

Space Privatization: A History and Analysis of its Economic Consequences for the Future of Space

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Humanity has long been fascinated with the universe, and since antiquity has looked up at the night sky, fantasizing about gods and what goes on up in the stars. During the Cold War, these dreams became reality, and ever since, mankind has made consistent effort to maintain a constant presence in Earth orbit and beyond. However, these ambitions were cloaked in a veil of nationalistic, cultural, and economic competition. This notion of intense competition exists among current spacefaring endeavors, beginning with the grandfathered contract companies such as Lockheed Martin (LM) and Boeing to some of the “New Space” companies such as Space Exploration Technologies Corporation (SpaceX). Instead of competition on a world stage, however, companies compete for valuable capital and market share within various government agencies. This renewed competition in the “New Space Race” opens up the opportunity to further humankind in ways unimaginable to the Buzz Aldrin’s and Yuri Gagarin’s of the first Space Race, turning from a more nationalistic to a more seemingly noble ambition. Decentralization of the space market is the best way to approach the new era of space exploration and competition.

One cannot refer to the current state of space exploration and the competition surrounding it without first addressing the event where it all began: the launching of *Sputnik I* in 1957 and the subsequent Space Race that followed, between the Soviet Union (USSR) and the United States (USA). The USA was shocked and awakened from its complacency when the USSR launched their first Earth-orbiting satellite in 1957 (Siddiqi, 2010), and a technological

revolution occurred in both the USA and the USSR. Despite their ideological differences, both nations had very similar experiences and developed equally similar perceptions of themselves, forming nationalist identities around their space programs, lauding technological advancement for their own countries respectively, and even harkening to more universal goals for humanity. Nonetheless, there are key cultural and political differences between how each nation perceived the space race.

As mentioned prior, in the ambition to beat out the other in the Space Race, both the USA and the USSR developed new technologies at a massive rate, but both had their own reasons of doing so. The Russians, having only recently undergone their Bolshevik Revolution, called back to those days of revolution, remembering Lenin's quote of "communism equals Soviet power plus the electrification of the entire country" (Siddiqi, 2010). This idea of technological progress is what propelled the USSR to a great deal of firsts in the Space Race, including the first satellite, first animal, man, woman, and "walk" in space, and first lunar soft landing. All of these things put to the forefront in the Soviet psyche that they were the nation that was meant to be the chief spacefaring nation (Siddiqi, 2010). The most notable in citizens' minds, even to the present day, is the first man in space, Yuri Gagarin, who is rarely mentioned at all in the USA (Siddiqi, 2010).

Meanwhile, the USA has long believed that they would be the ones to ultimately conquer the unknown reaches of our known universe, adopting a sort of "technological utopianism and an updated version of 'manifest destiny'" (Siddiqi, 2010), a notion that Americans adopted as early as the late 1800s, constantly progressing towards technological feats that would make Americans the leading discoverers, and they believed that their own economic system and vigor of the American people would carry the day. This American exceptionalism cannot be more blatant than in David Reynolds description of *Apollo's* effect on the national identity of the USA: "[The

Moon race] was a...battle...of the superior system, capitalism versus communism....And the battle did prove out the more capable system....we saw extraordinary, impossible things accomplished by ordinary Americans” (Siddiqi 2010). Indeed, the *Apollo* mission to land the first men on the moon in 1969, ultimately “winning” the Cold War, is so engrained in American exceptionalism that it is what is most thought about when talking about space exploration in the USA, even to this day, just as Gagarin’s flight in space was for the USSR.

Though the idea of a new “manifest destiny” rallied millions of Americans behind the space exploration endeavors of the 1960s and beyond, even to the present day, criticisms have been drawn about the rhetoric used during this time. “Manifest destiny” was a term coined in the mid-1800s and was used to describe the westward expansion of the United States territories into the “unsettled” areas of the North American continent. In this way, many Americans saw this as a moral and just thing, that it was a right bestowed upon them by God that they would “civilize” the Western North American continent. However, what the policies and politicians of the time often did not talk about was the displacement and sometimes killing of native populations in the Americas as a result of western expansion, particularly with the Jacksonian *Trail of Tears* and the many Native-Union wars fought throughout the era of US territorial expansion in the 1800s. This theme, while not overt, rang true in President John F. Kennedy’s famous “Moon” speech in 1962, where he paraphrases one of the first settlers to the Plymouth Colony in expressing his intent to send Americans to the lunar surface: “William Bradford, speaking in 1630 of the founding of the Plymouth Bay Colony, said that all great and honorable actions are accompanied with great difficulties, and both must be enterprised and overcome with answerable courage” (Haskins, 2018). What Kennedy failed to mention was that Bradford had engaged in battles with Native Americans and even brutally massacred them (Haskins, 2018). Furthermore, though

Kennedy did not intend to create permanent living arrangements on the moon, the use of Bradford implied that America would colonize other celestial bodies in the future, and using this language could be detrimental to the continuation of space exploration.

Of course, these space enterprises on both sides of the Cold War were not mere spectacles, though they did excite the people of the respective nations, but they also served as important national security advancements. When the USSR first launched *Sputnik*, Americans realized the frightening possibility that if the Soviets could launch a relatively small metal sphere into orbit around the Earth, then they could easily launch nuclear weapons capable of hitting any American city within hours. This shocked the American government and the American people, and propelled them to claw back and develop their own technologies, borrowing from the Soviets in the process. Yet still, even with the (perhaps unintentional) exchange of knowledge between the two superpowers of the time, space exploration was still framed very much in a national context.

Today, many of the companies that are involved in the National Aeronautics and Space Administration (NASA) of the USA, though some did not exist, or at least in their current form, during the Space Race, have their origins in national security, such as LM, Boeing and Northrop Grumman, the latter two being well known for their bomber-class military jets, both past and present. Boeing manufactured the *Saturn V* rocket that launched the first men to the moon. Thus, it is not like corporations have never been involved in the furthering of space exploration technologies; in fact, the use of the private sector is arguably what led to the USA's massive success against the USSR in achieving their space exploration goals. However, as a result, this results in a very uniform view of space exploration, that it should mainly serve national security purposes and other such whims of the government.

These companies showed their collective bargaining power within NASA and the US government through the formation of the United Launch Alliance (ULA) in 2005, “a joint venture which combined the only two suppliers [Boeing and LM] of medium-to-heavy national security related launch services” (Kovacic, 2020). At this point, these companies already provided the majority of services to NASA and the Department of Defense (DoD) that were required to maintain proper national security, and this move, though it made sense from a logistical standpoint, seemed on the borderline of anti-trust. Long gone are the days of technological innovation; many of the rockets that were in use during the Space Race have been used continuously to this day by these government contractors, with little redesigns. There was no point, as space exploration had all but left the public eye, and as these companies have an effective monopoly on the medium-to-heavy launch vehicles, and without competition, there is no real need to innovate. When the ULA went to the Federal Trade Commission (FTC), to get this joint venture approved, they were understandably reluctant, due to antitrust laws (Kovacic, 2020). The DoD still recommended that the transaction be approved, however, due to the fact that “the joint venture would increase launch reliability by concentrating production and launch services in a single team rather than...between two separate organizations” (Kovacic, 2020). Since the ULA was formed in 2006, it has maintained both of its Atlas and Delta rocket designs, and has been the only bidder for their Evolved Expendable Launch Vehicle (EELV) launch services (ELS) program, and from 2006 to 2013, total space launch costs have soared from \$613 million to \$1.63 billion (Rogosa, 2015). Regardless, they have successfully launched sixty-eight consecutive EELV missions, doing what they were contracted in an efficient manner.

DoD and NASA recognized, however, that there could be great difficulties in the future if they became “irretrievably beholden to a supplier with unassailable monopoly power” (Kovacic,

2020). Therefore, in the deal, they worked out that government purchasers for corporate contracts would make an effort to encourage other companies to enter into contract as a way to motivate ULA (Kovacic, 2020), encouraging competition.

Enter: SpaceX. Space Exploration Technologies Corporation, or SpaceX, is an up-and-coming aerospace and rocket company founded in 2002 by South African-born entrepreneur and multimillionaire, Elon Musk (Kovacic, 2020). Musk claimed that he could drastically reduce the launch costs of rockets in delivering payloads into space, projecting that he would be able to take the \$11 billion price tag of the contract awarded to the ULA in 2013, which was already purportedly saving around \$4.4 billion, and reduce that by an additional \$6.6 billion, while still assuring the same mission success rates (Rogosa, 2015). Soon enough, the EELV opened up bidding for other contractors, and SpaceX was awarded delivery launches to the International Space Station, which became the lowest delivery price in the history of resupply missions to the ISS (Rogosa, 2015). Of course, as a result, SpaceX had to vertically integrate some parts of production with the Air Force to “monitor national security payloads” (Rogosa, 2015).

By opening up the bidding for the EELV program to launch services other than the ULA, the DoD and NASA were able to effectively combat the rising costs in launches that occurred over the eight-year period that the ULA was the primary launch service provider. For example, in the mid-2000s, NASA was already experiencing increases in launch costs, but instead of the DoD propping up one provider, NASA partnered with the private sector to make cheaper, newer launch vehicles (Rogosa, 2015), under a system called the Commercial Orbital Transportation Services (COTS) program, of which SpaceX was a part, with their *Dragon* capsule. Along with one other new vehicle, these cost only the price of a single Space Shuttle flight, a great reduction in price (Rogosa, 2015), down to merely \$500 million, or 1% of NASA’s five year budget

(Weinzierl, 2018). These innovations into the private sector led to launch services to return to American soil, including the launch of humans to scientific missions to the ISS starting in 2020 by SpaceX (Kovacic, 2020), something that has been outsourced to nations such as Russia since the cancellation of the Space Shuttle program in 2011. Regardless, as the countless regulations and hoops that SpaceX had to go through to be certified with the federal government, these businesses are still very much at the whim of national security interests, but SpaceX and other recent aerospace startups are thinking much bigger.

Elon Musk is among the most pronounced of the aerospace startups to express that his intent behind his company SpaceX is more than just jumping through the bureaucratic hoops of the federal government to test and fly his vehicles. In the mission statement of SpaceX, Elon Musk says that he intends to “revolutionize space technology, with the ultimate goal of enabling people to live on other planets” (Vreech, 2019). Musk has already made good on part of that promise. SpaceX’s flagship rocket – the *Falcon 9* – is a two-stage orbital-class rocket that has a completely reusable first stage initial booster; on typical rockets, the first stage can be difficult to recover, and if at all, it’s only metal scraps. The recovery of guided landing reusable first stages greatly reduces the cost of subsequent launches, allowing for quick turnaround (Vreech, 2019), making SpaceX a desirable contractor for NASA.

The *Falcon 9*, and its heavy-load counterpart, the *Falcon Heavy* (which lands two of those first-stage boosters, not just one), are not the only vehicles on the planned SpaceX lineup. The *Falcon* class of SpaceX rockets are only capable of orbital launch at this point in time, but Musk has another spaceship in the works, initially code named the *BFR*, which will be the first rocket to land on the planet Mars (Vreech, 2019). With these rockets, he plans on colonizing the Red Planet, making the human race go interplanetary. Although the rocket is still very much in

the design and testing phase of development, Musk is confident that an operational *BFR* will become available by 2022. In this way, Elon Musk, with SpaceX, has a grander vision for space flight than the geopolitical and security feats that we use rockets for now and in the recent past. And although NASA and other space agencies have always harkened to a utopian vision of human destiny in going to space, Elon Musk's vision is greater than that. However, the current centralized nature of NASA clashes with the innovations that Musk wants to achieve, despite the administration's continued success as such (Weinzierl, 2018). With this comes the rise of "New Space", where NASA has increasingly been looking to private commercial partners as a means to replace the Space Shuttles, with companies like Blue Origin (owned by Jeff Bezos of Amazon) and Virgin Galactic (by Richard Branson), though SpaceX has proven so far to be the most successful of all. As NASA slowly decentralizes (with the COTS program being a good first step), Musk and his contemporary space pioneers can begin to compete and innovate more freely (Weinzierl, 2018), though there is still a long way to go in terms of legislation and regulatory hurdles, as commercial space flight companies muddy those legislative waters.

Space legislation, or "Space Law", saw its origins ten years after the launch of *Sputnik I*. That year, the USSR, USA, and the United Kingdom signed a treaty, the "Outer Space Treaty", that no one nation shall own any part of outer space, that it is the "province of all mankind" (Vreech, 2019), and that all exploration must be done "in the interest of maintaining international peace and security and promoting international co-operation...and understanding" (Vreech, 2019). Being written and signed during the height of the Space Race, this treaty made sense, such that the Earth's atmosphere and the remainder of outer space would not become just another battleground for humankind. The treaty goes further by saying that no nuclear weapons or other such destructive weapons shall be placed into orbit or installed on a planet or moon's surface;

there are other similar treaties that protect astronauts and ensure their safe return if they were to be stranded out in space (Vreech, 2019). Though these laws and treaties provide a great framework for national and international operations in space, it has changed little and does not take into account the recent privatization trends of space travel (Vreech, 2019).

Musk's plan to set up a permanent residence on, colonize, and terraform Mars is arguably in conflict with many parts of the Outer Space Treaty. He claims that he will terraform Mars by detonating thermonuclear weapons, which goes against Article IV. But he would also be potentially contaminating another planet by attempting to colonize it, which also goes against the treaty (Vrecch, 2019). The nuclear weapons may also interfere with Article II, which states that no one can put a weapon into orbit around or in the moon (Vreech, 2019). However, Musk may be able to circumvent these regulations by saying these endeavors are all for peaceful and exploratory purposes. Either way, in order for this plan to become reality, International and Space Law would have to change, again making a decentralization away from government and worries about international meddling, and a switch to allow for companies such as Elon Musk's SpaceX to operate freely. Regardless, the Outer Space Treaty certainly is there for the right reasons, as Elon Musk could potentially ruin Martian life if it exists, or otherwise destroy the Red Planet.

There are many other criticisms to Musk's and other's ideas for private space exploration in the coming years, regardless of their current illegality. As mentioned earlier, the language that is used to describe space exploration can be incredibly damaging to the endeavors. Even using a term as seemingly harmless as "colony" can and does give a negative connotation, especially looking with a critical lens at the Colonial and Imperialist periods of the European Empires and of the US, which consisted by large measure the subjugation of the native peoples of the land

that Europeans and Americans alike colonized. These dynamics have often led to discrimination and racism. Such a thing is a cause for worry even when going to a new planet to create new settlements there. Even though there will presumably be no life on these barren planets, humankind should still work to preserve the environments that are encountered and to prevent any possibility of contamination. Especially in light of the Coronavirus pandemic, which disproportionately hit minority groups particularly in the US, an extraterrestrial biohazard may prove to be even more hard hitting (Tavares et al., 2020).

Furthermore, the emigration of humans to another planet will inherently create a divide: those who are rich enough to be able to leave Earth for another life on another planet, and those who cannot afford such a trip (Lee, 2015). Even with all the advancements being made, spaceflight is still expensive, for now. And according to some perspectives, when it is always the centibillionaires, the Musk's, Bezos's and Branson's of the world, that talk about the salvation of humanity from the mere chance of impending doom on Earth, it creates yet another dichotomy, as these people will ultimately have their own interests at heart, and that is why they are insistent on meeting with the government and decentralization (Lee et al., 2015). Furthermore, as is exemplified with both Bezos's and Branson's private flights on their own spacecraft, space travel can still appear to be a toy only for the elite. But as it stands, Musk and Bezos have made their real, long-term intentions seemingly clear: the former wanting to create an interplanetary settlement and the other wanting to establish a new economic market, allegedly to create millions of new space jobs (Vreech, 2019; Weinzierl, 2018). However, even if they do succeed in their plans, they will certainly become rich from it; indeed, Neil deGrasse Tyson has said that the first trillionaire will be an asteroid miner or some other spacefaring businessperson (Weinzierl, 2018). Yet, these people still have the opportunity to make an impact.

Space exploration has reached a crossroads. As more and more people decide to pour increasing amounts of their own capital into space startups and other aerospace companies, the new space race's pace moves ever faster. Long gone are the days of national glory and prestige that marked the first Space Race; now, companies new and old vie for important government contracts that shape the future of humankind in space. As competition gets fiercer and more advancements towards the goal of humanity as an interplanetary species are made, the consequences and effects of these endeavors must be considered, as well as the best way forward. Despite the illegality and questionable environmental morality of some of his long-term plans and goals, Elon Musk of SpaceX pushes on, causing concern among others for his massive wealth he has accrued, believing that he only serves his own self interests. However, he believes that with his plans, humanity will be uplifted, soaring to new heights. Either way, decentralization is essential in order for SpaceX and other companies to continue to compete for government contracts and innovate. It is the only way that space exploration can become truly accessible and beneficial for all.

References

- Haskins, C. (2018, August 14). *The Racist Language of Space Exploration*. The Outline. <https://theoutline.com/post/5809/the-racist-language-of-space-exploration>
- Kovacic, W. E. (2020). Competition Policy Retrospective: The Formation of the United Launch Alliance and the Ascent of SpaceX. *George Washington University Scholarly Commons*. https://scholarship.law.gwu.edu/faculty_publications/1501
- Lee, D. N. (2015, March 26). When discussing Humanity's next move to space, the language we use matters. *Scientific American*. <https://blogs.scientificamerican.com/urban-scientist/when-discussing-humanity-8217-s-next-move-to-space-the-language-we-use-matters/>
- Rogosa, A. (2015). Shifting Spaces: The Success of the SpaceX Lawsuit and the Danger of Single-Source Contracts in America's Space Program. *Federal Circuit Bar j*, 25(1), 101–124.
- Siddiqi, A. A. (2010). Competing technologies, national(ist) narratives, and universal claims: Toward a global history of space exploration. *Technology and Culture*, 51(2), 425–443.
- Tavares, F., Buckner, D., Burton, D., McKaig, J., Prem, P., Ravanis, E., Trevino, N., Venkatesan, A., Vance, S. D., Viduarri, M., Walkowicz, L., & Wilhelm, M. B. (2020). *Ethical Exploration and the Role of Planetary Protection in Disrupting Colonial Practices*. <https://arxiv.org/abs/2010.08344>

Vreech, S. D. (2019). To Infinity and Beyond?: The History of Space travel and the legal implications of privatized space flight through the lens of SpaceX. *Loyola Mar*, 18(1), 152–179.

Weinzierl, M. (2018). Space, the final economic frontier. *The Journal of Economic Perspectives: A Journal of the American Economic Association*, 32(2), 173–192.