

IAF SPACE SYSTEMS SYMPOSIUM (D1)
Interactive Presentations - IAF SPACE SYSTEMS SYMPOSIUM (IP)

Author: Mr. Sang-Youn Shin
Korea Aerospace Research Institute (KARI), Korea, Republic of, syshin@kari.re.kr

Mr. Hyoungho Ko
Chungnam National University, Korea, Republic of, hhko@cnu.ac.kr

THE EFFECTIVE SYSTEM ENGINEERING FOR THE LUNAR EXPLORATION PAYLOAD SYSTEM

Abstract

In this paper, the payload development plans, concepts, processes, analysis and verification for the lunar exploration is introduced and studied using system engineering to complete all readiness for the launch. The lunar exploration payloads are under developing currently by the Korean lunar exploration program(KPLO) and will be launched in a few years. Because of a lot of restrictions of the lunar payloads development caused by the environmental reasons, it has different development processes with that of the general low earth observation satellite. The environmental features of the moon impact on the system requirements, design concepts, stability, reliability, life time etc. The moon has no air, the lower gravity than the earth, the different reflectance, higher temperature variance, etc. It can cause many restrictions for the thermal design, the reliability and the life time analysis, the orbiting instability impact, power management, etc. Also, KPLO's aim is to reduce the development cost and time. The lunar satellite bus system can provide much lesser system resources to the payloads system than other satellite programs. It affects the power capacity, weight and envelop budgets, etc. Therefore, this paper describes the new development processes and verification method. The KPLO's main purpose is to take information on the lunar surface and it consists of several payloads on the same satellite bus system with the small system budget. So, the design requirements are tight but the required performance is high to perform many missions by the various payloads to get lots of information as much as possible. It isn't enough to solve the problem with the conservative development processes of the earth observation program. The payload requirements and design is optimized and the verification plan is well planned. Then, the total development time and cost can be reduced with new system engineering method.