

Approach and Possible Cooperative Activity from South Korea for Lunar Space Exploration

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Introduction:

The Republic of Korea is currently conducting strategic and systematic researches on space exploration. Under the Governmental supports, recent success of launch vehicles by Korea Aerospace Research Institute (KARI) is the clear evidence for further program in space exploration in Korea. For the lunar exploration and Mars exploration, recently, the private sector is also trying to participate in space exploration.

In the late 1950, the preliminary studies for explorations was done in South Korea. In 1960, the two ITO-1A and 2A rockets soared into orbit amidst cheers and explosive sounds and in the presence of the schools faculty and staff from Inha university, Incheon citizens, and the press. It was a successful take-off of Korea's first rocket designed and produced by the rocket class students of the Inha College of Engineering. In the late 1950s, the international community had just witnessed the space arms race with, both, the US and Soviet Union launching rockets to the moon. Following 9 more rocket launchings, the 3-stage rocket 'IITA-7 CR including a small camera and a rat with wireless health monitoring' took off successfully in 1964.

As a private approaches for space exploration in South Korea, Inha Institute of Space science and Technology (Inha IST) was established and started the internationally cooperative research works with a NASA Langley Research Center (NASA LaRC). Also, recently new organization from Inha University, the Inha Research Institute for Aerospace Medicine and medical school also jointed for space exploration.

Potential ISRU Activities

Based on these activities, now new approaches for space exploration is under prepared for lunar exploration. Currently Inha IST and Korea Institute of Geoscience and Mineral resource (KIGAM) agreed to collab-

orate and join the activities for lunar exploration with NASA LaRC.

Based on the technical discussion with NASA LaRC, Inha IST has found many potential area to join the current ISRU program with KIGAM.

The first possible collaborative topic will be the air-tighten fabric technology to contain oxygen or hydrogen gases for habitation or propellant usages. For this, light and strong fabric with the anti-cosmic ray protective function will be required. Also, to protect anti-dust function landing pad in Moon or Mars will be the other possible area to work together with NASA LaRC.

Second issue will be the water extraction and purification with membrane technology. Also further chemical process for propellant conversion will be connected to this water technology. This topic will be cooperative with KIGAM by planetary resource investigation.

Third one will be energy harvesting on Moon to generate energy with KIGAM based on the elementary map. Resource extraction technology, based on novel energy harvesting technology from the charged lunar surface by electro static conversion system, will be investigated.

The last one will be related to the space medical issue on Moon. Inha Research Institute for Aerospace Medicine and Inha medical school will assist and join the basic biological (including animal test) as well as fundamental life science investigations to understand human safety issue in space habitation and travel.

Way Forward

Currently, the attendance of team Korea in the Moon Race is under preparation. The moon race will be the best implementing opportunity to join the lunar exploration from South Korea.