PLANNING AND OPERATIONS USING ORBITER HIGH RESOLUTION CAMERA ONBOARD CHANDRAYAAN-2.

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Introduction: Orbiter High Resolution Camera (OHRC) is designed to provide spatially high resolution images of moon surface in visible panchromatic band. The Ground Sampling Distance (GSD) for OHRC at nadir is 0.25 m. The main goal of OHRC payload was to capture images of the landing site for finding hazard-free region for Chndrayaan-2 lander Vikram. Post landing, the payload is utilized for finding landing sites for Chandrayaan-3, capturing permanently shadowed regions (PSRs), Lupex Sites and rocket booster impact site. With stereo imaging, high quality digital elevation models (DEM) are also created.

Effective payload planning and operations are carried out to capture the images of target sites while meeting the constraints. Firstly, the orbit is maintained between 85 kms to 110 kms above the target site. The payload is designed for imaging in very low sun elevation conditions (< 12 deg), due to which the opportunities to image a particular site comes after long gaps. The swath of the camera is 3 km and a maximum of 16 secs of imaging is only possible during one acquisition due to baseband data handling constraints. So, to cover an area of 14 km x 25 km, it takes six acquisitions with overlap. This constraint also calls for high precision of orbit determination and propagation. Proper roll and pitch biases, integration time and selection of Time Delay Integration (TDI) stages are required to be uplinked for capturing the images. Payload Planning System (PPS) also takes care of Solid State Recorder (SSR) memory management for recording and playback of the acquired data considering different ground station configurations.

Figure 1: Target Site Strip Imaging Paths

Figure 2: OHRC Image after data processing

Results: Figure-1 shows the plan for capturing an area of 14 km x 25 km over 6 orbits. After acquisition of images, the data was downloaded over IDSN station and processed by DP team. Fi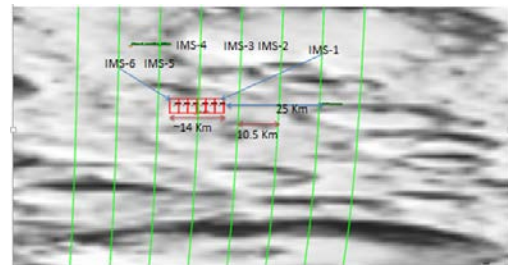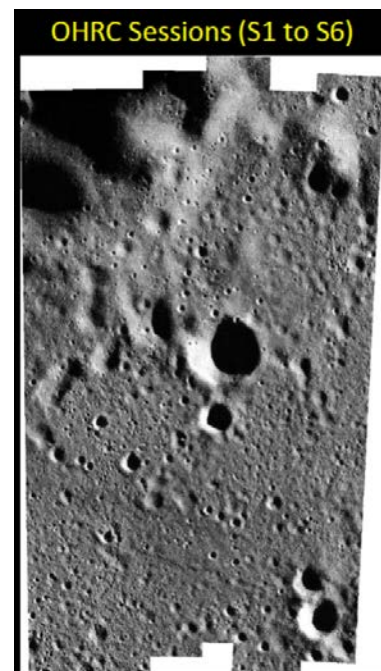gure-2 shows the output image after processing the data.