

Building a Sustained International Future for Space Resources



SECURE
WORLD
FOUNDATION



Outcomes of A Workshop on Perspectives of New Entrant Space Programs on Space Resources

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LUXEMBOURG
SPACE
RESOURCES
WEEK 2024



INTERNATIONAL WORKSHOP ON SPACE RESOURCES

Perspective of New Entrant Space Exploration Programs

Date & Location

- November 29 - December 1, 2023
- Daejeon, South Korea



Organized by

- Korea Aerospace Research Institute (KARI)
- Korea Institute of Geoscience and Mineral Resources (KIGAM)
- Korea Institute of Civil Engineering and Building Technology (KICT)
- Secure World Foundation (SWF)

International Workshop on Space Resources

Perspectives of New Entrant Space Exploration Programs

November 29 – December 1, 2023
Daejeon, South Korea

Venue: IBS Science Culture Center

Jointly Organized by

Korea Aerospace Research Institute (KARI)
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BACKGROUND

- Growing interest and engagement in space resources by new countries participating in space exploration
- Need to consider approaches to effectively engage new entrants to the space resources ecosystem
- Establishing information-sharing links between the space resources community and the new entrant exploration community is the first step

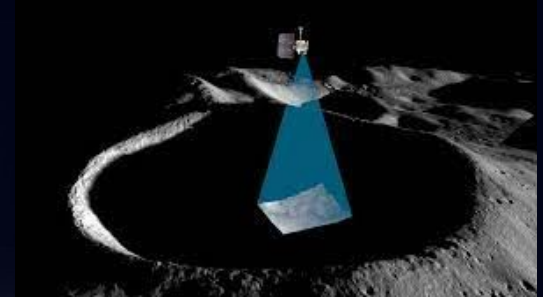
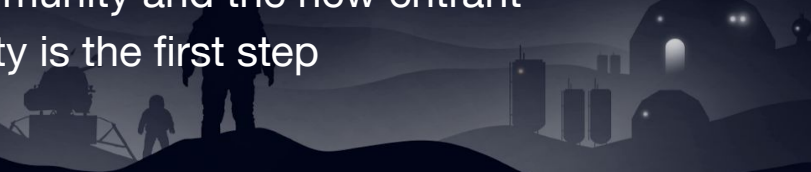


Image: KPLO Shadowcam



WORKSHOP AGENDA OVERVIEW

Day 1 & 2 : Public Conference

- Keynotes from ISECG and NASA
- Agency presentations on ISRU activities
- Scientific, Technical, Business and Policy Panels



Day 3 : Expert Workshop

- Scenario exercise
- Moderated discussion



TECHNICAL TOUR

KARI

- AIT Facility
- Ground Station
- KPLO Mission Control Room



KIGAM

- Planetary Payload Development Lab
- Mineral Processing Lab
- Smelting Lab



KICT

- Dusty Thermal Vacuum Chamber
- Simulant Manufacturing Facility
- Extreme Environment Material & Processing Lab



PARTICIPANTS OVERVIEW

Registered Participants: 108

- 33 international
- 75 Koreans

International Speakers: 30

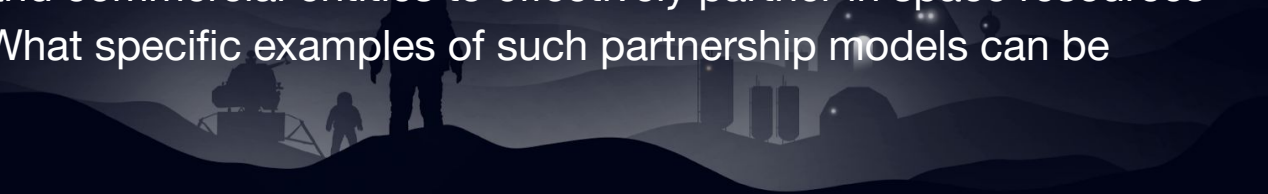
- Government: 18
- Academic: 3
- Industry: 4
- Non-profit/NGO: 5

Countries Represented : 15

- Australia, Brazil, Canada, France, Italy, Japan, Luxembourg, Mexico, Netherlands, Republic of Korea, Romania, Saudi Arabia, Turkey, United Kingdom, United States



MAIN QUESTIONS

- What is the current landscape of participation in the space resources field?
 - What is the current state of understanding across science, technology, business, and governance of space resources?
 - How can smaller or new entrant countries contribute to the development of space resources activities?
 - What partnership models exist to allow smaller or new countries, established countries, and commercial entities to effectively partner in space resources activities? What specific examples of such partnership models can be identified?
- 
- A dark, atmospheric illustration of a lunar or planetary surface. In the foreground, the silhouettes of several astronauts and pieces of space equipment are visible against a slightly lighter, hazy background. The terrain is uneven with small hills and depressions. The overall tone is dark and futuristic.

AGENCY PRESENTATIONS

Presentation of Space Resources Related Plans and Activities or Interests

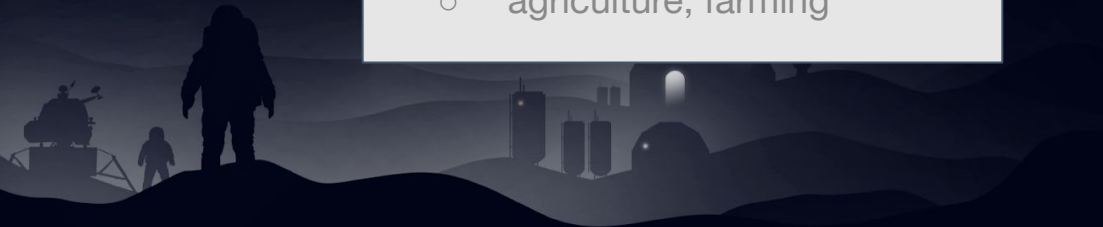
- Australia (ASA/CSIRO)
- Brazil (AEB)
- Europe (ESA)
- France (CNES)
- Japan (JAXA)
- Korea (KARI / KIGAM / KICT)
- Luxembourg (LSA)
- Mexico (AEM)
- Turkey (TUBITAK)
- United Kingdom (UKSA)
- United States (NASA)

Planned Missions

- resource assessment
- ISRU technology demo

Use Cases

- propellant, life support
- construction, manufacturing
- agriculture, farming



PANEL DISCUSSIONS

1. Scientific Knowledge and Interests on Space Resources
2. In-Situ Resources Utilization (ISRU) Technology
3. Private Sector Drivers of Space Resources Activities
4. Policy and Governance Issues in Space Resources



Emphasized Multi-disciplinary

- scientists hearing relevancy of policy, policy makers hearing current status of technology

Exchanged Ideas and Information

- between established and new entrant countries

SCENARIO EXERCISE

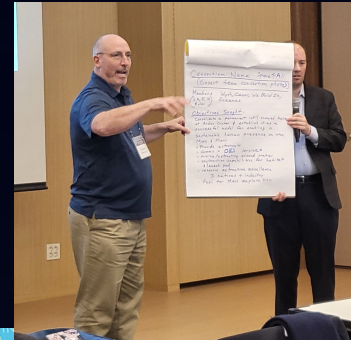
Space Resources Cooperation Program Design

- Exercise was designed to consider the different objectives, benefits, and challenges in building cooperation in space resources activities
- Participants were asked to build a cooperation model in response a hypothetical scenario
 - The scenario featured an established space agency building a consortium with other actors interested in space resources activities
 - Participants played roles of different actors - commercial, governmental, scientific and civil society organizations
- In proposing this cooperation model the participants considered :
 - The objectives - both individually and as a group
 - The information needed to establish the cooperation
 - The roles each entity will play in the proposed cooperation



SCENARIO EXERCISE OUTCOMES

- Parties should have clear understanding of their own goals and objectives going into a potential cooperation
- Effective partnerships should consider that each actor may have different priorities for different objectives - not everyone will share all goals equally, but that's OK
- Governance framework will be needed in near term in order to promote cooperation



PARTICIPANTS SURVEY

Q. When do you expect that extraction and use of space resources on the Moon will be realized?

A. In the next five years



B. 5 to 10 years from now



C. 10 to 20 years from now

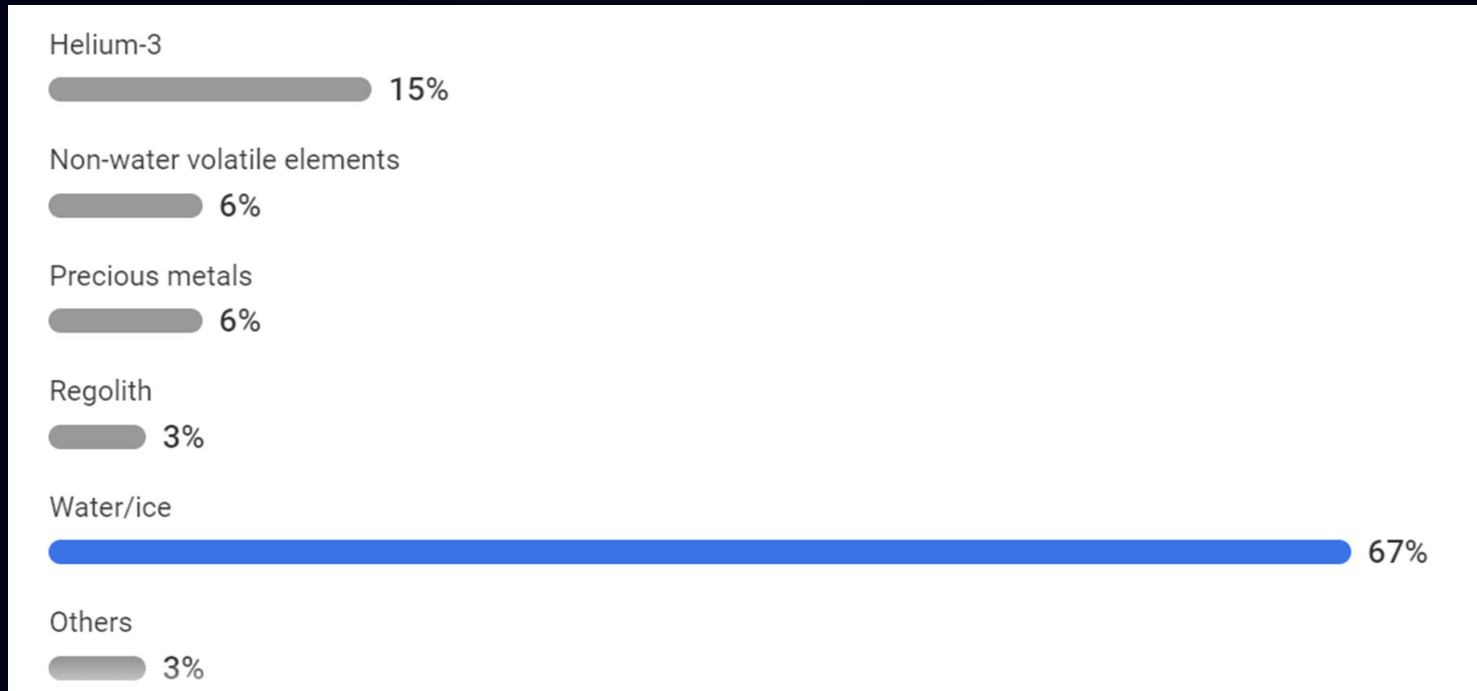


D. Beyond 20 years from now



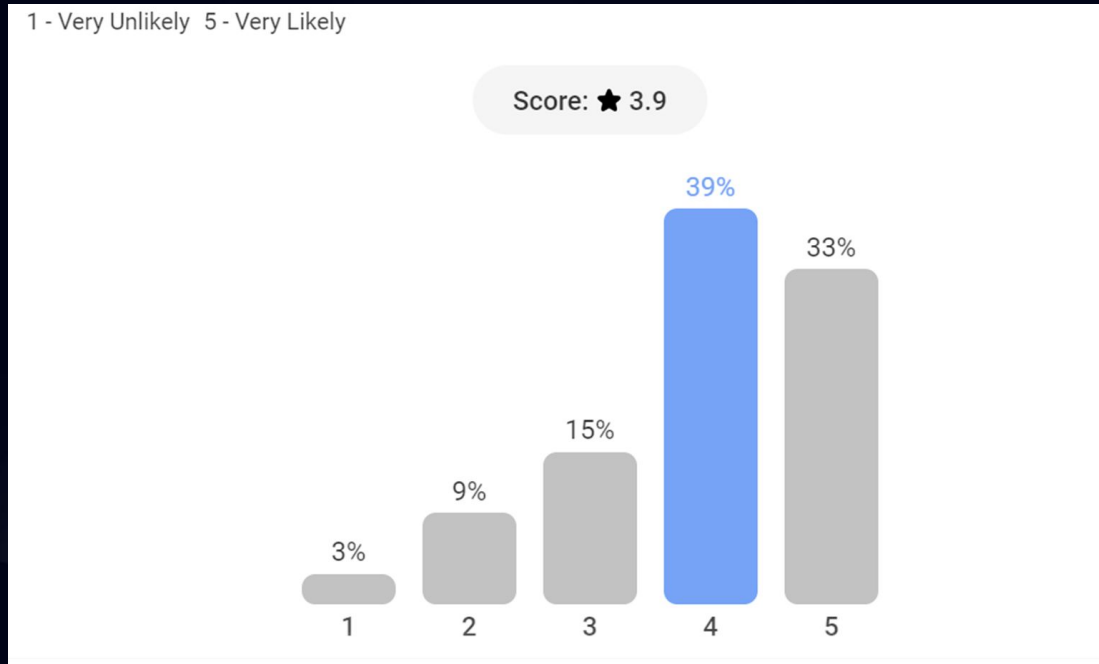
PARTICIPANTS SURVEY

Q. In your view, what is likely to be the most valuable space resources?



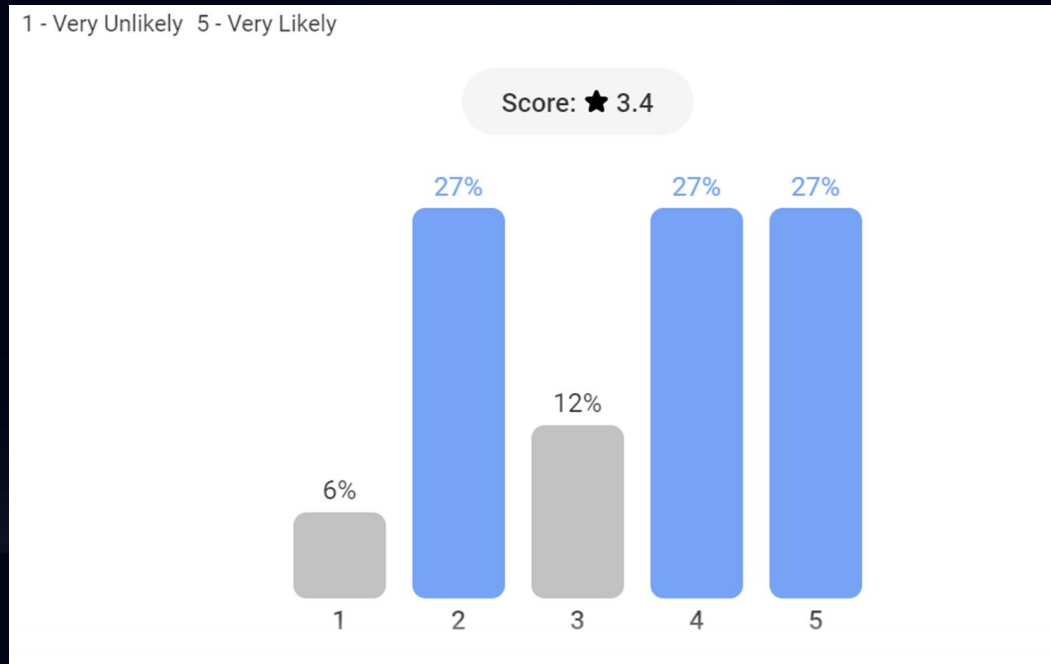
PARTICIPANTS SURVEY

Q. In your view, how likely is that advanced countries and/or companies will monopolize space resources?



PARTICIPANTS SURVEY

Q. In your view, how likely is the potential for conflict over space resources on the Moon between now and 2050?



MYTH AND CONCERNS

MYTHS

- Large-scale space resources activities are happening in the near future
- Space resources activities are about returning resources to Earth
- Advanced countries and leading commercial actors will monopolize space resources
- Space resources will create “trillionaires” in the near future
- There is immediate potential for geopolitical conflict over space resources

CONCERNS

- Science alone is not a sufficient driver for public support
- Realistic economic assessment is lacking
- Science, commercial, and environmental objectives should be balanced
- Implementation of governance principles should be informed by scientific realities
- New entrant countries should not be left out
- Government-driven competition might increase uncertainty

OVERALL OUTCOMES

- Importance of multidisciplinary interaction and collaboration
- Existence of opportunities to build awareness and partnerships among various actors
- Importance of considering sustainability in developing the space resource ecosystem
- Need for improved communication of the potential benefits of space resources to all stakeholders

RECOMMENDED NEXT STEPS

- More focused efforts should be made in analyzing and communicating the tangible economic and other benefits of space resources
- Platform to enable new entrant nations to share their space resources related plans, capabilities and interests with the space resources community is needed

ANNOUNCEMENT

- AEB and SWF will hold the next workshop in this series in 4Q 2024 hosted by Brazil

THANK YOU!

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