

## **Property interests and the environment in outer space – editorial note**

Outer space endeavours are no longer the realm of select nations and their governments. The past decade has seen significant growth in private public partnerships (PPP), with private players rapidly advancing their space travel capabilities. At the same time technical innovation has reduced the cost of access to space, enabling greater opportunity for emerging industry and nation players. Space governance and regulation are also evolving, and this is particularly important for at stake billion-dollar assets and property rights, with many active space missions providing critical capability to support essential services to society, across the earth.

It is within the growing space economy that this special issue raises preliminary and significant discussion about space law, property rights, environmental concerns and the fundamental role contract law and international customary law will continue to play as regulatory realities are being debated at the global level. The space treaties remain relevant but also in need of 21st century revision to accommodate PPPs and new nation state involvement. As not all nations have signed the space treaties – particularly as these were written at a time when the USA and USSR were the major space actors – there is no absolute uniformity in approach. Hence, challenges remain in regulating space endeavours. This is problematic, as there is heavy reliance from all nations on communication, navigation and observation from space. Such services are essential for tracking natural disasters, as well as built environment catastrophes such as the recent Champlain Towers collapse in Miami, where satellite technology was relied upon to seek for signs of life. Still to be addressed is the urgency in mitigating space debris to ensure space activities are aligned with environmental and sustainable best practice. Other issues in need of more attention are the anti-trust behaviour of particular private space players, and on-going concerns on how space technologies will address climate change.

Property and real estate itself are integrated into outer space activities. This impacts on both Earth and Space-based segments of space infrastructure. Technological undertakings, asset proliferation and management are significant actors in the space economy and humanitarian endeavours. A global food crisis, for instance, could be avoided with the aid of space-based technologies, satellites and related software and hardware that offer solutions for agriculture. Such satellite technology has also enabled many cities to continue working and educating students during the pandemic; however, outputs have not been distributed across the globe on an equal basis.

Contract law will continue as a fundamental lever for both the real estate industry, as well as the space economy, particularly as the latter is set in the context of international treaties, where not all nations are signatories. International law itself has always faced challenges regarding compliance and enforcement. Regulation to cover territorial and extra territorial arenas is unrealistic, and it is within this context that this special issue sparked a discussion which commenced in May 2020 at the “Property rights and real estate interests in outer space” conference. This conference, which switched quickly online to accommodate the pandemic, was sponsored by the Space Industry Association of Australia and supported by the



Australian Space Agency, the Australian Property Institute, RMIT School of Property, Construction and Project Management and the Sir Lawrence Wackett Defence and Aerospace Centre. There were over 80 participants from across the globe, and papers were presented on a variety of outer space related issues. These were on topics concerning natural resources; heritage and environmental protection; outer space and the United Nations Sustainable Development Goals; start-up *Astropreneurs*; and space mining concerns. An important output from the conference is the current collection of articles in this special issue that address contemporary and provocative outer space issues.

The six articles are from authors from across the globe, interested in space law and governance and how it intersects with property rights, environmental justice and real estate concerns. The authors raise novel ideas and draw on existing research which has lifted earth-bound realities and experiences into outer space.

Rhimbassen and Rapp in their article advocate for an interdisciplinary approach as international space law struggles with new actors. They remind readers that space lawyers are still debating what in fact is a “space object” and which property rights could be applicable in space. They offer transnational alternatives to help navigate through this area of evolving law, including suggesting a transformed antitrust regime, adapted for space, based on the *corpus juris spatialis* ethics.de Vries\* and Hugentobler draw on conceptual frameworks from land management to discuss and highlight concerns regarding space debris and its removal. The authors rely on modelling to extend additional relevant issues of planned human space explorations, space mining and current rules, regulations, responsibilities and related debates on outer space activities. They note that there is still great opportunity for further research on the revision of regulatory frameworks on outer space objects, and existing land management frameworks can apply for outer space property access, allocation and distribution mechanisms related to planned human space exploration and space mining.

Mouat\*, Techera, Notebaert, Blake and Barker examine existing and novel governance models to discuss the governance of spacescapes and space settlement which is particularly important where a space-bound common regulatory regime is impossible.

Dalledonne refers to international environmental law, international economic law and international law to remind us how difficult it is to regulate debris and other environmental concerns for outer space.

Leshinsky makes a call to real estate professionals and university real estate courses that there is an existing and fast-growing field of real estate law and practice for the outer space sector. This discipline of real estate law for outer space is essential as there are numerous stakeholders in need of property rights protection, both private and public, with billions of dollars invested in assets *for and in space*.

Arvanitidis and Almyriotou draw on Ostrom’s work to identify parallels with the governance of Antarctica, a unique territorial space on Earth, to outer space. There are many parallels to be drawn between these two locations to allow for sustainable and peaceful use and exploration of outer space resources.

As the space industry reaches into numerous areas of the economy, both local and global, there is an urgency for interdisciplinary and intersectional teams to work collaboratively for smoother and more equitable transactions. Property interests and the environment in outer space contemporary concerns are raised in the articles in this special issue, paving the way

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for fresh discussion in this field of enquiry supportive of a just, inclusive, sustainable and equitable space economy. Guest editorial

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