

IAF SPACE EXPLORATION SYMPOSIUM (A3)
Moon Exploration – Part 1 (2A)

Author: Ms. Yang Zhao
China, zy501cast@163.com

Mr. fei li
Beijing Institute of Spacecraft System Engineering China Academy of Space Technology (CAST), China,
kuokuolee@163.com

Mr. Xue Ying Wu
China Academy of Space Technology (CAST), China, wuxueying@sohu.com

Prof. Zhang He
China Academy of Space Technology (CAST), China, zhanghe_maoqiu@163.com

DESIGN METHOD OF PRECISE LANDING SITE SELECTION AND EVALUATION FOR
CHANG'E-4 MISSION AND IN-ORBIT VERIFICATION

Abstract

The Chang'e-4 lunar probe safely landed in Von Karman crater of South-Pole Atiken (SPA) basin on the farside of the Moon on 3rd, Jan. 2019. To select proper landing site from rugged area in SPA is prerequisite for the success of Chang'e-4 mission. Conditions of scientific requirements, constraints for implementation, as well as lunar environment and topography, etc. should be carefully taken into consideration while selecting targeted landing sites. According to our study, the lunar topography features generally can be described by surface slopes, crater densities, rock abundances and the occlusions to the sun. These mainly influence the powered-descending process, landing safety and the locomotion capability of lunar rover. In this paper, four major landing sites in large areas are selected according to the scientific requirements and implementation constraints. Then, based on the remote sensing and survey information of these landing sites, the major terrain features of these areas are analyzed. Based on fuzzy reasoning method, the landing site evaluation and selection fuzzy model are set up to precisely pick out smaller regions. Finally, according to the actual powered-descending process and landing site survey result of Chang'e-4 lunar probe, the selection model and method are verified to be available for this mission. The methods can benefit future missions of soft landing on celestial bodies.