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JAXA'S ROADMAP AND CONCEPTS OF FUTURE LUNAR LANDING MISSIONS

Abstract

JAXA has been developing a roadmap and concept study of lunar landing missions. SLIM (Smart Landing for Investigating Moon) is a current progressing lunar landing project, which plans to develop a hundreds-kg wet mass sized lander and to land on low latitude area of lunar surface in 2023. The major mission purpose of SLIM is to develop and demonstrate pinpoint landing technology by optical navigation. Proceeding by SLIM, JAXA is studying a next generation lunar lander aiming to inherit and expand the technologies from SLIM's achievement. This lander is designed as thousand-kg wet mass size and JAXA requires this lander that land on the south pole region where is supposed to be the main area of activity for international lunar exploration, targeting to launch in the late 2020s. The major purpose of this project is to transport several payloads such as science mission probes, lunar navigation satellite system demonstration and lunar surface environment measurement instruments. In tandem with that payload transportation mission, JAXA also aims to acquire the optical navigation based pinpoint landing technology even though under the low elevation sunlight condition of polar region, through this opportunity. JAXA places importance on the pinpoint landing technology on wherever want to go because it is supposed to be the essential technology for the future lunar logistics. Furthermore, JAXA is studying a concept of further generation lunar lander, which is mainly for cargo logistics of human lunar exploration and large size science observation missions. This lander is designed as more than 10tons wet mass size, called Mid-sized lander. In order to transport cargo to the moon as much as possible, JAXA assumes high Isp cryogenic propulsion system is one of the effective means and JAXA is promoting related RD (high performance MLI, deep throttling engine, etc..). This paper reports the latest status and technical information about concept study of JAXA's future lunar landing missions and displays the stepwise programmed Roadmap.