Lunar Exploration (3)
Lunar Analysis & Simulation (4)

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ANALYSIS OF THE INFLUENCE OF TERRAIN OF THE FARSIDE OF THE MOON ON SOFT-LANDING

Abstract

Chang'e 4 probe is scheduled to be launched in about 2018 and land on the farside of the moon for the first time of all human. Compared to Chang'e 3, the terrain on the farside of the moon is rugged and complex and there is no large flat area, so the change of the terrain and landform will affect the soft-landing of Chang'e 4. Based on the analysis of the Chang'e 4 landing site on the South-Pole Aitken Basin, this paper analyzes three aspects of the influence including the mission design, the lander design and the lunar working procedure. The main conclusions are as follows: 1) The landing area is reduced from the magnitude of hundreds of kilometers in Chang'e 3 to the tens of kilometers in Chang'e 4, and the latitude and longitude range of the landing area were 2° and 1° respectively; 2) In the power descent the strategy after the main deceleration phase is changed from the oblique forward motion trajectory to vertical down the trajectory, and the operation time of the distance measuring sensor is also changed; 3) The signal transmission powers and signal to noise ratios of the microwave ranging and velocity sensor will be improved; 4) It is need to predict the lander lighting and communication by the terrain occlusion, and then design operation strategies such as sleep mode or eclipse mode. Through the modification, Chang'e 4 mission can be adapted to the changes in the topography of the farside of the moon to reduce the risk of landing and lunar mission.