

## Development of micrometeoroid impact sensor within a multi-layered insulation (CLOTH) onboard 6U deep-space explorer EQUULEUS

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In recent years, the use of CubeSat for deep-space exploration is remarkably expanding. Equilibrium Lunar-Earth point 6U Spacecraft (EQUULEUS) project led by the University of Tokyo and JAXA is one of 13 sub payloads which will be launched by the NASA' s new rocket, Space Launch System (SLS) in 2019 or later. In addition to the engineering mission of orbital maneuvering, EQUULEUS will perform 3 scientific missions consisted of geo-corona, lunar impact flash, and micrometeoroid observations on the way to the Earth-Lunar libration point 2. Our Cis-Lunar Object detector within THERMAL Insulation (CLOTH) is a piezoelectric film sensor integrated with the EQUULEUS' s multi-layer insulation (MLI). CLOTH can detect micrometeoroid which impacts and penetrates the outermost layer of EQUULEUS's MLI. The space flight demonstration of CLOTH will expand the possibility of deep-space exploration by CubeSat. In this presentation, we introduce the concept of CLOTH, i.e. micrometeoroid detector integrated with a spacecraft bus component, and the detection performance estimated by hypervelocity microparticle impact test on the ground.

Keywords: Piezoelectric film, PVDF, Thermal insulation, CubeSat, Micrometeoroid, Hypervelocity impact

