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

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CHANDRAYAAN-2: INDIA'S FIRST SOFT-LANDING MISSION ONTO MOON

Abstract

The quest for knowledge had always been the main driving force for any exploration in general and space exploration in particular. With four billion years of solar system history preserved in it, the Moon, nearest neighbour of the Earth, had always evoked intense curiosity. After the initial euphoria in the sixties and seventies there had been a lull in the lunar exploration. In the recent times, there had been rejuvenation due to the possibility of certain distinct advantages the moon could provide, as a platform for future Deep Space missions and also the emerging possibility of certain exploration for the benefit of mankind, in addition to scientific objectives. India, as one among the very few space faring nations, has chalked out its own roadmap through Chandrayaan-1. Chandrayaan-2, second in the series, features a lander, and a rover along with an orbiter. International cooperation has been the hallmark of Indian Space Programme since its inception. Chandrayaan-1 was one of the most exceptional examples of international collaboration towards exploring moon. In Chandrayaan-2, Russia and India will jointly participate towards fulfilling the mission goals. Chandrayaan-1 and other contemporary missions by other countries, are primarily lunar polar orbiters aimed at chemical and mineral mapping of the moon, targeting both science and exploration objectives. Mission objectives of Chandrayaan-2 are;

- To design, realize and deploy a Lunar Landerrover capable of Soft Landing on a specified lunar site to enable in-situ determination of chemicals, maximally using the data gathered during Chandrayaan-1 Mission.
- Carry payloads in the orbiter that will enhance the scientific objectives of Chandrayaan-1 with improved resolution.
- Develop and demonstrate newer technologies, including those needed for sample return that will be useful for future planetary missions

This paper presents the overall configuration of Chandrayaan-2 mission, challenges, how lessons learnt/field experience of Chandrayaan-1 converted into opportunities, different options studied, configurations worked out, trade-off studies made, optimization studies, reconfigurations of some of the Chandrayaan-1 systems, payloads, overall mission profiles, project management etc. Chandrayaan-2 adopts a judicious choice of flight proven as well as technology demonstration elements, while ensuring a reliable lunar mission. The spacecraft is configured to meet mission specific needs required in different phases of the mission including payload pointing, data transmission and reception, storage schemes, power generation, distribution and management, autonomous operation etc.