National Space Society
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Information and Views for Consideration by the United Nations Committee on the Peaceful Uses of Outer Space Working Group on Legal Aspects of Space Resource Activities.

I. Introduction

With the signing of the Outer Space Treaty in 1967 and America's first lunar landing two years later, humanity entered a new age of discovery, wonder, and possibility. For the first time in our history, humanity set its sights on exploring the unknown with a set of guiding principles written with the input & assent of the entire global community.

Nearly 60 years later, that commitment to exploring our universe as one species, with respect & due regard for each other and our shared universal heritage, has remained a commanding force in international law. Key themes of the Outer Space treaty: access to space and the knowledge borne of the endeavor, the imperative to explore in peace and without aims of national conquest, and the duty to render aid — have been informed by the best and hardest lessons of terrestrial diplomacy, history, & the daily human experience. These principles represent the best hope for humanity's continued survival, and for the National Space Society's vision of future civilizations that live, work, and peel back the mysteries of the universe in space.

To achieve this outcome peacefully, and at great benefit to the material conditions of all that call Earth home, the road to space settlement must be paved by trade. Both by investment in groundbreaking technologies & achievements funded from the top down, and from a robust inter-planetary economy that maintains and sustains productive communities of all backgrounds and origins.

This vision of civilization's leap to a spacefaring future depends on frameworks shaped by the unique demands of the space environment and strategic development, driven by sustainable, inclusive, & forward-thinking international law.

The National Space Society (NSS) believes that realizing the potential of space resources is instrumental to humanity's peaceful, productive expansion to the Moon, Mars, & beyond. But the extreme nature of space demands more diligence & a deeper appreciation of the downstream consequences of our takings than humanity has managed in our historical and modern use of terrestrial resources.

In the space environment, especially in our earliest steps beyond our only home, resources mean much more than a store of monetary value. For humans living beyond earth, space resources will mean the air they breathe and the water they drink, it will be the building blocks of habitats and the foundations of launch pads and the scaffolding of orbital infrastructure. Our ability as a species to harness the potential of space resource extraction represents nothing less than our ability to carve out a place for ourselves among the stars. If we are to build that place and wish to

keep it, we cannot allow our crucial first steps to be compromised by conflict and unnecessary risk — whether that be driven by commercial, militaristic, or nationalistic impulses.

II. Relevant Factors for the Development of a Set of Initial Recommended Principles for Such Activities

In anticipation of an international framework, the Hague International Space Resources Governance Working Group adopted the most pertinent and recognized document for discussion around space resource governance. The Building Blocks for the Development of an International Framework on Space Resource Activities is essentially the first step in considering what should be included in an international governance framework for In Space Resource Utilization (ISRU). Although the Building Blocks are merely suggestions for a framework, they also provide a glimpse into what principles for ISRU can be created through custom in the absence of an international framework. The US-led Artemis Accords, now with 23 total signatories (including the US), *inter alia*, provide similar ideas for recommended principles directly related to ISRU.

Notably, there are four factors most relevant to the development of a set of initial recommended principles: 1) the mitigation of harmful impacts and interference; 2) the need for economic incentives and clarity in benefit-sharing; 3) recognition of resource rights regardless of domestic or international implementation; and 4) the dissemination of data.

First, the mitigation of harmful impacts and interference speaks to the impacts of ISRU activities and external interference upon ISRU activities. The protection of international cultural heritage sites in outer space should be paramount regarding ISRU impacts. Both the Artemis Accords and the Building Blocks have provisions related to heritage sites. The Artemis Accords provide more definitive examples in Section 9. The Building Blocks extend the notion of heritage sites to include natural heritage sites in Building Block 10 (h). As humanity transcends into the solar system, the protection of how we progressed is important historically, culturally, and inspirationally.

Second, the current void of governance has contributed to a lack of investment in ISRU because of uncertainty within the legal field and the calls for monetary benefit-sharing. The recommended principles should incentivize investment by clarifying that benefit-sharing ought not to be compulsory monetary benefit-sharing but rather encouragement of enabling and promoting the development of technology, capabilities, and education; particularly in developing countries. Benefit-sharing could also take the form of an international fund to assist in the above-mentioned actions and bolstering the ever-necessary UN SDGs. Clarity with the intentions of benefit-sharing is likely to incentivize economic activity to develop ISRU further.

This leads into the third and fourth factors of resource rights and data dissemination. In order for ISRU to further the human experience to outer space, the right to utilization is necessary. Thus, legitimate resource rights provided through legal processes should be recognized regardless of their domestic or international implementation. This would also incentivize economic investment. Lastly, the dissemination of data related to the type and amount of resources discovered and/or extracted should be considered. This is significant because as data becomes available regarding the amount of resources in varying places, it can create clearer methods of governance.

III. Case Study: The First Commercial Space Resources Sale via Japanese Law

In September of 2022, ispace received an interim payment from NASA after meeting development milestones toward acquiring lunar regolith under their HAKUTO-R lunar lander program. Should this mission succeed, it will be the first-ever commercial sale of space resources.

Thus far, all other samples collected in crewed & robotic exploration; from the lunar regolith collected during the Apollo missions, to the pieces of Asteroid Ryugu returned in JAXA's Hayabusa mission, and the Martian rock core samples currently being collected by NASA's perseverance rover, were all collected by government-funded missions.

A successful HAKUTO-R mission would mean many other firsts- including the first sale of space insurance for beyond earth orbit and the first commercial lunar landing. But perhaps most significantly, ispace's HAKUTO-R mission will represent the first transaction executed under a nation's space resources law.

The Artemis Accords not only contemplated this reality but created a framework that empowers commercial participation in this once-exclusive aspect of space exploration. Through bilateral agreements that permit the trade of space resources in accordance with the peaceful purposes set out in the Outer Space Treaty & subsequent international law, aspiring & established spacefaring nations have become motivated & empowered to fund innovative approaches to exploration. By fueling the growth of business models that sustainably advance In-situ resource utilization technology in tandem with government-led exploration efforts.

Of the 23 countries that have signed the Artemis Accords, the United States, Luxembourg, Japan, and the United Arab Emirates have all adopted domestic space resources laws. In doing so, they have taken on a leading role in defining the practices & norms that will be required to implement a space resources regime that is sustainable, advances scientific knowledge, & brings economic benefit to terrestrial markets.

Commercial missions like HAKUTO-R could only break such barriers through enabling legislation, in this case, Japan's Space Resources Act. Japan's membership in the Artemis Accords demonstrates the nation's ambitions to leave its mark in the next chapter of space exploration, but the initiative to demonstrate & define best practices in new markets is what can make that vision achievable.