

Effects of Undiscerned Craters on Lunar Rover Traveling Distance

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The high resolution stereo camera of the SELENE will provide us with the data of spatial resolution of 10 m. Since at least several pixels are necessary to recognize an object, obstacles with less pixels are undiscerned. Though the route of a lunar rover is planned according to the science purpose based on the data obtained from the former mission, the rover has to make a detour to avoid those unexpected obstacles. To attain the mission purpose, we have to adapt the rover design to this traveling distance. To estimate the traveling distance of the rover, we made a simulation model. The model consists of a virtual lunar surface and a virtual rover which travels on the surface. We suppose that the obstacles on the route are craters, and virtual craters on the surface are generated based on the E. M. Shoemaker's distribution equation. The virtual rover travels to the goal veering away the craters. As the obstacle avoidance algorithm for the rover, we adopt the Tangent Bug algorithm which is developed for the sensor based autonomous mobile robots. Using this model, we also examine the effects of the obstacle sensor range.

This simulation model will be expected be used as the basis for the rover system design to determine the size of motors, solar panels, and so on.