

**PDC2017
Tokyo, Japan**

IAA-PDC-17-05-P35

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OBSERVATIONS OF LUNAR IMPACT FLASHES AND NEOS FROM EARTH-MOON L2 HALO OEBIT

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Keywords: *lunar impact flash, meteoroids, NEOs, TCOs*

ABSTRACT

High-velocity meteoroids are dangerous for manned lunar surface activities. Even though the meteoroid does not hit directly, fragments ejected by a meteoroid impact on the moon are fast enough to be hazardous. Thus it is very important to know the meteoroid flux on the moon. When a meteoroid impacts the moon at several tens of km/s, a brilliant flash at the point of impact can be observed as a lunar impact flash by the ground-based telescope. The lunar impact flash observed from the ground is biased due to atmospheric extinction and short term, few hours per day and 1/3 of a month, observing windows. EQUULEUS (EQUilibriUm Lunar-Earth point 6U Spacecraft) will demonstrate low-energy trajectory control techniques, such as multiple lunar flybys, within the Earth-Moon region proposed by University of Tokyo and JAXA. EQUULEUS will be launched by NASA-SLS (Space Launch System) in

2018. DELPHINUS (DEtection camera for Lunar impact PHenomena IN 6U Spacecraft) will be onboard EQUULEUS to observe lunar impact flashes and near-Earth asteroids when the spacecraft will stay around the Earth-Moon Lagrangian (L_2) halo orbit. Thus the distance from the lunar surface is approximately ten times closer than that of ground-based observation. As a result of estimation referred to Suggs et al.(2014), we can detect 339, 957 and 2699 assuming the limiting magnitude of 3.0, 4.0 and 5.0 respectively by DELPHINUS during 6 months mission phase while NASA's meteoroid impact program has detected 300 flashes in 7 years. We will present DELPHINUS camera system and the space-based observation of the lunar impact flash.
