

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

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CONCEPTUAL DESIGN STUDY ON KOREAN LUNAR ORBITER/LANDER PROTOTYPE

Abstract

Recently we are seeing new ‘moon rush’ era all over the world. A series of robotic missions to the Moon including LRO and LCROSS have been launched in 2009 or earlier to research the lunar science and prepare for future human exploration. Our neighbors Japan and China launched lunar exploration satellites into orbit in 2007 and are planning to launch lunar landers on the moon surface in early 2010s. Korea is also planning to send a lunar exploration module in 2020s, while a launch of a manned Korean spacecraft is unthinkable thus far. Under the supervision of the MEST (Ministry of Education Science and Technology), KARI (Korea Aerospace Research Institute) has conducted the study on establishing a preliminary plan for the national space exploration including unmanned lunar exploration activities. In addition, as of 2010 KARI started internal funding for development of lunar orbiter/lander prototype as well as its conceptual study. In this paper, an intermediate outcome of the conceptual study for the Korean lunar orbiter/lander prototype is suggested. Firstly, the feasible mission strategies for Korean unmanned lunar exploration will be proposed in terms of chronology and possible mission scenarios, etc. Secondly, in order for the lunar spacecraft to be adapted to launch capabilities of the planned KSLV-2 or the currently exiting launch vehicles in the same class with KSLV-2, possible mission scenarios for Korean lunar spacecraft are suggested. Also, a set of budget computation results including mass, power, link, etc. as well as conceptual design and analysis results for each subsystem (structure, propulsion, attitude control, etc.) design are also suggested by using internally developed conceptual design tool. In order to demonstrate the basic performance of the lunar orbiter/lander, a testbed-like prototype will be developed for actual landing test, which is connected to the HILS type lunar simulator with a virtual reality. In this study, the preliminary design concept of the lunar simulator is also suggested. In conclusion, the outcome of this conceptual study can be extended to provide a proper guideline and input for the planned Korean unmanned lunar exploration in 2020s.