

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

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A COMPARATIVE STUDY OF LUNAR MISSION REQUIREMENT AND ONBOARD PROPULSION
SYSTEM PERFORMACE

Abstract

After the project Apollo's first successful human landing on the Moon in 1969, whole lunar exploration programs of the United States have been suspended over 20 years due to enormous financial expense and a rapid decrease of interest in Moon. But since two low cost lunar orbiters, the Clementine and the Lunar Prospector, were launched by US again from mid of 1990s, an interest in Moon revived, and thus the lunar exploration programs have been restarted though related activities were low-key compared to the frantic efforts over the past decades. Recently, several nations progress their own lunar exploration program successfully, such as SMART-1 from ESA, Chinese Chang'E-1, Japanese SELENE-Kaguya, Indian Chandrayaan-1 and finally US lunar reconnaissance orbiter, etc. Unlike a satellite orbiting around the Earth, it is recognized that developing an onboard propulsion system of the orbiter is one of the most important works because it is not simple to make the orbiter arrive correctly to the other planet far from the earth. Hence, selecting a proper type of the onboard propulsion system usually depends on several factors. In this study, the mission requirements of various lunar orbiters launched since 1990 will be surveyed first. Then, a trade-off study will summarize the technical trends of the onboard propulsion systems of the recent lunar orbiters and their key design performance specifications. By comparing these features, the present study intends to investigate which lunar mission requirements are critical factors, and how they can effect on the overall performance of onboard propulsion system.