 on Mars required for terraforming](https://www.newscientist.com/article/2175414-terraforming-mars-might-be-impossible-due-to-a-lack-of-carbon-dioxide/), and that future geoengineers would have to somehow import the required gases to do so.

#### Water on Mars is impossible – growing food there is impossible with current tech

Dvorsky 19 [George, senior staff reporter at Gizmodo,interviewing Louis Friedman, Louis Friedman, co-founder of the Planetary Society and author of [Human Spaceflight: From Mars to the Stars](https://www.amazon.com/Human-Spaceflight-Stars-Louis-Friedman-ebook/dp/B015PSMY0U/ref=sr_1_1?ascsubtag=feef34302a6f72b4900cf2e8c74515f465a2d4e2&keywords=louis%20friedman%20human%20spaceflight&qid=1561146564&s=books&sr=1-1&tag=gizmodoamzn-20) “Humans Will Never Colonize Mars”, July 30 2019, https://gizmodo.com/humans-will-never-colonize-mars-1836316222]

Finally, there’s the day-to-day survival to consider. Limited access to fundamental resources, like food and water, could place further constraints on a colony’s ability to grow and thrive.

“Establishing stable resources to live off for a long period of time is possible, but it’ll be tough,” said Horgan. “We’ll want to be close to water and water ice, but for that we’ll have to go pretty far north. But the further north you go, the rougher the conditions get on the surface. The winters are cold, and there’s less sunlight.”

Colonists will also need stable food sources, and figure out a way to keep plants away from radiation. The regolith, or soil, on Mars is toxic, containing dangerous [perchlorate chemicals](https://www.space.com/37402-mars-life-soil-toxic-perchlorates-radiation.html), so that also needs to be avoided. To grow crops, colonists will likely build [subterranean hydroponic greenhouses](https://www.nasa.gov/feature/lunar-martian-greenhouses-designed-to-mimic-those-on-earth). This will require specialized lighting, [genetically modified plants designed specifically for Mars](https://theconversation.com/how-to-grow-crops-on-mars-if-we-are-to-live-on-the-red-planet-99943), and plenty of water, the latter of which will be difficult to source on Mars.

“People don’t realize how complicated this is,” said Horgan. “Trying to think about establishing colonies to point of what we would consider safe will be a big challenge.”

Technological solutions to these problems may exist, as are medical interventions to treat Martian-specific diseases. But again, nothing that we could possibly develop soon. And even if we do develop therapies to treat humans living on Mars, these interventions are likely to be limited in scope, with patients requiring constant care and attention.

#### Warming Impacts are improbable hyperbole and innovation checks

Ridley, 14 – [Matt Ridley, Author of The Rational Optimist & member of the House of Lords,“Junk Science Week: IPCC commissioned models to see if global warming would reach dangerous levels this century. Consensus is ‘no’, Special to Financial Post, 6-19-2014 http://business.financialpost.com/2014/06/19/ipcc-climate-change-warming/] Jeong

The debate over climate change is horribly polarized. From the way it is conducted, you would think that only two positions are possible: that the whole thing is a hoax or that catastrophe is inevitable. In fact there is room for lots of intermediate positions, including the view I hold, which is that man-made climate change is real but not likely to do much harm, let alone prove to be the greatest crisis facing humankind this century. After more than 25 years reporting and commenting on this topic for various media organizations, and having started out alarmed, that’s where I have ended up. But it is not just I that hold this view. I share it with a very large international organization, sponsored by the United Nations and supported by virtually all the world’s governments: the Intergovernmental Panel on Climate Change (IPCC) itself. The IPCC commissioned four different models of what might happen to the world economy, society and technology in the 21st century and what each would mean for the climate, given a certain assumption about the atmosphere’s “sensitivity” to carbon dioxide. Three of the models show a moderate, slow and mild warming, the hottest of which leaves the planet just 2 degrees Centigrade warmer than today in 2081-2100. The coolest comes out just 0.8 degrees warmer. Now two degrees [above pre-indistrial levels] is the threshold at which warming starts to turn dangerous, according to the scientific consensus. That is to say, in three of the four scenarios considered by the IPCC, by the time my children’s children are elderly, the earth will still not have experienced any harmful warming, let alone catastrophe. But what about the fourth scenario? This is known as RCP8.5, and it produces 3.5 degrees of warming in 2081-2100 [or 4.3 degrees above pre-industrial levels]. Curious to know what assumptions lay behind this model, I decided to look up the original paper describing the creation of this scenario. Frankly, I was gobsmacked. It is a world that is very, very implausible. For a start, this is a world of “continuously increasing global population” so that there are 12 billion on the planet. This is more than a billion more than the United Nations expects, and flies in the face of the fact that the world population growth rate has been falling for 50 years and is on course to reach zero – i.e., stable population – in around 2070. More people mean more emissions. Second, the world is assumed in the RCP8.5 scenario to be burning an astonishing 10 times as much coal as today, producing 50% of its primary energy from coal, compared with about 30% today. Indeed, because oil is assumed to have become scarce, a lot of liquid fuel would then be derived from coal. Nuclear and renewable technologies contribute little, because of a “slow pace of innovation” and hence “fossil fuel technologies continue to dominate the primary energy portfolio over the entire time horizon of the RCP8.5 scenario.” Energy efficiency has improved very little. These are highly unlikely assumptions. With abundant natural gas displacing coal on a huge scale in the United States today, with the price of solar power plummeting, with nuclear power experiencing a revival, with gigantic methane-hydrate gas resources being discovered on the seabed, with energy efficiency rocketing upwards, and with population growth rates continuing to fall fast in virtually every country in the world, the one thing we can say about RCP8.5 is that it is very, very implausible. Notice, however, that even so, it is not a world of catastrophic pain. The per capita income of the average human being in 2100 is three times what it is now. Poverty would be history. So it’s hardly Armageddon. But there’s an even more startling fact. We now have many different studies of climate sensitivity based on observational data and they all converge on the conclusion that it is much lower than assumed by the IPCC in these models. It has to be, otherwise global temperatures would have risen much faster than they have over the past 50 years. As Ross McKitrick noted on this page earlier this week, temperatures have not risen at all now for more than 17 years. With these much more realistic estimates of sensitivity (known as “transient climate response”), even RCP8.5 cannot produce dangerous warming. It manages just 2.1C of warming by 2081-2100 [see table 3 in the report by Lewis and Crok here] That is to say, even if you pile crazy assumption upon crazy assumption till you have an edifice of vanishingly small probability, you cannot even manage to make climate change cause minor damage in the time of our grandchildren, let alone catastrophe. That’s not me saying this – it’s the IPCC itself. But what strikes me as truly fascinating about these scenarios is that they tell us that globalization, innovation and economic growth are unambiguously good for the environment. At the other end of the scale from RCP8.5 is a much more cheerful scenario called RCP2.6. In this happy world, climate change is not a problem at all in 2100, because carbon dioxide emissions have plummeted thanks to the rapid development of **c**heap nuclear and solar, plus a surge in energy efficiency. The RCP2.6 world is much, much richer. The average person has an income about 16 times today’s in real terms, so that most people are far richer than Americans are today. And it achieves this by free trade, massive globalization, and lots of investment in new technology. All the things the green movement keeps saying it opposes because they will wreck the planet. The answer to climate change is, and always has been, innovation. To worry now in 2014 about a very small, highly implausible set of circumstances in 2100 that just might, if climate sensitivity is much higher than the evidence suggests, produce a marginal damage to the world economy, makes no sense. Think of all the innovation that happened between 1914 and 2000. Do we really think there will be less in this century? As for how to deal with that small risk, well there are several possible options. You could encourage innovation and trade. You could put a modest but growing tax on carbon to nudge innovators in the right direction. You could offer prizes for low-carbon technologies. All of these might make a little sense. But the one thing you should not do is pour public subsidy into supporting old-fashioned existing technologies that produce more carbon dioxide per unit of energy even than coal (bio-energy), or into ones that produce expensive energy (existing solar), or that have very low energy density and so require huge areas of land (wind).

### Space col good

#### Colonizing mars specifically is good –solves resources, solves the root cause of global wars

[Strainchamps](https://www.ttbook.org/people/anne-strainchamps) interviewing Zubrin 22 – Robert Zubrin is a Ph.D. in Nuclear Engineering, M.S. in Aeronautics and Astronautics, from University of Washington [Anne, “How A Colony On Mars Would Change Everything On Earth,” posted online 2/15/2022, https://www.ttbook.org/interview/how-colony-mars-would-change-everything-earth]

Fear about the future of the planet keeping you up at night? Aerospace engineer Robert Zubrin has a solution: it’s time to settle Mars. "We’re entirely ready," he said. "We're better prepared today to send people to Mars than we were to go to the moon in 1961. Given a serious decision, we could have people there within 10 years."

Zubrin has been trying to get to Mars for a long time. He spent decades with Lockheed Martin and Martin Marietta Astronautics, working on knotty problems in space propulsion and making plans for interplanetary colonization. At 67, he’s putting his hope in Elon Musk’s Space X program.

"If it keeps moving forward at the rate it currently is" Zurbin told Charles Monroe-Kane for "To The Best Of Our Knowledge," "I’d say they’ll land before the end of the 2020s."

His prediction? It’ll be the best thing that could happen to Planet Earth.

This transcript has been edited for clarity and length.

Charles Monroe-Kane: What’s in this for Earthlings? Why colonize Mars?

Robert Zubrin: A number of reasons. There’s the one NASA gives — for science. There’s the positive stimulus of the challenge, especially for the youth. But here’s the thing: what is the greatest danger humanity faces? What caused the disasters of the 20th century? Bad ideas! In particular, variants of one continuous bad idea, which is that there isn’t enough to go around, so we have to push other people aside and even exterminate them in order to take what there is.

I know for a fact — because I've spoken with them — that there are people in the Pentagon who look at the rise of China and say "this has got to be stopped; if they all become middle class, there won’t be enough oil in the world." If that kind of thinking prevails, it will lead to more wars.

Human exploration and settlement of Mars is a disproof of this theory. We can open up whole new worlds of resources if we exercise our creativity. It’s the only positive answer.

CMK: How would this work, exactly? What’s the plan?

RZ: The way to go is with a few small exploration missions to find the right place for a permanent outpost. Then you send lots of cargos with habitations. Then you send a few groups of people to set up greenhouses for food production and facilities to manufacturer plastics, steel, propellant, and oxygen. And once you create the capacity for people to be self-supportive, you can send more and more of them.

So it won’t be like the Normandy landing, with 100,000 people the first day and another 100,000 in the second wave. It’ll be more organic growth.

CMK: What about water?

RB: There's water on Mars — and not just at the poles. That’s one of the discoveries to come out of NASA’s very successful robotic planetary exploration program. We have now discovered glaciers on Mars at about the same latitude as San Francisco on Earth. They contain more water than the American Great Lakes and they're covered by only a few feet of dust and sand. So they're within shoveling distance.

#### Privatization is necessary for space colonization – disruptions kill that potential

Thiessen ‘20 – writes a twice-weekly column for The Post on foreign and domestic policy. He is a fellow at the American Enterprise Institute, and the former chief speechwriter for President George W. Bush. (Marc A., "SpaceX’s success is one small step for man, one giant leap for capitalism," Washington Post, 6-1-2020, https://www.washingtonpost.com/opinions/2020/06/01/spacexs-success-is-one-small-step-man-one-giant-leap-capitalism/, Accessed 1-6-2021, )

It was one small step for man, one giant leap for capitalism. Only three countries have ever launched human beings into orbit. This past weekend, SpaceX became the first private company ever to do so, when it sent its Crew Dragon capsule into space aboard its Falcon 9 rocket and docked with the International Space Station. This was accomplished by a company Elon Musk started in 2002 in a California strip mall warehouse with just a dozen employees and a mariachi band. At a time when our nation is debating the merits of socialism, SpaceX has given us an incredible testament to the power of American free enterprise. While the left is advocating unprecedented government intervention in almost every sector of the U.S. economy, from health care to energy, today Americans are celebrating the successful privatization of space travel. If you want to see the difference between what government and private enterprise can do, consider: It took a private company to give us the first space vehicle with touch-screen controls instead of antiquated knobs and buttons. It took a private company to give us a capsule that can fly entirely autonomously from launch to landing — including docking — without any participation by its human crew. It also took a private company to invent a reusable rocket that can not only take off but land as well. When the Apollo 11 crew reached the moon on July 20, 1969, Neil Armstrong declared “the Eagle has landed.” On Saturday, SpaceX was able to declare that the Falcon had landed when its rocket settled down on a barge in the Atlantic Ocean — ready to be used again. That last development will save the taxpayers incredible amounts of money. The cost to NASA for launching a man into space on the space shuttle orbiter was $170 million per seat, compared with just $60 million to $67 million on the Dragon capsule. The cost for the space shuttle to send a kilogram of cargo into to space was $54,500; with the Falcon rocket, the cost is just $2,720 — a decrease of 95 percent. And while the space shuttle cost $27.4 billion to develop, the Crew Dragon was designed and built for just $1.7 billion — making it the lowest-cost spacecraft developed in six decades. SpaceX did it in six years — far faster than the time it took to develop the space shuttle. The private sector does it better, cheaper, faster and more efficiently than government. Why? Competition. Today, SpaceX has to compete with a constellation of private companies — including legacy aerospace firms such as Orbital ATK and United Launch Alliance and innovative start-ups such as Blue Origin (which is designing a Mars lander and whose owner, Jeff Bezos, also owns The Post) and Virgin Orbit (which is developing rockets than can launch satellites into space from the underside of a 747, avoiding the kinds of weather that delayed the Dragon launch). In the race to put the first privately launched man into orbit, upstart SpaceX had to beat aerospace behemoth Boeing and its Starliner capsule to the punch. It did so — for more than $1 billion less than its competitor. That spirit of competition and innovation will revolutionize space travel in the years ahead. Indeed, Musk has his sights set far beyond Earth orbit. Already, SpaceX is working on a much larger version of the Falcon 9 reusable rocket called Super Heavy that will carry a deep-space capsule named Starship capable of carrying up to 100 people to the moon and eventually to Mars. Musk’s goal — the reason he founded SpaceX — is to colonize Mars and make humanity a multiplanetary species. He has set a goal of founding a million-person city on Mars by 2050 complete with iron foundries and pizza joints. Can it be done? Who knows. But this much is certain: Private-sector innovation is opening the door to a new era of space exploration. Wouldn’t it be ironic if, just as capitalism is allowing us to explore the farthest reaches of our solar system, Americans decided to embrace socialism back here on Earth?

#### Happens by 2050s---solves every impact BUT degrowth disrupts progress

Drake '16 – a science journalist and contributing writer at National Geographic. She earned an A.B. in biology, psychology, and dance at Cornell University, worked in a clinical genetics lab at The Johns Hopkins University School of Medicine, then returned to Cornell for her Ph.D. in genetics and development. (Bynadia, "Elon Musk: A Million Humans Could Live on Mars By the 2060s," Science, 9-27-2016, https://www.nationalgeographic.com/science/article/elon-musk-spacex-exploring-mars-planets-space-science, Accessed 6-10-2021, )

In perhaps the most eagerly anticipated aerospace announcement of the year, SpaceX founder Elon Musk has revealed his grand plan for establishing a human settlement on Mars. In short, Musk thinks it’s possible to begin shuttling thousands of people between Earth and our smaller, redder neighbor sometime within the next decade or so. And not too long after that—perhaps 40 or a hundred years later, Mars could be home to a self-sustaining colony of a million people. “This is not about everyone moving to Mars, this is about becoming multiplanetary,” he said on September 27 at the International Astronautical Congress in Guadalajara, Mexico. “This is really about minimizing existential risk and having a tremendous sense of adventure.” Musk’s timeline sounds ambitious, and that's something he readily acknowledges. “I think the technical outline of the plan is about right. He also didn’t pretend that it was going to be easy and that they were going to do it in ten years,” says Bobby Braun, NASA’s former chief technologist who’s now at Georgia Tech University. “I mean, who’s to say what’s possible in a hundred years?” And for those wondering whether we should go at all, the reason for Musk making Mars an imperative is simple. “The future of humanity is fundamentally going to bifurcate along one of two directions: Either we’re going to become a multiplanet species and a spacefaring civilization, or we’re going be stuck on one planet until some eventual extinction event,” Musk told Ron Howard during an interview for National Geographic Channel’s MARS, a global event series that premieres worldwide on November 14. “For me to be excited and inspired about the future, it’s got to be the first option. It’s got to be: We’re going to be a spacefaring civilization.” Mars Fleet Though he admitted his exact timeline is fuzzy, Musk thinks it’s possible humans could begin flying to Mars by the mid-2020s. And he thinks the plan for getting there will go something like this: It starts with a really big rocket, something at least 200 feet tall when fully assembled. In a simulation of what SpaceX calls its Interplanetary Transport System, a spacecraft loaded with astronauts will launch on top of a 39-foot-wide booster that produces a whopping 28 million pounds of thrust. Using 42 Raptor engines, the booster will accelerate the assemblage to 5,374 miles an hour. Overall, the whole thing is 3.5 times more powerful than NASA’s Saturn V, the biggest rocket built to date, which carried the Apollo missions to the moon. Perhaps not coincidentally, the SpaceX rocket would launch from the same pad, 39A, at Kennedy Space Center in Cape Canaveral, Florida. The rocket would deliver the crew capsule to orbit around Earth, then the booster would steer itself toward a soft landing back at the launch pad, a feat that SpaceX rocket boosters have been doing for almost a year now. Next, the booster would pick up a fuel tanker and carry that into orbit, where it would fuel the spaceship for its journey to Mars. Once en route, that spaceship would deploy solar panels to harvest energy from the sun and conserve valuable propellant for what promises to be an exciting landing on the Red Planet. As Musk envisions it, fleets of these crew-carrying capsules will remain in Earth orbit until a favorable planetary alignment brings the two planets close together—something that happens every 26 months. “We’d ultimately have upward of a thousand or more spaceships waiting in orbit. And so the Mars colonial fleet would depart en masse,” Musk says. The key to his plan is reusing the various spaceships as much as possible. “I just don’t think there’s any way to have a self-sustaining Mars base without reusability. I think this is really fundamental,” Musk says. “If wooden sailing ships in the old days were not reusable, I don’t think the United States would exist.” Musk anticipates being able to use each rocket booster a thousand times, each tanker a hundred times, and each spaceship 12 times. At the beginning, he imagines that maybe a hundred humans would be hitching a ride on each ship, with that number gradually increasing to more than 200. By his calculations, then, putting a million people on Mars could take anywhere from 40 to a hundred years after the first ship launches. And, no, it would not necessarily be a one-way trip: “I think it’s very important to give people the option of returning,” Musk says. Colonizing Mars After landing a few cargo-carrying spacecraft without people on Mars, starting with the Red Dragon capsule in 2018, Musk says the human phase of colonization could begin. For sure, landing a heavy craft on a planet with a thin atmosphere will be difficult. It was tough enough to gently lower NASA’s Curiosity rover to the surface, and at 2,000 pounds, that payload weighed just a fraction of Musk’s proposed vessels. For now, Musk plans to continue developing supersonic retrorockets that can gradually and gently lower a much heavier spacecraft to the Martian surface, using his reusable Falcon 9 boosters as a model. And that’s not all these spacecraft will need: Hurtling through the Martian atmosphere at supersonic speeds will test even the most heat-tolerant materials on Earth, so it’s no small task to design a spacecraft that can withstand a heated entry and propulsive landing—and then be refueled and sent back to Earth so it can start over again. The first journeys would primarily serve the purpose of delivering supplies and establishing a propellant depot on the Martian surface, a fuel reservoir that could be tapped into for return trips to Earth. After that depot is set up and cargo delivered to the surface, the fun can (sort of) begin. Early human settlers will need to be good at digging beneath the surface and dredging up buried ice, which will supply precious water and be used to make the cryo-methane propellant that will power the whole enterprise. As such, the earliest interplanetary spaceships would probably stay on Mars, and they would be carrying mostly cargo, fuel, and a small crew: “builders and fixers” who are “the hearty explorer type,” Musk said to Howard. “Are you prepared to die? If that’s OK, then you’re a candidate for going.” While there will undoubtedly be intense competition and lots of fanfare over the first few seats on a Mars-bound mission, Musk worries that too much emphasis will be placed on those early bootprints. “In the sort of grander historical context, what really matters is being able to send a large number of people, like tens of thousands if not hundreds of thousands of people, and ultimately millions of tons of cargo,” he says.

### At microbes

#### No internal to contamination – they are all powertagged. Rolfe only gets to humans brings microbes but no ! to them leading to extinction

#### Zero microbial life on mars – the dirt is poison

Kluger 17 [Jeffrey Kluger is Editor at Large for TIME magazine and the author of ten books, including Apollo 13, Apollo 8 and two novels for young adults. He has written more than 40 cover stories for TIME on topics ranging from space to human behavior to climate to medicine. Along with others at TIME, Kluger is an Emmy nominee for the web series A Year in Space. "Why Life on Mars May Be Impossible." https://time.com/4845251/mars-life-toxins-microbes/]

Mars is a lousy place to try to live—what with the paralyzing cold, the blistering radiation and the thin carbon dioxide atmosphere. That hasn’t stopped us from looking for life on Mars or from hoping to live there ourselves one day. The Red Planet was once a watery world like ours, after all, with oceans and seas and rushing river valleys. Microbial life that got started in those days could, scientists theorize, still be holding on in pockets today.

That theory may well be a good one, but the odds just got a lot slimmer. According to a new study in Scientific Reports, the Martian soil itself may be toxic to bacteria. Any microorganisms that could have emerged in the past would be poisoned to death today.

#### Only life on Earth matters – Humans are unique, but bacteria exists across the universe. That raises the moral imperative to save humans at the expense of small alien species, because the scarcity of humanity gives it moral weight.

Ozimek 17 [Adam Ozimek, economist at Moody's Analytics, where he covers labor markets and other aspects of the U.S. economy. Sorry Nerds, But Colonizing Other Planets Is Not A Good Plan. May 6, 2017. https://www.forbes.com/sites/modeledbehavior/2017/05/06/sorry-nerds-but-colonizing-other-planets-is-not-a-good-plan/#dbaea3551e66]

ADDENDUM: The goal of colonizing to preserve the human species rather than evacuate all humans doesn't make sense either. If there are habitable planets within reach, then there must be many, many habitable planets that aren't within reach. In this case the Drake Equation implies humans are not alone in the universe, and therefore our existence is far less special, lowering the benefit of preserving humanity. In a world of other habitable planets, saving the actual life on earth grows in importance compared to preserving the species somewhere in the universe.

#### Extensive protective measures against back contamination AND its scientifically impossible

Meltzer 10 [Michael, degrees in physics, geophysics, and environmental sci - ence and engineering from the University of California. Michael Meltzer has been writing books and articles about science and technol - ogy for over 30 years. He has investigated topics that include NASA expeditions to Jupiter and Saturn, planetary environmental protection, solar house design, industrial pollution prevention, and the history of U.S. commercial fishing. He was an engineer at Lawrence Livermore National Laboratory for 15 years, where he helped start a pollution prevention program. “When Biospheres Collide: A History of NASA’s Planetary Exploration Programs” p. 35-36]

Prioritizing planetary protection. Beginning with WESTEX’s initial meetings in 1959–1960, Lederberg as well as Carl Sagan (figure 2.4) advocated that a high priority be placed on preventing planetary probes from carrying terrestrial contamination into space, and nearly as high a priority on the prevention of back contamination from sample return missions. Lederberg and Sagan lobbied to make these priorities NAS SSB’s official policy and to present them to COSPAR, which had become an important international forum for exobiology matters. Lederberg and Sagan’s lobbying efforts proved very effective at bringing planetary protection issues to the fore and incorporating them into space science policy at all levels. Allan H. Brown, a scientist on NASA’s Biosciences subcommittee, also advocated taking steps to prevent back contamination, underlining (as Lederberg and Sagan did) that even if the risk of such contamination was very small, the scale of harm could be huge indeed. In 1963, COSPAR agreed to form an anticontamination panel.62 62. 35A dissenting voice. Norman Horowitz was a WESTEX member who had quite a different view on back contamination. Although he gave some support to spacecraft sterilization as a means of preventing forward contamination, he considered the attention given to back contamination to be overblown. Belief in the supposed danger of back contamination, according to Horowitz, rested on three assumptions, each of which he thought was improbable: • Microorganisms will be found on the planets. • They will prove dangerous to humans. • We would be unable to cope with them if they were brought back to Earth and escaped from quarantine. The probability that the microbes would run rampant on Earth could be estimated by taking the product of the probability of each of the bulleted items (in other words, multiplying together the small probabilities of each of the above events should they occur). This would, in Horowitz’s mind, produce a very small overall probability of contaminating Earth—so small that he stated, regarding sample materials brought back from Mars: “I would be willing to run the risk involved in a premature return trip, if a less bold schedule meant that a sample of Martian soil could not be brought back to earth in my lifetime.”63 Horowitz argued that the slight risk of introducing

#### Disease doesn’t cause extinction.

Halstead 19 – John Halstead, doctorate in political philosophy. [Cause Area Report: Existential Risk, Founders Pledge, https://founderspledge.com/research/Cause%20Area%20Report%20-%20Existential%20Risk.pdf]//BPS

However, there are some reasons to think that naturally occurring pathogens are unlikely to cause human extinction. Firstly, Homo sapiens have been around for 200,000 years and the Homo genus for around six million years without being exterminated by an infectious disease, which is evidence that the base rate of extinction-risk natural pathogens is low.82 Indeed, past disease outbreaks have not come close to rendering humans extinct. Although bodies were piled high in the streets across Europe during the Black Death,83 human extinction was never a serious possibility, and some economists even argue that it was a boon for the European economy.84 Secondly, infectious disease has only contributed to the extinction of a small minority of animal species.85 The only confirmed case of a mammalian species extinction being caused by an infectious disease is a type of rat native only to Christmas Island. Having said that, the context may be importantly different for modern day humans, so it is unclear whether the risk is increasing or decreasing. On the one hand, due to globalisation, the world is more interconnected making it easier for pathogens to spread. On the other hand, interconnectedness could also increase immunity by increasing exposure to lower virulence strains between subpopulations.87 Moreover, advancements in medicine and sanitation limit the potential damage an outbreak might do.

#### Media hype over diseases detracts from health education and results in more counterproductive measures

Belluz 15— Health reporter (Julia, “Ebola doctor Craig Spencer says media's disease hype was deadly,” Vox, February 26, 2015, <http://www.vox.com/2015/2/26/8114299/ebola-media>). WM

Yesterday, I was on the phone with a Liberian man who survived the world's worst Ebola epidemic. I asked him to rate his fear of the virus during the height of spread in his home city, Monrovia. When he knew little about the disease, he said, he was extremely fearful, even preemptively pulling his children out of their classes before schools across the country shutdown. But as he learned more, his fears went away. "Ebola is simple," he reasoned, calmly. "Obey the rules and you won't get infected." Then he said something interesting: "The media hype on Ebola was so much that the fear of Ebola probably killed a lot of people." He was speaking from experience: his sister-in-law, who was three months pregnant, died because no one would admit her to a hospital when she was having problems with her pregnancy. Irrational fears about the virus, he believes, caused many of the doctors and nurses to walk off the job in Monrovia, and turn otherwise healthy patients like his beloved family member away. This fear, he said, was entirely whipped up by the media who focused too much on conspiracy theories and pseudoscience and not enough on educating the public about the virus. He's not the first to observe that the overwrought reactions to this virus had damaging effects. Closer to home, Dr. Craig Spencer — who became infamous for bowling with Ebola in New York — said much the same thing in a new piece in the New England Journal of Medicine. He too blames the media (and self-serving politicians) for stirring fear and hate, unnecessarily vilifying returning humanitarians like himself despite the fact that we know from science it would have been almost impossible for him to transmit the virus: After my diagnosis, the media and politicians could have educated the public about Ebola. Instead, they spent hours retracing my steps through New York and debating whether Ebola can be transmitted through a bowling ball. Little attention was devoted to the fact that the science of disease transmission and the experience in previous Ebola outbreaks suggested that it was nearly impossible for me to have transmitted the virus before I had a fever. The media sold hype with flashy headlines — "Ebola: `The ISIS of Biological Agents?'"; "Nurses in safety gear got Ebola, why wouldn't you?"; "Ebola in the air? A nightmare that could happen" — and fabricated stories about my personal life and the threat I posed to public health, abdicating their responsibility for informing public opinion and influencing public policy. We — the media and the public — need to absorb this Ebola lesson. It applies to every disease and health issue that becomes a matter of public concern. We need to emphasize reason not fear, scientific explanation not conspiracy theory, compassion not derision and hate. Peoples' lives hang in the balance.

### At ost and militarization

#### No space war- interdependence and deterrence

Bowen, 18 -- University of Leicester international relations lecturer

[Bleddyn, "The Art of Space Deterrence," European Leadership Network, 2-20-18, https://www.europeanleadershipnetwork.org/commentary/the-art-of-space-deterrence/, accessed 7-18-19]

Fourth, the ubiquity of space infrastructure and the fragility of the space environment may create a degree of existential deterrence. As space is so useful to modern economies and military forces, a large-scale disruption of space infrastructure may be so intuitively escalatory to decision-makers that there may be a natural caution against a wholesale assault on a state’s entire space capabilities because the consequences of doing so approach the mentalities of total war, or nuclear responses if a society begins tearing itself apart because of the collapse of optimised energy grids and just-in-time supply chains. In addition, the problem of space debris and the political-legal hurdles to conducting debris clean-up operations mean that even a handful of explosive events in space can render a region of Earth orbit unusable for everyone. This could caution a country like China from excessive kinetic intercept missions because its own military and economy is increasingly reliant on outer space, but perhaps not a country like North Korea which does not rely on space. The usefulness, sensitivity, and fragility of space may have some existential deterrent effect. China’s catastrophic anti-satellite weapons test in 2007 is a valuable lesson for all on the potentially devastating effect of kinetic warfare in orbit.