



Promoting Space Sustainability

Space Resource Utilization for Sustainability

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I. Short description of the outer space activity

ispace is a lunar exploration company based primary in Tokyo, Japan and also in Luxembourg and Colorado, U.S.A.

ispace's vision is "Expand our planet. Expand our future". We envision that Human beings will extend our life into outer space by making the Earth and Moon one eco-system, a new economy on the Moon will be created. The key is to utilize the lunar water resources. Specifically, our Moon Valley 2040 concept depicts a world in which 1,000 people work and live on the moon, and 10,000 people travel between the earth and the moon in the 2040s.

ispace is first attempting to establish a high-frequency, low-cost transportation system to the moon, accelerate water exploration, and present the economic value of lunar resource utilization, especially water. Our first lunar landing mission is scheduled for 2022 as a private lunar exploration program called HAKUTO-R. The second mission is scheduled for 2023 and will carry out not only landing but also lunar exploration by a lunar rover. After that, we will provide the transportation service that lands on the moon twice a year, transport customers' payloads such as rovers and various exploration equipment, and support various activities for water resource discovery and utilization. In addition to transportation services, we are also developing data business (Blue Print Moon) that provides various data obtained from series of our lunar missions.

In the future, ispace believes that it will be important to utilize space assets to enhance the sustainability of the earth. In order to establish growing space assets economically viable and sustainable way, it is inevitable to use the resources from the moon, and it is important to enable the private sector to take the initiative in using the resources and improve economic sustainability. thinking about. To that end, we are very interested in creating rules that allow private companies to use the lunar resources sustainably, and are actively participating in related activities.

II. Connection with the LTS Guidelines

Utilization of lunar resources improves the sustainability of space activities and is linked to the concept of LTS Guidelines in many ways.

Guideline B: Safety of space operation

How to maintain the safety of activities on the lunar surface or in the lunar orbit is a perspective that requires full-scale examination in the near future. It is important to make the best use of what we have learned in the earth's orbit such as debris in the past, and to build it effectively from the beginning so as not to hinder the development. In addition, the safety of activities on the moon is different from the safety in orbit because of the ground, and it is necessary to consider it from different viewpoints.

Guideline C: International cooperation, capacity-building and awareness

Utilizing the resources of the Moon will dramatically improve the sustainability of space activities, so it is necessary to accelerate international understanding and consensus building on this point. Sustainability of space activities (and thus the sustainability of the earth) by ensuring a mechanism in which the use of space resources does not benefit only limited countries and players, but all players involved in space activities can enjoy the benefits.

Guideline D: Scientific and technical research and development

The technology required to use space resources (such as refueling in orbit) should not create an advantage that can be used only by specific countries and players, but is used by players involved in all space activities through standardization of interfaces, etc. In addition, technological development should be promoted so as not to place a heavy burden on the lunar environment.

III. Lessons learned

Discussions on Sustainability in lunar exploration and development have yet to begin seriously. However, given the potential for the use of lunar resources to play a very important role in improving the sustainability of space activities, It is important to proceed with the discussion on the sustainability of lunar exploration and lunar development, with the understanding of many countries and players, At discussion, it is important not to limit to technological perspective and to have a broader perspective, and not to disincentivize commercial activities and entrepreneurs,

The technology that would enable resource development on the moon still has many uncertainties, and there are various technical options, so even if we discuss rules that depend on a specific technology, it will not be effective. Therefore, it is important to first agree on a major framework and then create steps to

decide the details after the technological development has progressed more concretely.

The technology that supports the activities of the moon is not a specific technology, but a wide range of systems, so a broad perspective is required. In addition to technology, various factors such as ownership issues, environmental load, and economic aspects affect each other, so it is necessary to consider from a broad perspective without biasing to specific factors.

Not limited to the moon, private companies will be more responsible for future space activities. Therefore, it is necessary to consider a mechanism that does not damage economic profits so that private companies can carry out as a sustainable business.

The lunar discussion is yet to begin. By all means, we would like to make use of what we have learned in the past on the earth and in the earth's orbit so that I can build a mechanism that enables sustainable development on the moon.