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INSTRUMENT SCIENCE REPORT

CAL-FOS-002

TITLE: FOS Entrance Aperture Sizes

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ABSTRACT

The sizes of the 22 FOS entrance apertures are measured directly with a microscope, and their light transmittance is measured with the aperture map technique. The light transmittance is determined by the area of an aperture, so the aperture map results can be compared with the areas measured with the microscope. Two sets of aperture maps are discussed, the first taken during the ambient calibration in March, 1983 and the second during thermal vacuum testing in August 1983. The March aperture map results give relative areas that are between 8 and 100% larger than the microscope measurements. Particularly discrepant is the 0.1 arcsec blue side aperture. The two halves of this paired aperture are supposed to be the same size, but in the March maps the lower half transmits 60% more light than the upper half, conflicting with microscope measurements which show that they are the same size to within 5%. The August aperture maps also show the two halves to be the same size, but each is 15% smaller than the microscope measurements. For the other apertures, the August maps give areas that are 4 - 8% smaller than the microscope measurements, which are closest to the specifications. Uneven illumination, varying lamp brightness, light scattering from the sides of the small aperture holes, and cathode non-uniformity are considered as possible sources of error in the aperture maps, but none of these can adequately explain all the discrepancies. Further data is required while the FOS is at Goddard Space Flight Center in order to isolate the cause of the discrepancies.

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