

Is space travel a necessity or an indulgence?

Space exploration is a thing that amazes and intrigues people from all over the planet however, is it necessary that we explore space or is it simply an indulgence? For the purposes of this essay, I define space exploration as people physically entering and exploring space. The technological breakthroughs that have come from space exploration are too numerous to name – many of which people don't associate with space. However, the monetary spend on space each year is great and is one of the biggest points that I cover against space exploration. Many people wonder why we are so focused on space and why the desire to explore is one that has been around since before the stone age; this is easily explained by the fact that humans have an innate need to explore and understand the unknown (Nasa 2015). While there are counter arguments that certainly have some merit, the argument that comes out on top is that space exploration is a necessity.

This is shown by the technological and scientific advances of space developments. While many advances like global communication, GPS and weather/disaster forecasting have come directly from space, many came from the development of the space programme itself. There have been countless developments that could have come from Earth but came from the space programme because it had funding and a clear goal to make advancements. Prime examples for this would be stem cell and cancer research, which came about from microgravity research which accelerates biological aging and alters cell growth, providing an unparalleled laboratory for medical research (Joshua P. Vandenbrink, John Z. Kiss, 2016). On top of this it helps many sciences develop and has “given birth to new understandings in many sciences: physics, astronomy, geology, biology; environmental, ecological, engineering and computer sciences” (Ocampo et al, 1998). The main opposing argument for this is that we could be spending money here on earth to solve problems like poverty, famine, and disease. Poverty and reliance on government aid programmes is only increasing while the actual budget for US aid is going down. For example, the budget for the Supplemental Nutrition Assistance Program (SNAP), the largest U.S. federal food-assistance program, will be reduced by \$187 billion over the next ten years (Shabu Abraham Varghese, 2016). This indicates that the US budget for poverty aids needs to be increased and this could come from the cost of space travel. However, the US government spent \$7.01 trillion last Fiscal year; compared to the \$25.2 billion spent on Nasa this equates to 0.36% of national spending. This shows that while the funds for space travel are high, compared to national expenditure it isn't that great a cost. On top of this, the satellite and space industry drives significant economic benefits – while Nasa spent \$25.2 billion in 2025, they brought in \$42.4 billion to the US economy (in 2024) (ESA Space Economy, 2024). The cost for space travel while great is more than made up for by the benefits and advances to technology and science as well as the drive for US economy (using US as an example here as it is good for easily found figures and idea of worldwide impact).

Space exploration is a necessity as it fulfils human curiosity and the need to understand the unknown. Since before civilization, people have gazed up at the sky and wondered what lies beyond. The reason behind this is a pathological need to explore and understand the unknown. “The Human Desire for Exploration Leads to Discovery” indicates that humans must explore and in doing so we discover ourselves and develop our understanding of topics. Almost all of earth's land has been discovered and explored - because of this we now seek other unexplored places such as space. However, must we send up ships and people for billions of dollars? By sending people to space we have to develop complex human environment and safety systems which is a huge expense of time and money. The opposing argument is that using space cameras and robots to explore and capture images of space

would be a cheaper and safer way to set out the space programme. “Economic analysis of small form aerial photography mission utilising the LSA/01 space UAV” is evidence that space photography is incredible and both highly detailed and much cheaper than manned missions. However, while space photography can do some of the things space exploration can cheaper, it cannot do many things for example medical advancements due to investigating the effects of microgravity on the body, and opportunities to use the discoveries of space in a helpful and meaningful way. They cannot easily perform experiments and if we do find anything out there, we will need humans to go and do the jobs as while robots are good, if a situation happens that they do not know how to deal with they may fail. This displays evidence that while space photography does have a place, it cannot replace manned missions and exploration.

Space exploration is a necessity as the opportunity for future discoveries could greatly benefit and even save human life. There are many Sci-Fi films about what we could find in space and while they are fiction, we do not know what space holds. There are still possibilities of habitable planets and new materials as we do not know what is in space; Astronomers estimate there may be hundreds of billions to trillions of galaxies in the observable universe, and we have studied only a few. Nasa claims there to be at least 200 billion (“Hubble Reveals Observable Universe Contains 10 Times More Galaxies Than Previously Thought”) however other astronomers such as University of Nottingham Astronomy department predict many more. While we do know earth like planets in the goldilocks zone like Proxima B do exist, many claim that they are not in fact habitable (Sarah Scoles, 2023). We have attempted to create “biospheres” that people can live in however it has never worked the way we wanted. Problems like food, drinking water and psychological issues have always stopped these experiments and inevitably will also occur if we settle in space (Sarah Scoles, 2023). However, as I pointed out at the start, we do not know what is in space and so cannot guarantee a return of the investment of space “In space, explorers can’t be sure of the value proposition at their destination. So, we have to be a little bit careful about thinking that it will just somehow pay off,” Weinzierl points out. However this does not mean we shouldn’t explore, it however means that we need to carefully manage the costs of space exploration – This is well represented by the Indian space program which landed on the south pole of the moon for only 74 million USD (an estimate provided by ISRO [Indian Space Research Organisation] in 2020). There is also a risk that not only do we not discover a future planet to continue human existence, but the process of space exploration shortens the life on Earth due to the environmental impact of the space programme utilising fossil fuels; this is also shown by the more than 16,200 tonnes of space debris we have left in orbit (European Space Agency, 2026). Another consideration is that we know the sun in our solar system will eventually fail so unless we expand into space, this means that the human race will inevitably die at that point if we cannot find another place to live. Although we don’t know how easy it will be to find somewhere that is suitable for human life, if we don’t try and find it we know all human life will eventually die; a small investment of 19 billion dollars global spending or 0.0576% of global expenditure for the 2024 fiscal year (Statista Research Department 2024) does not seem unreasonable in this context.

In conclusion, space exploration is a necessity not an indulgence. This is because it brings technological and scientific advancements in the form of GPS, global communication and cancer research which modern society relies on. As well as this, space exploration is a necessity as it fills human intrigue and need to understand the unknown; humans need to explore and naturally want to understand things that they don’t. The possibilities are endless, a term used too often however it perfectly fits this scenario – anything could come from space, new materials, planets and species however it could also

as Weinzierl says lead to nothing. This is part of why we explore it, because it could indeed hold anything. However possibly the greatest point to why it is a “necessity” is the fact that the sun will explode and if the human race does not find a way to escape this galaxy, we will certainly go extinct.

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