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

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VISUAL TELEMETRY TECHNOLOGY AND ITS APPLICATION IN DEEP SPACE EXPLORATION

Abstract

Deep space exploration is characterized by complicated tasks and various forms. In order to meet the requirements of monitoring, measurement, imaging and display in the course of flight,the paper puts forward the technology of visual telemetry. Firstly, the camera is used to monitor the action of the explorer directly, and based on the principle of vision measurement, the camera model is used to analyze and calculate the velocity of the explorer. Secondly, based on the camera model, illumination, orbit and attitude data of the explorer, a strategy which used to imaging celestial bodies with a specific geometric relationship has been designed. Finally, by designing the deblurring algorithm of the large blurred images and the mosaic algorithm of the multi-rail side-sway images, the method which remote sensing the celestial body surface by CMOS array camera under high dynamic condition is acquired. The flight results of Circumlunar return and reentry spacecraft of 3rd phase of China Lunar Exploration Program showed that the velocity between the re-entry module and the service module,the first photo of earth-lunar and the lunar remote sensing images with highest resolution in China have been obtained in turn in the course of the task, the practicability and validity of visual telemetry technology has been proved.