Exploration of Other Destination (6)
Exploration of Other Destination (1)

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THE FEASIBILITY STUDY OF THE HOVERING EXPLORATION

Abstract

At present,the maneuver capability in large area on celestial bodies by mainly used exploration methods, including orbit exploration, landing exploration, rovering exploration and sampling and return to Earth, is greatly constrained by landform features and topography conditions of the destination. The hovering exploration is a newly developed method for exploration on celestial bodies with atmosphere. By "flight" maneuver, probes can take full advantage of planetary atmosphere to collect more scientific exploration data. By hovering exploration, the maneuver defects of probes can be overcome. In this paper, the concepts of a hovering probe and its working modes are proposed. A six-degree dynamic model of the probe is set up. Together with careful study on the environment of planets and other celestial bodies with atmosphere in solar system, the dynamic characteristics of hovering probe is demonstrated and its exploration targets are listed out. Based on the study results, the evaluation coefficient of feasibility (ECoF) of hovering probe is proposed for the first time, thus to lay out solid theoretical foundation for the feasibility study on usage of hovering probe in deep space exploration.