

Abstract Submitted
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Orbital Debris Photometric Study HEATHER RODRIGUEZ, University of Houston-Physics Graduate Student — In an effort to better understand differences between optical and radar size estimates of orbital debris, a photometric study of debris pieces from an exploded mock satellite has been initiated. This study will take brightness measurements of debris of various shapes and sizes at varying phase angles and orientations. The Orbital Debris Program Office at NASA Johnson Space Center (JSC) has an array of debris pieces from a mock satellite that was exploded in the European Space Operations Centre's ESOC2 test. A Xenon lamp will be used to simulate solar illumination and a CCD camera will record a digital image in filters defining specific bandpasses in the visible spectrum. The illumination of the debris will be varied by observing at different phase angles and orientations through the programming of the robotic arm. The ultimate goal in the optical measurements group at JSC is to create an optical Size Estimation Model (SEM) that will correlate with the current radar SEM. The radar SEM uses laboratory produced debris pieces observed at different orientations to convert radar cross section to characteristic length. The optical cross section (OCS) of a target is a product of albedo and physical cross section, where albedo is defined as the fractional flux reflected from a surface. The albedo of an object is necessary to convert the brightness into a size. By examining the brightness variations as functions of surface material, shape, and orientation, a better determination of albedo or size may be obtained.

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