"As the commercialisation of Space grows at an ever faster pace and companies such as Virgin Galactic, Blue Origin and Space X now regularly launching commercial astronauts, has the time come to limit access to space to protect the space environment for future generations? Or should we welcome private companies engagement in the space environment, removing the barriers of national agencies such as NASA, ESA and Roscosmos, allowing everyone on Earth access to Space and its potential?" - Dr Simon Foster

Terra nullius is a Latin expression meaning "land belonging to nobody"; a fitting way to describe the domain outlined in the Outer Space Treaty (United Nations 1967), which remains the most significant document that regulates pursuits made beyond Earth's borders. The world has changed. National entities are no longer the engine driving the space race. With a deliciously diverse range of applications and estimations of $1.8 trillion opportunities waiting to be captured, the number of companies that want a part in the commercial space circus is unsurprising. And for the well-endowed, the barrier to entry is tantalisingly low. You don't need to serve your country or bag a handful of master's degrees to see the stars up close anymore. Anyone can be an astronaut.

But budget-friendly sub-orbital holidays aren't on the cards right now. It's an option for those with incomes they're itching to dispose of who need the "Overview Effect" to gain awareness of the struggles of their fellow man. Prosperity has shrivelled their capacity for empathy, so they must look down on the world from even greater heights to remember what it means to be human. Or perhaps they just really like to float around.

The growth of space commercialisation has led to a shift in power towards the private sector. The balance between strict government-enforced legislation and capital-driven chaos is a difficult one to reach. Trust makes this task harder still. It's not just a case of placing trust in Elon Musk or Jeff Bezos. How can we predict the intentions of the next generations of innovators and entrepreneurs? Who's to say that fresh loopholes won't have been poked into the fabric of the mighty Outer Space Treaty? The same treaty that maintains Space as belonging to the Commons and forbids claims of sovereignty but is ambiguous enough to allow a scramble for resources not unlike the colonial power struggles of our not-so-distant history. Earth's orbital environment is a finite resource, and there is a lot of money to be made in Space. At the risk of allowing capitalism's cold grip to engulf other celestial bodies, limits must be placed, and holes ought to be firmly sewn shut with regulation.

The Commercial Space Launch Competitiveness Act was passed in 2015, allowing US citizens and industries to "engage in the commercial exploration and exploitation of space resources". This right does not extend to extraterrestrial life - a slightly comforting caveat. So celestial bodies can be mined, and their resources claimed for profit, without claiming the body itself, thus abiding by the Outer Space Treaty… Unsurprisingly, some scholars are not convinced. Commercial space endeavours have summoned a new wave of concerns that an arms race is on the horizon.

According to a collaborative report from McKinsey's Aerospace & Defense Practice and the World Economic Forum (Acket-Goemaere et al. 2024), the space economy is forecast to reach $1.8 trillion by 2035. And though rocket launches and space tourism

are among the bold innovations that make the headlines, they make up a small fraction of this monumental estimated growth. Sub-orbital flights are expected to represent no more than $1-2 billion per year by 2035. Compared with ride-hailing applications, where revenues are expected to grow from $61 billion in 2023 to $300 billion by 2035. If sub-orbital space flight is predicted to be dwarfed by the likes of Uber, what does the space environment need protection from?

Supply chain and transportation, food and beverage, state-sponsored defence, retail, consumer goods and lifestyle, and digital communications are the five industries expected to generate more than 60% of the increase in the space economy by 2035. These industries and many others are becoming more dependent on satellite technology, and the UN seems to agree that the number of satellites in orbit around the world is a more pressing threat than millionaires on the Moon. They indicated as such in a 2023 report: "For All Humanity – the Future of Outer Space Governance" (United Nations 2023). The Union of Concerned Scientists reports that there have been 7,560 satellites deployed as of 1st May 2023 (Union of Concerned Scientists 2023). The concern regarding space junk goes far beyond the occasional yellow streak in the sky or fears that chunks of the International Space Station crashing through roofs in Florida will become commonplace. Besides, the chance of a particular person being hit by space debris is in the order of 1 in a trillion (Aerospace 2018). The real concern here is that human activity in Space is increasing the risk of collisions and conflict between nations. The World Economic Forum's Global Future Council on the Future of Space has recommended collision avoidance mechanisms and the removal of obsolete satellites from low-Earth orbit (LEO) as measures to mitigate this risk (Khlystov and Schrogl 2023). Naïve ideas of the Earth being cocooned in an empty void have surely been shattered. Diagrams of satellites in LEO represented by cheerful coloured dots, scattered around the globe like galactic glitter have seen to that.

The question of limiting access isn't a case of being for or against innovation. The same 2023 UN report describes how space technology is crucial for climate change monitoring and disaster management response, contributing to meeting the UN's Sustainable Development Goals. Space X's Falcon 9 is the world's first orbital-class reusable rocket. Ground-breaking technologies such as this have brought about a decrease in launch costs and are huge steps towards environmentally conscious launches. But innovation that is accelerated unsustainably does more harm than good.

Further regulation and collaboration between public and private entities are integral to minimise the risk of collisions and international conflict, to stop parties claiming resources while sidestepping acts of sovereignty, and to protect the environment local to our planet and beyond. If not for the sake of our civilisation, then for selfish reasons – for the 1 in a trillion chance that you'll find yourself clobbered on an unassuming Tuesday by a block of space junk that forgot to burn up on its way down.

References

Acket-Goemaere, Alizée, Ryan Brukardt, Jesse Klempner, Andrew Sierra, Brooke Stokes. 2024. *Space: The $1.8 trillion opportunity for global economic growth*. World Economic Forum.

Aerospace. 2018. *Satellite Reentry: Manipulating the Plunge*. May 5. https://aerospace.org/article/satellite-reentry-manipulating-plunge.

Khlystov, Nikolai, Kai-Uwe Schrogl. 2023. *Space Industry Debris Mitigation Recommendations*. World Economic Forum, European Space Agency.

Union of Concerned Scientists. 2023. *UCS Satellite Database*. May 1. https://www.ucsusa.org/resources/satellite-database.

United Nations. 2023. *Our Common Agenda. Policy brief 7: for all humanity – the future of outer space governance*. United Nations Office for Outer Space Affairs.

United Nations. 1967. *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies*. General Assembly resolution 2222 (XXI), annex—adopted on 19 December 1966, opened for signature on 27 January 1967, entered into force on 10 October 1967. https://www.unoosa.org/pdf/publications/STSPACE11E.pdf