

India and the Artemis Accords

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Executive Summary

- The United States has signed bilateral agreements, called the Artemis Accords, with 11 other states. The Accords lay down norms for space exploration and are a prerequisite for states seeking to join NASA's Artemis programme, which envisages a new wave of lunar exploration that would eventually use the moon as a launch pad for voyages to Mars and the Asteroid Belt.
- The lunar exploration programme could provide a major boost to India's lunar ambitions. However, while terms of the Accords are generally in line with existing international space law, there are concerns. Chiefly, one provision in the Accords allows for unregulated mining on the moon and other celestial bodies. The Accords also allow states to declare 'safety zones' that could become de facto private property by virtue of sustained presence.
- The Artemis programme also has a rival in the form of the International Lunar Research Station led by Russia and China. As these two spacefaring states prepare to release their own set of norms by the end of 2021, India is faced with an imperfect choice: joining either or both programmes will aid its own ambitions, but rival blocs could scuttle any chances of creating a widely accepted multilateral framework for space governance in this century.
- This document concludes that India would benefit from signing the Artemis Accords and joining the Artemis programme. However, it should keep its options open, seeking space cooperation with Russia bilaterally or via the ILRS, while also pushing for an overarching multilateral set of norms or a new treaty.

Executive Summary

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Introduction

There are presently two rival programmes for lunar exploration. One is the US-led Artemis programme, which also includes a set of agreements that lay out norms for participants. The other is the International Lunar Research Station (ILRS) led by Russia and China. Both programmes see lunar exploration and a presence on the moon as key stepping stones towards interplanetary travel in the future.

¹ These are Luxembourg, the UAE, Japan, Australia, Canada, Italy, the United Kingdom, Ukraine, South Korea, New Zealand and Brazil

Overview of Planned Lunar Exploration Programmes

The Artemis Programme & Accords

NASA's Artemis Programme aims at a vast expansion of lunar exploration for the first time since the 1970s. Components of the programme include new launchers, ground equipment, spacecrafts, and spacesuits, besides a gateway module in orbit around the moon and an associated lunar lander.² One of the programme's most ambitious goals is to land the first woman and the next man on the Moon by 2024.³

First announced in October 2020, the Artemis Accords are a series of bilateral agreements between the US and other states for lunar and outer space exploration. Acceptance of the Artemis Accords is a prerequisite for participation in the Artemis programme.

The Accords seek to put in place a set of practical guidelines and practices. These are: the use of space for peaceful purposes, transparency, interoperability, emergency assistance, registration of space objects, release of scientific data, protecting heritage in space, allowing the extraction and use of resources in space, deconflicting activities, and finally, managing orbital debris and ensuring the safe disposal of spacecraft.⁴

For most part, these principles are in consonance with the 1967 Outer Space Treaty (OST), which has 110 state parties (including India) as well as 89 other signatories that have not completed ratification.⁵ However, at least one of these principles, allowing the extraction and use of resources, falls into a legal grey area.

The 1979 Moon Agreement or Moon Treaty is generally interpreted as restricting the extraction and use of resources from celestial bodies. However, this treaty has only been ratified by 18 states and has 11 other signatories including India.⁶ Of all these states, India is the only significant spacefarer, with the US, Russia, China, and others notably absent.

² NASA. Artemis: Humanity's Return to the Moon. n.d.
<https://www.nasa.gov/specials/artemis/>

³ Ibid

⁴ NASA. Principles for a Safe, Peaceful, and Prosperous Future.
<https://www.nasa.gov/specials/artemis-accords/index.html>

⁵ Daryl Kimball. The Outer Space Treaty at a Glance. Arms Control Association. October 2020.
<https://www.armscontrol.org/factsheets/outerspace>

⁶ NTI. Agreement Governing the Activities of States on the Moon and Other Celestial Bodies. 29 January 2021.
<https://www.nti.org/learn/treaties-and-regimes/agreement-governing-activities-states-moon-and-other-celestial-bodies-moon-agreement/>

Article 1 of the OST describes outer space as being the “province of all mankind”.⁷ In contrast, the Moon Treaty describes outer space (including celestial bodies) as being the “common heritage of mankind”. There has been an enduring debate about the exact meanings and implications of these two phrases.⁸ However, American government officials and scholars have long asserted that the OST’s “province of all mankind” formulation is the only one with widespread traction and validity.⁹ According to this interpretation, private entities and states could potentially claim ownership of resources extracted from celestial bodies without laying claim to territory.¹⁰

Furthermore, while the OST clearly states that outer space “is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means,” this leaves out the potential for private ownership.¹¹ While the Artemis Accords do not mention private ownership of celestial real estate, the US is likely to retain a dominant position in the private space sector.

The US has left little doubt about its intentions in this regard. In 2015, the US Congress passed a bill that allowed private companies and citizens to use resources from the Moon and other celestial bodies like asteroids.¹² Later, in April 2020, President Donald Trump signed an executive order seeking to make this an international norm.¹³ The order directs the Secretary of State to reach out to other states to “develop joint statements, bilateral agreements, and multilateral instruments” that will “enable safe and sustainable operations for the

⁷ UNOOSA. Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies. n.d.
<https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/introouterspacetreaty.html>

⁸ J. I. Gabrynowicz. The "Province" and "Heritage" of Mankind Reconsidered: A New Beginning. The Second Conference on Lunar Bases and Space Activities of the 21st Century, Proceedings from a conference held in Houston, TX, April 5-7, 1988. Edited by W. W. Mendell, NASA Conference Publication 3166, 1992., p.691-695.
<http://articles.adsabs.harvard.edu/full/1992lbsa.conf..691G>

⁹ Henry R. Hertzfeld, Brian Weeden, Christopher D. Johnson. How Simple Terms Mislead Us: The Pitfalls of Thinking about Outer Space as a Commons. Secure World Foundation. 2015.
<https://swfound.org/media/205390/how-simple-terms-mislead-us-hertzfeld-johnson-weeden-iac-2015.pdf>

¹⁰ *ibid*

¹¹ UNOOSA. Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies.
<https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/introouterspacetreaty.html>

¹² Congress.gov. H.R.2809 - American Space Commerce Free Enterprise Act.
<https://www.congress.gov/bill/115th-congress/house-bill/2809/text>

¹³ The White House. President Donald J. Trump is Encouraging International Support for the Recovery and Use of Space Resources. April 2020.
<https://trumpwhitehouse.archives.gov/wp-content/uploads/2020/04/Fact-Sheet-on-EO-Encouraging-International-Support-for-the-Recovery-and-Use-of-Space-Resources.pdf>

commercial recovery and use of space resources”.¹⁴ It also instructs the Secretary of State to “object to any attempt to treat the 1979 Moon Agreement as expressing customary international law.”¹⁵

US-based companies presently dominate the international private space sector and will be the chief beneficiaries of the Artemis Accords.¹⁶ Three other states have also passed legislation on space resources: Luxembourg¹⁷, the UAE¹⁸, and Japan¹⁹. Of these, the UAE and Japan have well-developed lunar programmes. The UAE plans to launch its Rashid Rover to the lunar surface in 2022.²⁰ Japan is likely to be a crucial NASA partner in the Artemis programme, with plans to send payloads in both the uncrewed Artemis-1 mission later in 2021 and the crewed fly-by Artemis-2 mission slated for 2023.²¹ Like the US, Japan has also dispatched a spacecraft to collect and return samples from asteroids or near earth objects (NEO).²²

Currently, a total of 12 states have signed the Accords with the United States, Besides Luxembourg, the UAE, and Japan, the signatories are Australia, Canada, Italy, the United Kingdom, Ukraine, South Korea, New Zealand and Brazil.²³

¹⁴ Ibid.

¹⁵ Ibid.

¹⁶ David P. Fiddler. The Artemis Accords and the Next Generation of Outer Space Governance. 2 June 2020. Council on Foreign Relations
<https://www.cfr.org/blog/artemis-accords-and-next-generation-outer-space-governance>

¹⁷ Luxembourg Space Agency. Legal Framework. N.d.
<https://space-agency.public.lu/en/agency/legal-framework.html>

¹⁸ SpaceWatch.Global. UAE Space Law Details Announced To Facilitate Space Sector Development. June 2021.
<https://spacewatch.global/2020/02/uae-space-law-details-announced-to-facilitate-space-sector-development/>

¹⁹ SpaceWatch.Global. Japan fourth country in the world to pass space resources law. June 2021
<https://spacewatch.global/2021/06/japan-fourth-country-in-the-world-to-pass-space-resources-law/>

²⁰ Nandini Sircar. UAE lunar mission: How Rashid Rover will explore the moon in 14 Earth days. Khaleej Times. 30 April 2021.
<https://www.khaleejtimes.com/news/government/uae-lunar-mission-how-rashid-rover-will-explore-the-moon-in-14-earth-days>

²¹ Neel V. Patel. Why Japan is emerging as NASA’s most important space partner. Technology Review. 22 July 2020.
<https://www.technologyreview.com/2020/07/22/1005546/why-japan-jaxa-nasas-most-important-space-partner-artemis-moon-gateway/>

²² NASA Science. Hayabusa2. Solar System Exploration.
<https://solarsystem.nasa.gov/missions/hayabusa-2/in-depth/>

²³ NASA. Principles for a Safe, Peaceful, and Prosperous Future
<https://www.nasa.gov/specials/artemis-accords/index.html>

Russia-China Bloc

In March 2021, Russia's Roscosmos signed an agreement with China's National Space Administration (CNSA) to build an International Lunar Research Station (ILRS) on the Moon.²⁴ The two states are actively looking for other governments to collaborate with in developing such a facility, either on the lunar surface or in orbit.²⁵

In June 2021, Wu Yanhua, the deputy administrator of CNSA, unveiled a three-phase plan for ILRS.²⁶ In the first phase from 2021-2025, they would collect data and validate 'high-precision soft landings', both with China's Chang'e and Russia's Luna missions.²⁷

The second, so-called 'construction' phase from 2026-2035 would occur in two stages. The initial stage would involve joint missions, deliveries of cargo, and the return of samples of lunar regolith. In the next stage, they would set up energy and construction infrastructure, both in orbit and on the lunar surface.²⁸

It is only in the third and final phase, beginning in 2036, that crewed landings will begin.²⁹

Russia and China have been drawn to each other by international circumstance. In October 2020, Roscosmos director-general Dmitry Rogozin criticised the Artemis programme's lunar gateway as being too US-centric to be acceptable.³⁰ Earlier, Rogozin likened the Artemis Accords to other manifestations of US unilateralism like "Iraq or Afghanistan."³¹ However, while Russia has been a major NASA partner in the International Space Station, China has

²⁴ NASA. China and Russia to build lunar space station. 10 March 2021.

²⁵ Associated Press. China, Russia agree to build lunar research station. 10 March 2021. <https://www.financialexpress.com/lifestyle/science/china-russia-agree-to-build-lunar-research-station/2209822/>

²⁶ Andrew Jones. China, Russia reveal roadmap for international moon base. Space News. 16 June 2021. <https://spacenews.com/china-russia-reveal-roadmap-for-international-moon-base/>

²⁷ Ibid

²⁸ Ibid

²⁹ Ibid

³⁰ Jeff Foust. Russia skeptical about participating in lunar Gateway. Space News. 12 October 2020. <https://spacenews.com/russia-skeptical-about-participating-in-lunar-gateway/>

³¹ Christian Davenport. Seven nations join the U.S. in signing the Artemis Accords, creating a legal framework for behavior in space. October 13 2020. The Washington Post. <https://www.washingtonpost.com/technology/2020/10/13/artemis-moon-mining-agreement-signed/>

been excluded. This is because a 2011 US legislation, the Wolf Amendment, effectively bars NASA from collaborating with China.³² The ILRS project could help to couple Russia's long-standing expertise in space travel with China's ambitions and its resources.

India's Choice

The two rival lunar exploration programmes are being undertaken amid increased security competition between the US on the one hand and Russia and China on the other. At the time of this writing, only the United States has set down a framework of guidelines for lunar activity via the Artemis Accords. However, the ILRS programme may also have a similar agreement soon: in June 2021, Wu said they planned to come up with a document outlining these principles by the end of 2021.³³ It is very likely that signing the document will be a prerequisite for participation in the ILRS programme.

The development of two rival programmes and two potentially conflicting frameworks for lunar governance creates new dilemmas for India. The decisions it takes will be based not just on its lunar ambitions but also the state of its relations with the three major powers spearheading voyages to the moon and beyond.

Also complicating the decision-making will be the varied history of space cooperation India has with all three states. Despite the gradual slide in India-Russia relations in recent years, the two states have a rich history of space cooperation. Russia launched India's first two satellites, Aryabhata³⁴ and Bhaskara-I³⁵ and in 1984, took Indian Air Force pilot Rakesh Sharma into space.³⁶ Russia also provided India cryogenic rockets for its GSLV launchers and is presently training Indian cosmonauts for the Gaganyaan human spaceflight mission.³⁷ India and Russia

³²George Whitford. Trouble in the Stars: The Importance of US-China Bilateral Cooperation in Space. Harvard International Review. 27 October 2019.

<https://hir.harvard.edu/trouble-in-the-stars-the-importance-of-us-china-bilateral-cooperation-in-space/>

³³ Andrew Jones. China, Russia reveal roadmap for international moon base. Space News. 16 June 2021.

<https://spacenews.com/china-russia-reveal-roadmap-for-international-moon-base/>

³⁴ ISRO. Aryabhata. Nd.

<https://www.isro.gov.in/Spacecraft/aryabhata-1>

³⁵ ISRO. Bhaskara-I. Nd.

<https://www.isro.gov.in/Spacecraft/bhaskara-i>

³⁶ India Today. Rakesh Sharma: Our First Space Man. 9 November 2018.

<https://www.indiatoday.in/magazine/cover-story/story/20181119-rakesh-sharma-our-first-space-man-1384895-2018-11-09>

³⁷ PTI. Four Indian cosmonauts complete training in Russia for Gaganyaan mission. 23 March 2021.

<https://www.thehindu.com/news/national/four-indian-cosmonauts-complete-training-in-russia-for-gaganyaan-mission/article34140964.ece>

are also in the process of setting up ground stations in each other's territory to improve the performance of their national satellite navigation systems, NavIC, GLONASS.³⁸

Besides these instances, India and Russia also attempted to jointly pursue lunar exploration through the Luna-Resurs project. This cooperation has fizzled out in recent years as the two states pursue different timetables for exploring the moon. For instance, the failure of Russia's 2011 Phobos-Grunt mission to the Martian moon of Phobos, delayed its Luna-Resurs schedule.³⁹ This happened at the same time as India sought to advance its own lunar programme to keep up with China.⁴⁰

Historically, India's space cooperation with the United States has been hobbled by the politics of the Cold War and nuclear nonproliferation. However, in recent years, cooperation has grown. India's Chandrayaan-1 moon mission carried two NASA payloads, a Miniature Synthetic Aperture Radar, which looked for ice in the moon's poles and a Moon Mineralogy Mapper.⁴¹ ISRO and NASA are presently collaborating on the NASA-ISRO synthetic aperture radar or NISAR project, which will launch in 2022 and plans to "to make global measurements of the causes and consequences of land surface changes using advanced radar imaging."⁴² Following a 2+2 ministerial dialogue in October 2020, the two governments have also committed to cooperate on space situational awareness and discuss defence-related space issues.⁴³

In contrast to Russia and the United States, India's space cooperation with China is non-existent. After the launch of Chandrayaan-2 in 2019, China's foreign minister had mentioned it was open to space cooperation with India.⁴⁴ However, the Galwan crisis and the subsequent deterioration of relations makes the prospects for cooperation poor.

³⁸ Aditya Chaturvedi. Indo-Russian collaboration: GLONASS ground station in Bangalore; NavIC's in Novosibirsk. 5 December 2017.

<https://www.geospatialworld.net/blogs/indo-russian-collaboration-ghlonass-navic/>

³⁹ NASA Science. Solar System Exploration. Phobos-Grunt. Nd.

<https://solarsystem.nasa.gov/missions/phobos-grunt/in-depth/>

⁴⁰ Anatoly Zak. Luna-Resurs project. RussianSpaceWeb.com

http://www.russianspaceweb.com/luna_resurs.html

⁴¹ Ministry of External Affairs. India-US Space Cooperation - Fact Sheet. 2 March 2006

<https://mea.gov.in/bilateral-documents.htm?dtl/5998/IndiaUS+Space+Cooperation++Fact+Sheet>

⁴² Jet Propulsion Laboratory. NASA partnership with the Indian Space Research Organisation (ISRO). Nd.

<https://go.nasa.gov/3xbOLbk>

⁴³ Ibid.

⁴⁴ Ajey Lele. India-China space collaboration is worth a try. 6 August 2019. Space News.

<https://spacenews.com/op-ed-india-china-space-collaboration-is-worth-a-try/>

India's own ambitions in space go well beyond launching satellites to lunar and interplanetary travel.⁴⁵ Its Chandrayaan-2 probe to the Moon's South Pole ended in a crash landing⁴⁶ but ISRO remains committed to lunar exploration. Its next mission to the moon is Chandrayaan-3, which is scheduled to launch in the first half of 2022.⁴⁷ The project will consist of a stationary lander and a lunar rover⁴⁸ and will use the existing orbiter from Chandrayaan-2.⁴⁹

Despite this progress, technological and budget hurdles will keep India's lunar programme modest unless it collaborates with other spacefaring states. India will also have to come to terms with the prospect of the moon becoming a significant locus of activity, thus requiring some widely accepted norms and rules. India's options can be broadly placed in three categories:

1. Joining the Artemis programme and signing the Artemis Accords.
2. Joining the ILRS and signing the associated document.
3. Joining neither programmes, pursue a new framework via the UN

In theory, neither of these options may be mutually exclusive, which means India can pursue one or more at the same time. Therefore, India could join both the rival programmes and could potentially pursue a UN framework simultaneously. It could also choose to join either one programme and exercise the option of pursuing a UN framework. The Venn diagram below illustrates these choices. It is increasingly clear that China and Russia are growing sceptical about the utility of cooperation with the US in both space governance and space exploration.

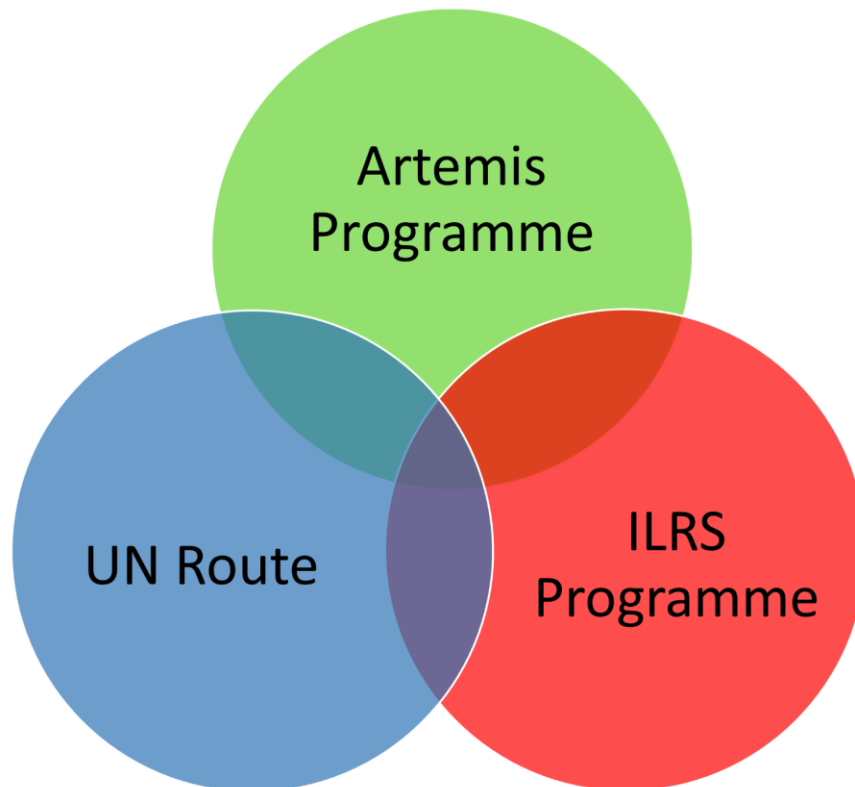
⁴⁵ Pallava Bagla. *Reaching for the Stars: India's Journey to Mars and Beyond*. Bloomsbury India. 2014.

⁴⁶ Vanessa Romo. *India's Attempt To Land Rover At Moon's South Pole Fails*. NPR. 6 September 2019.
<https://www.npr.org/2019/09/06/758419791/indias-attempt-to-land-rover-at-moon-s-south-pole-fails>

⁴⁷ Surendra Singh. *Launch of India's new-age earth imaging satellite by May: K Sivan*. The Times of India. 15 April 2021.
<https://timesofindia.indiatimes.com/india/launch-of-indias-new-age-earth-imaging-satellite-by-may-15-k-sivan/articleshow/82074910.cms?from=mdr>

⁴⁸ Mike Wall. *India Is Officially Going Back to the Moon with Chandrayaan-3 Lunar Lander*. 3 January 2020. Space.com.
<https://www.space.com/india-confirms-moon-landing-mission-chandrayaan-3.html>

⁴⁹ Siby Tripathi. *From Chandrayaan-3 to Artemis, countries rush to Moon with a desire to stay*. 25 May 2021. India Today.
<https://www.indiatoday.in/science/story/new-moon-race-chandrayaan-3-artemis-luna-isro-nasa-1806624-2021-05-25>



India's Options

This document weighs all three options using a simple SWOT analysis and also considers how these options could work in conjunction.

Option 1: Join the Artemis Programme

Strengths

1. Lunar Exploration Capacity: The Artemis Programme and its participants provide a robust structure for lunar exploration by creating a set of partners that can collaborate easily with each other.
2. Outer Space Governance: In the short-term, the Artemis Accords are potentially a useful and practical set of guidelines for signatories to collaborate in lunar, asteroid, and interplanetary missions.

Weaknesses

1. Since the Artemis Accords are a series of broad-based bilateral agreements and not a detailed multilateral treaty, they do not meaningfully address the lacuna evident in existing space law. Two points are most evident:

- a. Harmful interference: Under Article IX of the OST, a state experiencing 'harmful interference' can only 'request consultation'.⁵⁰ The Accords do not go beyond the OST to develop a practical dispute resolution mechanism, despite making signing of the Accords a prerequisite for the Artemis exploration programme.
 - b. Liability: The Accords also do not build on the 1972 Liability Convention to establish a mechanism for liability from damage caused during lunar activity.⁵¹
2. There is no provision for mutual inspection of lunar facilities, which is a useful mechanism for building transparency and trust.

Opportunities

1. The Artemis programme provides India an opportunity to collaborate on space activity with both the US, a major spacefaring state, as well as other emerging spacefarers. This could:
 - a. boost India's own lunar exploration programme,
 - b. create opportunities for co-financing of lunar projects
 - c. increase its access to critical space technologies,
 - d. and bring commercial opportunities.
2. The Artemis programme presently includes the other three member states of the Quad (the US, Australia, and Japan). It provides an opportunity to deepen technological cooperation within this informal grouping and provide a basis for increasing technology sharing through bilateral or plurilateral agreements in the future. For example, India could benefit from Japan's expertise in avionics and sample return, as well as established US-Australian facilities for space monitoring.⁵²

⁵⁰ UNOOSA. United Nations Treaties and Principles on Outer Space. 2002.
<https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/outerspacetreaty.html>

⁵¹ UNOOSA. Convention on International Liability for Damage Caused by Space Objects.
<https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/introliability-convention.html>

⁵² Pradeep Mohandas. Should India Sign the Artemis Accords?. The Wire. 29 May 2021.
<https://science.thewire.in/spaceflight/should-india-sign-the-artemis-accords/>

Threats

1. The Artemis programme and Accords pave the way for unregulated mining of the moon and other celestial bodies. This could set dangerous precedents that:
 - a. Undermine the spirit of existing international space law
 - b. Make it harder to pursue multilateral treaties on space governance.
2. Since both Russia and China view the Artemis programme as US-centric, any Indian involvement could reduce opportunities for collaboration with those states.
3. India is a signatory to the 1979 Moon Treaty (but has not ratified it). However, since the Artemis Accords are at odds with the Moon Treaty on the issue of mining, it could raise questions about India, or even calls for India to formally withdraw from the treaty. As of this writing, Australia is the only state party to the Moon Treaty that is a signatory of the Artemis Accords

Option 2: Join the International Lunar Research Station

Strengths

1. Builds on long-established India-Russia space cooperation and strengthens relations between the two states even as some of their interests diverge back on Earth.
2. The ILRs programme has a more ambitious and detailed plan of lunar exploration (as detailed in the previous section).

Weaknesses

1. As of this writing, the programme has yet to come up with a document equivalent to the Artemis Accords that lays down norms for lunar activity.
2. Any India-Russia cooperation on lunar exploration could be subject to the same limitations as their previous such effort, the Luna-Resurs project, which suffered from differing priorities and shrinking budgets.⁵³

⁵³ Anatoly Zak. Luna-Resurs project. RussianSpaceWeb.com
http://www.russianspaceweb.com/luna_resurs.html

Opportunities

1. Specific Russian technologies could be a game-changer in deep space operations. In particular, Russia's emerging nuclear space tug capability⁵⁴ and its proven Soyuz rockets would be useful for India's space aspirations?. India may want access to these capabilities on better terms for redundancy and diversification alongside indigenous capabilities.
2. China's private space companies could collaborate with their counterparts in India on projects or joint ventures on building components or subassemblies for lunar vehicles.

Threats

1. The major role of China in the ILRS project could hamper or scuttle effective cooperation. As India's chief adversary, China would have the incentive to delay or limit the benefits India receives from participation in the ILRS.
2. China's presence could also hamper cooperation with the US and other states in the Artemis programme, since US legislation bars NASA from cooperating with China.
3. There remains a possibility, however low, that proprietary Indian space technologies will be stolen or reverse engineered.

Option 3: Pursuing the UN Route

Strengths

1. Unlike the Artemis Accords or the potential ILRS document, a truly multinational agreement would find widespread traction and enjoy greater international legitimacy.

Weaknesses

1. The primary mechanism for such an agreement would be the UN Committee on the Peaceful Uses of Outer Space (COPUOS), which was created in 1959, at the dawn of the space age. However, COPUOS has not managed to produce new space-related

⁵⁴Chris Young. Russia's 'Space Tug' Could Tow a Nuclear Power Station to Mars. Interesting Engineering. 13 July 2021.

<https://interestingengineering.com/russias-space-tug-could-tow-a-nuclear-power-station-to-mars>

laws in decades and remains in deadlock - which is precisely why the Artemis Accords have come into being.⁵⁵

Opportunities

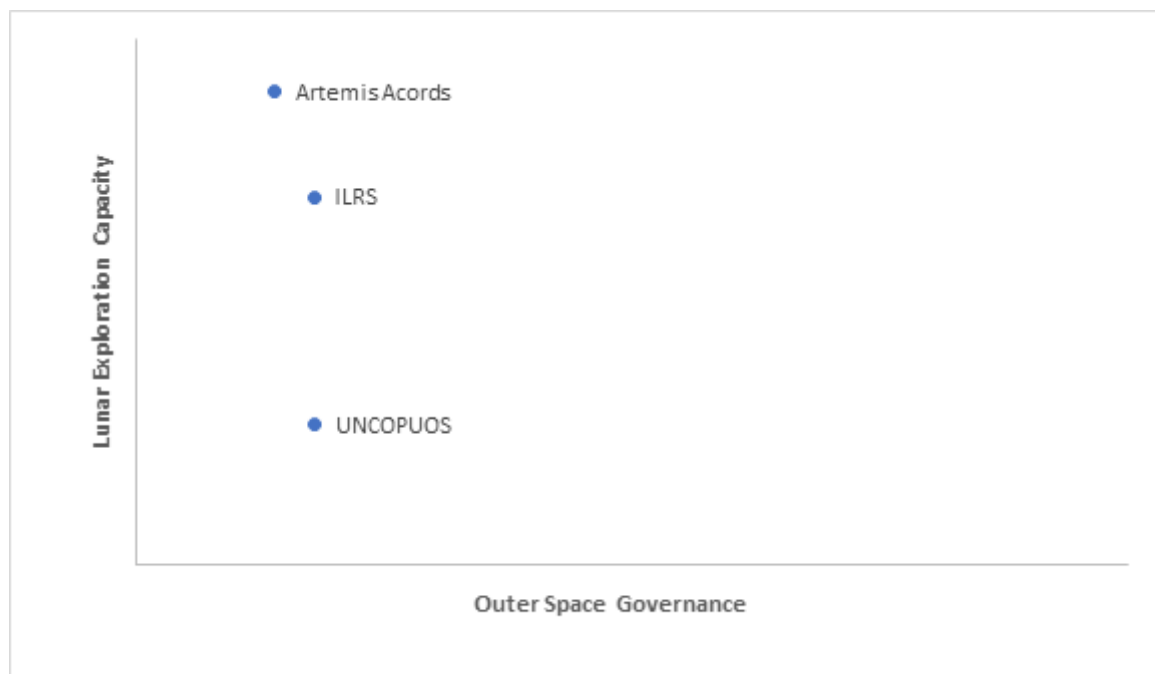
1. A COPUOS-based treaty could also form the basis of an updated arms control agreement for space.

Threats

1. Given the history of deadlock and overlapping mandates with the Conference on Disarmament (CD), a failed attempt at a treaty could set back progress for decades.⁵⁶

Conclusions

India is faced with a menu of imperfect options. Joining either the Artemis or ILRS programmes is likely to benefit its own ambitions in space but this could come at the cost of space governance, which could become fragmented and ridden with rivalries. However, if India were to only pursue a UN treaty, it would lose out on the advantages of collaboration in lunar exploration while likely making little headway in COPUOS all by itself.



India's Imperfect Options

⁵⁵ Annette Froehlich, Vincent Seffinga, and Ruiyan Qiu. The Future of the UN Space-Related Framework. Springer. In Annette Froehlich and Vincent Seffinga (ed) The United Nations and Space Security. 2020. P107 - 117.

⁵⁶ *ibid.*

As a middling space power, India lacks the clout to create international norms by itself but can help shape them in collaboration with other states. Similarly, while India will have much to offer in a collaborative lunar exploration project, any attempt at going it alone will only result in it falling behind. India will thus have to seek collaboration for both lunar governance and lunar exploration.

India's strategy hinges on having a seat at the table. It can join either lunar programmes or both while also simultaneously pushing for an updated UN-based treaty. It must, however, prioritise. While space cooperation with Russia will remain crucial, particularly for human spaceflight, India has much to gain from the Artemis programme, which opens up the possibility of creating a framework for supply chains and technology transfer within the Quad as well as avenues for private sector participation.

While the Artemis programme is likely to bring India the greatest benefits in terms of lunar exploration, it can also simultaneously enhance space cooperation with Russia either through the IRLS or bilaterally.

Such a strategy would allow it to help bridge the gap between other major powers and come closer to an agreed set of norms for space exploration, whether through COPUOS or outside of it.

Pradeep Mohandas and Karantaj Singh contributed to this document.