Image Processing and EDS Analysis Using ImageJ

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MoonRIDERS is a joint-collaboration partnership between PISCES, NASA Kennedy Space Center, Kealakehe High School, ‘Iolani School, and a Google Lunar X Prize team; its main focus is to test and validate the Electrodynamic Dust Shield (EDS) that will be tested on the lunar surface in 2017. Kealakehe’s role is to find the optimal placement of the EDS on a lunar footpad, and my role within Kealakehe is to lead up image analysis, discovering and deciding which variables directly impact that optimal placement. Extensive tests have been conducted in environments with similar conditions to the moon that test the effect of certain variables on the EDS’s repulsion abilities. Pictures were taken before and after the device ran to examine the amount of dust on the EDS within certain variables. The program ImageJ was used to quantify the pictorial results through a detailed process I outlined in which the total amount of dust pixels in the image was counted. These removal percentages were beneficial in understanding the effect of certain variables on how the EDS repels dust. Analysis proved the camera lens used as well as the ideal relationship between the camera angle and the EDS angle relative to the ground would provide with the most clear and precise coverage of the EDS. An improvement that was recommended to KSC was a change in the design of the EDS for future image processing; it was taken into account. My work with this experiment changed the course of a NASA experiment that will qualify multiple years of scientific research.

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