

IAF SPACE EXPLORATION SYMPOSIUM (A3)
Solar System Exploration including Ocean Worlds (5)

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DESIGNING OF A MULTI-USE SATELLITE STRUCTURE TO STUDY TITAN

Abstract

Analysis of data collected from the Cassini mission shed some light on the composition of the surface of Saturn's moon Titan. However, there exists a large number of questions presently remaining unsolved about its atmospheric composition, terrain mapping, methane deficiency near the surface, etc. We propose the idea of launching a satellite plus lander mission to Titan, a moon of Saturn to study the environment of the moon. The primary objective of the satellite would be to maintain a steady orbit around Titan, conducting preliminary analysis of the moon through observations in multiband spectrum with greater resolution, terrain mapping, atmospheric composition studying, etc. The satellite would also consist of a gradiometer through which analysis of the subsurface could be done. The lander would consist of a rover plus a nuclear-powered mini-helicopter where the rover would conduct analytical testing of the soil of the surface, studying the characteristics of the soil, low-level atmospheric studies, therefore helping to solve the methane problem and the structure of methane lakes on Titan. The helicopter would conduct small surveys of the surface of Titan, helping to map the structure with great detail, providing key sites for future settlement missions, and the terraforming of Titan. The mission altogether would help scientists gather comprehensive data of the moon which could also be used for further habitat missions on the moon.