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

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AN OVERVIEW OF CHINESE CHANG'E-3 LUNAR LANDER PAYLOADS

Abstract

1 Mission. Chinese Chang'E-3 spacecraft, which include a Lander and a robotic rover, landed successfully on moon at 13:11 Ground UTC on December 14, 2013. The scientific objectives of the Lander mission were to: Examine the texture, mineralogy, and structure of the local lunar terrain; operate an ultraviolet astronomy telescope on the moon and images the distribution of He+ in Earth's plasmasphere. Four kinds of scientific instruments are chosen for Chang'E-3 Lander, which include Topography Camera, Lunar Optical Telescope, Extreme Ultraviolet Imager and Lander Descent Imager so on.

2 Scientific Payloads. 2.1 Topography camera. Topography camera is a high-resolution color CMOS cameras used to image the lunar surface and YuTu lunar exploration rover. The cameras are located on a camera bar that sits on top of the CE-3 Lander. Scientists use camera to create a map of the area where the CE-3 Lander lands, as well as search for interesting rocks to study. Engineers are more interested in observing YuTu lunar exploration rover. The camera field of view is 2352 x 1728 pixels.

2.2 Lunar Optical Telescope. Man's first optical-astronomy observations from the lunar surface were made by the Apollo 16 astronauts. The experiment demonstrated the great value of the lunar surface as a site for astronomical observatories. Chang'E-3 Lunar optical telescope was designed and constructed for studies of the celestial objects from the lunar surface. LOT uses a high performance CCD and works in the wavelength range from 2200 to 3500 angstroms. Pointing is accomplished by using mirror located on an altitude-azimuth mount.

2.3 Extreme Ultraviolet Imager. The Extreme Ultraviolet Imager images the distribution of He+ in Earth's plasmasphere by detecting its resonantly-scattered emission at 304 Å. EUV consists of a MCP detector, a common electronics module, a high-voltage power supply, an 8w RHU to survive in cold lunar night. EUV imager also has two separate motors. One motor turns the cameras in the horizontal plane and another turns the cameras in the vertical plane. EUV imager can always point to Earth by changing orientation once every day.

2.4 Descent Imager. The Lander Descent Imager took video during the CE-3 spacecraft's descent toward the lunar surface. Knowing the location of rocks and other features of the terrain is important for planning the lunar Yutu rover path of exploration. The Descent Imager also provided information about the larger geologic context surrounding the landing site.