EDITION 0015

ANASDA
DEFINE OUR FUTURE

DEFINE OUR FUTURE

Charting Space Sector Growth, Artemis Programme Updates, and Analysis of International Law for Space Resources

SPACE INDUSTRY REPORT

MARCH/APRIL 2026

CONTENTS

INTRODUCTION

Watching the first landing of a Falcon-9 first-stage booster back in December 2015, it was perhaps easy to ignore the industry growth which lay ahead. In 2015, 237 objects were launched into space, over 87 launch attempts. Cut to 2025, and the number has grown exponentially: 4522 objects launched into orbit, over 329 launches. There is no doubt which way the industry his heading.

Growth projections also point towards an industry set to observe continued expansion in the years to come. According to space industry consultants Novaspace, in 2025 the space economy was valued at $626.4 billion, and attributes this growth to '...innovation, new business models, assertive government policies and expanding demand for satellite-enabled services.' Novaspace also projects that this value will grow to over $1 trillion by 2034. However, according to previous US financial sector estimates, as well as Taylor Wessing predictions, the space economy is set to reach this target sooner, expanding to $1.1 trillion by 2030. Meanwhile, in December 2025, the World Economic Forum estimated that the global space economy is on track to exceed $1.8 trillion by 2035.

While it is easy to marvel at these projections, it is critical to understand just where the growth is coming from, certainly amid often otherwise times of economic uncertainty. In this brief introductory article, we present some recent industry developments to help gain a broader understanding of the growing pace of the space economy.

Satellite Sector

Nowhere is the scale of that investment more apparent than in the satellite segment. Amazon has announced an $11.6 billion acquisition of Globalstar, a move that significantly accelerates its ambitions in low Earth orbit and direct-to-device (D2D) connectivity. The deal would combine Amazon's Kuiper constellation programme with Globalstar's existing spectrum assets and network infrastructure, positioning Amazon as a serious competitor to SpaceX's Starlink in the emerging D2D market.

China's ambitions in orbital infrastructure are no less significant. A domestic orbital data centre startup has received $8.4 billion in credit lines, underlining Beijing's determination to establish a presence in the space-based computing segment. The figure is remarkable even by the standards of China's broader space investment programme and suggests that the race

for orbital computing infrastructure is developing a distinctly geopolitical character, with both US and Chinese actors committing substantial resources in this area.

The downstream effects of LEO expansion are also being felt in the supply chain. Taiwan's Universal Microwave has reported revenue growth driven directly by LEO satellite demand, a point that illustrates how the growth of constellation programmes is beginning to be felt through the broader electronics and components manufacturing base. As launch cadences increase and constellation deployments accelerate, this kind of supply chain pressure is likely to intensify.

Images: SpaceX (Left), Pexels (Right)

Orbital Infrastructure

Investment into orbital services and in-space infrastructure continues to flow at pace. Starfish Space has raised more than $100 million to advance its satellite servicing capabilities, as the on-orbit servicing market moves steadily from the demonstration phase toward commercial operations. True Anomaly, which develops spacecraft for space domain awareness and orbital operations, has raised $650 million in a new funding round, a figure which reflects both the growing commercial demand for orbital situational awareness and the increasing interest of defence-oriented investors in the sector.

Samsung Foundry has announced advances in space semiconductor chip development, a development which speaks to the growing demand for radiation-hardened, high-performance computing hardware capable of operating in the orbital environment. As AI and data processing capabilities are increasingly deployed in space, from NVIDIA's orbital computing platform to the AI systems being integrated into lunar rovers, the demand for capable space-grade semiconductors is set to grow considerably.

European in-space logistics is also advancing, with ATMOS Space Cargo raising €25.7 million to begin space return operations. The company's focus on the reentry solutions addresses what has historically been an underserved part of the in-space economy, and reflects the development of the broader in-space services market as it moves beyond launch and deployment toward a more complete operational cycle.

Launch Activities

The launch segment continues to attract significant capital. Rocket Lab has secured a $1.1 billion war chest for strategic expansion, a substantial raise that gives the company a means to develop its Neutron medium-lift vehicle and broaden its service offering beyond small satellite launch. Blue Origin, meanwhile, has filed documents to begin construction of a second launch pad at Cape Canaveral, a concrete signal of its intent to increase launch cadence and compete more directly with SpaceX for commercial and government contracts.

In China, commercial launch startup i-Space is reportedly aiming to raise $970 million, further evidence of Chinese commercial space expansion. China's commercial space industry recorded revenues of $146.75 billion in 2025, a figure which underscores the scale and pace of growth in what was, not long ago, a predominantly state-dominated sector. The combination of aggressive private investment, state backing and rapidly increasing launch cadence (China targeted 140 orbital launches in 2026) positions the country's commercial space industry as a structural force in the global market.

Defence Sector

The militarisation of space continues to attract growing budgetary commitment. The US Space Force is reported to be poised for an 80 percent funding boost in the 2027 budget, building on the more-than-doubling proposed in last month's defence plan.

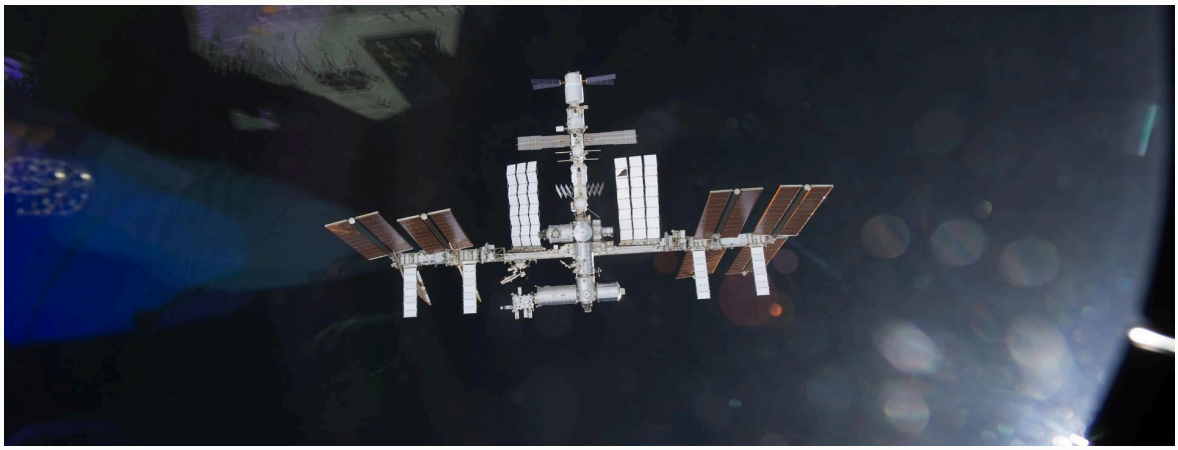
The scale and consistency of these proposed increases reflect a strategic consensus within the US defence establishment that space is a critical domain requiring urgent investment, particularly in light of the operationalisation of Russian co-orbital anti-satellite weapons reported last month. The trajectory of Space Force funding also has significant implications for the commercial space sector, as a substantial portion of that investment flows through contracts with private companies for launch, satellite services and domain awareness capabilities.

Global Partnerships

Alongside the competition dynamics, this month also provides evidence that the cooperative nature of the space sector remains alive, even as it is tested by geopolitical pressures. Paraguay has become the 67th signatory of the Artemis Accords, reflecting the continued expansion of the US-led framework for civil space cooperation. The steady growth in Artemis Accords signatories across Latin America and Africa is a noteworthy trend, suggesting that the Accords are successfully extending beyond the traditional spacefaring nations to build a broader coalition around norms for responsible space behaviour.

BRICS countries have also advanced cooperation discussions in the space industry, a development worth monitoring given the grouping's growing space ambitions of members, including China, India and Brazil. Furthermore, the UAE's Sheikh Mohamed has held discussions with Elon Musk on AI, technology and space cooperation, further reflecting the Gulf state's active engagement with the commercial space sector as part of its broader technology diversification strategy.

Perhaps the most scientifically significant international development, however, is the joint China-Europe space mission that is reported to be on course to collect data of a kind never previously gathered. At a moment when US-China space relations are defined largely by competition and the EU Space Act debate has introduced new friction into transatlantic space relations, the continued operation of scientific cooperation channels between Europe and China represents an important counterpoint, and a reminder that the space domain, at its best, retains its capacity to function as a setting for genuine collaboration.



Images: NASA - ISS remains a bastion of coopertaion.

NEWS ANALYSIS

April New Glenn launch (Image: Blue Origin)

Launch: Blue Origin Anomaly, Firefly Sea Launches, European Debuts

The commercial launch sector, for the last decade at least, has been increasingly dominated by SpaceX's Falcon-9. The partially reusable launch vehicle carried out 165 launches in 2025 alone. The vehicle has been largely responsible for democratising access to space through reducing launch costs, and placing more payload into space than any other. However, through geopolitical crises and shifting international relations, States are increasingly looking diversify launch contracts and reduce reliance on single supply chains.

In light of this, Blue Origin's New Glenn has been highly anticipated, as it is somewhat similar to the SpaceX workhorse. It also has a fully reusable first stage, designed to be landed, refitted and relaunched, and also provides an increased launch capacity of 45 tons to low Earth orbit (LEO), compared to 22 tons capacity of Falcon-9. In its second flight, in November 2025, it achieved a remarkable success, in launching NASA's Mars ESCAPADE mission (Escape and Plasma Acceleration and Dynamics Explorers - the mission hopes to understand how Mars lost its once-thick atmosphere), but also successfully landed the booster on the Jacklyn landing platform located several hundred miles downrange in the Atlantic.

The quick flight validation lines New Glenn up to become a serious competitor on the market, and its third launch followed in April. The company successfully relaunched a previously used first-stage and carried out another successful landing. However, it wasn't able to deliver the payload, a direct-to-cellphone communications satellite for AST SpaceMobile, into the correct orbit. Though this might be seen as a setback, Blue has announced a highly ambitious strategy of increasing production of the rocket from 12 to 60 per year by the end of 2028, and then to 100 by 2029.

Following the successful launch its Alpha Flight 7, Firefly Aerospace have announced that Lockheed Martin will support its effort to establish sea-based launches for Alpha. They will work with Seagate Space to provide '...rapid, flexible access to space from diverse locations...', according to Jonathan Caldwell, the vice president and general manager of Lockheed Martin's Strategic and Missile Defense Systems. Caldwell added 'With more than 70 percent of the Earth covered by water, that greatly increases our mission flexibility by taking advantage of the platform's mobility to generate multi-azimuth launch geometries driven today by limited availability for air-launched target delivery and unconstrained by typical land-based launch locations.'

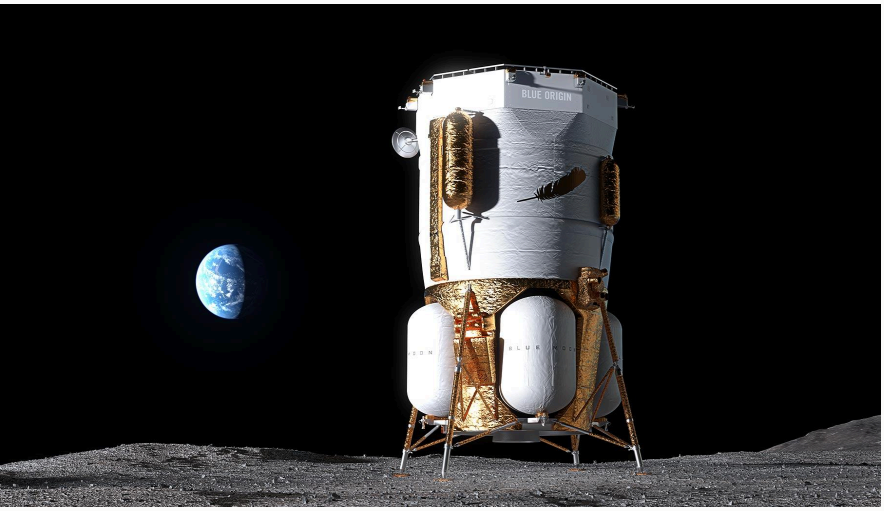
Despite recent setbacks, including the bankruptcy of Orbex Space (UK), Europe is ploughing ahead with its aims to establish sovereign launch capabilities, in light of commercial and governmental demand, particularly in relation to increasing space defence rollouts. PLD Space (Spain) has announced it has raised €30 million, toward the development of its MIURA-5 rocket. According to the company, '...MIURA 5 launch vehicle is a two-stage reusable launcher', which is dedicated to small payloads, and will eventually offer up to 30 launches per year. PLD has also previously announced details of a family of MIURA rockets, which includes MIURA Next (2030 launch), which will carry over 13 tons to LEO, MIURA Next Heavy (2031/2032 launch target) capable of lifting 36 tons to LEO, and MIURA Next Super Heavy (2033 launch target) aiming to carry 53 tons into orbit. The company carried out its first successful suborbital launch in 2023, and is aiming to carry out the debut launch of MIURA-5 in 2026.

Rocket Factor Augsburg (RFA - Germany) has given a date for its debut launch, which will take place from the SaxaVord launch site in Scotland. The RFA ONE is due to launch no sooner than July this year. This will not only mark their debut launch, but the first launch to take place from British soil. The UK has held ambitious plans to establish itself as a European launch hub, but has faced several setbacks. The debut launch of Virgin Orbit from Cornwall ended in failure, followed by the company declaring bankruptcy. Furthermore, the fate of several planned UK launch sites seems unclear, following the bankruptcy of Orbex, which was due to provide launches from the Sutherland launch site, also in Scotland. Nonetheless, RFA will be aiming to be the first company to successfully launch satellites into space from the UK, while Skyrora (UK) became the first company to receive a launch license in August last year.

The Moon: Artemis and Inftrastructure

Despite its launch anomaly, Blue Origin has provided many details about its lunar exploration development in recent months. The company is awaiting critical testing of its Blue Moon lunar lander, which is scheduled to launch in 2026, while it is also aiming to develop a human landing system (HLS) variant for the Artemis programme. Furthermore, it is also developing several initiatives for lunar infrastructure development, such as Blue Alchemist, which is to utilise lunar soil to produce different usable materials, such as metals and silicon.

The company has also announced details of its Air Pioneer technology, designed to extract treatable oxygen from lunar regolith. As with Blue Alchemist, this would melt the regolith and also use electrolysis to extract the molecular components, which are then filtered to create breathable and rocket-grade oxygen. Blue will likely continue to play a central role within the Artemis programme, not only through providing argo and crewed landings, but also through infrastructure projects such as these.



(Image: Blue Origin)

> Blue Origin will play a central role in the Artemis Project, through cargo landings and infrastructure projects.
>
> **ANASDA**

iSpace (Japan) has also provided an updated lunar landing schedule, adding to a growing mission cadence. In March, the company announced details of its ULTRA lander, '...its newest lunar lander model integrating the APEX 1.0 lander and the Series 3 lander, each of which had been in development in parallel at the company's Japanese and U.S. entities', and will be used in each of their upcoming missions, including the iSpace US mission in 2030. The mission is contracted under NASA's Commercial Lunar Payload Services (CLPS) programme, and considering the recent announcement from NASA to increase cargo missions from 2027 (potentially two per month), iSpace and its competitors may be reassured about its near and long-term prospects.

Artemis and Lunar Resources

The Artemis programme has undergone some significant changes in recent months, not least due to the Trump Presidential Executive Order in December 2025, calling for US superiority in space, and to '...establishing initial elements of a permanent lunar outpost by 2030 to ensure a sustained American presence in space and enable the next steps in Mars exploration.' Furthermore, in March, at its 'Ignition' event, NASA announced a series of changes. After Artemis V (planned 2028), NASA will pivot to '...commercially procured and reusable hardware to undertake frequent and affordable crewed missions to the lunar surface, initially targeting landings every six months, with the potential to increase cadence as capabilities mature.' Furthermore, NASA has published its **'Moon Base: Igniting Progress',** which lays out the three-phase plan to establish a lunar base.

Additionally, in April, NASA announced that it had rolled out the core stage of the Space Launch System (SLS), for the Artemis-III mission, scheduled for next year. According to NASA, Artemis-III will '...launch astronauts to Earth's orbit aboard the Orion spacecraft on top of SLS to test rendezvous and docking capabilities between Orion and commercial spacecraft needed to land Artemis IV astronauts on the Moon in 2028.' The test will involve demonstrating these capabilities with either the Blue Origin or SpaceX HLS, or both.

Furthermore, regarding lunar infrastructure development, Lunar Outpost (US) have raised an additional $30 million toward the development of robotic rovers, as the company revealed details regarding its new 'Pegasus' rover. This vehicle is to be a precursor to its crewed Lunar Terrain Vehicle (LTV), and aims to launch in 2027. The vehicle is to play a role as a scout, while also supporting infrastructure projects. Also, Astroport Space Technologies has announced a partnership with Vermeer Corporation to develop autonomous construction technology, under a project named 'Lunar Iron'. According to the Astroport founder, the partnership with Vermeer is delivering the technology '...necessary to dig foundations, build roads and landing pads, and provide the hardened infrastructure required for critical assets such as safe nuclear power deployment and habitation on the Moon.'

Also, the Danish Technological Institute (DTI), in cooperation with ESA, is developing an in-situ resource utilisation (ISRU) technology that uses lunar regolith to produce '...inks and powders needed to print electronic components directly on the Moon.' (ESA) The system envisages using the residue left behind after extracting oxygen from the regolith. More companies and organisations are seeking to utilise local materials on the Moon, and this year we expect to, for example, China's Chang'e-7 mission launch to the Moon to begin scouting for surface minerals.

Lockheed Martin has also announced that it will deliver its Neutron Spectrometer System (NSS), designed to '...detect water ice on planetary bodies, measuring cosmic ray interactions with hydrates in lunar or planetary regolith.' This is due to be launched with the Lunar Polar Exploration mission (LUPEX), being carried out in partnership between the Japanese space agency (JAXA) and the Indian Space Research Organization (ISRO). The mission is due to launch in 2028.

This year will hopefully also see US helium-3 mining company, Interlune, launch its own spectrometer to the Moon, being delivered as part of the Astrobotic commercial lunar mission in July. This will be used to prospect for quantities of helium-3 within the lunar soil, ahead of later planned missions to extract and retrieve the isotope. Interlune has also been awarded a $6.9m Small Business Innovation Research (SBIR) Phase III contract from NASA, which aims to '...develop a payload suite that will capture on-site measurements of gases in lunar regolith and demonstrate technologies for resource extraction, including helium-3 and hydrogen' (Interlune). The mission is due to launch in 2028, and is one of several initiatives aimed at scouting for lunar helium-3. Also in April, Lunar Helium-3 Mining (US) secured its 11th patent, enabling the development of its own helium-3 mining technology, and aims to serve the fusion energy and rapidly growing quantum cooling demands.

Much has been said both in favour and against the idea of lunar helium-3 mining, regarding its feasibility, cost-efficiency, as well as the legal and governance considerations in a domain that is defined as a 'province of humankind'. Nonetheless, recent developments, and specifically the Interlune-NASA contract, might indicate that real attempts to calculate the possibility of extracting the isotope are actually developing.

SPACE LAW REVIEW

SPACE LAW & POLICY

SUSTAINABLE & PEACEFUL USES OF OUTER SPACE

Discussing the challenges, threats and opportunities to international space law and governance, arising out of evolving international relations, geopolitical dynamics and more.

(Image: NASA)

Key terms: COPUOS; LSC; Outer Space Treaty; Moon Agreement; UNOOSA; ISRU; Space Resources; ATLAC; WGSR; US Commercial Space Launch Competitiveness Act; Act on the Promotion of Business Activities for Exploring and Developing Space Resources.

How will Governance Developments Align with Established National and International Law Frameworks on Space Resources? - Pt 1

The Director of the United Nations Office for Outer Space Affairs (UNOOSA), while speaking at the 2026 Legal Subcommittee (LSC) meeting of the Committee on the Peaceful Uses of Outer Space (COPUOS), stated that as the international community approaches the 70th anniversary of the Outer Space Treaty (OST),[1] it is critical to advance work in key areas, including the peaceful and sustainable use of space resources and enhanced information-sharing under Article XI of the treaty.[2] Indeed, in the wake of the successful Artemis-II mission, and the advent of commercial entities looking to soon provide technology solutions to effectively utilise the resources of the Moon (and beyond), governing the use of space resources is prime on the global legal agenda.

Firstly, resources will be critical in supporting and sustaining off-world operations. For example, lunar water can provide oxygen, rocket fuel, and consumable water for sustaining life, and technology is being explored to achieve this, such as by Takasago Thermal Engineering.[3] Furthermore, minerals contained within lunar soil also provide resources for in-situ resource utilisation (ISRU), such as through Blue Origin's 'Blue Alchemist' project, which aims to use a system of 'molten regolith electrolysis' to produce silicon for solar cells, breathable oxygen, propellant, metals and construction materials.[4] The upcoming Chinese Chang'e 7 mission this year will also search for water at the lunar south pole,[5] while Chang'e 8, launching in 2029 to conduct ISRU operations, and provide initial groundwork for the future International Lunar Research Station (ILRS).[6]

There is then an increasing amount of value being placed on these finite resources, especially considering the geopolitical conflicts which could arise over determining ownership rights and appropriation of resource-rich areas on the Moon. This may also apply to potentially exportable resources, such as rare-earth metals and the isotope helium-3.[7]

This research paper will aim to analyse the developments regarding domestic and international law, in order to understand what efforts are being made to establish a common rulebook for resource activities. To achieve this, the research will analyse the recent developments at the LSC, particularly those of the Working Group on Legal Aspects of Space Resource Activities (WGSR), and its mandate to '...a set of initial recommended principles for such activities',[8] as well as the work of the Action Team on Lunar Activities Consultation (ATLAC), as it strives to establish an international consultative mechanism on lunar activities.[9] Moreover, it will also strive to understand how these developments and potential frameworks might align or create fragmentation among States, especially considering the increasingly popular US-led Artemis Accords (the 'Accords'),[10] the competing Chinese-led ILRS project, and the application of national legislation.

COPUOS, ATLAC and the Working Groups

It is probably most apt to first discuss the ongoing work of the COPUOS LSC, in particular the recent developments regarding the Working Groups and ATLAC, they being pivotal in the construction of any future international governance regime on outer space resources.

In 2021, COPUOS agreed to establish the WGSR, yet prior to its establishment, in 2019, the Hague International Space Resources Governance Working Group released its 'Building Blocks for the Development of an International Framework on Space Resource Activities ('Building Blocks')', and were introduced to COPUOS in 2020.[11] The Building Blocks are based upon the

principle of 'adaptive governance', believing that '...space resource activities should be incrementally addressed at the appropriate time on the basis of contemporary technology and practices.'[12] They '...consist of recommended practices and guidelines regarding space resource activities', and were '...intended to become the basis for future negotiations regarding an international legal framework for space resource activities...',[13] covering areas including, but not limited to, preventing disputes, ensuring peaceful uses of outer space, proposing international consultations, assigning State responsibility for non-governmental actors, and establishing resource ownership rights.[14]

In addition to the 2020 submission of the Building Blocks to COPUOS, the Outer Space Institute (OSI) submitted a letter to COPUOS, outlining their concerns surround the '... uncertainty about the legality of these activities under the current international legal framework', which has '...led several States to adopt national laws and engage in bilateral negotiations in an effort to satisfy the need for legal certainty.'[15] It further highlights concerns regarding commercial recovery and use of resources, and also notes that through interpretation of the Outer Space Treaty (OST), outer space is considered an 'area beyond national jurisdiction', or *res communis*.[16] Article I of the OST states that '...outer space, including the moon and other celestial bodies...shall be the province of all mankind', while Article II prohibits '... national appropriation by claim of sovereignty, by means of use or occupation, or by any other means.' As Zwart et al describe, the letter from the OSI, as well as '...other statements on behalf of national delegations...', led to the formation of the WGSR.

In 2021, the WGSR was mandated at COPUOS to develop '...a set of initial recommended principles for such activities, taking into account the need to ensure that they are carried out in accordance with international law',[17] and further, in 2022, the WGSR agreed on a five-year workplan, beginning with '...information-collection and stocktaking tasks, including on the basis of submissions by States members of the Committee and organizations having permanent observer status with the Committee.' Throughout the process, submissions and contributions have been summarised and disseminated by the Chair and Vice chair, and in 2026, work includes '...the final review and refinement of a summary of discussions on the existing legal framework for activities in the exploration, exploitation and utilization of space resources.'[18] By 2027, the WGSR will deliver '...a set of initial recommended principles for such activities for the consideration of and consensus agreement by the Committee, followed by possible adoption by the General Assembly as a dedicated resolution or other action...'[19]

Within the Consolidated Report, however, there is sevidence of a fragmented approach to the development of a final set of Principles. It is relevant to observe that the Report notes that 'Differences of approach are visible with respect to the degree of international structuring...',[20] and 'Some submissions favour an adaptive, incremental set of non-binding

principles intended to guide compatible domestic approaches and emerging practice, while others emphasise stronger multilateral framing, including drawing on concepts associated with the Moon Agreement and the development of international governance arrangements.'[21]

Also at the 2026 LSC, developments regarding the ATLAC process were presented. The process of establishing the ATLAC was agreed upon at the COPUOS 2024 meeting, mandating it at '...improving consultations related to lunar activities, considering different options, including, for instance, whether to recommend the establishment of an international mechanism.'[22] The types of activities which will fall under the scope of such a mechanism are to be discussed, and ATLAC is to deliver its final report '...with recommendations for consideration by the Committee', for the 70th meeting of COPUOS in 2027, or in 2028 as appropriate.[23] It is to be seen how these frameworks and mechanisms might work and harmonise with other multilateral and bilateral agreements, national legislation, and other bodies of international law.

The Dawn of National Space Resource Legislation

The US has taken the legal position that resource utilisation, on the Moon and other celestial bodies, is not prohibited within the OST, and this is restated within the Artemis Accords framework. Section 10(2) of the Accords calls for adherence with the OST, and states that '... the extraction of space resources does not inherently constitute national appropriation under Article II of the Outer Space Treaty...'[24] The US representative at the 2026 LSC, Caitlin Poling, also commented under Agenda Item 9 that the removal of resources '...is permitted by Article I of the Treaty, which provides that outer space, including the Moon and other celestial bodies, shall be free for exploration and use by all States.'[25] Here is perhaps a starting point to analyse the proposals from the WGSR and ATLAC, and discuss where alignment might be found.

Prior to establishing the Accords, in 2015, the US introduced its US Commercial Space Launch Competitiveness Act 2015 (CSLCA),[26] which provides clear provisions on space resources. Title IV of the CSLCA states that:

> "A U.S. citizen engaged in commercial recovery of an asteroid resource or a space resource shall be entitled to any asteroid resource or space resource obtained, including to possess, own, transport, use, and sell it according to applicable law, including U.S. international obligations."[27]

First, this position on resource ownership aligns with the aforementioned position as stated within the Accords, and bases its compliance with international law on the provisions given in Articles I and II of the OST. Article I provides that outer space is '...free for exploration and

use by all States without discrimination of any kind…', and that it '…shall be the province of all mankind.'[28] As posited by Poling, 'use' is interpreted as freedom to exploit resources, while Article II, which prohibits '…national appropriation by claim of sovereignty, by means of use or occupation, or by any other means',[29] would not regard space resources, as restated in the Accords.

Arguments have been put forward as to what limitations are placed on the concept of 'use', whether this includes resources, and also whether there is a limitation or differentiation on commercial use, as opposed to States. In regard to the former, von der Dunk presents the argument that 'Reading the "province of all mankind" provision as a ban on commercial use as long as not subject to any international regime effectively equates it to the "common heritage of mankind" concept,' which is established within the 1979 Moon Agreement (the 'Agreement').[30] Article 11(1) of that Agreement states that 'The moon and its natural resources are the common heritage of mankind…',[31] and furthermore, paragraph 5 calls for the establishment of '…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.'[32]

von der Dunk therefore argues that there is a clear difference, with the 'common heritage' principle of the Moon Agreement requiring an international regime, whereas the OST does not. This is a critical observation, as the US, and no other major space power, has ratified the Moon Agreement,[33] whereas there are 118 Parties to the OST.[34] The US position would then find grounding in principles of the OST, and allow for resource activities under Articles I and II.

There is then some opinion as to whether the principles of non-appropriation apply to private entities. Lewis asks if the principles of Article II should apply to non-state actors, and concludes that they should not, arguing that '…the rules of state responsibility for non-state actors do not apply to mining rights of celestial bodies…', and that '…no existing treaty binds the U.S. to limit the extraterrestrial activities of non-state actors.'[35] Lewis also adds that '…in the absence of any legal prohibition, no appeal to policy or custom provide sufficient reasons to expand international law and limit the outer space activities of non-state actors.' While Article II itself may not explicitly mention non-governmental entities, there is a strong counterargument against this position. Article VI of the OST requires that States '…bear international responsibility for national activities in outer space…whether such activities are carried on by governmental agencies or by non-governmental entities…'[36] Importantly, Article VI continues, requiring States to ensure '…that national activities are carried out in conformity with the provisions set forth in the present Treaty', and that '…activities of non-governmental

entities in outer space, including the moon and other celestial bodies, shall require authorization and continuing supervision by the appropriate State Party to the Treaty.'

There is then a clear provision for licensing and supervision of activities of all actors, and furthermore, it seems reasonable to interpret that non-governmental actors, under the supervision of their respective national governments, fall within the full scope of the OST. As Kelly rightly observes, '...it would be illogical to believe that a State could authorize a private actor to act when the State itself is denied the same action.'[37]

According to Freeland, '...in light of the promulgation of the CSLCA into law, other countries have begun to follow this example in their own national law.' Indeed, in 2017, Luxembourg introduced its own legislation on the 'Exploration and Use of Space Resources'.[38] The legislation introduces a licensing regime for space resource activities, requiring that 'No person can explore or use space resources without holding a written mission authorisation from the minister or ministers in charge of the economy and space activities',[39] but perhaps most importantly, Article 1 states, unambiguously, that 'Space resources are capable of being owned.'[40] The law also explicitly refers to commercial actors, similar to the CSLCA, stating that 'The authorisation shall be granted to an operator for a mission of exploration and use of space resources for commercial purposes upon written application to the ministers.'[41] iSpace-Europe has utilised this legislation, being based in Luxembourg, and secured its first license to operate its TENACIOUS lunar rover, when it was tasked with '...the collection and transfer of ownership of lunar regolith for ispace-EUROPE to execute a 2020 regolith contract signed with NASA.'[42] Although the mission ended with a hard landing, it marked the first of its kind to enable commercial space resource activities, and '...the first authorization granted in Europe to enable the commercial utilization of space resources.'[43]

Similarly, the United Arab Emirates introduced its own legislation in 2023 'Concerning the Regulation of the Space Sector'.[44] Firstly, the law provides a definition of 'space resources' as 'Any non-living resources present in Outer Space, including minerals and water.'[45] It furthermore includes a provision akin to a licensing and supervision requirement, stating that 'The conditions and controls relating to Permits for the exploration, exploitation and use of Space Resources, including their acquisition, purchase, sale, trade, transportation, storage and any Space Activities aimed at providing logistical services in this regard shall be determined by a resolution issued by the Cabinet or whomever it delegates.'[46] Additionally, Japan enacted its 'Act on the Promotion of Business Activities for Exploring and Developing Space Resources' in 2021,[47] which provides a more thorough regime for resource activities. Actors must submit a 'business activity plan', prescribed by Cabinet Office Order.[48] The plan must specify 'the purpose of the business activities for exploring and developing space resources that are to be conducted using a satellite related to the relevant application for a license for exploring and developing space resources', the duration of activities, the location

of resource activities, and the methods of exploration. Furthermore, the Prime Minister must only authorise the plan if it complies with the Basic Space Act,[49] and must provide public notice of such activities. Also, Article 5 enables ownership of resources, stating that 'A person that conducts business activities related to exploring and developing space resources acquires the ownership of space resources that have been mined…',[50] and quite interestingly, Article 7 requests that 'The national government is to endeavor to establish internationally harmonized systems for exploring and developing space resources in collaboration with foreign governments by cooperating with international organizations and other international frameworks.'[51]

Conclusion: Compatibility with New UN-Level Approaches, Amid Growing Geopolitical Tensions?

It is reasonable to argue that such national and multilateral regimes are based on the principles of the OST, and specifically adhere to Article VI, which requires that private actors '…shall require authorization and continuing supervision by the appropriate State Party to the Treaty',[52] and therefore meet their obligations under international law. However, as Tronchetti writes, '…one can argue that at the time the fundamental rules governing space activities were elaborated the primary concern of their drafters was to clarify the legal nature of celestial bodies, rather than that of their resources.'[53] Space and lunar resources will now play a critical role in offworld development through ISRU, with missions launching in 2026 to validate the technology (such as the Chang'e-7 mission mentioned previously). This may then require a lex specialis, or a specific international rules-based regime, in order to maintain safety, trust, sustainability and deconfliction of resource activities. As seen within a US house debate in 2023, a geopolitical race maybe be unfolding, as Greg Autry described, 'Any delay in America's development of space resources, no matter how well intended, will leave the field to that rapacious regime', referring to China.[54] Furthermore, Michelle Hanlon, executive director of the University of Mississippi's Center for Air and Space Law, described that winning this 'race' required only getting there first, and argued that interpretations of 'due regard' within Article IX of the OST would allow US actors to use safety zones that would reserve the mineral resources within it.

The US is also advancing its Space Resources Institute Act, which requests NASA to report '… on the merits of, and options for, establishing an institute relating to space resources.'[55] As described by Congresswoman Foushee, the Act aims to ensure '…that the United States – not China – sets the terms in this critical domain.'[56] Therefore, deliberations at the COPUOS LSC will be focused and looking forward to the completion of the mandates of ATLAC and the WGSR, with an eye on providing a stabilising outcome, in light of these geopolitical tensions. Nevertheless, the Consolidated Report does outline some ongoing fragmentation on

approaches to resource governance, while national frameworks indicate more unilateral ways of governance.

Yet as we head toward 2027, the 70th anniversary of the OST, and UNISPACE IV, it could be hoped that at least a new foundation can be found; one which builds at least on the requirements of safety, sustainability, and deconfliction.

Joseph Holden | Senior Strategist
4 May 2026

References

1. Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies (adopted 27 January 1967, entered into force 10 October 1967) 610 UNTS 205.
2. Nana Appiah Acquaye, 'UNOOSA calls for strengthened legal frameworks as space activities accelerate' Tech Review Africa (16 April 2026) <https://techreviewafrica.com/news/4997/unoosa-calls-for-strengthened-legal-frameworks-as-space-activities-accelerate> accessed 23 April 2026.
3. iSpace, 'ispace and Takasago Thermal Engineering Co., Ltd. Agree to Explore Thermal Mining Technology for Water Extraction on the Moon' iSpace News (9 May 2025) <https://ispace-inc.com/news-en/?p=7354> accessed 23 April 2026. According to its director, the company '...has been developing technologies for "lunar water electrolysis that generates hydrogen and oxygen in the lunar environment" and "technology for extracting water resources on the moon–thermal mining" with the goal of establishing the foundation for scientific and industrial activities that integrate Earth and the Moon.'
4. Blue Origin, 'Blue Alchemist Hits Major Milestone Toward Permanent and Sustainable Lunar Infrastructure' Blue Origin (10 September 2025) <https://www.blueorigin.com/news/blue-alchemist-hits-major-milestone-toward-permanent-sustainable-lunar-infrastructure> accessed 23 April 2026.
5. The Planetary Society, 'Chang'e-7: China's water-hunting lunar south pole mission' The Planetary Society (2026) <https://www.planetary.org/space-missions/change-7> accessed 23 April 2026.
6. Xinhua, 'China to launch Chang'e-8 lunar mission around 2029, collaborating with int'l partners' Xinhua (25 April 2025) <https://www.cnsa.gov.cn/english/n6465652/n6465653/c10670293/content.html#:~:text=These%20efforts%20will%20lay%20the%20groundwork%20for,*%20An%20exploration%20rover%20made%20by%20T%C3%BCrkiye> accessed 23 April 2026.
7. Fabio Tronchetti, 'Legal aspects of space resource utilization', in Frans Von Der Dunk and Fabio Tronchetti (eds), Handbook of Space Law (Paperback edition, 2017), 771-772. Regarding the latter, Tronchetti writes that, due to '...its potential to substitute fossil fuels...', helium-3 could often be referred to as '...the first likely object of governmental and private interest...', though 'significant technological advancements are still required to enable large-scale usage of helium-3 as a source of energy.'
8. Report of the Committee on the Peaceful Uses of Outer Space (2021) UN Doc A/76/20, 53.
9. Report of the Committee on the Peaceful Uses of Outer Space (2024) UN Doc A/79/20, 59.
10. Artemis Accords (adopted 15 October 2020) <https://www.nasa.gov/wp-content/uploads/2022/11/Artemis-Accords-signed-13Oct2020.pdf?emrc=682cd75d63c36> accessed 23 April 2026.
11. Building blocks for the development of an international framework on space resource activities: Working paper submitted by Luxembourg and the Netherlands (2020) UN Doc A/AC.105/C.2/L.315.
12. ibid, 1.
13. Melissa de Zwart, Stacey Henderson and Michelle Neumann, 'Conceptualising sustainability in outer space resource utilisation' (2024) 32 Griffith Law Rev. 481.
14. Building Blocks (n 10).

15. Letter dated 2020/08/20 from the Outer Space Institute to Tijjani Muhammad-Bande President, United Nations General Assembly, André Rypl, Chair, UNCOPUOS, Andrzej Mistzal, Chair, LSC, UNCOPUOS and Natália Archinard, Chair, STSC, UNCOPUOS (August 2020) <https://outerspaceinstitute.ca/osisite/wp-content/uploads/InternationalOpenLetterOnSpaceMining.pdf> accessed 24 April 2026.
16. Martin Svec, 'Outer Space, an Area Recognised as Res Communis Omnium: Limits of National Space Mining Law' (2022) 60 Acta Astronaut 101473. Svec describes res communis as areas '...not susceptible to occupation and sovereignty.'
17. COPUOS Report 2021 (n 8), 53.
18. Consolidated summary by the Chair and Vice-Chair of the Working Group on Legal Aspects of Space Resource Activities of views and contributions received on the mandate and purpose of the Working Group (2026) UN Doc A/AC.105/C.2/L.347/Add.7, 2.
19. ibid, 16.
20. ibid, 6.
21. ibid.
22. COPUOS Report 2024 (n 9), 59.
23. Draft mandate, terms of reference and methods of work for an Action Team on Lunar Activities Consultation (ATLAC) (2024) UN Doc A/AC.105/2024/CRP.12/Rev.2.
24. Artemis Accords (n 10), s 10(2).
25. 9 Agenda Item 9 Potential Legal Models for Activities in Exploration, Exploitation and Utilization of Space Resources: Statement by Caitlin Poling, US Representative to the Legal Subcommittee on of the UN Committee on the Peaceful Uses of Outer Space (April 2026) <https://www.unoosa.org/documents/pdf/copuos/lsc/2026/Statements/Friday17AM/9_USA_rev.pdf (2)> accessed 24 April 2026.
26. US Commercial Space Launch Competitiveness Act 2015 (US)
27. ibid, title IV
28. OST (n 1), art I.
29. ibid, art II.
30. Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (adopted 5 December 1979, entered into force 11 July 1984) 1363 UNTS 3.
31. ibid, art 11(1).
32. ibid, art 11(5).
33. United Nations Treaty Collection, (treaties.un.org, 28 April 2026) <https://treaties.un.org/pages/ViewDetails.aspx?src=IND&mtdsg_no=XXIV-2&chapter=24&clang=_en#3> accessed 28 April 2026. The Moon Agreement has just 17 Parties as of April, 2026
34. United Nations Treaty Collection, (treaties.un.org, 28 April 2026) <https://treaties.un.org/pages/showdetails.aspx?objid=0800000280128cbd> accessed 28 April 2026

35. Alexander Lewis, ‘A Bundle of Stcicks in Zero G: Non-State Actor Mining Rights for Celestial Bodies’ (2019) 25(2) Southwest. J. Int. Law 393, 395.
36. OST (n 1), art VI.
37. Robert Kelly, 'Nemitz v. United States, a Case of First Impression: Appropriation, Private Property Rights and Space Law before the Federal Courts of the United Sates’ (2004) 30 J Space L 297, 308.
38. Luxembourg Space Act 2017 (LXM)
39. ibid, art 2
40. ibid, art 1
41. ibid, art 3
42. iSpace News, ‘ispace-EUROPE Secures First-Ever Mission Authorization Under Luxembourg’s Space Resources Law’ (8 January 2025) <https://ispace-inc.com/news-en/?p=6660> accessed 30 April 2026.
43. ibid.
44. Federal Decree by Law No. (46) of 2023: Concerning the Regulation of the Space Sector (UAE)
45. ibid
46. ibid, art 8(1)
47. Act on the Promotion of Business Activities for Exploring and Developing Space Resources 2021 (JP)
48. ibid, art 3(1)
49. Basic Space Act 2008 (JP). The Act includes provisions on peaceful uses of outer space, space development for improving citizens’ lives, strengthening technical competence, international cooperation, and environmental protection considerations.
50. Space Resources Act (JP) (n 47), art 5
51. ibid, art 7
52. OST (n 1), art VI.
53. Tronchetti (n 7), 777.
54. Jeff Foust, ‘House committee debates space mining’ (12 December 2023) <https://spacenews.com/house-committee-debates-space-mining/> accessed 30 April 2026.
55. Space Resources Institute Bill 2023 (US)
56. Congresswoman Valerie Foushee, ‘Ranking Member Foushee, Rep. Webster Introduce Bipartisan Legislation to Establish Space Resources Research Initiative’ (2025) <https://foushee.house.gov/media/press-releases/ranking-member-foushee-rep-webster-introduce-bipartisan-legislation-to-establish-space-resources-research-initiative> accessed 13 May 2026.

ANASDA GmbH Monthly Space Report March/April 2026

www.anasda.de
@anasda_gmbh
@ANASDA
info@anasda.de

Anasda GmbH
Herzog-Carl-Str. 2
73760 Ostfildern
Germany

Research & Analysis - Joseph Holden
Project Supervisor - Ching-Te Yen

Cover image: NASA

Adobe Stock image license owner Joseph Holden

ISSN 3052-217X