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# Moon Landing Mission SELENE-2

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JAXA plans SELENE-2 moon landing mission and SELENE-X more sophisticated mission (Sample return, etc.) following SELENE (Kaguya) lunar orbiter. Mission objectives of SELENE-2 are as follows,

1.Technology development and demonstration for future lunar and planetary exploration

Though soft landing itself was performed by U.S. and U.S.S.R. 40 years ago, future lunar exploration requires 100m accuracy to designated landing point. To realize the accuracy, new technologies such as landmark navigation are needed. An exploration rover is also essential for wide area exploration. Though large-scale rovers were realized on moon, a small rover for science exploration is easy to stuck and technologies to overcome that is required. To survive during two-weeks lunar night, nuclear energy was used in the past missions. Since public consensus on the usage of nuclear power in space has not yet reached in Japan, solar power and battery with sophisticated thermal control are used for SELENE-2.

2.Scientific observation to know the origin and evolution of Moon

To solve the questions on the origin of Moon, the material of it should be known. On the other hand, to make the evolution of Moon clear, detailed geological observation is essential. For the former purpose, SELENE-2 plans seismic, thermal, and electro-magnetic measurements. For the latter purpose, imaging and spectrograph by instruments onboard the rover are planned.

3.Environment investigation for future lunar exploration such as human missions

For astronauts to stay on Moon surface for long time, more accurate measurement of radiation environment, dust environment, and soil mechanics than Apollo era is required.

4.Public interest and international cooperation and contribution

Kaguya's HDTV proved that high definition movies aroused public interest. Since exploration, especially human exploration is performed under international collaboration lately, how Japan can contribute is important issue form the view point of policy.

To realize the mission objectives, H-2A rocket is assumed as a launch vehicle. The size of the lander will be about one-ton dry mass. It means that the total payload mass will be 200 to 300 kg including the rover.

SELENE-2 pre-project has started since 2007 and continues the conceptual design (phase-A study). Because of the severe economical situation in Japan, the start of phase-B study has delayed. Since other countries make progress on lunar exploration, however, we continue research for critical technologies.

Keywords: Precise landing, Exploration, rover, Night survival