

**JAPANESE 1ST MOON LANDER SELENE-2 AS SELENE FOLLOW-ON.** Kohtaro Matsumoto<sup>1</sup>, Tatsuaki Hashimoto<sup>1</sup>, Takeshi Hoshino<sup>1</sup>, Satoshi Tanaka<sup>1</sup>, Masatsugu Otsuki<sup>1</sup>, and Jun'hiro Kawaguchi<sup>1</sup>, <sup>1</sup>Space Exploration Center, Japan Aerospace Exploration Agency, 3-1-1 Yoshinodai, Sagami-hara, Kanagawa 229-8510, Japan, matsumoto.kohtaro@jaxa.jp

**Introduction:** JAXA plans the moon lander SELENE-2, as the SELENE follow-on lunar explorer. The system design study has been done as phase-A of SELENE-2.

**SELENE:** JAXA successfully launched SELENE orbiter in last Sep. 14 2007, with HDTV, 13 scientific sensors, and two small satellites. The major objectives of the SELENE mission are to obtain scientific data of the lunar origin and evolution and to develop the technology for the future lunar exploration. In addition to the many scientific results and academic papers, the repetitive broadcasting of the 1st HDTV movies of the moon and rising earth over desolate gray lunar craters has promoted a better understanding on the detail of moon surface and status of earth in the space, with considerable public favor and popularity. The SELENE global lunar map had also made many 3D lunar pictures; those were never photographed and never drawn as the geographical image, such as the central hill of the Tycho crater. (Fig.1)

**SELENE-2:** From the SELENE's success as the 1st step of Japan's lunar exploration, the next step SELENE-2 is strongly expected to land on the surface and performs in-situ scientific observation, environment investigation, and research for future lunar utilization with human lunar activity. At the same time, it will demonstrate some key technologies for future lunar and planetary exploration. The SELENE follow-on moon lander is requested to be launched until mid of 2010s in the report of the lunar exploration WG of SAC (Space Activity Commission).

**Phase-A study:** Following the SAC report, phase-A study of SELENE-2 had been carried out by JAXA experts and by major space companies until this July. The lunar scientists team is organized to identify the most valuable lunar science for SELENE follow-on landers, SELENE-2 and SELENE-Xs. To accomplish the lunar landing exploration and lunar science, the primary technological missions identified in the early stage of this phase-A study are, (1)safe & precise landing, (2)lunar surface mobility, and (3)lunar night survival. (Fig.2)

**Technical subjects:** The landing site selection is major critical factor for safe & precise landing, landing sensors, and the lunar night survival. For the surface mobility, the major factors of the rover design are the lunar night survival and the travelling area size to carry the scientific in-site measurement, such as terrain observation, selection and picking samples,

seismometer installation, and so on. The mission life length of SELENE-2 might be the largest design factor. The trade-off study is still open for the required energy source for lunar night survival, and/or survivability of lander, rover, or scientific instruments.

For the SELENE-2 system design, the maximum weight of the mission payloads, available on the lander, is the most important design parameter. To identify this payload weight, various SELENE-2 design cases were also examined, such as the rocket itself, selection of the transfer scenario to the moon, the lander configuration, and the development period.

**Summary:** In this paper, interim report of SELENE-2 phase-A study will be described, including the preliminary design of the lander itself. Also the present status of SELENE-2 international cooperation, such as ILN, will also be reported.

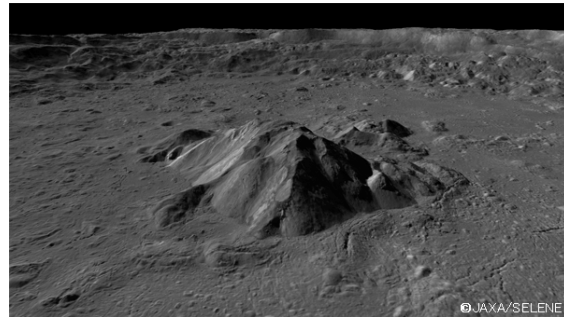


Fig.1 3D image of Central hill of Tycho crater  
[http://wms.selene.jaxa.jp/data/jpn/tc/012/tc\\_012\\_b\\_1.jpg](http://wms.selene.jaxa.jp/data/jpn/tc/012/tc_012_b_1.jpg)

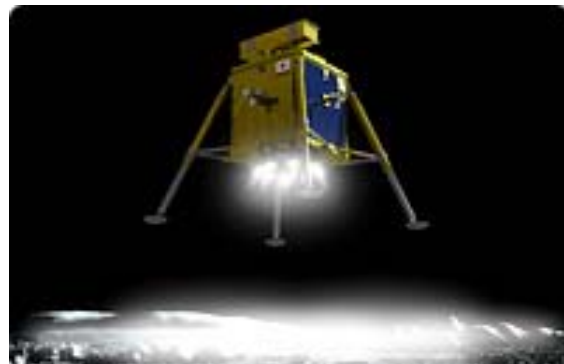


Fig.2 Artistic Image of SELENE-2  
<http://www.jspec.jaxa.jp/e/activity/selene2.html>