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SPACE, CLIMATE CHANGE, AND SUSTAINABILITY: TECHNOLOGICAL AND SOCIETAL
IMPACTS

Abstract

Space exploration and the advancement of knowledge that comes with it has far-reaching effects into many aspects of our world. Understanding the ways in which space impacts our world will allow for more informed decisions about what direction we choose to set ourselves. With increased awareness of the importance of environmental sustainability and how it affects our daily lives, we are seeing a much greater emphasis placed on sustainable practices and mitigating climate change.

Space technologies, as well as the popular culture surrounding them, have influenced societal views of environmentalism, leading to a widespread belief in the necessity of sustainable development. Not only does this include Earth Observation satellites that allow us to monitor our changing planet, but also spin-off technologies that can be leveraged to address the climate crisis, by adapting and improving the quality of life on Earth. Some of these technologies allow us to better address the environmental impacts caused by anthropogenic climate change. In particular, space technology is expected to have a significant influence on the future of energy generation and use, agriculture and land management, natural resources conservation and more.

It is now common knowledge that the global climate is changing at an accelerated pace. As it continues to do so, it will threaten many aspects of society. Space exploration can show that it is possible to sustainably inhabit other planets, and develop alternative methods of living on this one. It can be used to mitigate or exacerbate environmental impacts, depending on how we pursue it. This research explores the following questions: What are the ways in which space can help with climate change, and in what ways do space activities contribute to environmental impacts? How can space technology be leveraged for sustainable development? What are the impacts of advancing space exploration, and what societal benefits can it bring? How does space exploration as a cultural phenomenon motivate people to take better care of the planet?

This paper investigates the aforementioned questions by reviewing the essential relationship between space technology, climate change, and sustainability. It presents an overview of the ways in which space has helped us understand, monitor, mitigate, and adapt to climate change. Finally, it reaffirms the role of space as a motivational tool to promote positive environmental behavior. By providing a comprehensive set of factors, this research intends to serve as a starting point for deeply exploring the intersections between these topics.