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Space Resources - The Artemis Accords, International Lunar Research Station and Options for India

Air Marshal R Radhish PVSM, AVSM, VM (Retd)

United Service Institution of India (USI)

New Delhi

About the Monograph

The monograph attempts to bring out that governance of activities in space is at an inflection point. Space Law that was negotiated under the aegis of the United Nations against the background of Cold War has been successful in keeping outer space free from confrontation, until now. Although the Outer Space Treaty of 1967 alludes to use of space resources, the Moon Agreement of 1979 prohibits national appropriation of assets in space or on celestial bodies. However, countries that are not signatories to the Moon Agreement and some, including India, who are signatories, have enacted laws that permit use of space resources by entities supervised by their respective space agencies. Though the Space Law has left provisions for further negotiations with respect to use of space resources, no substantial progress has been made. The US, and its allies, and partners as members of the Artemis Accords, and China and Russia, and their partners as members of International Lunar Research Station (ILRS) are poised to return to the Moon, use resources on the Moon to prolong their presence on the Moon, lunar and cislunar space, proceed to Mars and beyond, to gain and sustain strategic advantage. This significant step for humankind is also coming at a crucial time on Earth, where we are witnessing a geopolitical upheaval due to the rise of China as the emerging power challenging the established world power, the US. Given this context there is a potential for confrontation at vantage points in space and on strategically significant places on the Moon. While the effort to establish a regulatory framework is in progress, the race has already begun. In this context India needs to act wisely and pursue its core national interests, steadfastly.

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Introduction

Governance of activities in space is at a crossroads. Most significant reason for this is the aspect of ownership of resources extracted from celestial bodies and the Moon. The model of governance of space based on global commons governance, especially the Antarctic Treaty 1959, is seen to have run its course in the initial phase of space exploration, and the subsequent phase of exploitation of space for scientific exploration, national security, and commercial purposes. The stable world order that emerged after the World War II (WWII) and consolidated further following the end of the Cold War—leaving the United States (US) as the sole superpower—is now, for the first time, in a serious state of flux. The established great power, the US, is being challenged by a rising power, China, whose technological prowess and niche critical capabilities have enabled it to advance rapidly in several domains, including space. Presently, the Outer Space Treaty (OST) of 1967 is the basis for space governance. The OST, along with other agreements, conventions, guidelines, principles, treaties, and United Nations General Assembly (UNGA) resolutions, together constitute the body of rules and norms collectively referred to as 'Space Law'.[1] In addition, as mandated by the United Nations (UN), the nations must enact legislations to govern space activities originating from their soil.[2] The OST 1967 and the rest of the body of documents that comprise the Space Law were drawn up during the Cold War—a period of intense political, diplomatic, and military détente between the US and the Union of Soviet Socialist Republics (USSR). Under the circumstances prevalent at that time, the

OST was negotiated under the aegis of the UN primarily with a view that outer space—the new domain of human ventures—remain free of the Cold War-inspired competition and confrontation, and the nuclear arms race. Therefore, the OST 1967 and other instruments of Space Law were negotiated accommodating the grave concerns and deep interests of the spacefaring nations of that time, mainly the US and the USSR. The OST 1967 also encompasses the Moon and other celestial bodies in its ambit, besides the outer space itself. The Article II of the OST states that "Outer space, including the Moon and other celestial bodies, is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by other means".[3] Whether it meant the whole of the celestial body or any part of it is now a topic of intense debate. However, the Moon Agreement is more specific. The Moon Agreement of 1979 is the only document besides the OST that has relevance about ownership of assets and resources in space and on celestial bodies. Article 11, Para 3 of the Moon Agreement 1979, states that "Neither the surface nor the subsurface of the Moon, nor any part thereof or natural resources in place, shall become property of any state, international intergovernmental or non-governmental organisation, national organisation, non-governmental entity, or of any natural person. The placement of personnel, space vehicles, equipment, facilities, stations, and installations on or below the surface of the moon, including structures connected with its surface or subsurface, shall not create a right of ownership over the surface or the subsurface of the Moon

or any areas thereof".[4] Over the years, since the first exploratory landing on the Moon in 1969, samples of its rock and regolith have been brought back for geological study and analysis for ascertaining its origin, constitution, and contents. Apollo 17 was the last mission to the Moon from the US and it returned in Dec 1972 with lunar sample. It was also the only mission that had a geologist as a crew member to study the Moon's surface to confirm the presence of Helium-3 isotope—a rare isotope of Helium—in abundance that could be used to produce nuclear energy using fusion technology without the resultant harmful radiation.[5] The USSR used robotic missions to collect samples for their study. More recently, China has carried out the first lunar sample return mission from the far side of the Moon, and more such missions from the country are in the pipeline. Data from payload onboard Chandrayaan-1, the first Indian mission to the Moon revealed the presence of frozen water-ice on the darker and colder regions of the Moon.[6] Payload onboard Chandrayaan-3, the first Indian mission to the surface of the Moon, and the only one to the lunar south pole region, has confirmed the abundance of water-ice in the polar and permanently shadowed regions and at high latitude regions, particularly in shadowed areas beyond the poles, making feasibility of accessing water-ice for exploitation much easier, accentuating Moon's strategic importance.[7] Study of the Moon's surface and lunar samples have revealed that it has resources that can be further exploited. Resources thought to be present on the Moon include uranium[8], potassium, phosphorus, water-ice,

platinum group of metals[9], and Helium-3.[10] The last of these is a rare isotope that could help power relatively clean fusion energy in future.[11] The US has made plans to exploit lunar resources in-situ to make the Moon a base and launchpad to exploit the cislunar space and beyond for strategic reasons and for persistent and prolonged human presence on the Moon and in space. China too has similar plans. There have been three asteroid sample-return missions that have revealed valuable information about the resources present in these bodies. However, any further progress in exploiting resources on the Moon or on celestial bodies depends on the right to ownership of the resources explored by them. Although Article 11, Paragraph 05, of the Moon Agreement states that "States Parties undertake to establish an international regime, including appropriate procedures, to govern the exploitation of the natural resources of the Moon as such exploitation is about to become feasible".[12] No substantial progress had been made in this regard until very recently. Article 18 of the Moon Agreement states, "A review conference shall also consider the question of the implementation of the provisions of Article 11, Paragraph 05, on the basis of the principle referred to in Paragraph 01 of the same article and taking into account in particular any relevant technological developments".[13] The US, Russia, and China are not signatories to the Moon Agreement; moreover, the Kingdom of Saudi Arabia has withdrawn from the Agreement, leaving only 17 States Parties. The US (National Aeronautics and Space Administration [NASA] and the Department of State) and its allies have drawn up plans for

peaceful exploitation of resources in space, on the Moon, Mars, comets, and asteroids, through the Artemis program being facilitated via the Artemis Accords (Principles for cooperation in the civil exploration and use of the Moon, Mars, comets, and asteroids for peaceful purposes).[14] China too has plans to start exploiting resources on the Moon by 2035 through the China-Russia International Lunar Research Station (ILRS) project.[15] Australia and Japan are developing capabilities to mine the Moon.[16] India joined the Artemis Accords in 2023. While India has already landed a rover on the Moon, European Union is in the process of developing a lunar lander.[17] As the 'Age of Exploration' of the 21st Century unfolds in space, how does India—as a leading spacefaring nation that pioneers the exploitation of space to further the socio-economic development of the Global South, and with several unique achievements in space exploration to its credit—ensure that its interests are served effectively?

Chapter 1

Space Exploration: The Big Leap

A Return to the Future: The Artemis Program

NASA's Artemis program is an effort to place astronauts on the lunar surface and develop an ongoing presence there.[18] NASA has been trying to go back to the Moon and eventually land on the Mars since 2004 when the then-US President George W Bush announced 'Vision for Space Exploration'.[19] After going through many versions of programmes with different aims, the current programme of returning humans to the Moon was mandated by the US President Trump's Space Policy Directive 1 in 2017. The policy calls for the NASA administrator to "Lead an innovative and sustainable program of exploration with commercial and international partners to enable human expansion across the solar system and to bring back to Earth new knowledge and opportunities".[20] The effort will more effectively organise government, private industry, and international efforts toward returning humans on the Moon, and will lay the foundation that will eventually enable human exploration of Mars.[21] The Artemis—the name adopted in 2019 for the mission's goals after the Greek goddess Artemis, twin sister of Apollo—ultimately aims to establish the Moon as a launching pad for missions to Mars and beyond, and to build a thriving space economy based on the Moon and cislunar space through the extraction and utilisation of lunar resources. A renewed urgency for execution of the program has been expressed by the second Trump administration by enacting a Presidential Executive Order titled 'Ensuring American Space Superiority' on 18

Dec 2025 that reiterates the goals of the Artemis program, of returning astronauts to the Moon by 2028, and start construction of a permanent lunar base by 2030, among other new purposes.[22] The new Presidential Executive Order, however, goes well beyond the mandates of the Artemis program. As its name suggests, it seeks to establish the US supremacy in space and, through it, on the Earth. It also has implications for the defence of the US mainland against modern-day aerial threats. Besides establishing the Moon as an industrial base to support the exploitation of lunar resources, the Order is also intended to further the US national interests, including—but not limited to—deep space missions and missions to Mars and beyond. The Artemis program with all its components will establish a prolonged, if not permanent, presence of humans on the Moon. Among other objectives, landing a woman and a person of colour is also included. While operationally inconsequential, this emphasis on inclusivity is politically significant. More importantly, part of the Trump administration's push towards the Moon includes an enlarged role for private aerospace firms, which are intended to develop hardware and potentially kickstart a lunar economy.[23] The US did not pursue any further human or other spaceflights to the Moon after the Apollo 17 mission in Dec 1972, as such missions were deemed economically unviable at the time, offered no tangible benefits, and were constrained by budgetary cuts necessitated by the need to fund the Vietnam War. However, it was not lost on them that one day it might

become economically viable and scientifically possible to harness the rich resources of the Moon and other celestial bodies in pursuit of their national interests; hence, the reluctance to become a signatory to the Moon Agreement. Several economic reasons also fuelled the idea for multinational cooperation and private investments to take on further exploration and exploitation of space, starting with the Space Shuttle program and the International Space Station (ISS). Therefore, as has been the case with the rest of the space economy, in the US, its government, private companies, entrepreneurs, start-ups, and investors—both domestic and international—would play an important role in the lunar and cislunar economy as well, where the scope is far vaster and more varied. In addition, as the Artemis progresses and matures, it is expected to be joined by space agencies of other nations, contributing their niche capabilities in various capacities, much like the ISS project. To facilitate cooperation and collaboration with allies, partners, and like-minded nations—primarily for economic reasons—and to legitimise the non-confirmatory facets of the Artemis program that influence the extant provisions of space law, the Artemis Accords were conceived. As evident, there is a blurring of lines between civilian space, national security space, and commercial space, all in the interests of the US. How the Artemis Accords will fit into this matrix beyond close allies and partners would have to be seen and watched.

Principles for a Safe, Peaceful, and Prosperous Future in Space[24]

- **Norm Setting**: **The Artemis Accords**. The 'Principles for cooperation in the civil exploration and use of the Moon, Mars, comets, and asteroids for peaceful purposes' or the Artemis Accords is a step initiated in Oct 2020 by the US Department of State and the NASA, along with seven other signatory nations that include Australia, Canada, Italy, Japan, Luxemburg, the United Arab Emirates, and the United Kingdom to establish norms and behaviour in space exploration and exploitation as envisaged by the Artemis program, for larger acceptance amongst the international community.[25] As of end 2025, there are 60 nations that are signatories to the Accords, which includes India. An in-depth analysis is essential to understand what it entails as far as future of space governance and its implications are concerned. The Accords are meant to foster cooperation in civil exploration and exploitation of resources on celestial bodies. It commits to establish sustainable exploration of the solar system, along with international and commercial partners. The Accords affirm the importance of compliance with the OST, the Rescue and Return Agreement, the Liability Convention, and the Registration Convention, and of coordinating through multilateral forums such as the UN Committee on the Peaceful Uses of Outer

Space (UNCOPUOS) to advance efforts toward a global consensus on critical issues relating to space exploration and use. The Accords "Desires to implement the provisions of the OST and other relevant international instruments and, thereby, establish a political understanding regarding mutually beneficial practices for the future exploration and use of outer space, with a focus on activities conducted in support of the Artemis program".[26] The Accords accepts that the "Principles described provide for operational implementation of important obligations contained in the OST and other instruments".[27] An analysis and interpretation of the provisions of the Accords are as follows:

- The principles apply to civil space activities undertaken by the respective space agencies of the signatories, either independently or through contracts executed on their behalf. Cooperative activities are to be implemented through appropriate instruments of cooperation, presumably with the US. This implies that separate instruments—such as Memoranda of Understanding (MoUs), government-to-government agreements, or similar arrangements—would need to be concluded between each signatory and the US Department of State in order to benefit from cooperative activities.

- Signatories are expected to demonstrate a commitment to transparency regarding their space activities and policies. The interoperability clause requires signatories to make efforts to establish common exploration infrastructure and adopt current standards, thereby, enhancing cooperation, interoperability, exploration, and commercial utilisation.

- With regard to scientific data and other information, signatories are expected to share such data openly when it concerns, or is derived from, cooperative activities. This requirement, however, does not extend to purely private sector operations unless such activities are conducted on behalf of a signatory.[28]

- The most important and contentious issue of space resources have also been dealt with in Section 10 of the Accords. According to the Accords, any extraction and utilisation of resources have to be in compliance with the OST and in support of safe and sustainable space operations, and that extraction of resources does not constitute national appropriation under Article II of the OST. The Accords commit to informing the UN Secretary-General and the international scientific community of activities involving space resource extraction, in accordance with the OST.

Another important aspect is that of deconfliction of space activities. The Accords is very explicit about provisions in the OST concerning due regard and harmful interferences. This aspect is very important from the point of impending activities on the Moon and in its orbit. The Accords introduce the concept, definition, and determination of safety zones and harmful interference which would be relevant when resource extraction activities and its utilisation is conducted on the Moon. There is no mention of any aspects related to funding. It is presumed that the members would have to fund their own activities or programmes that they take part in through national budgets. However, in an interview titled 'Artemis Accords: International Collaboration in Deep Space'—during the Humans to the Moon and Mars 2025 Summit in May 2025—moderated by Mat Kaplan, Senior Communications Advisor at the Planetary Society, the speaker Mike Gold, President of Civil and International Space Business at Redwire Space, introduced as one of the founding architects of the Artemis Accords in his earlier role as NASA's Associate Administrator for Space Policy and Partnerships and Acting Associate Administrator at the Office of International and Interagency Relations, states that the US expects partner contributions in the form of funding to help offset budgetary constraints depending on the

capabilities of the signatories, and compares this approach to funding arrangements within North Atlantic Treaty Organization.[29] He also states that Artemis Accords is the gateway for signatories to be part of the Artemis program. The signing of the Accords represents a significant political attempt to codify key principles of Space Law and apply them to the program.[30] It could be argued that the Artemis Accords is an attempt at consensus building outside of the UN, which has been the traditional route to rulemaking with regard to all matters related to space because the UN has been slow after being included it in the Moon Agreement, and has been unrelenting with respect to national appropriation of assets in space. On the contrary, it is felt that it is an attempt to force acceptance of terms that are conducive to the US, its close allies, and partners by luring countries to join or miss out the opportunity to gain from exploitation of resources on the Moon, asteroids, and other technological knowhows. It is a pure *quid pro quo* bilateral arrangement between the US and the members signing up where the US expects the nations to accept the terms of the Accords and contribute to the programme and take the benefits accruing based on their contribution. The programme does not guarantee any benefits without contribution just by signing up the Accords. It is not consensus-building, it is

rather a unilateral attempt at defining the terms of exploiting resources on the Moon and asteroids for commercial and strategic benefit of commercial space companies and the US and its allies and partners, respectively. Russia has refused to join the Accords, terming it too "US-centric".[31] China cannot be a part of the Accords due to the US laws that do not permit cooperation with China. Both China and Russia have objected to the terms of the Artemis Accords because of what they perceive as its unilateral approach to controlling activities in outer space, including the Moon, particularly those relating to the national appropriation of lunar assets, which they argue is at variance with the OST. China has even accused the US for interfering in its joint space programmes with other nations.[32] Therefore, it is felt that the Accords is more of an exercise in show of strength in numbers and an attempt to woe nations to their side by offering other incentives in comprehensive packaging, like the India-US Initiative on Critical and Emerging Technology[33], to prevent tilting the other way. It could be argued quite convincingly that with the latest Presidential Orders blurring the lines between the Artemis program and the broader US space program, membership of the Accords is essentially a coalition-building exercise among like-minded states to legitimise the ways and means of strengthening the US space capabilities against

potential adversaries, and of reinforcing the US superiority, both on the Earth and in space.

ILRS: The Alternative or the Rival?

China National Space Agency (CNSA) launched the China Lunar Exploration Programme (CLEP) in Jan 2004, the first stage of which was the Chang'e Project, which was initiated on 24 Oct 2007 with the launch of Chang'e 1. Although the CLEP envisioned international participation, it was not very successful at it. In this political context, the ILRS was formally announced in 2019, as the future development of the CLEP, to develop more international cooperation than the CLEP could individually manage.[34]

The CNSA and Roscosmos—the State Space Corporation of the Russian Federation—signed a MoU on the ILRS in Mar 2021, making it a joint project. The roadmap and partnership guidelines were subsequently revealed in Jun 2021. Considering the fruitful experience from the People's Republic of China and the Russian Federation in the areas of space technology, space science, and space application, the CNSA and the Roscosmos jointly initiated the ILRS, based on the their existing lunar exploration plan.[35] Salient aspects of the project indicate that it has been conceived to be a cooperative initiative with countries, international organisations, and international partners as partners in the exploration and use of the Moon in the interest of all humankind. The project offers opportunities and

participation to interested international partners in all phases and at all levels, without any discrimination, adhering to the principles of equality, openness, and integrity. It is an open invitation to interested parties to participate in any areas or missions according to their expertise. The program defines:

> "ILRS is a complex experimental research facilities to be constructed with a possible attraction of partners on the surface and/or in the orbit of the Moon designed for multi-discipline and multi-purpose scientific research activities, including exploration and use of the Moon, moon-based observation, fundamental research experiments, and technology verification with the capability of long-term unmanned operation with the prospect of subsequent human presence."[36]

The scientific objectives also include 'Lunar resources in-situ utilisation'. By 2035, research, exploration, and verification of in-situ utilisation of resources is to be established by the ILRS-3 mission. Cooperation guidelines have been listed very lucidly and liberally to attract partners to join in. The project allows cooperation under different categories—from space mission cooperation to space system cooperation to subsystem cooperation to equipment cooperation to ground and application cooperation—according to the partner's capability and capacity. The document lists all available opportunities for the partners to choose from. Here too, there is no mention of funding arrangements. Will ILRS be an alternative available for those

looking for a peaceful future in space or a rival to the Artemis Accords as the geopolitical competition between the established power and the rising power goes beyond the confines of Earth will only be established in the future.

Chapter 2

Resources in Space: Toward Moon, Mars, and Beyond

Space Resource Governance: Using without Owning Model

The governance of activities in space is facilitated under the stewardship of the UN through the Space Law. This law consists of five international treaties that are binding and five sets of principles that are non-binding. The OST 1967, the Rescue Agreement 1968, the Liability Convention 1972, the Registration Convention 1975, and the Moon Agreement 1979 consist of the binding treaties. The Declaration of Legal Principles, the Broadcasting Principles, the Remote Sensing Principles, the Nuclear Power Source Principles, and the Benefits Declaration are the non-binding principles that sets the norms of conduct and guide activities in space. Besides these, every nation is expected to authorise all activities in space and supervise the activities of any entity that it is responsible for, both governmental as well as non-governmental, as the 'Launching State' by enacting domestic space laws. While there has not been much angst regarding the majority of the treaties, principles, or their legal provisions, the Moon Agreement—particularly the aspect relating to the appropriation of assets and resources on the Moon and other celestial bodies—has been a source of contention. This has resulted in only 17 States Parties being a signatory to the Moon Agreement following the withdrawal of the Kingdom of Saudi Arabia, with neither the US, Russia, nor China being a party to the Agreement. As technology progresses, exploration,

excavation, and use of resources available on the Moon and celestial bodies is becoming increasingly promising. Besides sample return missions from the Moon, three missions have returned samples from asteroids. To facilitate prolonged human presence on and around the Moon and a thriving lunar economy as well as to enhance deep-space exploration to facilitate human mission to the Mars and beyond, a need has been felt to mine the Moon and asteroids to exploit and use the resources in-situ. While the Article II of the OST 1967 states that outer space, including the Moon and other celestial bodies, is not subject to national appropriation by any means, the Article 11 of the Moon Agreement is categorical in stating that besides repeating the above with respect to national appropriation by any means, the surface, subsurface, or any part thereof, or natural resources in place shall not become property of any state or entity. It also states that "The placement of personnel, space vehicles, equipment, facilities, stations, and installations on or below the surface of the Moon, including structures connected with its surface or subsurface, shall not create a right of ownership over the surface or the subsurface of the Moon or any areas thereof".[37] According to Article 11 of the Moon Agreement, "State Parties are to undertake to establish an international regime, including appropriate procedures, to govern the exploitation of the natural resources of the Moon, inform the Secretary-General of the UN as well as the public and the international scientific community, of any natural resources they may discover on the Moon, undertake these activities for orderly and safe

development of the natural resources of the Moon for rational management of those resources, expansion of opportunities in the use of those resources, and equitable sharing by all States Parties in the benefits derived from those resources, whereby the interests and needs of the developing countries as well as the efforts of those countries which have contributed either directly or indirectly to the exploration of the Moon shall be given special consideration".[38] However, it was only in 2016 that this aspect titled 'General exchange of views on potential legal models for activities in exploration, exploitation, and utilisation of space resources' was included in the agenda for discussion in the UNCOPUOS by the Legal Sub Committee (LSC).[39] Not much progress was made in the UNGA in the ensuing years, leading to other agencies taking the lead to propose various governance models. In 2019, the Hague International Space Resources Governance Working Group, founded in 2016 by Professor Tanja Masson-Zwaan of the International Institute of Air and Space Law at the University of Leiden, adopted the 'Building Blocks for the Development of an International Framework on Space Resource Activities'.[40] This document was introduced to the UNCOPUOS in 2020. In 2021, the UNCOPUOS, based on a letter from Canadian Space Agency, noted the pitfalls in not regulating space resource activities and the advantages of it being brought within the provisions of the OST.[41] During debates about the creation of the working group, the US observed that the utilisation of resources in space and on celestial bodies is critical to sustained and prolonged activities in space, and stated that

the four basic space treaties provide the legal framework for the states to ensure that their interests are protected.[42] In 2021, the LSC established a working group to progress the agenda further.[43] In 2022, the 'Working Group on Legal Aspects of Space Resource Activities', as it had been renamed, suggested a five-year working plan to put up initial recommended principles with regard to space resource activities for consideration by UNCOPUOS and possible adoption by the UNGA as a resolution.[44] Supporting the creation of the Working Group, the Russian Federation noted that any "Activity that is related to the exploration, exploitation, and utilisation of space resources must be based on a clear legal framework which is widely recognised on a global level".[45] The Group of 77 and China argued that it is of the utmost importance to draw up domestic laws permitting and regulating exploitation of resources on celestial bodies for economic purposes according to International Space Law to avoid loopholes within the extant legal framework and provide clarity with respect to legal obligations of parties involved in exploration and exploitation of space resources.[46] Meanwhile, the Hague Working Group developed a commentary to explain each aspect of the Building Blocks, the agreed provisions, and the suggestions of the LSC-mandated Working Group. Luxembourg and the Netherlands put forward the 'Commentary to the Building Blocks' as a conference room paper to the LSC in 2022.[47] Luxembourg noted that "The Artemis Accords, the Hague International Space Resources Governance Working Group, and the Moon Village

Association will facilitate knowledge-sharing and technical understanding of major aspects that would help progress discussions at the UN".[48] The Space Generation Advisory Council put up a report titled 'Effective and Adaptive Governance for a Lunar Ecosystem', on 27 May 2021.[49] The report suggested that governance of any activity on the Moon need to take in to consideration four basic aspects—fairness, effectiveness, adaptiveness, and sustainability.[50] It also advocated for the creation of a Lunar Governance Charter as a shared narrative that could frame the global debate on lunar governance within pragmatic but also idealistic terms.[51] In Mar 2020, another initiative to provide 'Best practices for Sustainable Lunar Activities' to assist in the facilitation of peaceful lunar settlement by establishing the best practices to facilitate long-term sustainability of activities in lunar and cislunar space undertaken by the Moon Village Association.[52] On 27 May 2021, the Moon Village Association submitted its report on the 'Global Expert Group on Sustainable Lunar Activities'.[53] The report noted that inadequate coordination mechanisms for activities on the Moon poses difficulties and challenges to peaceful exploration and exploitation of the Moon in the future.[54] The report cautioned that it could result in unintentional harmful interference, more so in those areas that are of the utmost interest to all the parties involved, like the south pole of the Moon.[55] The Moon Village Principles suggest establishing a 'Land Use Registry' that is accessible to the public, to register all existing and planned lunar activities, including location, nature, and duration of activity, uphold the right of the registered users to avoid

interferences, deconflict activities, and promote safety zones. The proposal for a registry build upon the work of the Building Blocks, which proposes a registry of priority rights with respect to the search for and recovery of space resources.[56] The key question is whether the 'Using Without Owning' model is both viable and acceptable. There is also a growing concern and an understanding that unless the nations come together and put some rules in place, the scramble for resources on celestial bodies and the Moon could become a potential flash point between great powers, and unbridled excavation and exploitation of resources on the Moon could lead to environmental deterioration.[57] A UN-sponsored modern egalitarian version of the 'Treaty of Tordesillas'—an agreement between Spain and Portugal in 1494 that divided the lands into Western and Eastern hemispheres to avoid conflicts—is acceptable to the rest of the world and is probably a solution.[58] 'The Mining Code—Draft Exploitation Regulations' that are currently under negotiation with the International Seabed Authority (ISA), which was established in accordance with the United Nations Convention on the Law of the Sea and the 1994 Agreement, to organise and control all mineral resources related activities in the Area, covering almost 54 per cent of the total area of the world's oceans is an ideal model to follow.[59] An equivalent of the ISA would have to be created under UNCOPUOS to begin the process.

Beginnings of Another 'Gold Rush'

It is clear that as yet there is no legal framework as envisaged in Article 11 of the Moon Agreement to facilitate

ownership of space resources mined from the Moon or asteroids. With just 17 State Parties as members, the Moon Agreement is not considered a customary international law. More importantly, neither the US, Russia nor China are party to the Moon Agreement. The Artemis Accords and the ILRS claim that they abide by the provisions of the OST, where both have envisioned to use space resources in situ to further their objectives, which as of now is to establish presence on the Moon and/or in its orbit, as well as to extend their reach into the cislunar space, Mars, and beyond. The economics of the effort, time, and cost involved in mining asteroids and the associated effects on the global mineral economy do not make supplying of resources extracted from asteroids to Earth a profitable and viable option, as yet.[60] Similarly, the launch and recovery effort and cost vis-à-vis the scale makes utilisation of the mined resources on the Moon in situ to facilitate deep-space exploration, and space and lunar economy as a better option than supplying raw materials to the Earth.[61] In-space economy based on space resources and in-space manufacturing catering to human spaceflights, surface and space habitats, space and surface transportation, cargo transportation, space utilities, and tourism are already driving commercialisation of microgravity environment.[62] The Article I of the OST permits 'Exploration and Use' of outer space including the Moon and other celestial bodies. And, as mandated by the UN, states have enacted legislations to permit exploration and use of outer space, and the Moon and celestial bodies by governmental and non-governmental entities without claiming sovereignty

over it. Multilateral agreements like the Artemis Accords and the ILRS are expected to provide the necessary support in terms of funding, scientific expertise, and international cooperation to further the stated objectives in a mutually benefiting way. As far as national appropriation is concerned, as long as state parties recognise and respect the sanctity of each other's intent and abide by the principle of due regard to each other's interests and avoid harmful interference through consultation as envisaged in the Article IX of the OST, it might not be a point of contention. However, it is expected that whoever reaches the areas on the Moon that are potentially lucrative would be in a better position to advance their interests. National policies are being enacted with renewed urgency to accelerate the process to reach the Moon and establish a lunar base, deploying nuclear reactors on the Moon and in its orbit, and use resources on the Moon for further space exploration and for commercial purposes to establish a lunar economy.[63] More importantly, the US and China are both trying to reinterpret the extant laws for their benefit, giving each other the advantage of following a precedent set by the other. Whatever applies to one would apply to the other. Russia had evinced interest in joining the Artemis Accords, however, it did not, stating that it was too US-centric. India is a member of the Artemis Accords. Thailand is party to both, and it is felt that there are some benefits in such a position too. The rush to get to the Moon to gain strategic advantage to exploit its resources by taking advantage of the lax and ambiguous regulations while also attempting to

impose norms and behaviour through trendsetting has further incentivised the US and China to continue their efforts more vigorously. How should India further its national interests? The answer depends on the choices it makes.

Chapter 3

India's Choices

Pursuing National Interests

The Artemis Accords and the ILRS are prevailing geopolitics playing out on the Moon and in outer space in pursuit of their respective national interests. Right from the beginning, anything to do with space exploration and exploitation was intrinsically related to geopolitics and domestic politics. From the first rocket launch into space in 1957 and the ensuing race to beat each other at achieving important milestones, to launching satellites for national security requirements with varied capabilities for taking strategic advantage that outer space provides, national space policies have always been driven by the prevalent geopolitical situation and its impact on the domestic politics. The US-USSR geopolitics that prevailed post-WWII until the end of Cold War has now been supplanted by the US-China geopolitical rivalry. Race to get back to the Moon, and go further to Mars and beyond, has prompted some frantic leg work by the US and its allies to build consensus amongst 'Like-minded' countries, with issuing of presidential policy directives and executive orders with strict timelines and follow up orders. It is surmised that consensus building through the Artemis Accords is an exercise to force global acceptance of the principles that it lucidly brings out, to undermine the Moon Agreement. It is also aimed at bringing transparency in national space endeavours and make it part of Space Law through the UN to constrain China and Russia in the process. The new

Presidential Executive Order of 18 Dec 2025—'Ensuring American Space Superiority'—alludes to this deduction.[64]

By signing up for the Artemis Accords, Indian space programme is unwittingly becoming a part of that great power geopolitical rivalry that has consequences. Although India's first sounding rocket was the US-made Nike-Apache, Indo-US cooperation in space has been project-based with the latest example being the NASA–Indian Space Research Organisation (ISRO) Synthetic Aperture Radar (NISAR) Earth observation satellite, launched in 2025. On the historic occasion of this launch, the US Mission to India's Charge D'Affaires Jorgan K Andrews said, "During their Feb meeting in Washington, President Trump and Prime Minister Modi underscored space cooperation as a priority for the bilateral relationship. NISAR, an unprecedented joint satellite mission between NASA and ISRO, marks a new chapter in the growing collaboration between our two space agencies. As NISAR begins its journey to unlock new insights about the planet, it is a testament to this collaboration". Indian space programme has hitherto survived and prospered on its own, with bipartisan mission specific bilateral cooperation. India has always preferred to be strategically autonomous when it comes to its commitments to the world; it prefers bilateral issue-based partnerships rather than global multilateral partnerships that tend to drive its own agendas. Exceptions like the membership of Quadrilateral Security Dialogue prove that some realpolitik is necessary when core national interests

are at stake; and joining the Artemis Accords as part of space diplomacy seems to be following on the same lines.

The bipartisan nature of India's space programme since its beginning, with partnerships with most of the prominent spacefaring nations, helped it to progress even when geopolitics played its part in denying India critical technologies at some crucial junctures. That ultimately proved counter-productive and, in fact, beneficial when India managed to produce its own cryogenic engine to power the Geo Synchronous Launch Vehicle Mk 2. Indian space programme being oriented to India's socio-economic development right from the beginning helped civilian space cooperation with other space agencies without any commitments. There are some who argue that of late the space programme has become more national security and national prestige-oriented, with its focus mainly on taking on China. However, it is felt that while that might be true to some extent, it has not lost its initial focus of being oriented toward national development and self-reliance. Of late, in addition, the space programme has elevated itself to serve the commercial and entrepreneurial interests of its people as well as the socio-economic needs of its neighbours, and the Global South, using its technological heft. The Indian Space Policy 2023, establishment of NewSpace India Limited, and Indian National Space Promotion and Authorisation Centre, South Asia Satellite (2017), and the proposal for G20 Satellite for climate monitoring are examples of the same. Some argue that India's space programme is increasingly aligning itself with that of the US[65], although unlike the US, it is firmly committed to abide

by the UN-sponsored Space Law for all its undertakings in space. Notwithstanding the whimsical nature of the US leadership is causing concerns to India and the rest of the world. Its impact on bilateral and multilateral agreements, treaties, organidations, trade pacts, and diplomatic relations is becoming difficult to comprehend, let alone act against or protect from it.

On 07 Jan 2026, the White House issued a Presidential Memoranda titled 'Withdrawing the US from International Organisations, Conventions, and Treaties that are Contrary to the Interests of the US', directing "All executive departments and agencies (agencies) to take immediate steps to effectuate the withdrawal of the US from the organisations listed in Section 02 of this memorandum as soon as possible. For the UN entities, withdrawal means ceasing participation in or funding to those entities to the extent permitted by law".[66] With this, the US has withdrawn or relinquished its leadership role and funding from 66 organisations, stating that the President feels it "To be redundant in their scope, mismanaged, unnecessary, wasteful, poorly run, captured by the interests of actors advancing their own agendas contrary to our own, or a threat to our nation's sovereignty, freedoms, and general prosperity".[67] The latest US National Security Strategy, which states that "America's core national security interests shall be our focus"[68], clearly indicates what India should be focused on, with or without the Accords. India is one of the major spacefaring nations that has a unique character to its space programme, and it can be proud of its achievements

in space, despite all the constraints of being a developing nation. India's relations with China and Pakistan precludes it signing up to the ILRS, despite India's close, long, and deep relations with Russia on space issues. Therefore, as a leading spacefaring nation, India needs to be prepared to go for it alone, and with other like-minded nations, through bipartisan project-based cooperation, if the Accords challenges its national character and core national values. It would be tough, but it's worth considering, given the lessons that have been learnt developing India's cryogenic engine. India needs to retain the strategic autonomy of its space programme and ensure that its core national interests are not compromised at any cost, even as a signatory to the Artemis Accords.

Pursue Socio-Economic Development'

The second point is about the commercialisation of space. The Artemis Accords is a set of principles for cooperation in civilian space. It is the entry point to the Artemis program, which is a US space programme to take human back to the Moon and beyond and initiate commercial exploitation of resources obtained from the Moon, in situ, or otherwise, to gain strategic and economic advantage over its rivals and adversaries. The Artemis program relies very heavily on commercial space companies, mainly because of budgetary considerations, since it is only commercial interests of big companies and entrepreneurs that can drive participation in such programmes with high risks and high returns. It has been the US policy to let the commercial players take on the heavy investments as long as they meet

the requirements of the nation, be it national security, civilian, commercial, or scientific exploration. As stated earlier, the Artemis Accords is a bilateral arrangement for participation through contribution in return for access to technology. India's attitude towards space programme would have to reorient itself to such thinking, and large private players would have to be encouraged to take on heavy lifting, supported by government, alone, or in partnership with their counterparts in the US or in other signatory countries. Because of high reliance on commercial players in the Artemis program, Indian space start-ups and companies have immense opportunities to gain exposure to technology and practices while pursuing their commercial interests by participating in it. taking advantage of India's membership of the Accords. Indian space programme stands to gain from this exposure. While commercial interests along with national prestige and national security may drive the national space programme, India's space programme must not lose its basic purpose and characteristics, which is the socio-economic development of the nation and of those who cannot afford their own space programme.

Pursue Inclusive Development

The third point is about India's position with respect to Space Law. India is a signatory of the five treaties, including the Moon Agreement. Space Policy of India 2023 articulates its stand with respect to space resources. Although the Indian space policy by itself does not contradict the Moon Agreement; by signing up for the Artemis Accords, in

principle it supports the invalidation or, at best, a reinterpretation of certain clauses of the Moon Agreement while being a party to it. The Accords ignores the concerns of those who cannot partake the benefits accrued from exploiting the resources of the Moon which according to the world is a common heritage of humankind. Unbridled commercialisation that would be unleashed once the Artemis program commences would in fact widen the already existing developmental and economic gap between the global north and south. As mandated by the UN, any benefits or development accrued from space is meant to provide for inclusive development of whole of humankind, however, neither the Artemis Accords nor the ILRS promises to provide it. India, being one of the leading spacefaring nations, needs to encourage and support the UN effort to articulate a policy on space resource utilisation, as mandated by the Moon Agreement. IT ensures inclusive development and serves the interest of all of humankind, especially the Global South.

Keep Options Open

Lastly, like the Artemis Accords, the ILRS is also an attempt by China and Russia to build consensus and establish international cooperation for their space programme to exploit resources on the Moon to facilitate prolonged presence there and go further to the Mars and beyond. The ILRS, according to the information available, allows any participant country to take part within its capability and capacity, at any level, without any commitments. India and Russia already have a very active cooperation in space. India

could keep its options open to sign up for the ILRS with Russia on mutually beneficial terms and gain from both the programs. India, being one of the leading spacefaring nations in the world today, would be able to contribute actively, while also gaining from exposure to such complex programs. If the US and Russia can continue to cooperate in the ISS programme through all these years even after sanctions being enforced by the US and its allies due to invasion of Ukraine, India and China would also be able to cooperate in the ILRS without compromising their respective national interests. It might not be politically convenient to think in such terms, however, under the prevailing circumstances, for its national interests, it is better to keep the options open to join the ILRS with Russia. As Lord Palmerston, the British Foreign Secretary in 1848, stated, "We have no eternal allies, and we have no perpetual enemies. Our interests are eternal and perpetual and those interests it is our duty to follow".[69]

Conclusion

Governance of activities in space is at an inflection point. The UN-sponsored space governance mechanism, modelled on the global commons governance that was relevant and effective during the Cold War, has become less relevant due to advancements in technology and in the wake of changes in the world order. Governance of use and ownership of space resources is at the centre of geopolitical power struggle between the established power and the rising power. It is but natural that it would be because of the strategic implications of enhanced space capability provided by the advancements in technology. The UN's approach to providing the required legal framework with respect to use and exploitation of space resources has not kept pace with the scientific advancements that are promising to make it economically viable and technologically possible. The extant legal provisions with respect to exploitation of resources on the Moon and asteroids is being challenged with alternative provisions drafted in the interest of those countries who have the capability to undertake such exploration and exploitation to gain strategic and economic advantage through norm setting. In the bargain, the established norms and practices, treaties, agreements, conventions, and understandings are under threat of being overlooked, undermined, and re-interpreted for gaining strategic advantage and commercial gains. National interests and priorities are driving the policy making to support such strategic moves. These draft policies and suggested practices are at variance with the UN-sponsored International Space Law that has hitherto been the legal framework on all activities in space and on celestial bodies. In this context,

India needs to identify its national interests and pursue it without losing its space policy's basic nature and characteristics of socio-economic development, commercial interests, and inclusive development of the Global South without compromising on the strategic autonomy of its space programme. India being a leading spacefaring nation has the capability to partake in joint ventures as an equal partner or go alone. The UN's effort to draft governance mechanisms for space resources need to be strengthened by supporting it to continue the established practice of letting the UN lead all space related making of the rules. India needs to keep its options open especially because of the unpredictive and whimsical nature of geopolitics emanating from the US, which it seems is under pressure from threats to its position as an established power. Space has inadvertently become the final frontier in the geopolitical rivalry between the great powers. Any disruption that might result from confrontation would have very severe implications, not only to those involved but also to the rest of humanity. A UN-sponsored draft policy to regulate and govern use of space resources would be one of the ways to engage all the major spacefaring nations in dialogue to avoid such a confrontation.

Endnotes

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About the Author

Air Marshal R Radhish (Retd) PVSM AVSM VM is a Ph D Scholar with Osmania University, Hyderabad. He is an alumnus of Royal College of Defence Studies, UK, and the Joint Command and Staff College, UK. His academic qualifications include MA with Merit, Defence Studies, King's College London, UK, and M Sc and M Phil, Defence and Strategic Studies, Madras University, Chennai. His research areas include Commercial Space, Space Policies, Space Security, Space Warfare, and Joint Warfare. He has published papers on space related topics in India and the UK.

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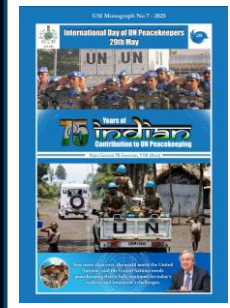

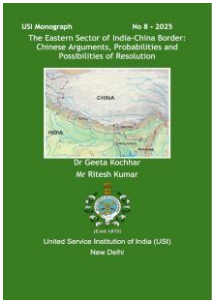

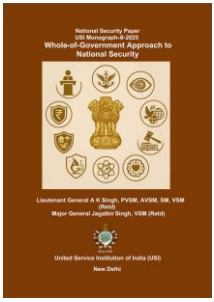

Rao Tula Ram Marg, Opposite Signals Enclave, New Delhi-110057

Tele: 2086 231 Fax: 2086 2315,

E-mail: direditorial@usiofindia.org

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