

Activity report relating to landing site review for lunar sample return mission of HERACLES

*Yuzuru Karouji¹, Masanao Abe¹, Junichi Haruyama¹, Makiko Ohtake¹

1. Japan Aerospace Exploration Agency

The space agencies of the International Space Exploration Coordination Group (ISECG) are investigating a next step of international partnership of International Space Station (ISS), and how they proceed post-ISS activities, which is suggested in the Global Exploration Roadmap (GER). The GER proposed that the deep space habitat could be relocated to other locations in the lunar vicinity to meet science or exploration objectives, and that human-assisted sample return and tele-presence represent new and integrated approaches to space exploration with the potential to increase benefits.

Japan Aerospace Exploration Agency (JAXA) is studying the Human-Enabled Robotic Architecture and Capability for Lunar Exploration and Science (HERACLES) concept that is an international collaborative program initiated by European Space Agency (ESA). The HERACLES mission is a lunar robotic mission based on human-assisted of the cislunar station as a precursor mission of human exploration on the lunar surface. This mission is going to return of lunar sample and explore on the lunar surface contributed by human-assisted. Advanced studies for this mission concept are being undertaken in a collaborative framework with ESA in the coordination role and undertaking study of the ascent module, JAXA undertaking study of the lander, and Canadian Space Agency (CSA) study of the surface rover element. While the primary objective of HERACLES is to demonstrate key precursor technologies, its initial surface operations scenario builds on the international science community motivation for lunar sample return and involves landing at a site of high scientific interest and return of lunar samples of high scientific value before conducting a long distance traverse that provides further opportunities for science and exploration. Science planning for the HERACLES mission is co-led, with a multi-agency HERACLES Science Working Group (SWG) responsible for developing a mission science management plan to describe science team and science payload selection processes, and data and sample policies.

As a reference mission, which is used for identifying required technology to achieve this type of mission, Schrödinger crater has been used as a landing area. From now on, we are planning to prioritise mission objectives suitable for this mission with landing sites suggesting that can contribute to the progress of the lunar science by discussing international lunar science community. For this, we are planning to assembling an international science team. In this presentation, we are going to report outcome of previous activities related to the HERACLES SWG and planned discussion within Japanese lunar science community of study in this SWG.

Keywords: HERACLES, Lunar Exploration, sample return