

Path tracing of the Chandrayaan-3 Rover from OHRC images

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The Chandrayaan-3 Pragyaan Rover traversed a path of approximately 101 m on the lunar surface after the soft landing of Chandrayaan-3's Vikram Lander on 23 August 2023. Experiments were carried out by the two science instruments, namely APXS and LIBS mounted on the rover. A rover traversal path was plotted over the image captured by the Orbiter High Resolution Camera (OHRC) onboard the Chandrayaan-2 orbiter, taken after the post-landing of the Vikram lander. This plot was based on the mobility commands uploaded to the rover through lander. Subsequent opportunities of imaging the landing site by OHRC could not infer the rover mobility path due to poor illumination conditions over the site. However, recently acquired OHRC image had better illumination conditions and the images were analysed for fetching the rover mobility tracks. Since the rover tracks could not be seen directly in the images, they were further processed to find the rover in-place turn locations, as these must have done the maximum disturbance to the regolith. However, these changes could not be clearly detected using some of the conventional methods. Hence, an indigenous technique was adopted to detect these changes. The present article discusses the findings on the possible landmarks left back by the rover mobility and its coordinates on the lunar terrain.

Keywords: Chandrayaan-3, moon, OHRC, regolith change detection, rotations, rover.