

IAF MATERIALS AND STRUCTURES SYMPOSIUM (C2)
Late Breaking Abstracts (LBA) (LBA)

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ASSESSMENT OF IMAGE PROCESSING METHODS APPLIED TO MONITORING THE
DEGRADATION RATE OF ABRASION FOR EMIRATES LUNAR MISSION MATERIAL SAMPLES**Abstract**

The MAD (Material Adhesion/Abrasion Detection) experiment was a part of the Emirates Lunar Mission with the aim of exploring material behaviours in the lunar environment. During operations, images of the materials would have been taken and successively analysed using image processing and segmentation techniques. Despite the unfortunate landing, an extensive test campaign was carried out using the rover's EQM (Engineering Qualified Model). This paper investigates algorithms to monitor degradation and abrasion rates to meet some of the scientific mission objectives of the MAD experiment. The methodology encompasses the use of the Laplacian filter, HED, and additional feature detection algorithms such as similarities, e.g., ORB and SSID. The analysis is performed for datasets differing in light conditions. This study concludes with a comparison of accuracy, computational efficiency, and adaptability, enabling a relatively fast post-processing of images. Hence, the results will lay the groundwork for future lunar and space exploration missions.