International Space Exploration Research Institute Recent Activities in Korea for Space Resource and Planetary Mining. T. S. Lee[1], K. Zacny[2], B. C. Chang[3], D. C. Choi[4], and J. H. Lee[5], [1]Civil and Environmental Engineering Department, Hanyang University (Sa 3-dong, Sangrok-gu, Ansan, Gyeonggi-do, Korea, cmtsl@hanyang.ac.kr), [2]Exploration Technology Group, Honeybee Robotics (398 W Washington Blvd., Suite 200, Pasadena, CA 91103, zacny@honeybeerobotics.com), [3]Civil and Environmental Engineering Department, Hanyang University (Sa 3-dong, Sangrok-gu, Ansan, Gyeonggi-do, Korea, bcc@hanyang.ac.kr), [4]Civil and Environmental Engineering Department, Hanyang University (Sa 3-dong, Sangrok-gu, Ansan, Gyeonggi-do, Korea, dongcheol.choi@gmail.com), [5]Civil and Environmental Engineering Department, Hanyang University (Sa 3-dong, Sangrok-gu, Ansan, Gyeonggi-do, Korea, jaekojaero@hanyang.ac.kr).

Summary: This paper introduces International Space Exploration Research Institute (ISERI) which is recently established in Korea to prepare the expected Korean Lunar missions and to participate international collaboration on Lunar surface exploration.

Introduction: Space agencies including NASA, JAXA, CSA has a vision for Lunar surface exploration. Korea is also on the initiate stage of Lunar exploration, planning programs in 2020s starting with Lunar orbiter, lander, and missions with sample returns. To prepare the expected Korean missions and to participate international collaboration on Lunar surface exploration, Hanyang University recently established International Space Exploration Research Institute (ISERI). Participating organizations are Honeybee Robotics of U.S.A., Korea Aerospace Research Institute, Research Institute of Industrial Science and Technology, Korea Institute of Industrial Technology, and Gyeonggi Province. The institute is sponsered by the Ministry of Education, Science, and Technology to establish Global Research and Development Center.

ISERI Vision and Goal:

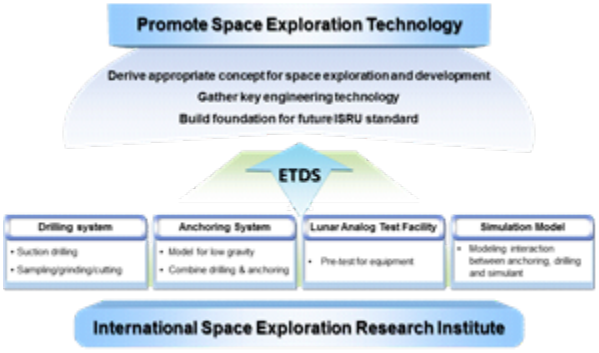

Figure 1. ISERI Long Term Vision and Goal

One of the key issues for a successful long term unmanned/manned mission is using on-the-spot resources as there is a limit on cost and volume sending resource from Earth to Moon. In-Situ Resource Utilization (ISRU) is a core component of space exploration which establishes, evaluate and assess the in situ resources available on the Moon and Mars and the technologies needed to utilize and exploit these resources.

The overall goal of the institute is to design and build a small, light multitasking robot system (Extra-Terrestrial Demonstration System; ETDS) to perform, in-situ experiments which will be compared with the terrestrial analog testing results to build a simulation model for required techniques.

Recent Activities: ISERI is recently focusing on Extreme Terrain Exploration Rover (ERTER), Planetary Drilling and Anchoring System, Waterless Lunar Concrete and Landing Pad, Korea Lunar Simulant KOHLS-1, and etc. Following activities and details will be present on the upcoming 2012 Planetary & Terrestrial Mining Sciences Symposium.

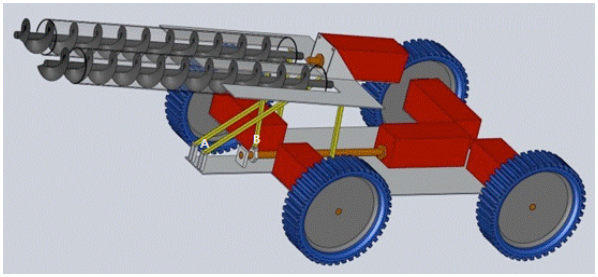

Figure 2. Concept of ISERI's Lunar Excavation Rover

References:

[1] J. Lee, B. C. Chang, S. Lee, and T. S. Lee (2012), "Feasibility Study on Lunar Concrete Landing Pad", *Proceedings of ASCE Earth and Space 2012,* 128–134, Pasadena, CA.

[2] B. C. Chang, D. Choi, J. Lee, and T. S. Lee (2012), "Mobility Evaluation of an Anchored Lunar Exploration Rover", *Proceedings of ASCE Earth and Space 2012,* 489–494, Pasadena, CA.