

APOLLO 12 LUNAR ORBITAL MULTISPECTRAL PHOTOGRAPHY EXPERIMENT

by

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The lunar multispectral photography experiment was accomplished successfully on Apollo 12. In the blue, green and red portions of the optical spectrum, 142 frames were returned. New photographic and computer image processing methods were developed to enhance and display subtle differences in spectral reflectivity within each frame. In addition to film calibration, ground based photoelectric photometry was used to verify color accuracy.

The existence of distinct color boundaries was established in several frames. However, analysis of 30 frames indicates that no major color differences exist 1) over a large portion of the central highlands, 2) between upland basin fill, upland plateau volcanics, and apparently older homogeneous highland material, 3) in the floor, walls and rim of Theophilus, a major Copernican age impact crater, 4) between certain parts of maria regions (Fecunditatis, Nectaris) and adjacent highlands, 5) within several maria themselves, and 6) within the portion of Fra Mauro Formation in the vicinity of the Apollo 14 landing site, and between this region and nearby mare areas. The relationships of these observations to known lunar color differences and their implications for lunar surface composition and processes are discussed.

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