

SPACE EXPLORATION SYMPOSIUM (A3)
Moon Exploration – Part 2 (2B)

Author: Prof. Tatsuaki Hashimoto
Japan Aerospace Exploration Agency (JAXA), Japan

JAPANESE MOON SURFACE EXPLORATION MISSION

Abstract

JAXA launched Kaguya (SELENE) moon orbiter in September, 2007 and the spacecraft was successfully put into moon orbit in October. It observed moon surface and gravity field with 13 instruments and a couple of small satellites till the hard landing in June, 2009. As the next step of moon exploration, a lunar lander SELENE-2 has been considered. It lands on the moon surface and performs in-situ scientific observation, environment investigation, and research for future lunar utilization including human activity. At the same time, it demonstrates some key technologies for lunar and planetary exploration such as precise and safe landing, surface mobility (rover) and overnight staying. Landing site candidates of SELENE-2 are in near side, low or middle latitude area. They are selected from the view point of lunar science. That is, solving mysteries on the origin and evolution of moon-earth system. The lander carries laser altimeters, image sensors, landing radars for precise and safe landing. Landing legs and precisely-controlled propulsion system are also developed. The rover is designed so as to travel in wide area and observe featured terrain with scientific instruments. Some instruments require long term observation on the moon surface. We are developing survival technologies for two weeks night without radio-isotope energy. As scientific instruments, multi-band cameras, a microscopic camera with a grinding tool, and a very broad-band seismometer, etc. are considered. For future lunar exploration, measurement of radiation, regolith dust, and soil mechanics are also planned. JAXA also considers a polar region exploration with international collaboration. Polar region is another interesting target of planetary science. Volatile material under the surface will reveal the history of the solar system. And also, polar region is one of candidates of the next generation human base because of long duration sunlit. Spacecraft configuration of the polar lander will be similar with SELENE-2 but Japanese contribution has not yet decided. As the next step of the landing mission, sample and return from far side are also studied. Far side area like South Pole Aitken basin is very interesting for lunar science, because mantle material can be obtained there. The first landing mission should consider the technological continuity and expandability. In this presentation, present study the status of Japanese moon landing mission is shown.