

SPACE EXPLORATION SYMPOSIUM (A3)  
Moon Exploration – Part 2 (2B)

Author: Dr. Baofeng WANG

1)Science and Technology on Aerospace Flight Dynamics Laboratory, China,2)Beijing Aerospace Control Center, China, China

## A POSITIONING TECHNOLOGY OF LUNAR ROVER TELEOPERATION BASED ON VISION

**Abstract**

According to China's lunar exploration project planning, " Landing on the moon " is the core task of the second phase of the project. China plans to launch Chang'e -3 lunar probe (including the lander and Rover ) in 2013. This will be the first lunar soft landing flight test. In 2014, we will implement the second lunar soft landing and patrol detection. Among them, lunar rover teleoperation is one of the important contents of the second phase of the Chang'e project. In the rover teleoperation, Navigation of lunar rover is the basis of scientific detection. Positioning accuracy determines the success or failure of the task. At present, the relative position accuracy of 2D is about 100m by Same beam interferometer to relatively locate between the Lander and Rover. The result is far from satisfying the requirements of navigation of lunar rover. Therefore, this paper presents a method for the precise location of lunar rover by the navigation camera. In this paper, we introduce the Chang'e-3 mission, and are focused on the visual localization teleoperation. Affine-SIFT method is first used to match corresponding points of adjacent site. The correlation coefficient matching algorithm will finish the same name point match in the same site with pixel level. Then least squares matching algorithm can achieve sub-pixel level match. Finally the current site of the lunar rover can be located by bundle adjustment method. Theoretical accuracy shows that the visual positioning accuracy is better than 3.5