ESTIMATING THE NUMBER OF IMPACT FLASHES VISIBLE ON THE MOON AND MARS FROM AN ORBITING CAMERA. D. Koschny[1] and and J. Mc Auliffe[1], [1]European Space Agency, ESA/ESTEC, Keplerlaan 1, Postbus 299, NL-2200 AG Noordwijk, The Netherlands. Email: Detlef.Koschny@esa.int.

Introduction: As part of a technology study of the European Space Agency, a camera which could be used from the orbit of a planet to detect of meteors and impact flashes was recently developed to breadboard level (see *e.g.* [1]). This camera, called SPOSH (Smart Panoramic Optical Sensor Head), uses either an Electron-Multiplied or a standard back-illuminated CCD sensor, coupled to a very fast wide-angle lens in combination with image-detection software yielding a sensitivity of about $M_v = 6$ magnitudes for meteors or impact flashes. In this study, we make an estimate of the number of impact events per time observable with a flight version of this instrument visible from different lunar orbits and Mars orbits.

Brightness of an impact flash: Eichhorn *et al.* [2] performed measurements of the impact light flash generated by the impact of small particles at high speeds. More recent work was done *e.g.* by Ferri [3]. We analyse these and other studies to estimate of the brightness of an impact flash within the sensitivy range of the camera as a function of the mass and velocity of the impactor.

Particle flux: The impacts are generated by high-velocity particles hitting the surface of the target body. These come from the sporatic background of mteoroids in the solar system, and from meteor streams generated by comets and asteroids. We model the sporadic flux using the SPENVIS system [4], which in turn is based on the work by Grün *et al.* [5]. The flux density for Mars are basically unknown, but some extrapolation can be done.

Effect of the atmosphere: In the case of Mars, the atmosphere filters out the smaller and slower particles, which ablate and fragment in the atmosphere and may not survive to reach the surface.

Number estimate: We model the number of meteoroids hitting the Lunar surface by using the Grün flux at 1 AU. For Mars, we extrapolate to the Solar-Martian distance and model the reduction in number due to the atmosphere by applying a simple ablation model. Then we use the sensitivity parameters of the camera and the distance to the surface to estimate the number of impact events brighter than 6 magnitude as seen from the orbiting camera.

References:

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