# Neg

#### I negate: The appropriation of outer space by private entities is unjust.

### My value is morality for two reasons

1. The resolution’s use of the word unjust implies a moral question
2. Morality allows us to perceive what is inherently good or bad – thus it must be prioritized.

### My criterion is Increasing Maximum Expected Wellbeing:

#### Government policy is limited by resource availability. Any government decision must account for resource tradeoffs.

**Mack**, 20**04**, Peter Mack (Former U.S. Representative) “Utilitarian Ethics in Healthcare.” International Journal of the Computer, the Internet, and Management Vol. 12, No.3. 2004. Department of Surgery. Singapore General Hospital.] <http://www.ijcim.th.org/past_editions/2004V12N3/ijcimv3n1_article6.pdf>

Medicine is a costly science, but of greater concern to the health economist is that it is also a limitless art. Every medical advance created new needs that did not exist until the means of meeting them came into existence. Physicians are reputed to have an infinite capacity to do ever more things, and perform ever more expensive interventions for their patients so long as any of their patients’ health needs remain unfulfilled. The traditional stanceof the physicianis that each patient is an isolated universe.When confronted with a situation in which his duty involves a competition for scarce medications or treatments, he would plead the patient’s cause by all methods, short of deceit. However, when thephysician’sdecision involves more than just his own patient, or has some commitment to public health,other issues have to be considered.He then has to recognise that the **unbridled advocacy of the patient may not square with** what the economist perceives to be **the most advantageous policy to society** as a whole. Medical professionals characteristically deplore scarcities. Many of them are simply not prepared to modify their intransigent principle of unwavering duty to their patients’ individual interest. However, **in decisions involving multiple patients**, making available **more** medication, labour or **expenses for one** patient **will mean** leaving **less for another.** The physician is then compelled by his competing loyalties to enter into a decision mode of one **versus many, where the underlying constraint is** one of **finiteness of the commodities.** Although the medical treatment may be simple and inexpensive in many instances, there are situations such as in renal dialysis, where prioritisation of treatment poses a moral dilemma because some patients will be denied the treatment and perish. Ethics and economics share areas of overlap. They both deal with how people should behave, what policies the state should pursue and what obligations citizens owe to their governments. The centrality of the human person in both normative economics and normative ethics is pertinent to this discussion. Economics is the study of human action in the marketplace whereas ethics deals with the “rightness” or “wrongness” of human action in general. Both disciplines are rooted in human reason and human nature and the two disciplines intersect at the human person and the analysis of human action. From the economist’s perspective, **ethics is identified with** the investigation **of rationally justifiable bases for resolving conflict among persons with divergent aims** and who share a common world. Because of the scarcity of resources, one’s success is another person’s failure. Therefore ethics search for rationally justifiable standards for the resolution of interpersonal conflict.While the realities of human life have given rise to the concepts of property, justice and scarcity, the **management of scarcity requires the exercise of choice**, since having more of some goods means having less of others. Exercising choice in turn involvescomparisons, and comparisonsare based on principles.As ethicists, the meaning of these principles must be sought in the moral basis that implementing them would require. For instance, if the implementation of distributive justice in healthcare is founded on the basis of welfare-based principles, as opposed to say resource-based principles, it means that the health system is motivated by the idea that what is of primary moral importance is the level of welfare of the people. This means that all **distributive questions should be settled according to which distribution maximises welfare.** Utilitarianism is fundamentally welfarist in its philosophy. Application of the principle to healthcare requires a prior understanding of the welfarist theory as expounded by the economist. Conceptually, welfarist theory is built on four tenets: utility maximisation, consumer sovereignty, consequentialism and welfarism. Utility maximisation embodies the behavioural proposition that individuals choose rationally, but it does not address the morality of rational choice. Consumer sovereignty is the maxim that individuals are the best judge of their own welfare. Consequentialism holds that any action or choice must be judged exclusively in terms of outcomes. Welfarism is the proposition that the “goodness” of the resource allocation be judged solely on the welfare or utility levels in that situation. Taken together these four tenets require that a policy be judged solely in terms of the resulting utilities achieved by individuals as assessed by the individuals themselves. Issues of who receives the utility, the source of the utility and any **non-utility aspects** of the situation **are ignored.**

### Innovation

**Outer Space as a private sector is growing significantly right now**

**Weinzierl 21**, 2-12-2021, "The Commercial Space Age Is Here," Harvard Business Review, <https://hbr.org/2021/02/the-commercial-space-age-is-here> PM

There’s no shortage of hype surrounding the commercial space industry. But while tech leaders promise us moon bases and settlements on Mars, the space economy has thus far remained distinctly local — at least in a cosmic sense. Last year, however, we crossed an important threshold: For the first time in human history, humans accessed space via a vehicle built and owned not by any government, but by a private corporation with its sights set on affordable space settlement. It was the first significant step towards building an economy both in space and for space. The implications — for business, policy, and society at large — are hard to overstate. In 2019, [95%](https://brycetech.com/reports) of the estimated $366 billion in revenue earned in the space sector was from the space-for-earth economy: that is, goods or services produced in space for use on earth. The space-for-earth economy includes telecommunications and internet infrastructure, earth observation capabilities, national security satellites, and more. This economy is booming, and though [research shows](https://hbsp.harvard.edu/product/716037-PDF-ENG) that it faces the challenges of overcrowding and monopolization that tend to arise whenever companies compete for a scarce natural resource, [projections for its future](https://hbsp.harvard.edu/product/720027-PDF-ENG) are optimistic. Decreasing costs for launch and space hardware in general have enticed new entrants into this market, and companies in a variety of industries have already begun leveraging satellite technology and access to space to drive innovation and efficiency in their earthbound products and services. In contrast, the space-for-space economy — that is, goods and services produced in space for use in space, such as mining the Moon or asteroids for material with which to construct in-space habitats or supply refueling depots — has struggled to get off the ground. As far back as the 1970s, [research](https://ntrs.nasa.gov/citations/19780004167) commissioned by NASA predicted the rise of a space-based economy that would supply the demands of hundreds, thousands, even millions of humans living in space, dwarfing the space-for-earth economy (and, eventually, the entire terrestrial economy as well). The realization of such a vision would change how all of us do business, live our lives, and govern our societies — but to date, we’ve never even had more than [13 people](https://www.space.com/6503-population-space-historic-high-13.html) in space at one time, leaving that dream as little more than science fiction. Today, however, there is reason to think that we may finally be reaching the first stages of a true space-for-space economy. SpaceX’s [recent achievements](https://www.nasa.gov/press-release/nasa-s-spacex-crew-1-astronauts-headed-to-international-space-station/) (in cooperation with NASA), as well as upcoming efforts by [Boeing](https://www.nasa.gov/feature/boeing-s-starliner-makes-progress-ahead-of-flight-test-with-astronauts), [Blue Origin](https://www.blueorigin.com/news/nasa-selects-blue-origin-national-team-to-return-humans-to-the-moon), and [Virgin Galactic](https://spacenews.com/virgin-galactic-prepares-to-transition-to-operations) to put people in space sustainably and at scale, mark the opening of a new chapter of spaceflight led by private firms. These firms have both the intention and capability to bring private citizens to space as passengers, tourists, and — eventually — settlers, opening the door for businesses to start meeting the demand those people create over the next several decades with an array of space-for-space goods and services. Welcome to the (Commercial) Space Age In our [recent research](https://www.hbs.edu/faculty/Publication%20Files/jep.32.2.173_Space,%20the%20Final%20Economic%20Frontier_413bf24d-42e6-4cea-8cc5-a0d2f6fc6a70.pdf), we examined how the model of centralized, government-directed human space activity born in the 1960s has, over the last two decades, made way for a new model, in which public initiatives in space increasingly share the stage with private priorities. Centralized, government-led space programs will inevitably focus on space-for-earth activities that are in the public interest, such as national security, basic science, and national pride. This is only natural, as expenditures for these programs must be justified by demonstrating benefits for citizens — and the citizens these governments represent are (nearly) all on earth. In contrast to governments, the private sector is eager to put people in space to pursue their own personal interests, not the state’s — and then supply the demand they create. This is the vision driving SpaceX, which in its first twenty years has entirely upended the rocket launch industry, securing 60% of the global commercial launch market and building ever-larger spacecraft designed to ferry passengers not just to the International Space Station (ISS), but also to its own promised [settlement on Mars](https://www.spacex.com/media/making_life_multiplanetary_transcript_2017.pdf). Today, the space-for-space market is limited to supplying the people who are already in space: that is, the handful of astronauts employed by NASA and other government programs. While SpaceX has grand visions of supporting large numbers of private space travelers, their current space-for-space activities have all been in response to demand from government customers (i.e., NASA). But as decreasing launch costs enable companies like SpaceX to leverage economies of scale and put more people into space, growing private sector demand (that is, tourists and settlers, rather than government employees) could turn these proof-of-concept initiatives into a sustainable, large-scale industry. This model — of selling to NASA with the hopes of eventually creating and expanding into a larger private market — is exemplified by SpaceX, but the company is by no means the only player taking this approach. For instance, while SpaceX is focused on space-for-space transportation, another key component of this burgeoning industry will be manufacturing. [Made In Space, Inc.](https://madeinspace.us/capabilities-and-technology/archinaut/) has been at the forefront of manufacturing “in space, for space” since 2014, when it 3D-printed a wrench onboard the ISS. Today, the company is exploring other products, such as high-quality fiber-optic cable, that terrestrial customers may be willing to pay to have manufactured in zero-gravity. But the company also recently received a [$74 million contract](https://www.nasa.gov/press-release/nasa-funds-demo-of-3d-printed-spacecraft-parts-made-assembled-in-orbit) to 3D-print large metal beams in space for use on NASA spacecraft, and future private sector spacecraft will certainly have similar manufacturing needs which Made In Space hopes to be well-positioned to fulfill. Just as SpaceX has begun by supplying NASA but hopes to eventually serve a much larger, private-sector market, Made In Space’s current work with NASA could be the first step along a path towards supporting a variety of private-sector manufacturing applications for which the costs of manufacturing on earth and transporting into space would be prohibitive. Another major area of space-for-space investment is in building and operating space infrastructure such as habitats, laboratories, and factories. Axiom Space, a current leader in this field, recently [announced](https://www.theverge.com/2021/1/26/22250327/space-tourists-axiom-private-crew-iss-price) that it would be flying the “first fully private commercial mission to space” in 2022 onboard SpaceX’s Crew Dragon Capsule. Axiom was also [awarded](https://spacenews.com/nasa-selects-axiom-space-to-build-commercial-space-station-module/) a contract for exclusive access to a module of the ISS, facilitating its plans to develop modules for commercial activity on the station (and eventually, beyond it). This infrastructure is likely to spur investment in a wide array of complementary services to supply the demand of the people living and working within it. For example, in February 2020, Maxar Technologies was awarded a [$142 million contract](https://www.builtincolorado.com/2020/02/03/maxar-technologies-142m-nasa-contract) from NASA to develop a robotic construction tool that would be assembled in space for use on low-Earth orbit spacecraft. Private sector spacecraft or settlements will no doubt have need for a variety of similar construction and repair tools.

#### Privatization of space boosts innovation.

Morgan **Stanley**, 7-24-20**20**, "Space: Investing in the Final Frontier," <https://www.morganstanley.com/ideas/investing-in-space> SS

Will declining launch costs, advances in technology and rising public-sector interest position space exploration as the next trillion-dollar industry? It’s been nearly half a century since humans left footprints on the moon and during that time, human space exploration has largely centered on manned low-Earth orbit missions and unmanned scientific exploration. But now, high levels of private funding, advances in technology and growing public-sector interest is renewing the call to look toward the stars. The investment implications for a more accessible, less expensive reach into outer space could be significant, with potential opportunities in fields such as satellite broadband, high-speed product delivery and perhaps even human space travel. While the most recent space exploration efforts have been driven by handful of private companies, the establishment of a sixth branch of the U.S. military in 2019—the “Space Force”—along with growing interest from Russia and China, means public-sector investment may also increase in the coming years. To outline progress in space from both public and private companies, as well as government efforts, the Space team at Morgan Stanley Research has been examining these developments to detail th2020: A Space Odyssey A single transformative technology shift often can spark new eras of modernization, followed by a flurry of complimentary innovations. In 1854, when Elisha Otis demonstrated the safety elevator, the public couldn’t foresee its impact on architecture and city design. But roughly 20 years later, every multistory building in New York, Boston, and Chicago was constructed around a central elevator shaft. Today, development of reusable rockets may provide a similar turning point. “We think of reusable rockets as an elevator to low Earth orbit (LEO),” says Morgan Stanley Equity Analyst Adam Jonas. “Just as further innovation in elevator construction was required before today's skyscrapers could dot the skyline, so too will opportunities in space mature because of access and falling launch costs.” Privately held space exploration firms have also been developing space technologies, with ambitions such as manned landings on the moon and airplane-borne rocket launchers that could launch small satellites to LEO at a far lower cost, and with far greater responsiveness, than ground-based systems. Growing Public-Sector Interest While private-equity projects have grabbed most of the headlines in recent years, public-sector interest has also grown. In December of 2019, the Trump Administration established a U.S. Space Command (including a Space Operations Force and a Space Development Agency) with the signing of the as part of the National Defense Authorization Act for 2020. This development will likely benefit the U.S. Defense Department—as well as the aerospace and defense industries—and help focus and accelerate investment in innovative technologies and capabilities. Then in May of 2020, NASA launched a manned flight to the International Space Station (ISS) on a commercially developed U.S. rocket. The launch represented the first time that the U.S. has flown a manned mission to the ISS since the shuttle program was retired in 2011. It also represents an important milestone for the relationship between private enterprise and the U.S. government in the space domain. The Global Space Economy Near term, space as an investment theme is also likely to impact a number of industries beyond Aerospace & Defense, such as IT Hardware and Telecom sectors. Morgan Stanley estimates that the global space industry could generate revenue of more than $1 trillion or more in 2040, up from $350 billion, currently. Yet, the most significant short- and medium-term opportunities may come from satellite broadband Internet access.e constellation of potential opportunities for investors.

#### Commercialized space is sustainable through innovation.

Derek **Handley**, 10-16-**2021**, "Space Tourism Can Help Conquer Climate Change," <https://pebblemag.com/magazine/doing/how-space-tourism-can-help-conquer-climate-change> SS

Actor William Shatner rocketed into space this week on Jeff Bezos’ Blue Origin, propelling civilian space travel into the global spotlight for the second time in two months. In September, SpaceX took non-professional astronauts on a spaceflight aboard Inspiration4. With all the challenges on planet Earth, it may seem like a frivolous waste of money and carbon emissions to send famous and wealthy “tourists” into space for a few moments or days of weightlessness. But many similarly dismissed the Wright brothers’ efforts at Kitty Hawk in December 1903 as an underwhelming flight of fancy. In fact, it was a small but crucial first step in the story of flight, which ultimately opened up global travel and connectivity to the masses which has transformed humanity forever. In a similar spirit, Virgin Galactic and Blue Origin are symbols of the frontier of the second major era of space exploration, one where private industry is in the pilot’s seat. The first era of space exploration saw the US and Russia invest vast public resources in their space programmes, even in the face of domestic issues crying out for attention. But when President Kennedy vowed to land Americans on the Moon by the end of the 1960s, he knew it would unlock human potential in ways that no one could fully imagine. He was right. It is due almost entirely to the series of satellites launched by NASA in 1992 that we are even able to accurately measure sea level rise at all. The wake up call the United Nations’ Intergovernmental Panel on Climate Change was informed by data from dozens of remote sensing satellites and instruments These ‘eyes in the sky’ are fundamental to our understanding of global warming. monitoring the vital signs of our planet: temperature changes, greenhouse gas emissions, soil moisture and glacier movements. The Carbon Mapper and MethaneSAT projects are set to deliver new satellites into space that will monitor potent methane emissions leaking from gas wells, pipelines, refineries, and power plants, allowing scientists to accurately pinpoint sites to target with localised emissions mitigation efforts. Since the beginning of time it has been inherent in human nature to make room for the risky challenges and longshots that enable us to understand ourselves, our planet and the universe we inhabit. The competition emerging in the space industry is crucial to delivering the critical mass that will make operating in space more affordable and spur a new wave of innovation. Elon Musk’s satellite broadband company Starlink was born from the pioneering work of SpaceX, with its reusable rockets taking people to and beyond the International Space Station, most recently with the Inspiration4 spaceflights. Sir Richard Branson’s space tourism venture has already spun off Virgin Orbit, which aims to make delivery of small satellites into space cheaper and more sustainable. This pioneering challenge is partly what drew me to Branson’s quest to launch a space tourism industry and pursue the breakthroughs that could accompany it. When I, along with what was then around 300 other would-be astronauts put our money down in 2012 for a Virgin Galactic ticket, we played a role to help underwrite and validate demand for a bold venture that might otherwise never have got off the ground. William Shatner gives a nod to Bezos’ ‘noble ambitions’ for space travel in a Blue Origin video released just hours before take-off, “Somebody has to start. We’re just at the beginning but how miraculous that beginning is, and how extraordinary it is to be part of the beginning.” This new era of space exploration is risky and expensive but will offer a net benefit to humanity. It doesn’t mean that we should turn our gaze skyward in favour of addressing the problems facing us on our warming planet. We should aspire to do both. It's encouraging to see record amounts of funding pouring into climate tech, with the Silicon Valley Bank reporting US$58 billion will be invested in 2021, beating out last year’s record $35 billion. At Aera VC, we have funded companies like Noya, which uses cooling towers common to industry all over the world to pull in air and extract the carbon dioxide from it. At scale, this technology could make a significant impact on reducing the amount of CO2 in the atmosphere. Dawn Aerospace, another of our investments, is creating reusable drone-like spacecraft that will usher in a new era of inexpensive and sustainable orbital access. Their aim is to be the first spacecraft in history to reach space and return to Earth twice in one day. They recently completed a series of successful test flights from New Zealand, where I live and work. Some very aspirational thinkers are pursuing more ambitious reasons for furthering into space, such as mining asteroids for minerals or relocating our polluting industries there. If we can do it while consciously addressing any resultant space debris without causing chaos in the rest of the Solar System, why not? Since the beginning of time it has been inherent in human nature to make room for the risky challenges and longshots that enable us to understand ourselves, our planet and the universe we inhabit. We must keep pursuing them. Those efforts have resulted in the finest moments of human endeavour and will ultimately play a role in ways we can’t even yet comprehend, in addressing the biggest challenge ahead - avoiding catastrophic climate change.

**Innovation brought about by space helps to mitigate climate change**

**ESA 20,** (European Space Agency ) 7-16-2020, "Space technology helps mitigate climate change", Esa, https://www.esa.int/Applications/Telecommunications\_Integrated\_Applications/Technology\_Transfer/Space\_technology\_helps\_mitigate\_climate\_change PM

Space technologies have led to a number of inventions that benefit the environment and save energy. Satellite-based systems are reducing vehicles’ carbon dioxide emissions, remote-sensing technology is making wind turbines more efficient, and information from weather satellites is helping solar cells to produce more energy. These are just some examples of how spin-offs from space technology and satellite services can make a difference. Over the years, ESA’s Technology Transfer Programme and its Business Incubation Centres have fostered and supported many innovative technologies and business ideas that contribute to new services and products to mitigate climate change. To maximise the amount of electricity from new wind turbines, the French company Leosphere developed a small instrument to measure wind speed and direction from the ground up to heights of 200 metres. The ‘lidar’ technology is similar to that which ESA will use on its Aeolus satellite to provide global observations of wind profiles from space. ESA’s expertise from this mission was important for Leosphere and was used to improve their instrument during the company’s start-up phase at ESA’s Business Incubation Centre (BIC) in Noordwijk, the Netherlands. More instruments based on the same technology have followed and these are now being used in more than 100 countries. By using data from weather satellites, ‘SolarSAT’ from Italian company Flyby can accurately predict the power output of photovoltaic power plants. This information is used to design improved systems and quickly identify faults in operating photovoltaic plants – faults that can reduce energy production by more than 10% a year. This system has already been installed on several photovoltaic systems in Italy. Miniaturised ceramic gas sensor technology, developed originally for measuring oxygen levels around spacecraft reentry vehicles, is now being used in systems that accurately control heater combustion, one of the major sources of pollutants. “It can reduce exhaust gases that are harmful for the environment and ensure that heating systems work at an optimum level. It also reduces fuel consumption by 10–15%,” explained Rainer Baumann from TU Dresden. Supported by ESA’s Technology Transfer Programme and its partner MST, this technology is now used by the German company ESCUBE in systems controlling industrial heaters. Conventional satnav systems help people to find their way. Now, several innovators have come up with interesting developments that use the same information to reduce fuel consumption and pollution by cars. Repeated rapid acceleration and abrupt braking increases the fuel consumption of even the greenest car. Alex Ackerman and Yossef Shiri have developed the intelligent GreenDrive system that combines information on the type of car, its location and the road conditions to advise the driver on the most economical driving style to use: when to accelerate, when to brake and when to keep the speed constant. On average, this can result in a 15–25% fuel saving. Another system proposed by Prof. Gerhard Güttler for the European Satellite Navigation Competition is Galileo-Ecodrive. This uses data on a road’s geodetic height profile provided by satnav systems to optimise the operation of auxiliary devices such as electricity generators, air conditioning, power steering, the deep freezers used on trucks for perishable goods and the moveable parts of a cement mixer –devices that consume up to 20% of the fuel. This could amount to savings of up to 2 billion litres a year across Europe, avoiding the emission of 5 million tonnes of carbon dioxide.