Lunar Industry Vision

— Toward the Planet 6.0 Era —

(Executive Summary)

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Executive Summary

Since the beginning of human history, we have expanded our sphere of existence and economic activity through the exploration of new frontiers around the globe. Now, Earth's orbit is already being utilized as a zone of indispensable social infrastructure for modern economic activities. In the near future, there will be an expansion of human activity toward the Moon and beyond. The Moon, as well as the area between the Earth and the Moon known as cislunar space, will become the frontline of a new space ecosystem. The vision detailed in this report has been compiled by the Lunar Industry Vision Council, which is composed of industry, legislators, and academia, and shows the determination to form a new lunar industry that returns value to Earth. This council calls on the Government of Japan to work together to realize this future.

Currently, lunar development is driven by government-led activities, such as the U.S.-led Artemis program and China's Chang'e program, in the context of advancing scientific research or engaging in competition. However, the value of the Moon goes beyond that. In fact, pioneering companies both in Japan and abroad have already begun technology demonstrations on the lunar surface and development of related businesses and services. In Japan, companies in various industries such as construction, automobiles, food, insurance, and toys have already started innovative lunar commercialization activities, and there are more than 100 companies interested in following their lead to launch lunar related businesses and services. The National Diet of Japan has recently passed a space resources law, formally known as The Law Concerning the Promotion of Business Activities Related to the Exploration and Development of Space Resources. In order for Japan's pioneering companies and the companies that will follow them to acquire market share in the coming era when the private sector will take the lead in lunar activity (what we deem as the "Planet 6.0" era), it is necessary to start lunar exploration activities with a focus on lunar industrialization from this point forward, and to foster a lunar industry ecosystem in which diverse companies participate. The following are the six declarations by industry and seven recommendations to the government to form a globally competitive industrial base and to ensure the future success of Japanese companies in the lunar industry. This vision is not intended to ask the government to provide all the funds necessary for the realization of the lunar industry, but rather to ask the government to improve the business environment, including measures based on Article 16 of the Basic Act on Space Policy, "Promotion of Space Development and Utilization by Private Business Operators," for industry to implement and develop the lunar business autonomously.

6 Declarations by Industry

Declaration 1: Moving toward an era of private sector-led lunar activity, we will identify areas where industry's strengths are required and/or applicable. In doing so, we will improve our technology and capabilities, and increase our threshold for risk in order to lead the world in the implementation of lunar businesses.

Declaration 2: We will use the Moon as a platform to validate technologies and social systems that return value in the form innovation and advancement of society on Earth.

Declaration 3: Identify specific rules and legal frameworks necessary to form a globally competitive industrial base, which highlight the positive effects if they are enacted and the risks if they are not enacted.

Declaration 4: Proactively develop and disseminate codes and norms to be followed by industry in the development and utilization of the Moon (e.g., adherence to environmental protection, sustainable development and peaceful use of the Moon, etc.).

Declaration 5: In the era of private sector-led lunar activity, we will conduct lunar business for the private sector, as well as domestic and foreign governments, across various industrial categories such as transportation (Earth-Moon, lunar surface); information and communication; media and contents; resources and energy; construction and infrastructure; food and biotechnology; finance and insurance; tourism; and others.

Declaration 6: Leveraging the opportunities offered by the Osaka-Kansai Expo 2025 as a flagship to stimulate public interest in lunar activity, we will plan and execute lunar missions (e.g., sample return of lunar water ice, lunar exploration robot piloting experience, and telexistence experience utilizing real-time interactive communication between the Earth and the Moon, etc.).

7 Recommendations to the Government

Recommendation 1: Governments should promote the value of innovation brought about by commercial space utilization and assume the procurement of private services, as standard practice, to create a lunar industrial ecosystem. This should include transportation to the lunar surface and lunar orbit, exploration, infrastructure construction, and other activities. To this end, the government's plans for lunar activities, such as its involvement in the Artemis program, should be organized in a visible manner to enhance the foresight of the private sector.

Recommendation 2: In order to reduce the cost of access to the Moon, the government should supply opportunities, utilizing both public and private missions, for the transportation of payloads to the Moon necessary for commercial lunar activity. For government missions, the government should provide the private sector with rideshare opportunities by offering the surplus payload capacity of the launch vehicle. For private missions, the government should utilize transportation opportunities to the Moon as a service provided by the private sector.

Recommendation 3: The government should design a regulatory framework to accelerate private investment into lunar businesses, utilizing existing industrial policies as appropriate. In doing so, the government should leverage regulatory sandboxes to support R&D and attract new actors and foster an environment that promotes investment into risk-taking companies (e.g., capital gains tax exemption for investment in lunar business companies, promotion of companies that comply with the Code for Sustainable Lunar Development, etc.), as well as other measures (e.g., R&D tax reduction, funds, special economic zones, cooperation with local governments, etc.).

Recommendation 4: The government should improve the environment for the acceleration of lunar-related business development. In doing so, the government should establish programs and opportunities for the creation of new businesses and the introduction of entrepreneurs into the lunar industry; implement programs to promote the flow and transfer of human resources, knowledge, and technology; build a platform for a simulated environment (e.g., a digital twin) using lunar data; and design lunar exploration projects through industry-academia collaboration with the scientific community. At the same time, these efforts should be linked to the development of the next-generation workforce and higher education.

Recommendation 5: The Government of Japan should promptly establish a ministerial ordinance in relation to the Space Resources Act and other necessary systems, guidelines, and standards, etc., in order to boost the global competitiveness of the Japanese private sector, and work with the international community to establish rules and standards for international commercial activities (e.g., communication bandwidth, construction standards, introduction of living organisms, safety zones, etc.). Through these activities, Japan may be recognized as a country that is proactive in supporting lunar business, thereby attracting foreign companies and becoming a center of the world's most advanced information, while controlling the export of information abroad.

Recommendation 6: Leveraging the opportunities offered by the Osaka-Kansai Expo 2025 as a flagship to stimulate public interest in lunar activity, the government should cooperate with the private sector to realize lunar missions (e.g., sample return of lunar water ice, lunar exploration robot piloting experience, and telexistence experience utilizing real-time interactive communication between the Earth and the Moon, etc.).

Recommendation 7: The public and private sectors should promote the fact that measures to accelerate the development of the lunar industry will provide policy advantages for Japan to lead the international community in solving global issues (e.g., contribution to the SDGs, creating a cyclical society, etc.). In addition, from the perspective of economic security, attention should be paid to the strategic indispensability of the technologies possessed by each company engaged in lunar business.

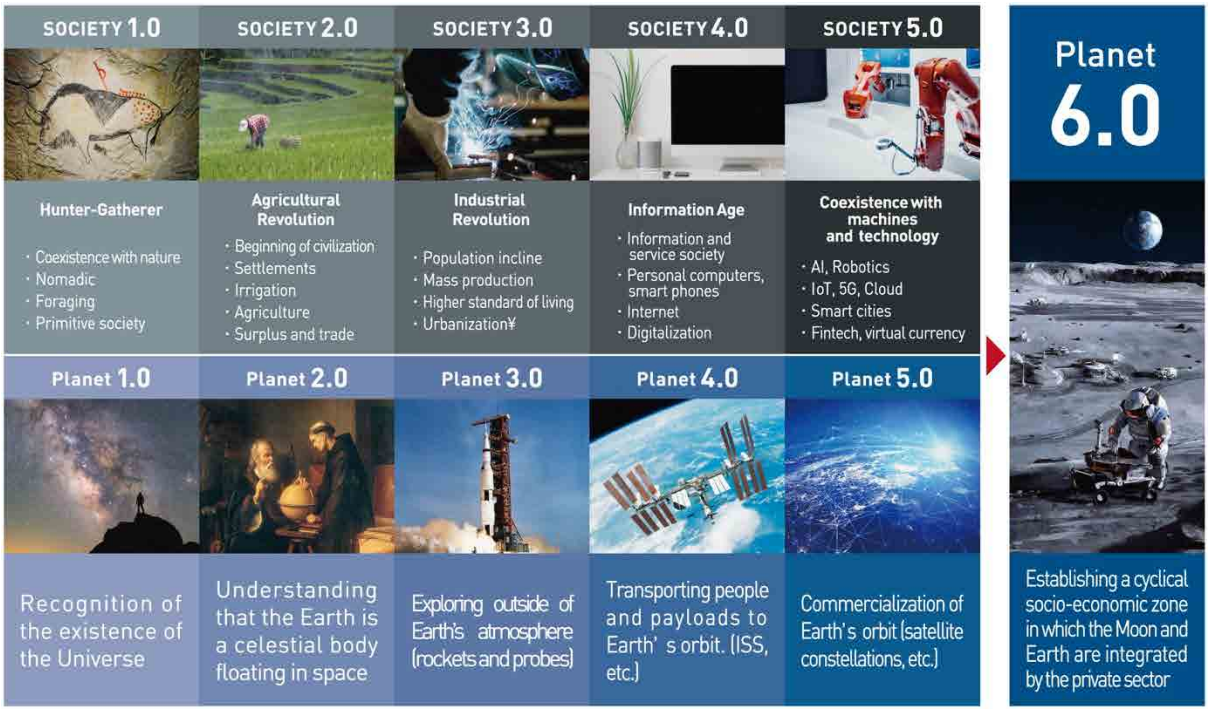
As a celestial body in proximity to Earth, the Moon has been a means to understand Earth from a natural and scientific perspective. However, moving toward the era of Planet 6.0, there will be a paradigm shift in which the Moon will be integrated into the Earth’s sphere of economic activity, forming into one ecosystem for space activities. With the Moon and Earth united, there will be an emergence of pioneering companies and the creation of new lunar business activities among various industrial categories such as transportation (Earth-Moon, lunar surface); information and communication; media and contents; resources and energy; construction and infrastructure; food and biotechnology; finance and insurance; tourism; and others. The development of such frontier areas will be a great challenge. Japan has been lagging behind other countries in the development of such frontier areas, but now is the time for Japan to take the lead as a front-runner in the "Lunar Industrial Revolution" that will create a new industry led by the private sector on the Moon.

Planet 6.0

The Lunar Industry Vision Council has coined "Planet 6.0" as a new concept illustrating the social and economic system of our modern world. Following the concept of "Society 5.0" promoted by the Government of Japan, which divides the advancements of civilization into five phases, Planet 6.0 is intended to be recognized as the next phase of advancement, but also incorporating the evolving relationship between humanity and space. Furthermore, it promotes the development of a lunar industry led by private sector activities.

Planet 6.0 envisages the Earth and the Moon integrated as one ecosystem with a cyclical social economy. As such, The Lunar Industry Vision Council aims to create a new market on the Moon, in which technological and social innovations cultivated through human activities on and around the Moon can return high value to society and industry on Earth. Specifically, value returned to Earth may include technological advancements in the fields of robotics, energy, habitation, and may solve societal issues related to energy conservation, automation, and the acceleration of healthcare and life sciences.

This Lunar Industry Vision, with the concept of Planet 6.0 at its core, depicts the future vision of the Moon as envisioned from the private sector's perspective, and proposes measures that Japanese society and industry should take to realize this future, while demonstrating a strong presence in the international community.



A vision in which the advancement of civilization combined with humanity's relationship with space lead toward a new socio-economic era, "Planet 6.0" (Source: Lunar Industry Vision Council)

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