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

Author: Dr. Gwanghyeok Ju
Korea Aerospace Research Institute (KARI), Korea, Republic of, ghju@kari.re.kr

Dr. Dong-Young Rew
Korea Aerospace Research Institute (KARI), Korea, Republic of, dyrew@kari.re.kr
Mr. Sang-Wook KANG
Korea Aerospace Research Institute (KARI), Korea, Republic of, kangsw9@kari.re.kr
Mr. Sung-Soo Jang
Korea Aerospace Research Institute (KARI), Korea, Republic of, ssjang@kari.re.kr
Mr. Cheol-Hea KOO
KARI, Korea, Republic of, chkoo@kari.re.kr
Dr. Su-Kyum Kim
Korea Aerospace Research Institute (KARI), Korea, Republic of, skim@kari.re.kr
Dr. Jae Hyuk Lim
Korea Aerospace Research Institute (KARI), Korea, Republic of, ljh77@kari.re.kr

KOREAN LUNAR LANDER DEMONSTRATOR DEVELOPMENT UPDATE

Abstract

Asian neighbors Japan, India and China launched lunar exploration satellites into orbit recently and are planning to launch lunar landers on the moon surface in early 2010s with the ultimate vision of human lunar exploration. Korea is also planning to send a lunar exploration module in 2020s, while a launch of a manned Korean spacecraft is unthinkable thus far. KARI (Korea Aerospace Research Institute) has conducted the study on the conceptual study of lunar orbiter/lander prototype as well as lunar lander demonstrator development since 2010. In this paper, updated outcome of the preliminary and critical design study for Korean lunar orbiter/lander prototype presented. Firstly, the updated mission design and analysis for Korean unmanned lunar exploration are performed in case of low thrust optimization and weak stability boundary maneuvering. etc. The critical design results for structure and propulsion subsystem to satisfy the launch capabilities of the planned KSLV-2(Korea Space Launch Vehicle-2) are introduced. Each subsystem design for lunar lander demonstrator is also inherited from lunar orbiter/lander prototype. In addition, KARI has developed a 100kg class ground-based lunar lander demonstrator associated with a lunar mission simulator to demonstrate lunar landing technologies. Updated design features are also presented in this paper with focusing on its design concept, HILS based test scenario with lunar simulator, avionics, etc. Ground-based test results with using HAN-based green propellants are presented with the detailed explanation of its test facilities. In conclusion, the outcome of this design study and lunar lander demonstrator development can be extended to provide a proper guideline and input for the planned Korean unmanned lunar exploration in 2020s.