

Lunar Exploration (3)  
Lunar Technologies (2B)

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## THE SYSTEM DESIGN OF THE COMMUNICATION RELAY SATELLITE FOR CHINESE LUNAR FARSIDE EXPLORATION MISSION

### Abstract

Chang'e-4 (CE-4) is a Chinese landing exploration mission on the farside of the moon. Chang'e-4 is composed of a lander, a rover and a communication relay satellite. The lander and the rover on the lunar farside will require a communication relay satellite to maintain contact with the Earth during their landing and surface operation. The communication relay satellite is an important part of Chang'e-4 farside exploration mission. Additionally, it is possible to provide communication relay for other lunar farside exploration mission in the future. This paper gives the system design of the communication relay satellite. Different from other spacecraft for lunar mission, a halo orbit around the Earth-Moon L2 libration point is used to provide a continuous communication link to the lander and the rover on the farside of the Moon. In order to reduce development period and cost while ensure high reliability, CE-4 communication relay satellite is developed based on mature small satellite platform developed by DFH Satellite Co. Ltd. The communication relay system was re-designed according to requirements and interface constraint from the lander and the rover. To meet relay capability, a large aperture antenna with 4.2m diameter was selected for communication relay. The communication relay satellite will be launched using CZ-4C launch vehicle half a year before the launching of the lander and the rover. Through several orbit maneuvers and lunar flyby, the communication relay satellite can reach its final halo operation orbit to provide relay support for the lander and the rover. Apart from communication relay, low frequency radio observation and new technology demonstration can be performed by this spacecraft.