How has the proliferation of satellites in orbit around the Earth influenced the society and economy positively?

On October 4th, 1957, the first satellite – the remarkable Sputnik I - was launched into space by the Soviet Union. With the rate of proliferation of satellites orbiting the earth increasing, what was the impact of such much technology wired above our head? NASA and the ESA all believe there to be a positive impact with the proliferation of satellites, but authors of the Environment magazine believe there is a detrimental risk to spacecraft through "space junk". However, with further research and evidence, we can conclude that the proliferation of satellites in orbit around the Earth created huge, positive impacts to both society and the economy.

The proliferation of satellites in orbit has influenced society positively through new ways of internet connectivity. Technologies such as weather forecasting, GPS navigation, communication and internet connectivity, television and radio broadcasting, and scientific research are powered by satellites ("The Unseen"). In communication, satellites transmit millions of billions of data, every second. Before the invention of the satellite, the fastest way of transmitting information was the telegram - an underground system of electric wires transmitting morse code signals. Connection was very limited, due to the fact that transmitting signals were both expensive, unreliable, and slow. People could only send one word at a time, causing inconvenience when sending even a simple sentence. For example, sending the phrase "*Where are you?"* might take 75 cents, but sending and receiving a full conversation between two people, or sending documents, might just break the bank, whereas when using contemporary technologies (i.e. satellite communication), not only are texts sent through SMS (Short Messaging Service), MMS (Multimedia Messaging Service), and RCS (Rich Communication Service) free of charge, but they offer instantaneous communication at what seems to be lightning speed. Satellites are a massive

feat of engineering and technology, blurring the oceanic boundaries intercepting methods of socialization between humans. In the above example, the satellite performs critical and crucial daily tasks that go unnoticed, creating an interconnected world. The features we take for granted are often powered by the hard-working machines above the sky – the satellites, orbiting the earth, with unrecognized efforts, so next time you enjoy the quality-of-life features, such as weather forecasting, TV broadcasting, GPS navigation, or text messages, remember satellites – the most often overlooked piece of technology that made it all possible.

As well as influencing the society, the proliferation of satellites in orbit around the earth has also supported the economy positively. Consider a scenario in which you are the manager of a company that creates a specific type of product, for example, Polaroid. Each component of your product could come from a different part of the world. How are you going to manage and control every single component's packaging, distribution, and arrival at your factory? In the times before the satellites, this would be nearly impossible. However, satellites give instant, real-time data of the location of your packages - where they are, and estimates of when they will arrive at the factory. Each component can be synchronized to arrive perfectly in time with each other, then assembled together, and shipped to retail stores. Thus, the satellite is a piece of technology significantly reducing the amount of human labor in the distribution of goods. As well as providing these services, satellites also generate income with these services. 16% of the total revenue of the satellite industry are generated through enterprise services (i.e. satellite services such as real-time data used to boost enterprises), generating 18 billion dollars in 2022. This shows the potential of the satellite industry in areas such as trade and finance, both simplifying complex tasks and generating revenue.

Amid the positive advancements caused by the proliferation of satellites in orbit around planet Earth, growing concerns have emerged, questioning if a constellation of satellites just a few thousand kilometers above our heads is actually beneficial. Debate emerges and revolves around concerns around the impacts of satellites on the environment and spacecraft. A primary concern raised by the *Environment* magazine argues that satellites eventually decompose and shred into small parts. The magazine highlights that this allegedly *"decomposed"* waste, coined as *"space junk"*, is a material that may damage spacecraft blazing through the ionosphere of our planet. This is less of a concern for us humans standing on planet Earth, with negligible impacts. As with asteroids, the particles will burn down as they reach the atmosphere, creating a phenomenon with high resemblance to meteors and meteorites, but the claimed issue stating that this *"space junk"*, orbiting at a speed of around 7.5 kilometers per second[1], will damage spacecraft within the planet's ionosphere does make sense at first sight, but after conducting further research seems to be minor. In reality, no spacecraft constantly appears in orbit of Earth, as, in fact, satellites take up most of the space in the ionosphere region of the Earth. Thus, this apprehension and concern is proven to be false and minor, but as we continue to harness the benefits of interconnected technology, it is imperative to remain vigilant about the environmental impact and adopt responsible practices to ensure the sustainable development of space exploration and satellite proliferation.

As shown above, the proliferation of satellites in orbit around the Earth undeniably brought many influences to the society and economy. While living in a constantly evolving world, it is essential to consider the impacts brought up by even the smallest pieces of equipment that are often left unconsidered. The satellite's impacts are much underestimated, with its functions left unseen. Next

[1] Calculations show that this speed is, in various cases, faster than the speed of sound (approximated to be around 343 meters per second)

time you enjoy the sense of an interconnected world, for example, playing music, talking to your friends, and navigating your way through the busy streets, remember satellites – the heroic device, thousands of kilometers above the air, working hard for your happiness.

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