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#### Private space appropriation will solve extinction – presume neg

Ginsberg 17

Leah Ginsberg (senior editor covering entrepreneurs, this article is just a summary of a musk interview), June 16 2017, “Elon Musk thinks life on earth will go extinct, and is putting most of his fortune toward colonizing Mars,” CNBC, https://www.cnbc.com/2017/06/16/elon-musk-colonize-mars-before-extinction-event-on-earth.html, // HW AW

If we stay on earth forever, “there will be some eventual extinction event,” says Elon Musk in an article published in academic [journal New Space](http://online.liebertpub.com/doi/full/10.1089/space.2017.29009.emu). In it, Musk says the alternative to this doomsday is for humans to become a multi-planetary species. He says Mars is the place to do it. Venus is a “hot acid bath,” says Musk in the article, which summarizes a speech he gave in Sept. of 2016. Mercury is too close to the sun. The moon is too small, has no atmosphere and not as “resource-rich.” Speaking like the entrepreneur he is, Musk says, Mars is better-suited “to scale up” to be a self-sustaining civilization. ″[I]f we could warm Mars up,” says Musk, which he believes is doable, “we would once again have a thick atmosphere and liquid oceans.” Mars also has enough sunlight and an atmosphere in which, with some tweaking, it would be possible to grow plants. 1:29 SpaceX’s Elon Musk’s bold ambition to colonize Mars Musk also says, “It would be quite fun to be on Mars because you would have gravity that is about 37 percent of that of Earth, so you would be able to lift heavy things and bound around.” The key, says Musk is his company SpaceX creating systems that make the move to Mars affordable – comparable to the median house price in the U.S. is the goal. Currently, Musk estimates trips to Mars would cost about $140,000 per ton (taking into account transporting things like luggage, food and life support). But he believes the cost could potentially drop to below $100,000 a ton. Musk sees a future where people would save up for a move to Mars like they do a home. “People could also get sponsorship. It gets to the point where almost anyone, if they saved up and this was their goal, could buy a ticket and move to Mars — and given that Mars would have a labor shortage for a long time, jobs would not be in short supply,” he says. Ultimately, says Musk, funding this will be a joint effort between private and government resources. “As we show that this is possible and that this dream is real—it is not just a dream, it is something that can be made real—the support will snowball over time,” says Musk. “I should also add that the main reason I am personally accumulating assets is in order to fund this,” says Musk of his wealth. “I really do not have any other motivation for personally accumulating assets except to be able to make the biggest contribution I can to making life multi-planetary.” Just 15 years ago, “SpaceX basically consisted of carpet and a mariachi band,” says Musk. “We were basically clueless.” Now, he believes SpaceX will have a spaceship by about 2020, with which it can start doing suborbital flights. That would also enable the transport of cargo “to anywhere on Earth in 45 minutes at the most,” he says. “Most places on Earth would be 20–25 minutes away. If we had a floating platform off the coast of New York, 20–30 miles out, you could go from New York to Tokyo in 25 minutes and across the Atlantic in 10 minutes,” he says. “If things go super-well, it might be in the 10-year time frame,” to Mars, says Musk. “But I do not want to say that is when it will occur. There is a huge amount of risk. It is going to cost a lot. There is a good chance we will not succeed, but we are going to do our best and try to make as much progress as possible.”

#### Commercialization is inevitable, and the benefits of space exploration outweigh any defects that it doesn’t already solve for Sharma 9/07/21

(Maanas Sharma, September 7, 2021, Sharma is a journalist for the Journal of Interdisciplinary Public Policy, “The privatized frontier: the ethical implications and role of private companies in space exploration”, [https://www.thespacereview.com/article/4238/1 //](https://www.stltoday.com/opinion/columnists/unions-ignore-long-history-of-excluding-minorities-from-jobs/article_ef58bccd-f04a-5172-8dbd-18b8ee5eb9e2.html%20/)NL)

Another key matter to note is restricted capitalism in space “could also be our salvation.”[11] Private space **exploration could** reap **increas**ed **access to resources and other benefits that can be used to solve the very problems on Earth that critics of capitalism identify**. Since governments offset some of their projects to private companies, **government agencies can focus on altruistic projects that** otherwise would not fit in the budget before and do **not have the immediate commercial use that private companies look for**. Scott Hubbard, an adjunct professor of aeronautics and astronautics at Stanford University, discusses how “this strategy allows the space agency to continue ‘exploring the fringe where there really is no business case’” but still has important impacts on people down on Earth.[12] Indeed, this idea is a particularly powerful one when considering the ideal future of private companies in space exploration. Though there is no one set way **governments** will interact with companies, the consensus is that they **must radically reimagine their main purpose as the role of private space exploration continues to grow.** As governments utilize services from private space companies, “[i]nstead of being bogged down by the routine application of old research, **NASA can prioritize** their limited budget to **work** more **on research** of other unknowns **and development of new** long-term space travel **tech**nologies.”[13] According to the Council on Foreign Relations**, such technologies have far-reaching benefits on Earth as well.** Past developments obviously include communications satellites, by themselves a massive benefit to society, but also “refinements in artificial hearts; improved mammograms; and laser eye surgery… thermoelectric coolers for microchips; high-temperature lubricants; and a means for mass-producing carbon nanotubes, a material with significant engineering potential; [and h]ousehold products.”[2**] Agencies like NASA are the only actors able to pursue the next game-changing missions**, “where the profit motive is not as evident and where the barriers to entry are still too high for the private sector to really make a compelling business case.”[8] These technologies have revolutionized millions, if not billions, of lives, demonstrating the remarkable benefits of space exploration. It follows then that **it is net ethical to prioritize these benefits**.

#### The private sector fuels space exploration— most of the global space industry is already commercialized and demands are set on an upward trend Urrutia ‘18

(Doris Elin Urrutia, October 12, 2018, Urrutia is a journalist for Inverse that bridge archaeological and paleontological discoveries with modern life. She also writes about astronomy and spaceflight for Space.com and on marine life for Scientific American, “How Will Private Space Travel Transform NASA's Next 60 Years?”, [https://www.space.com/42113-nasa-future-private-spaceflight.html //](https://www.stltoday.com/opinion/columnists/unions-ignore-long-history-of-excluding-minorities-from-jobs/article_ef58bccd-f04a-5172-8dbd-18b8ee5eb9e2.html%20/)NL)

First, people should understand that about **75 percent of the worldwide space enterprise is already commercial**, said Scott Hubbard, an adjunct professor in the Department of Aeronautics and Astronautics at Stanford University. This includes the satellites belonging to DirecTV and Sirius XM radio. “What's new is the extension of that into the human realm," said Hubbard, who also previously directed NASA's Ames Research Center in Silicon Valley. He served as the agency's "Mars czar," restructuring NASA's robotic Red Planet-exploration program after it suffered several failures in the 1990s. And if private companies can get the price of a suborbital flight down to about $50,000, "you get a lot of interest," Hubbard told Space.com. The highest-profile program currently in the works between NASA and the private sector is the agency's Commercial Crew Program, said Eric Stallmer, president of the nonprofit Commercial Spaceflight Federation. Commercial Crew is encouraging the development of U.S. spacecraft that will carry astronauts to and from the International Space Station (ISS). Toward this end, NASA has awarded multibillion-dollar contracts to both SpaceX and Boeing, which are building capsules called Crew Dragon and CST-100 Starliner, respectively. These craft are currently scheduled to start flying astronauts sometime next year. There's also the maturing commercial cargo program, which has given contracts to SpaceX and Northrop Grumman Corp. to fly robotic cargo missions to the ISS. Both of these companies have already completed numerous such flights. Both Hubbard and Stallmer said that **NASA wins by relying on private industry to provide such services in low Earth orbit.** Hubbard argued that this strategy allows the space agency to continue "exploring the fringe where there really is no business case." NASA has a budget about five times larger than the next biggest national space agency out there, but the U.S. agency's ambitious goals are still costly, said Stallmer. **To get the most bang** for the buck, "you'd have to **leverage the innovation and technology that is in the private sector and let NASA do the exquisite" projects.** The "exquisite" projects, Stallmer explained, are the "push-the-envelope-type things on deeper space exploration." "I see it not only as a cooperation or a collaboration, but maybe even interdependence," Hubbard said. "Without a thriving spaceflight entrepreneurship sector, I don't think that deep-space exploration with [regular] people is sustainable," he added. "And I think using the way in which the private sector has demonstrated they can reduce costs, through more nearly assembly-line production techniques, is really critical to sustainable space exploration in the future." Phil McAlister, director of commercial spaceflight at NASA, also advocated these public-private partnerships. Private companies offer the advantages of "being quick, being nimble, being fast, making a decision maybe without perfect knowledge — then moving forward and adjusting as required," McAlister told Space.com. NASA officials, he said, "have a lot of meetings … a lot of discussions, and things tend to take longer" than in private industry. **"The private sector wanting to move fast and wanting to be cost-effective** and NASA having our 50 years of human spaceflight experience … you bring those two things together**, and they actually complement each other very effectively," McAlister said.**

### Private Entities

#### Public and private companies must work together to overcome blockages that each industry face, only together can the process be expedited

Houser 17 (Kristin Houser is a writer for Futurism , where she covers science and tech. Her written work has appeared in Business Insider, NBC News, and the World Economic Forum’s Agenda, among other publications https://futurism.com/private-companies-not-governments-are-shaping-the-future-of-space-exploration) //HWLND

Private companies may be in the lead, but the finish line for this Space Race isn’t exactly clear. The first iteration was arguably “won” when Neil Armstrong took his first steps on the Moon, so does this sequel end when we establish the first Moon base? When a human walks on Mars? When we leave the solar system? Truthfully, the likelihood of humanity ever calling it a day on space exploration is slim to none. The universe is huge, with galaxy estimates in the trillions, so the goalpost will continue moving back (to bring another sport into the analogy). Rather than focusing on competing in what is ultimately an unwinnable race, private and government-backed space agencies can actually benefit from collaboration thanks to their inherent differences. “The way that SpaceX, Planetary Resources, or Virgin Galactic approaches space exploration is going to be very different from NASA or the Air Force,” explains Lewicki. Private companies aren’t beholden to the same slow processes that often stall government projects, and they can secure or reallocate funding much more swiftly if need be. However, unlike agencies like NASA, they do have shareholders to keep happy and a need to constantly pursue profitability. The two sectors, therefore, have a tremendous opportunity to help one another. Private companies can generate revenue through government contracts —for example, NASA has contracted Boeing to transport astronauts to the International Space Station (ISS), and SpaceX just closed a deal with the U.S. Air Force to launch its secretive space drone. This leaves the government agencies free to pursue the kind of forward-thinking, longer-term research that might not immediately generate revenue, but that can be later streamlined and improved upon in the private sector.

#### Private entities are uniquely crucial to space exploration especially since governments are no longer interested after the space race

Deb 18 [Sandipan Deb is an Indian journalist and writer. He has been the Managing Editor of Outlook, the Editor of The Financial Express and was the founder-editor of Outlook Money, Open, and Swarajya magazines. He is the author of several books. “Space, the next frontier for capitalism.” Mint. March 13, 2018. <https://www.livemint.com/Opinion/NPClPMlOIIAbnwToBO0QiO/Space-the-next-frontier-for-capitalism.html>] HW AL

Jeff Bezos, the richest man on earth, has said that he has been funding his space technology firm Blue Origin at the rate of $1 billion a year and will continue to pump in his “Amazon lottery winnings into a much lower price of admission so we can go explore the solar system." He can afford it — with a net worth of $131 billion, he is richer than two-thirds of the countries of the world. And, along with Elon Musk, the founder of SpaceX, he is the face of the next giant leap of capitalism — into space. Science fiction predicted most of humanity’s technological advancements — from submarines to television, from rockets to robots. But even the most clairvoyant of sci-fi authors failed to foresee that **planet earth would lose interest in manned space exploration after putting a man on the moon.** The space race of the 1950s and 1960s had a grandiose political purpose. **When that battle had been settled, placing communication satellites in orbit became by far the major activity.** Yes, space shuttles were launched, an International Space Station (ISS) is up there, but this was hardly space exploration. The US National Aeronautics and Space Administration’s (NASA) budget, in constant 2014 dollar terms, peaked at $43.6 billion in 1966; it was $18.9 billion in 2017. There were huge potential pay-offs — the obvious one being mining minerals on asteroids and other planets, **but to governments, the returns on investments were too far-off to commit the massive upfront cash outlays.** And thus it stayed for 40 years, till a new breed of capitalists emerged — whose dreams sought frontiers beyond earth. “Our planet is finite," Bezos has said. The turning point was the retirement of the space shuttle in 2011. As a result, NASA awarded billions of dollars of contracts to private companies to carry astronauts and cargo to the ISS. **The industry suddenly bloomed; there are more than a thousand space companies in the US today.** Investment bank Goldman Sachs estimates that space start-ups have, globally, attracted $13.3 billion of investment since 2010. In 2015, President Barack Obama signed the US Commercial Space Launch Competitive Act into law, guaranteeing private companies rights to own, sell and profit from resources extracted from asteroids and other “celestial bodies". In August 2017, Luxembourg became the first European country that officially allows space resources to be “appropriated" by commercial groups based in the country. Many companies have since then set up shop in Luxembourg. Bezos’ Blue Origin has successfully launched and landed several sub-orbital flights. In February this year, SpaceX launched Falcon Heavy into orbit around the sun. The company is aiming to have manned flights by the end of the year, and says that Big Falcon Rocket (BFR), its spaceship for interplanetary travel that may carry up to 100 passengers, will be ready in 2019. Meanwhile, Bigelow Aerospace, owned by Robert Bigelow, who made his billions from his budget hotel chain, plans to set up hotels that will orbit earth. Among start-ups that are focused on space mining, Planetary Resources points out that just one little near-earth asteroid called 3554 Anum has $8 trillion worth of platinum reserves, while our current annual output is $12 billion, of which 88% comes from three mines in South Africa.

#### Private companies are k2 future space exploration—lower costs, fewer accidents, and frees up government funds for more important space research.

Sharma 21

Maanas Sharma, research scholar @ Tezpur University, 9-7-2021, "The Space Review: The privatized frontier: the ethical implications and role of private companies in space exploration," The Space Review, <https://www.thespacereview.com/article/4238/1> //MLT

In recent years, private companies have taken on a larger role in the space exploration system. With lower costs and faster production times, they have displaced some functions of government space agencies. Though many have levied criticism against privatized space exploration, it also allows room for more altruistic actions by government space agencies and the benefits from increased space exploration as a whole. Thus, we should encourage this development, as the process is net ethical in the end. Especially if performed in conjunction with adequate government action on the topic, private space exploration can overcome possible shortcomings in its risky and capitalistic nature and ensure a positive contribution to the general public on Earth. The implications of commercial space exploration have been thrust into the limelight with the successes and failures of billionaire Elon Musk’s company SpaceX. While private companies are not new to space exploration, their prominence in American space exploration efforts has increased rapidly in recent years, fueled by technological innovations, reductions in cost, and readily available funding from government and private sources.[1] In May 2020, SpaceX brought American astronauts to space from American soil for the first time in almost 10 years.[2] Recognizing the greatly reduced costs of space exploration in private companies, NASA’s budget has shifted to significantly relying on private companies.[3] However, private space companies are unique from government space agencies in the way they experience unique sets of market pressures that influence their decision-making process. Hence, the expansion of private control in the space sector turns into a multifaceted contestation of its ethicality. The most obvious ethical concern is the loss of human life. Critics contend that companies must answer to their shareholders and justify their profits. This contributes to a larger overall psyche that prioritizes cost and speed above all else, resulting in significantly increased risks.[4] However, the possible increase in mishaps is largely overstated. Companies recognize the need for safety aboard their expeditions themselves.[5] After all, the potential backlash from a mishap could destroy the company’s reputation and significantly harm their prospects. According to Dr. Nayef Al-Rodhan, Head of the Geneva Centre for Security Policy’s Geopolitics and Global Futures Programme, “because there were no alternatives to government space programs, accidents were seen to some degree as par for the course… 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.” [6] Another large ethical concern is the prominence capitalism may have in the future of private space exploration and the impacts thereof. The growth of private space companies in recent years has been closely intertwined with capitalism. Companies have largely focused on the most profitable projects, such as space travel and the business of space.[7] Many companies are funded by individual billionaires, such as dearMoon, SpaceX’s upcoming mission to the Moon.[8] Congress has also passed multiple acts for the purpose of reducing regulations on private space companies and securing private access to space. From this, many immediately jump to the conclusion that capitalism in space will recreate the same conditions in outer space that plague Earth today, especially with the increasing push to create a “space-for-space” economy, such as space tourism and new technologies to mine the Moon and asteroids. Critics, such as Jordan Pearson of VICE, believe that promises of “virtually unlimited resources” are only for the rich, and will perpetuate the growing wealth inequality that plagues the world today.[9] However, others contend that just because private space exploration has some capitalist elements, it is by no means an embodiment of unrestricted capitalism. A healthy balance of restricted capitalism—for example, private space companies working through contracts with government agencies or independently under monitoring and regulation by national and international agreements—will avoid the pitfalls that capitalist colonialism faced down here on Earth. Even those who are generally against excessive government regulation should see the benefits of them in space. Lacking any consensus on definitions and rights in space will create undue competition between corporations as well as governments that will harm everyone rather than helping anyone. To create a conducive environment for new space-for-space exploration, one without confrontation but with protection for corporate astronauts, infrastructure, and other interests, governments must create key policies such as a framework for property rights on asteroids, the Moon, and Mars.[7,10] Another key matter to note is restricted capitalism in space “could also be our salvation.”[11] Private space exploration could reap increased access to resources and other benefits that can be used to solve the very problems on Earth that critics of capitalism identify. Since governments offset some of their projects to private companies, government agencies can focus on altruistic projects that otherwise would not fit in the budget before and do not have the immediate commercial use that private companies look for. Scott Hubbard, an adjunct professor of aeronautics and astronautics at Stanford University, discusses how “this strategy allows the space agency to continue ‘exploring the fringe where there really is no business case’” but still has important impacts on people down on Earth.[12] Indeed, this idea is a particularly powerful one when considering the ideal future of private companies in space exploration. Though there is no one set way governments will interact with companies, the consensus is that they must radically reimagine their main purpose as the role of private space exploration continues to grow. As governments utilize services from private space companies, “[i]nstead of being bogged down by the routine application of old research, NASA can prioritize their limited budget to work more on research of other unknowns and development of new long-term space travel technologies.”[13] According to the Council on Foreign Relations, such technologies have far-reaching benefits on Earth as well. Past developments obviously include communications satellites, by themselves a massive benefit to society, but also “refinements in artificial hearts; improved mammograms; and laser eye surgery… thermoelectric coolers for microchips; high-temperature lubricants; and a means for mass-producing carbon nanotubes, a material with significant engineering potential; [and h]ousehold products.”[2] Agencies like NASA are the only actors able to pursue the next game-changing missions, “where the profit motive is not as evident and where the barriers to entry are still too high for the private sector to really make a compelling business case.”[8] These technologies have revolutionized millions, if not billions, of lives, demonstrating the remarkable benefits of space exploration. It follows then that it is net ethical to prioritize these benefits. This report concludes that the private sector, indeed, has a prominent role to play in the future of space exploration. Further, though private space exploration does bring the potential of increased danger and the colonization of space, these concerns can be effectively mitigated. Namely, strong government frameworks—particularly international ones—will minimize possible sources of ethical violations and ensure an optimal private sector role in space. This also allows government agencies to complete significantly more difficult, innovative projects which have transformative benefits for life on Earth.

#### Private entities are critical to exploring space – public governments alone are not enough and don’t have incentive

Baumann 17 [Michael Baumann is a staff writer at The Ringer. University of South Carolina-Columbia. “Who Gets to Own Outer Space?” The Ringer. December 27, 2017. <https://www.theringer.com/2017/12/27/16812048/future-of-space-x-nasa-elon-musk-donald-trump>] HW AL

Contracting out ISS delivery insulates NASA from cost overruns — if a vehicle takes longer to build or goes over budget, the company makes it up out of its own coffers. That represents a departure from the traditional contractor model, which has resulted in just that — delays and cost overruns — for the Department of Defense. That’s also why NASA made a point to select not just one capsule design but one from Boeing and one from SpaceX: Capitalism promises increased innovation and lower costs through competition, but in order for that to happen, there has to be, in so many words, competition. **Private companies have been taking care of the American end of supply runs to the ISS for the past five years, generating a burgeoning industry that now includes several contractors.** SpaceX, the splashiest of the group, was founded 15 years ago by Musk with civilian and commercial spaceflight in mind, and furnishes both the spacecraft, the Dragon, and the rocket (known as the Falcon) that sends it to orbit. Orbital ATK is the result of a 2015 merger between Orbital Sciences Corporation, which has been building rockets and satellites since the 1980s, and defense contractor Alliant Techsystems. Orbital ATK’s Cygnus spacecraft has been launched to the ISS from both Antares rockets, built by Orbital ATK itself, and Atlas rockets, built by United Launch Alliance, a partnership of Lockheed Martin and Boeing. Sierra Nevada, another defense contractor with a 50-year history, will also send its planelike Dream Chaser into orbit on Atlas rockets. Commercial resupply services missions have guaranteed at least one reliable and lucrative customer — NASA — for a variety of companies, from newcomers like SpaceX, to aerospace giants, like Lockheed Martin and Boeing, which have diverse products and a lineage that dates back to the first years of powered flight. **Multiple private companies are making enough money to not only enter a market with high barriers to entry, but to make enough money to want to stay there**, while NASA enjoys lower costs and offloads some of the logistical burden, and at the same time sparking a burgeoning industry that creates high-paying jobs in the United States. Which raises an obvious question: Why did we ever do it any other way? “For these big military or aerospace contracts, generally the government is asking some subset of industries to make something that has never been made before, and no one knows how to make it,” Dreier said. “What company would say, ‘We will build the largest rocket ever and send it to the moon, having no idea how to begin with the materials, and we’ll assume all of that risk. And if we go over budget, then we go out of business and you no longer have a company to work on this rocket, and you have to start over’?” Nowadays, Dreier says, low-earth-orbit flights like satellite launches and ISS resupply missions are known quantities, so companies know what they can promise NASA and still meet deadlines and budget expectations. And while they’d probably prefer a blank check and a practically unlimited timeline, NASA is using its own leverage to demand a better deal. Public investment in spaceflight still grossly outstrips private money, so even the limited commercial resupply services missions — six in 2017 — are significant financial opportunities for a contractor. And the benefits extend beyond the CRS contracts. SpaceX, for instance, developed the Falcon 9 rocket not just for CRS missions but for commercial satellite launches — most notably communications satellites — and is adapting its technology for crewed missions. Transporting people into orbit isn’t exactly the same as transporting cargo — NASA requires greater reliability, because while losing a satellite is an expensive failure, losing a crew is an international tragedy — but the overlap between the two is obvious. NASA also requires CRS contractors to attract private investment, which is easier to get when the company has steady government work to show off.

#### Private entities are the only ones who can get the job done quickly and efficiently, they are quickly surpassing the government

Houser 17 (Kristin Houser is a writer for Futurism , where she covers science and tech. Her written work has appeared in Business Insider, NBC News, and the World Economic Forum’s Agenda, among other publications https://futurism.com/private-companies-not-governments-are-shaping-the-future-of-space-exploration) //HWLND

“We’re starting to see advances made by private entities that are more significant than any advances in the last three years that were made by the government,” Chris Lewicki, CEO and President of Planetary Resources, tells Futurism. Amazon CEO Jeff Bezos’s Blue Origin and Tesla CEO Elon Musk’s SpaceX are arguably the two companies that are setting the pace. In November 2015, the former completed the first successful vertical rocket landing after sending their New Shepard 100 kilometers (62 miles) into the air. SpaceX landed its own rocket a month later, only they did so with a craft twice as heavy as Blue Origin’s and traveled all the way into space first. A month after that, in January 2016, Bezos’s company became the first entity to re-launch and re-land a previously used rocket. SpaceX followed suit in 2017. “The government was never able to [build reusable rockets], but now, two private companies within the space of the same year have done that,” points out Lewicki. Not only are private companies already surpassing their government counterparts, several are poised to widen their lead in the coming months and years. If all goes according to plan, when SpaceX’s Falcon Heavy launches in September, it’ll take the title of the world’s most powerful rocket away from NASA’s Saturn V. Virgin Galactic is already selling tickets for what it expects to be the first private spaceflights, which will take place aboard the sleek VSS Unity. SpaceX plans to send space tourists to the Moon in 2018, and then in 2024, the company hopes to launch a system that will take people all the way to Mars…roughly 5-15 years before NASA expects to do the same.