Towards a Humanistic Era of Space Exploration

ESSAY

Space represents one of the most extreme and hostile environments humanity has ever ventured into. Hazards in space amplify some of the harshest conditions found on Earth, such as isolation, confinement, and distance from familiar surroundings—factors that create significant physical and psychological strain. Unique to the space territory, altered gravity fields disrupt human physiology further, while exposure to space radiation is the greatest threat limiting extended missions planned in deep space. Life outside the confines of a spacecraft or a station is impossible without advanced engineering systems. Even today, daily life for spacefarers living in low Earth orbit, a mere 420 kilometres above Earth, is barely sustainable despite their exceptional physical and psychological preparation. Future lunar and Martian habitats must prioritise optimisation over comfort; yet, the challenge of recreating a semblance of the vibrant terrestrial life humans know and depend on remains. Are we skilled enough to already propose missions that reflect the diversity of life? Can we make the space environment a place for all? These questions embody the purpose we must embrace: designing human space missions that are as inclusive as they are ambitious.

Since the early 20th century, modern space exploration has progressed through distinct eras, each shaped by unique aspirations and ambitions. The first era pioneered space travel through theoretical scenarios and early experiments. The second, marked by the space race between the United States and the Soviet Union, was defined by competition, with technological prowess and national pride setting the agenda. The third era saw the emergence of international consensus, followed by collaborations that drove unprecedented scientific research across disciplines, exemplified by the International Space Station. Most recently, a fourth era driven by commercialisation and private companies reshaped the industry and brought concepts once confined to science fiction, such as space tourism, closer to reality. Looking ahead, however, human spaceflights face challenges that are not only technological or economic but also philosophical and ethical. These challenges demand a bold new vision—a fifth era of space exploration—centred on humanistic values that could make space a place for all.

To achieve this vision, the initiative must start on the ground, at the very inception of mission design. Employing foresight methodologies will be crucial to anticipating risks and challenges, enabling proactive and comprehensive solutions. Such approaches also allow us to set up "what-if" scenarios, from unexpected system failures to complex ethical questions, such as the implications of human reproduction in space or the equitable distribution of space resources, and prepare accordingly. Listening to diverse voices—those of engineers, scientists, designers, philosophers, historians, and many more—will further support this endeavour, ensuring that mission planning reflects the full spectrum of human experience and thought. The ESA initiative to recruit astronauts with disabilities already demonstrates how modern technology can adapt to diverse physical needs, broadening the range of potential spacefarers. By embracing a human-centred approach to mission design, embedding foresight methodologies, and prioritising diversity, this humanistic era can pave the way for humanity's transition from space explorers to settlers in a space built for all.

Clara Richard
Head of Life Sciences at **NeurAstra**
Science Communicator at **P/Twain**
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