### DA- Innovation

#### There is a massive flood of investment pouring into the commercial space sector because of a signal of stable large company support AND lack of government interference – plan reverses that

Wharton 19 (Wharton Editorial Board of University of Pennsylvania, business analysis journal online run through U Penn, "Why Big Business Is Making a Giant Leap Into Space," 6/4/2019 <https://knowledge.wharton.upenn.edu/article/commercial-space-economy/> DD)

For decades, relatively easy access to space and the big profits to go with it have dangled elusively just over the horizon. With a little more R&D money and a few more advances in the technology, the thinking went, space would be ours. Are we there yet? More than a few signs are pointing in the direction of a robust, varied space age of viable commercialization — as well as more audacious goals than we’ve seen in generations. On the practical side, advances in reusable rockets, lowered per-launch costs and miniaturization of satellites are opening up business opportunities well beyond aerospace and defense, and into IT hardware and telecom, according to Morgan Stanley. The global space industry is expected to generate revenue of $1.1 trillion or more in 2040, up from the current $350 billion, according to a recent report by the firm. On the dream side, Amazon founder Jeff Bezos recently outlined a long-term vision for putting a trillion people in space colonies with one small step coming soon: an infrastructure starting with lunar lander Blue Moon. “We are going to build a road to space,” Bezos said at a May unveiling of his plans, “and then amazing things will happen.” Amazing things already are. One indication that big business is taking space more seriously is that interest has moved from the fringe to the mainstream, says Wharton management professor Anoop Menon. While space retains an undeniably speculative aspect, especially around development of business models, a number of factors are coming together now to suggest that big business’s foray into space is here. “I don’t think we are necessarily a long way away — it’s a matter of being creative,” said Menon, co-author with Laura Huang and Tiona Zuzul of “Watershed Moments, Cognitive Discontinuities, and Entrepreneurial Entry: The Case of New Space.” Satellites that capture geospatial data are potentially quite lucrative, he says, tracking shipping movements, deforestation or the location of mining deposits. “This is an interesting one,” says Menon of another idea: “Taking pictures of parking lots at Wal-Mart and Target and selling that to hedge funds, since traffic is a pretty good leading indicator of economic activity.” A sustainable business model for many is clearly the goal. For others, though, sustaining losses is a small price to pay for the pursuit of something larger and potentially more meaningful. Bezos, for instance, has said he is willing to sell a billion dollars of Amazon stock per year in exchange for adventure and knowledge in space. Says Nicolaj Siggelkow, Wharton management professor and co-director of the Mack Institute for Innovation Management: “The main driver for these people I think is much more an aspirational goal. Here we are clinging to this speck of dust moving through the universe and there is this idea that we might be able to escape that. That is ultimately what drives their wanting to succeed.” Space: Province of Billionaires Three individualistic billionaires — Bezos, Elon Musk and Richard Branson — have increasingly turned their attention in the last two decades to space, which is defined by NASA and other Earthlings as beginning at 50 miles above sea level. Last month, Musk’s SpaceX launched a rocket that released 60 500-pound satellites into orbit. SpaceX intends to launch others, creating Starlink, a web of satellites supporting a global internet service. “This ‘data-driven’ aspect when coupled with the rest of the space-industry ecosystem could make it more robust.”–Anoop Menon Thousands more satellites are being readied. Telesat LEO (low-earth orbit) will launch a “constellation of highly advanced satellites [to] seamlessly integrate with terrestrial networks,” trumpets the company’s promotional literature. “The global network will deliver fiber quality throughput anywhere on earth.” A partnership of OneWeb Satellites and Airbus will begin launching 900 satellites into low orbit in 2019 to deliver affordable global internet access. Amazon’s Project Kuiper will place 3,236 satellites into orbit with the stated intention of providing “low-latency, high-speed broadband connectivity to unserved and underserved communities around the world,” Amazon said in a statement to GeekWire. “Data is everything these days,” says Menon. “There are data companies whose business models are about processing the data that comes out of the satellites, and there is this whole set of companies coming up around this idea,” which is one reason he believes that the new space race is here to stay. “This ‘data-driven’ aspect when coupled with the rest of the space-industry ecosystem could make it more robust.” Back on Earth, demand for data only promises to increase with the proliferation of AI, development of self-driving vehicles, virtual reality and video. At the same time, costs for commercial applications are dropping for just about everything — hardware components, software development — enabled by using commercial technology and standard architectures, says Ellen Chang, co-founder of LightSpeed Innovations. “When costs have dropped by about 60% to 80% in whatever industry, I would say you have an opportunity. It started with the inception of the CubeSat, when different commercial off-the-shelf components were used instead of space-qualified components. Over time, more and more engineers adopted the form factor.” “Here we are clinging to this speck of dust moving through the universe and there is this idea that we might be able to escape that. That is ultimately what drives their wanting to succeed.”–Nicolaj Siggelkow Recently, the cost of launching a satellite has declined to about $60 million from $200 million because of reusable rockets, reports Morgan Stanley, with a potential drop to as low as $5 million. Satellite mass production could decrease the cost from $500 million per satellite to $500,000. But more data and better internet service are just the beginning. Companies like Bigelow Aerospace are developing orbital space stations. Axiom Space has staked out plans to build the first international commercial space station — with a Philippe Starck-designed interior — that aims to be a “microgravity laboratory where educators, scientists and researchers conduct life-improving research.” Other firms are chasing space tourism or mining asteroids for rare minerals. Morgan Stanley notes that privately held space exploration firms are pursuing goals like landing humans on the moon, as well as airplane-borne rocket launchers that could put small telecommunications satellites into low Earth orbit at a far lower cost, and with far greater responsiveness, than ground-based systems. “It used to be a space race between countries, and now it’s a space race between billionaires,” says Menon. “Musk is running SpaceX with the goal of colonizing Mars and making humanity a multi-planetary species. Bezos, with all of the might of Amazon behind him, is doing it with Blue Origin. He sees it very differently, a space-based civilization rather than colonizing planets, building space stations, and moving heavy industry off-planet, and he is slowly building the pieces for it.” “These far-out ideas — ‘let’s mine water on the moon, let’s build these big colonies out there’ — that to me I find fascinating and inspirational and aspirational,” says Siggelkow. “And I think that is what allows these firms to attract really good people. It is really cool to be working on something amazing, it’s how you attract great talent. Whether these big projects will become commercially attractive and at what point is another question, but that might be secondary to most people working on these projects.” “It used to be a space race between countries, and now it’s a space race between billionaires.”–Anoop Menon There are other reasons for pushing ahead with ideas that may seem pie-in-the-sky, says Wharton management professor David Hsu. “It’s like Google funding big science projects and trying to push the technology frontier,” he says. “That has a signaling purpose in the marketplace — ‘we may be making 99% of our money from your searches, but we are thinking about the future and pushing the frontier a bit.’ They are really trying to work on the harder problems, and maybe we haven’t thought of all of the uses for a particular technology in all cases. They are on the road toward that. You want to be able to show technological things that people didn’t necessarily understand were feasible or possible.” A certain amount of momentum for ideas hinges on perception, especially regarding a future for the space-tourism industry, Siggelkow notes. “We know this is a really complicated and to a certain extent dangerous endeavor, and the general public’s risk appetite is very low. Think about self-driving vehicles and accidents. At what point do we feel they are safe? There is something similar here. If something happens, I am afraid it will slow down space tourism quite a bit.” Branson’s Virgin Galactic has already suffered a visible tragedy. One pilot was killed and another injured in 2014 when experimental spaceflight vehicle VSS Enterprise broke up during a test flight and crashed in the Mojave Desert. Several other initiatives have failed, such as Israel’s Beresheet Spacecraft, which in April crashed into the moon. For now, investors are taking a relatively rosy view of the prospect of making money in space. In the first quarter of 2019, $1.7 billion in equity was invested into space companies — nearly the double the amount invested in the last quarter of 2018, according to Space Investment Quarterly, published by Space Angels. Total funding since 2009 exceeds $20 billion invested in 435 companies, the space-centric financial services firm says. “With SpaceX, Boeing, Virgin Galactic, and Blue Origin all inching closer to making history as the first privately funded companies to launch commercial passengers into space, we believe that 2019 will most certainly be the Year of Commercial Space Travel,” the report said. Rekindled Ambition In terms of the march of progress, mindset matters. In their research paper, Menon and his co-authors proposed that the New Space market was catalyzed by a set of “emotionally resonant” events. These moments — events like the 2003 Space Shuttle Columbia disaster, or when SpaceShipOne in 2004 became the first privately developed spacecraft to take a pilot into space twice within a two-week period — challenged or reinforced existing notions, and led to new solutions. “This, in turn, drove the emergence of a previously unimaginable market in aerospace,” they wrote. “It’s really relevant with the 50th anniversary of Apollo 11 to remember that it’s not easy to throw some resources at a problem and expect that it’s a given you will have success.”–David Hsu Menon says what while momentum lagged in recent years, the pace has now picked up — at NASA as well as in other countries. “The European Space Agency was in crisis mode because of the launch cost savings Musk achieved and the market share he was able to carve out so rapidly. In England, there is Reaction Engines. They have a very interesting concept, the Skylon Spaceplane, a single-stage-to-orbit plane that goes to space directly. India is interesting because they’ve been able to do a fair bit on a much lower budget. They got to Mars at a fraction of the price it took us to get there. The Chinese space program is a big part of their national prestige right now.”

#### Without that mass investment, all necessary space infrastructure is chilled – technology is all seen as linked to eventual deep space exploration

Sommariva 20 (Andrea, Italian Institute for International Political Studies, "The Evolution of Space Economy: The Role of the Private Sector and the Challenges for Europe," 12/11, <https://www.ispionline.it/en/pubblicazione/evolution-space-economy-role-private-sector-and-challenges-europe-28604> DD)

The second factor focuses on spacecraft and space-access costs. NASA has moved from a government-run International Space Station access system to one where the transportation of goods and people relies on private companies, obviously under contract and control of NASA, thus eliminating the monopoly of Lockheed Martin and Boeing. As a result, significant progress has been made in the design and development of cost-effective launch vehicles. Currently, SpaceX has developed a system to reuse the first stage of rockets, which serves to give the initial thrust necessary to overcome Earth's atmosphere. Normally, after doing its job, the first stage came off and fell into the ocean as waste. SpaceX has successfully developed the recovery and reuse of the first stages of rockets, reducing the cost per kilogram of payload by more than 50 percent. These developments provide access to space for many small and medium-sized companies, as well as educational and research institutions. In the near future, the development of the satellite Internet will allow people and companies to connect wherever they are - an effective alternative when terrestrial networks are absent or of poor quality. In addition, satellite technology gives rise to a growing stream of uses, including transportation and logistics efficiency, natural resource management, precision agriculture, environment and climate change monitoring, and makes it a potential source of economic growth, social well-being, and sustainable development. As for the exploration programs, the return to the Moon is now days on the agendas of the major space agencies, such as NASA and ESA. Over the next ten to fifteen years, the use of space resources will be crucial for the success of expeditions to the Moon and other planets. The Moon's resources provide propellant for the in-orbit refueling of spacecraft, reducing their costs[1], and oxygen and water for support systems of the future space station around the Moon (the Gateway project). A new form of public-private partnership is rising, a partnership in which governments will provide initial support in the exploration and the advancement of critical technologies (telecommunications and Moon-Earth navigation), and in the construction of space infrastructure. NASA plans a first exploration mission at the South Pole of the Moon in 2024. The private sector would then take the lead in creating new markets and expanding the presence of humanity in space. SpaceX is developing a vehicle, Starship, for missions to the Moon and beyond. The Starship is a fully reusable launch vehicle. It consists of two stages, the booster and the spacecraft, which in November 2018 Elon Musk renamed Super Heavy and Starship respectively. The overall vehicle architecture includes both the launcher and the vehicle, as well as the infrastructure for the first and subsequent launches, and zero-gravity propellant transfer’s technology. The spacecraft alone is designed to be used, in a first phase, without a booster for both freight and passenger transport. In April 2020, NASA selected a modified version of the Starship as one of three landing systems for the Artemis Program. Moon mining will present also an opportunity to make space based solar power (SBSP) economically feasible. SBSP has been studied for decades. However, the costs of launching such large infrastructure from Earth to geosynchronous orbit (GEO) make these projects economically not feasible. At the SEE Lab-SDA Bocconi, we have initiated a study where the basic idea is to build the SBSP satellite with material from the Moon and to transfer the components to GEO where they would be assembled. Its costs are comparable to a large-scale nuclear power plant. If preliminary results are confirmed by the completion of the study, space based solar power can transform the energy markets of Earth[2], and can give an important contribution to the climate change’s mitigation.

#### Space exploration solves extinction and endless resource wars.

Collins 10 [Patrick Collins, professor of economics at Azabu University in Japan, and a Collaborating Researcher with the Institute for Space & Astronautical Science, as well as adviser to a number of companies, Adriano V. Autino is President of the Space Renaissance International; Manager, CEO/CTO, Systems Engineering Consultant / Trainer at Andromeda Systems Engineering LLC; and Supplier of methodological tools and consultancy at Intermarine S.p.A, Acta Astronautica, Volume 66, Issues 11–12, June–July 2010, “What the growth of a space tourism industry could contribute to employment, economic growth, environmental protection, education, culture and world peace”, Pages 1553–1562]

7. World peace and preservation of human civilisation

The major source of social friction, including international friction, has surely always been unequal access to resources. People fight to control the valuable resources on and under the land, and in and under the sea. The natural resources of Earth are limited in quantity, and economically accessible resources even more so. As the population grows, and demand grows for a higher material standard of living, industrial activity grows exponentially. The threat of resources becoming scarce has led to the concept of “Resource Wars”. Having begun long ago with wars to control the gold and diamonds of Africa and South America, and oil in the Middle East, the current phase is at centre stage of world events today [37]. A particular danger of “resource wars” is that, if the general public can be persuaded to support them, they may become impossible to stop as resources become increasingly scarce. Many commentators have noted the similarity of the language of US and UK government advocates of “war on terror” to the language of the novel “1984” which describes a dystopian future of endless, fraudulent war in which citizens are reduced to slaves.

7.1. Expansion into near-Earth space is the only alternative to endless “resource wars”

As an alternative to the “resource wars” already devastating many countries today, opening access to the unlimited resources of near-Earth space could clearly facilitate world peace and security. The US National Security Space Office, at the start of its report on the potential of space-based solar power (SSP) published in early 2007, stated: “Expanding human populations and declining natural resources are potential sources of local and strategic conflict in the 21st Century, and many see energy as the foremost threat to national security” [38]. The report ended by encouraging urgent research on the feasibility of SSP: “Considering the timescales that are involved, and the exponential growth of population and resource pressures within that same strategic period, it is imperative that this work for “drilling up” vs. drilling down for energy security begins immediately” [38].

Although the use of extra-terrestrial resources on a substantial scale may still be some decades away, it is important to recognise that simply acknowledging its feasibility using known technology is the surest way of ending the threat of resource wars. That is, if it is assumed that the resources available for human use are limited to those on Earth, then it can be argued that resource wars are inescapable [22] and [37]. If, by contrast, it is assumed that the resources of space are economically accessible, this not only eliminates the need for resource wars, it can also preserve the benefits of civilisation which are being eroded today by “resource war-mongers”, most notably the governments of the “Anglo-Saxon” countries and their “neo-con” advisers. It is also worth noting that the $1 trillion that these have already committed to wars in the Middle-East in the 21st century is orders of magnitude more than the public investment needed to aid companies sufficiently to start the commercial use of space resources.

Industrial and financial groups which profit from monopolistic control of terrestrial supplies of various natural resources, like those which profit from wars, have an economic interest in protecting their profitable situation. However, these groups’ continuing profits are justified neither by capitalism nor by democracy: they could be preserved only by maintaining the pretence that use of space resources is not feasible, and by preventing the development of low-cost space travel. Once the feasibility of low-cost space travel is understood, “resource wars” are clearly foolish as well as tragic. A visiting extra-terrestrial would be pityingly amused at the foolish antics of homo sapiens using long-range rockets to fight each other over dwindling terrestrial resources—rather than using the same rockets to travel in space and have the use of all the resources they need!

7.2. High return in safety from extra-terrestrial settlement

Investment in low-cost orbital access and other space infrastructure will facilitate the establishment of settlements on the Moon, Mars, asteroids and in man[/woman]-made space structures. In the first phase, development of new regulatory infrastructure in various Earth orbits, including property/usufruct rights, real estate, mortgage financing and insurance, traffic management, pilotage, policing and other services will enable the population living in Earth orbits to grow very large. Such activities aimed at making near-Earth space habitable are the logical extension of humans’ historical spread over the surface of the Earth. As trade spreads through near-Earth space, settlements are likely to follow, of which the inhabitants will add to the wealth of different cultures which humans have created in the many different environments in which they live.

Success of such extra-terrestrial settlements will have the additional benefit of reducing the danger of human extinction due to planet-wide or cosmic accidents [27]. These horrors include both man-made disasters such as nuclear war, plagues or growing pollution, and natural disasters such as super-volcanoes or asteroid impact. It is hard to think of any objective that is more important than preserving peace. Weapons developed in recent decades are so destructive, and have such horrific, long-term side-effects that their use should be discouraged as strongly as possible by the international community. Hence, reducing the incentive to use these weapons by rapidly developing the ability to use space-based resources on a large scale is surely equally important [11] and [16]. The achievement of this depends on low space travel costs which, at the present time, appear to be achievable only through the development of a vigorous space tourism industry.

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

**Matthews 18** [Dylan Matthews, 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](https://docs.google.com/viewer?a=v&pid=sites&srcid=ZGVmYXVsdGRvbWFpbnxuYmVja3N0ZWFkfGd4OjExNDBjZTcwNjMxMzRmZGE).” 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](https://plato.stanford.edu/entries/consequentialism/) 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](https://app.effectivealtruism.org/funds/far-future) 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](https://www.vox.com/future-perfect/2018/10/15/17948062/pandemic-flu-ebola-h1n1-outbreak-infectious-disease), or global warming/out of control geoengineering — and engaging in activities to prevent that specific eventuality.

But in a [set of slides](https://intelligence.org/wp-content/uploads/2013/07/Beckstead-Evaluating-Options-Using-Far-Future-Standards.pdf) 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 things 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”](https://www.nytimes.com/2017/12/03/opinion/lost-einsteins-innovation-inequality.html) (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.\*

### DA- Economy

#### The private sector in space is growing and investors have poured hundreds of millions into the industry based on projected growth – the aff reverses that and crashes investment

Davenport 21 – covers NASA and the space industry for The Washington Post's Financial desk. He joined The Post in 2000 and has a bachelors degree from Colby College. [Christian, “Investors are placing big bets on a growing space economy. But can they reach orbit?”, Washington Post, 9/05/21, [https://www.washingtonpost.com/technology/2021/09/05/space-finance-bubble-investors/]//AV](https://www.washingtonpost.com/technology/2021/09/05/space-finance-bubble-investors/%5d//AV)

Space is hot. The billionaire “space barons” — Elon Musk, Jeff Bezos and Richard Branson — [have given the industry a cachet](https://www.washingtonpost.com/technology/2020/11/11/nasa-spacex-crew1-launch-space-station/?itid=lk_inline_manual_3) not seen since the Apollo era of the 1960s and ’70s, with Branson and Bezos flying to the edge of space on their own spacecraft and Musk’s SpaceX becoming the dominant supplier of people and cargo to the International Space Station. Investors are fearful of missing out. That’s turned out to be great news for the space companies hoping to get a piece of the satellite-launch business. But it’s also caused analysts to warn that space is still a nascent and risky business, one rocket explosion away from disaster. Hundreds of millions of dollars are now flowing to an industry long viewed as too risky for serious investment. New start-ups are blossoming in an explosion reminiscent of the early days of tech, when money poured into Silicon Valley start-ups at the beginning of the Internet age. Gen. John “Jay” Raymond, the chief of space operations for the U.S. Space Force, even predicted during a recent speech that investment in the commercial space sector would drive “a second Golden Age of space.” Over the past decade, investors pumped $200 billion into 1,500 space companies around the world, according to an analysis done by [Space Capital, a space investment firm](https://www.spacecapital.com/). Investment in start-up space companies reached $7.6 billion last year, a 16 percent increase from 2019, [according to Bryce Space and Technology](https://brycetech.com/download.php?f=Bryce_Start_Up_Space_2021.pdf), a consulting firm. “This level of investment is consistent with the 6-year trend beginning in 2015 of unprecedented levels of venture capital driven investment flowing into the space industry,” the company said. That has helped drive a $447 billion global space economy that grew 4.4 percent last year, [according to the Space Foundation](https://spacefoundation.org/), an advocacy group. Over the past 10 years, the space economy has grown 55 percent, according to the Foundation, which said the commercial space products and services market is valued at $219 billion. In addition to those investments, several space ventures have gone public over the past year through special purpose acquisition companies, or SPACs. Branson’s Virgin Galactic space tourism company [was one of the first high-profile space ventures](https://www.washingtonpost.com/business/2019/07/09/virgin-galactic-announces-plans-become-first-publicly-listed-space-company/?itid=lk_inline_manual_16) to go public through a SPAC when it merged with a New York hedge fund in 2019. Since then, SPACs have “exploded in popularity,” [according to a report by analysts at Avascent and Jefferies](https://www.avascent.com/news-insights/avascent-apogee/space-spacs-valuation-in-zero-g/), a financial advisory firm specializing in aerospace, which found that the mergers across all industries raised $83 billion in 2020 compared to $14 billion the year before. But the stocks can be volatile. In the last couple of weeks, for example, the stocks of two space companies took hits when they suffered problems. Shares of Virgin Galactic dipped after the Federal Aviation Administration said it was investigating the company after its flight, with Branson on board, went off course. The probe was first reported by the [New Yorker](https://www.newyorker.com/news/news-desk/the-red-warning-light-on-richard-bransons-space-flight). Astra, a start-up rocket company based outside of San Francisco, saw its stock drop after a launch attempt failed to reach orbit last month. Still, more than a dozen companies have gone public, or announced they would in recent months. They include Planet, which has built a constellation of satellites to take images of the Earth, and Astra. [Rocket Lab, which has launched dozens of small satellites](https://www.washingtonpost.com/news/innovations/wp/2017/11/09/ready-to-book-your-satellite-launch-online-the-rocket-industry-looks-to-run-more-like-an-airline/?itid=lk_inline_manual_21) on its Electron rocket, started trading on the Nasdaq last month. And Virgin Orbit, [which “air launches” a rocket](https://www.washingtonpost.com/technology/2021/01/17/richard-branson-virgin-orbit-launch-success/?itid=lk_inline_manual_21) designed to fly satellites by dropping it from the wing of a 747 airplane, announced that it would go public through a SPAC and that it had raised $100 million in another funding round backed by Boeing and AE Industrial Partners. International companies also are driving growth, analysts said. “Going forward, I would expect to see it becoming increasingly international,” said Nickolas Boensch, a program manager at Bryce. “China, Japan, the U.K. have been huge players here, and there is something attractive to having a domestic capability.”

#### The future of the economy is based on the private-sector driven success of space exploration

Clark 20 – President of U.S. Chamber of Commerce with an MBA from Georgetown University. [Suzanne, “Space is our new economic frontier. The US can’t afford to lose out”, CNN Business, 3/02/20, [https://www.cnn.com/2020/03/02/perspectives/space-economic-frontier/index.html]//AV](https://www.cnn.com/2020/03/02/perspectives/space-economic-frontier/index.html%5d//AV)

President Trump's budget, which was released last month, outlines several moonshots that are unlikely to pass a divided Congress. But there's one in particular that both Republicans and Democrats should support wholeheartedly: the $25.2 billion request to fund NASA, a 12% boost [over the prior year](https://www.cnn.com/2020/02/10/tech/nasa-budget-moon-landing-artemis-scn/index.html). The future of our economy depends on the vigorous pursuit of space exploration. And with NASA leading the way, the potential for growth — like space itself — has no limits. Since NASA's launch, American space exploration has always been a bipartisan venture. It was President Kennedy who announced our goal of going to the moon, but it was President Nixon who brought that goal to fruition. Reaching the next milestone in interplanetary travel requires a commitment from our leaders that spans political parties and administrations. And with a new space race getting underway — one that could prove even more consequential than the last — NASA needs bipartisan support from Congress today more than ever. Space is the most promising industry to arise since the birth of the tech sector, with growth projected to skyrocket in the coming years led by companies such as Boeing and Northrop Grumman, and new entrants, such as Virgin Galactic, SpaceX and Blue Origin. [According to US Chamber of Commerce economists](https://www.uschamber.com/series/above-the-fold/the-space-economy-industry-takes), the industry will be worth at least $1.5 trillion by 2040. While no one can fully grasp what our economy will look like 20 years from now, one thing is certain: the private sector space industry will transform how societies across the globe live, communicate and do business. In fact, it already has. Nearly every company depends on space-enabled technologies for day-to-day operations — whether they use satellite communications, remote sensing or location-based services. Businesses across multiple sectors are leveraging these and other technologies to stake their claim in this new economic frontier. Pharmaceutical companies such as Merck and Sanofi, for example, are conducting experiments in low-Earth orbit [aboard the International Space Station](https://www.issnationallab.org/research-on-the-iss/areas-of-research/life-sciences/) to evaluate the potential advantages of microgravity in developing new drug treatments that will help people live longer, healthier lives. Companies, such as Bigelow, are committed to making [off-Earth habitation](https://www.cnn.com/2016/05/05/tech/way-up-there-where-will-we-live-space/index.html) a reality. Even retailers are getting in on the action, with companies like Target [funding research](https://www.iss-casis.org/cottonsustainabilitychallenge/) on the International Space Station to produce more sustainable forms of cotton. Lunar colonies, asteroid mining and interplanetary travel — once the stuff of science fiction — could become a reality. But for any of that to happen, we need sustained and meaningful action from members of Congress. They can start by meeting the president's request for NASA funding. Included in the White House budget is [$12.4 billion](https://www.cnn.com/2020/02/10/tech/nasa-budget-moon-landing-artemis-scn/index.html) specifically for lunar exploration that would include landing systems, continued development of the Space Launch System (SLS) and the Orion crew module. These spacecraft will allow us to shuttle people and equipment to the moon and back. They will take us not only beyond Earth's orbit but also into the next phase of commercial space development. Most importantly, they will ensure that the United States continues to outpace competitors like China and Russia in the space race. Our country must be the vanguard in exploring these new economic frontiers. Planting the American flag in the private sector space industry will help create the jobs of the future and allow the United States to lead the formation of best practices that will govern the industry for decades to come. Some might ask if returning to the moon is worth the expense. The answer is undeniably yes. Providing NASA with the resources it needs to succeed is a small investment that will yield tremendous dividends over time. To start, it would help secure American commercial dominance in a fast-growing industry. It also would be a catalyst for innovation and scientific discovery, with salutary effects that would benefit the entire economy.

#### Economic decline results in nuclear war.

Tønnesson 15 [Tønnesson is a research professor at the Peace Research Institute Oslo (PRIO) in Norway and the leader of the East Asia Peace program at Uppsala University in Sweden.] “Deterrence, interdependence and Sino–US peace.” International Area Studies Review, volume 18, number 3, pgs. 297-311. 2015.

Several recent works on China and Sino–US relations have made substantial contributions to the current understanding of how and under what circumstances a combination of nuclear deterrence and economic interdependence may reduce the risk of war between major powers. At least four conclusions can be drawn from the review above: first, those who say that interdependence may both inhibit and drive conflict are right. Interdependence raises the cost of conflict for all sides but asymmetrical or unbalanced dependencies and negative trade expectations may generate tensions leading to trade wars among inter-dependent states that in turn increase the risk of military conflict (Copeland, 2015: 1, 14, 437; Roach, 2014). The risk may increase if one of the interdependent countries is governed by an inward-looking socio-economic coalition (Solingen, 2015); second, the risk of war between China and the US should not just be analysed bilaterally but include their allies and partners. Third party countries could drag China or the US into confrontation; third, in this context it is of some comfort that the three main economic powers in Northeast Asia (China, Japan and South Korea) are all deeply integrated economically through production networks within a global system of trade and finance (Ravenhill, 2014; Yoshimatsu, 2014: 576); and fourth, decisions for war and peace are taken by very few people, who act on the basis of their future expectations. International relations theory must be supplemented by foreign policy analysis in order to assess the value attributed by national decision-makers to economic development and their assessments of risks and opportunities. If leaders on either side of the Atlantic begin to seriously fear or anticipate their own nation’s decline then they may blame this on external dependence, appeal to anti-foreign sentiments, contemplate the use of force to gain respect or credibility, adopt protectionist policies, and ultimately refuse to be deterred by either nuclear arms or prospects of socioeconomic calamities. Such a dangerous shift could happen abruptly, i.e. under the instigation of actions by a third party – or against a third party. Yet as long as there is both nuclear deterrence and interdependence, the tensions in East Asia are unlikely to escalate to war. As Chan (2013) says, all states in the region are aware that they cannot count on support from either China or the US if they make provocative moves. The greatest risk is not that a territorial dispute leads to war under present circumstances but that changes in the world economy alter those circumstances in ways that render inter-state peace more precarious. If China and the US fail to rebalance their financial and trading relations (Roach, 2014) then a trade war could result, interrupting transnational production networks, provoking social distress, and exacerbating nationalist emotions. This could have unforeseen consequences in the field of security, with nuclear deterrence remaining the only factor to protect the world from Armageddon, and unreliably so. Deterrence could lose its credibility: one of the two great powers might gamble that the other yield in a cyber-war or conventional limited war, or third party countries might engage in conflict with each other, with a view to

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