

Finding new ways to share resources in space

A review of Dennis O'Brien: "Is outer space a de jure common-pool resource?"

Max Daniels

Max Daniels brings us more policy analysis with implications for our long term space activities. Here he offers a critique of a recent paper by space lawyer Dennis O'Brien, *Is outer space a de jure common-pool resource?* [1] In our earlier issues, Max has discussed *Territory in Outer Space* (Principium 24, February 2019), *The Artemis Accords: what comes after the Moon?* (Principium 32, February 2021). The world is laying the foundations for a Solar System civilisation, without which we cannot extend our reach to the stars.

Dennis O'Brien is a lawyer and president of the Space Treaty Institute, a non-profit working to build a framework of laws in outer space. He has written extensively [2] in favour of the Moon Treaty [3], publishing his own agreement to accompany it. In his article, *Is outer space a de jure common-pool resource?*, which is the focus of this review, he continues along this theme.

O'Brien argues that we are approaching a critical moment when we can go into space and access its resources. This echoes the 15th-century Age of Exploration, and just like then, such activity needs to be governed. He says that space is indeed a de jure common-pool resource, where the Artemis Accords [4] are incompatible with international law.

This review disputes aspects of O'Brien's case. The creation of international law and norms in space is more complex than he describes, while the Artemis Accords will not be the final agreements ever made; rather, they are just a part of an evolving patchwork of space policy. First, a look at O'Brien's contributions to this debate.

A Model Implementation Agreement

O'Brien urges the Biden administration to sign the Moon Treaty, as it would support the private sector while protecting "essential public policies" [5]. The Treaty describes, "an international regime... to govern the exploitation of the natural resources of the moon" (Art. 11, para. 5).

[1] In *The Space Review*, 25 October 2021, www.thespacereview.com/article/4270/1 www.thespacereview.com/article/4270/1

[2] *The Space Treaty Project, Space Law* www.spacetreaty.org/space_law

[3] IV. Resolutions adopted on the reports of the Special Political Committee www.unoosa.org/pdf/gares/

[4] The Artemis Accords, Principles for Cooperation in the Civil Exploration and use of the Moon, Mars, Comets, and Asteroids for peaceful purposes www.nasa.gov/specials/artemis-accords/img/Artemis-Accords-signed-13Oct2020.pdf

[5] In the new spectrum of space law, will Biden favor the Moon Treaty?, O'Brien in *The Space Review*, November 23, 2020 www.thespacereview.com/article/4073/1

◀ This needs to be put into practice, and so the Space Treaty Institute has developed a 'Model Implementation Agreement' [1] to bring it into reality [2].

The Model Agreement is centred around four principles: it supports all private activities in space (and not just mining, as with the Artemis Accords); private property rights would be granted in exchange for public-policy obligations; significant policy issues should be addressed through an agreed governance process; and it would build upon existing institutions.

This is a modern and carefully formed proposal for the governance of a space economy. A problem is that no major spacefaring nation has ratified the Moon Treaty, which means none would need the Model Agreement. Instead, several States have already signed the Artemis Accords.

This review first explores "de jure" common-pool resources' before arguing that his analysis of safety zones does not appreciate what they offer.

Viewing space as a 'commons'

This concept is from the framework of Nobel Prize-winning economist Elinor Ostrom (Fig 1 [3]), who wrote extensively on how groups organise themselves to manage resources [4]. Ostrom's theories run counter to Garrett Hardin's 'tragedy of the commons' thesis [5], which held that individual users of a shared environment would degrade it - as in the oceans, rivers, or even outer space. She offered an alternative, where users find ways to manage these resources sustainably, avoiding the need for privatisation or for government to intervene [6].

Authors have applied Ostrom's framework to space. Common-pool resources can be observed where satellites are placed in specific orbits such as near-Earth orbit or use certain communications frequencies [7]. Both can threaten the availability of resources to other users and create unsustainable levels of debris [8].

		Subtractability of Use	
		High	Low
Difficulty of Excluding Potential Beneficiaries	High	Common-pool resources: groundwater basins, lakes, irrigation systems, fisheries, forests, etc.	Public goods: peace and security of a community, national defense, knowledge, fire protection, weather forecasts, etc.
	Low	Private goods: food, clothing, automobiles, etc.	Toll goods: theaters, private clubs, daycare centers

Figure 1: Elinor Ostrom's categories of goods and resources [3]

- [1] Model Implementation Agreement for the Moon Treaty (January 2021) spacetreaty.org/modelimplementationagreement.pdf
- [2] *Avoiding a New Age of Imperialism: An Article 11 Implementation Agreement for the Moon Treaty* youtu.be/i4Ayz1hy3YQ
- [3] Elinor Ostrom Prize Lecture, *Beyond Markets and States: Polycentric Governance of Complex Economic Systems* www.nobelprize.org/prizes/economic-sciences/2009/ostrom/lecture/
- [4] *Elinor Ostrom's work on Governing The Commons: An Appreciation*, Wyn Grant. 2012 blogs.lse.ac.uk/lsereviewofbooks/2012/06/17/elinor-ostroms-work-on-governing-the-commons-an-appreciation/
- [5] *The Tragedy of the Commons*, Garrett Hardin (1968) in *Science*, New Series, Vol. 162, No. 3859, pp. 1243-1248, American Association for the Advancement of Science www.jstor.org/stable/1724745
- [6] *Governing the Commons for two decades: A complex story*, Erling Berge & Frank van Laerhoven (2011) in *International Journal of the Commons* www.thecommonsjournal.org/articles/10.18352/ijc.325/
- [7] *An Introduction to Ostrom's Eight Principles for Sustainable Governance of Common-Pool Resources as a Possible Framework for Sustainable Governance of Space*, T Chow & B Weeden, Secure World Foundation (2012) swfound.org/media/61531/isusymposium2012paper_tchowbweeden.pdf
- [8] *Elinor Ostrom Goes to Outer Space - An Association of Space Appropriators*, Shane Chaddha (2013) papers.ssrn.com/sol3/papers.cfm?abstract_id=2293581

What is a "de jure" common-pool resource?

O'Brien argues that space is a "de jure" common-pool resource'. There are two parts to this definition. First, resources in space are 'subtractable': that is, when an individual uses a resource, such as Lunar ice caps, there is less of it for everyone else.

Second, these resources are not highly 'excludable'. If an individual takes resources (known as appropriation), it excludes others from doing the same. The Outer Space Treaty of 1967 (or OST) [1] prevents the appropriation, and so exclusion, of space and its resources. O'Brien combines these two aspects of space's resources - their subtractability and excludability under international law - to label them a "de jure" common-pool resource.

Safety Zones

This review breaks down O'Brien's support of the Moon Treaty with a focus on safety zones. It is argued that these are complex, and a useful attempt at forming effective approaches to governance.

The safety zones outlined in Section 10 of the Artemis Accords rely on the exclusion of other states, according to O'Brien. This would violate Art. I and II of the OST. There is justification to these fears, but safety zones are more complex than this.

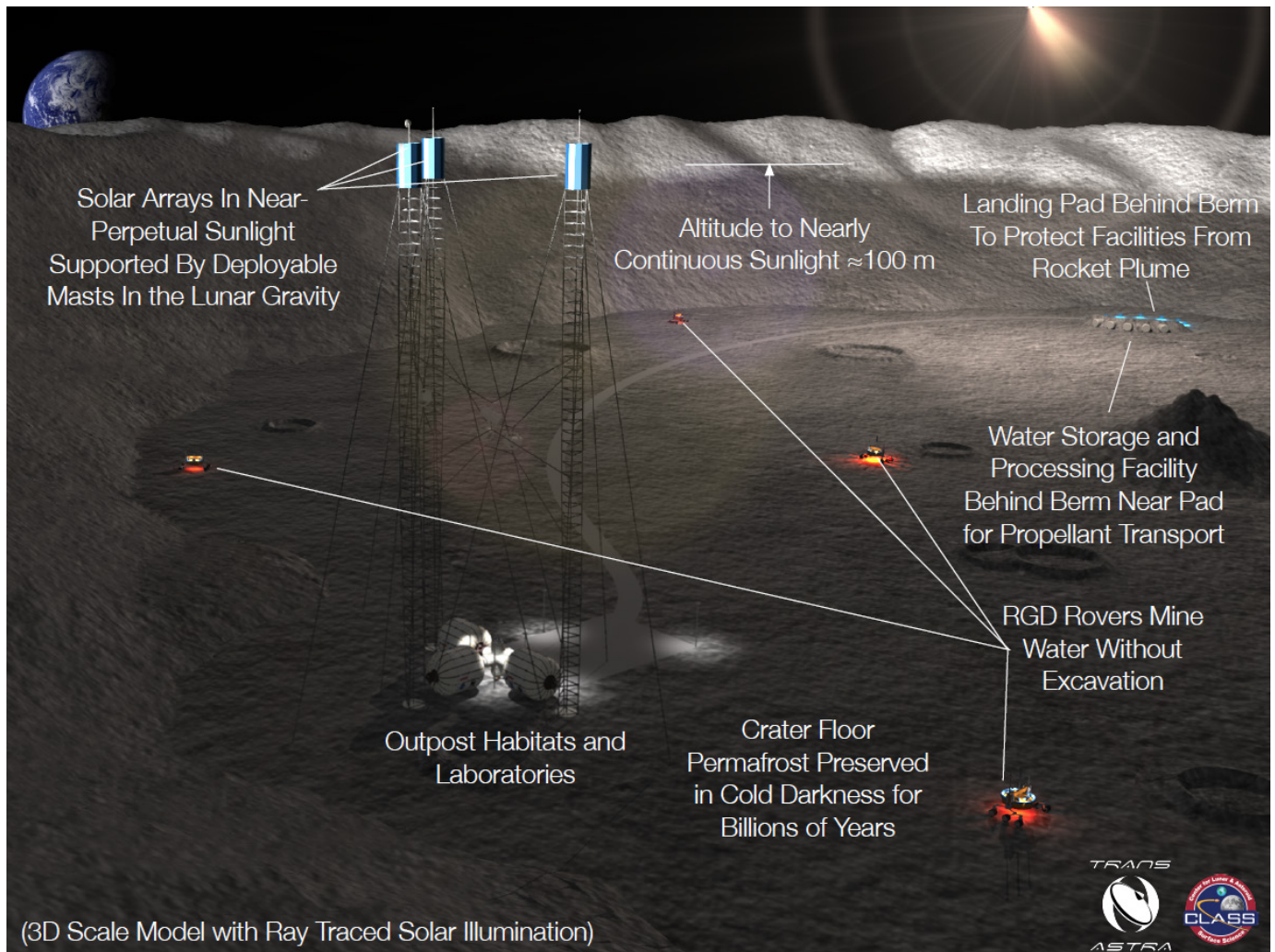


Figure 2: NASA depiction of extraction site of Lunar ice within a near-polar crater [1]

[1] Outer Space Treaty, 1967: www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/outerspacetreaty.html

- ◀ At best, the term 'safety zones' is vague. In space they are a relatively recent concept, where Schingler warns: "there are no precedents here." [1] Some authors, however, have made a start. Newsome [2] and Stubbs [3] give safety zones three 'general principles': they should be transparent, they do not grant sovereign rights, and, "law that applies outside, also applies inside the zone." Schingler adds that they should be dynamic and respond to the mobile nature of assets in space.
- They are not simply about land-grabs. They could be for practical reasons, as one state would not want another Lunar base (such as in Fig 2) right next to theirs which would blow up dust or interfere with transmissions and so disrupt operations[4]. Gilbert defines them by what they do: describing situations when mission operators believe third parties should "avoid harmful interference". [5]
- Echoing this, Salmeri [6] argues that if resource-extraction were done in a well-communicated way that includes informing the UN, it would fulfil obligations under Art. IX and XI of the OST. Such transparency would provide a legal basis for the extraction of resources, as well as the sustainable use of the space environment.
- This is not to say that the Artemis Accords are the ideal agreement, now or in future. Safety zones, as Gilbert concludes, are just the latest iteration towards building a sustainable lunar presence. Attempts to move towards agreed principles for operations in space should be welcomed.
- O'Brien is right to apply Ostrom's framework in space. His suggestions that the Artemis Accords are a fundamental mistake and that this is our last chance are naïve. We can and should keep trying new approaches to space policy. ■

[1] *Imagining safety zones: Implications and open questions*, Jessy Kate Schingler (2020) www.thespacereview.com/article/3962/1

[2] *The Legality of Safety and Security Zones in Outer Space: A Look to Other Domains and Past Proposals*, Ted Adam Newsome, McGill University (2016) escholarship.mcgill.ca/downloads/zp38wg314.pdf

[3] *The Legality of Keep-Out, Operational, and Safety Zones in Outer Space*, Matthew Stubbs, in *War and Peace in Outer Space Law, Policy, and Ethics*, Cassandra Steer & Matthew Hersch (2021) <https://oxford.universitypressscholarship.com/view/10.1093/oso/9780197548684.001.0001/oso-9780197548684-chapter-9>

[4] *NASA's Recommendations to Space-Faring Entities: How to Protect and Preserve the Historic and Scientific Value of U.S. Government Lunar Artifacts* (2011) www.nasa.gov/pdf/617743main_NASA-USG_LUNAR_HISTORIC_SITES_RevA-508.pdf

[5] *Safety Zones for Lunar Activities under the Artemis Accords*, Alexander Q Gilbert, Colorado School of Mines & Open Lunar Foundation (2022) uploads-ssl.webflow.com/5e4b7985a58df89b6c254001/6168af8319f5549af4dfc227_Pre-Print%20Safety%20Zones%20for%20Lunar%20Activities%20AQ%20Open%20Lunar%20Foundation.pdf

[6] NATO Legal Gazette, Issue 42 www.act.nato.int/application/files/5716/4032/2170/legal_gazette_42.pdf

About the Author

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