SPACE EXPLORATION SYMPOSIUM (A3)
Moon Exploration – Part 3 (2C)

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NEW KOREAN LUNAR EXPLORATION PROGRAM (KLEP): AN INTRODUCTION TO THE OBJECTIVES, APPROACH, ARCHITECTURE, AND ANALYTICAL RESULTS

Abstract

Leading countries in space exploration have ambitious plans to launch their robotic lunar landers before 2020. According to the new government's key vision and goals recently announced, the fusion of science and technology with industry creation is the first objective out of 5 major goals. A new KLEP associated with the second generation Korean space launch vehicle program was initiated by new Korean president to help the first major goal and realize people's security and happiness. The key focus of the KLEP is to make a lunar lander landed on the moon surface by 2020. Motivated by the president's vision, the strategic planning study to design and implement a program of robotic lunar mission has been conducted since early 2013. In this paper, an overview of newly issued Korean lunar exploration program is introduced as a result of the planning study. A set of scientific and engineering requirements raised by science and engineering definition teams are identified, categorized and prioritized to achieve goals for Korean lunar mission. National, social, and education needs are also enumerated in this study. Strategic approaches are investigated by defining assumptions and constraints with consideration of domestic space program and international lunar program status. To establish a link between the requirements and proper program milestones, a set of mission and timeline are specified with an orbiter and a lander. The lunar sample return program can be included in the milestone as final technological and scientific goal of Korean lunar mission. With suggested baseline architecture timeline for Korean lunar mission, current technological and scientific capabilities are surveyed to create the RD strategies in each field. The strategy to align with the Next Generation Middle Class Satellite program is also suggested to share the bus subsystem heritage. The CBA of the baseline architecture is computed and presented based on the cost models and inherited experience from previous satellite program in Korea. Finally, a set of analytical results are presented including mission scenario analysis, feasible configuration design compatible with KSLV-II, mission implementation analysis by assessment of appropriate platform combination, risk analysis, and schedule analysis to compromise with the 2nd generation of Korean space launch vehicle program. In conclusion, the outcome of this planning study for the new KLEP could be definitely the concrete cornerstone to initiate the new ambitious Korean lunar mission and to open up the 'new era of Korean space pioneering before 2020.