MEASUREMENT OF SPORADIC METEOR FLUX USING AN ELECTRO-OPTICAL SYSTEM. D. G. Braid[1], M. Campbell-Brown[1], P. A. Wiegert[1], [1]University of Western Ontario, Department of Physics and Astronomy, London, ON, Canada N6A 3K7

Introduction: With the continuing exploration of the solar system, it becomes increasingly important to understand the distribution of small bodies in interplanetary space, and the potential hazards they may present to spacecraft. Millimeter-sized objects represent a peak in the mass densitiy of solar system objects [1], and pose a significant hazard. By studying meteors observed in the Earth's atmosphere, we can sample and assess this population and gain insight to the flux, mass and speed distribution, and orbits of these bodies.

To determine these properties, we studied the flux of sporadic meteors using an electro-optical video system. Previous studies have measured the meteoroid flux using visual observers[2], photographic systems[3], and radar systems[4]. All observing systems have different instrumental biases; however, some are better understood than others. Visual observers are limited by training and have are limited (without instrumental aid) to meteors of +5 absolute visual magnitude and brighter. Photographic systems are restricted to brighter meteors, and therefore larger meteoroids. Intensified video systems can reach farther into the mass scale, and are restricted mainly by light conditions. Light pollution, overcast sky, and nighttime only observations limit the number of meteors and the meteor sources that we are able to observe[1]; however, these limitations are understood and can be taken into account. By comparison, radar systems have instrumental biases that are not as well defined, such as the ionization efficiency for head echo scattering radars and the initial radius effect for transverse scattering radars. The benefit of using a video system is that it provides an accurate set of data in the size range of interest with well-defined observing biases, and in the future we will be able to use the results to better understand the biases of radar measurements.

Experimental Setup: Two 25mm and one 50mm objective lens cameras were set up at two locations in Arizona, USA to collect two station video meteors in the range of 4th to 6th absolute visual magnitude. All three cameras used Gen III image intensifiers. Forty three hours of video data were recorded from April 26 to May 6 2006. The limiting stellar magnitude of the wide field camera systems was determined to be +7^{M} An analysis of astrometry and photometry was undertaken for several hundred meteors.

Analysis and Results: Photometric masses were determined for each meteor. A lower limit of meteor flux for each visible sporadic source was calculated using a maximum collecting area determined from a geometric approximation to the collecting volume (Fig 1). Results will show not only the flux for sporadic meteors in the millimeter size range, but also the photometric mass distribution of those meteors.

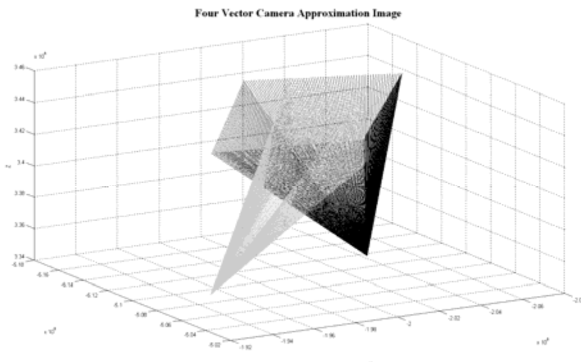

Figure 1: Collecting Volume Using Four Vector Approximation.

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