



Passive Measurement of Dust Particles on the ISS (MPAC): Status Report of the Post Flight Analysis

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The Micro-Particles Capturer (MPAC) is a passive experiment designed to evaluate the micrometeoroid and space debris environment, and to capture particle residues for later chemical analysis. MPAC experiments are not only useful for evaluation of the dust (meteoroids & debris) environment in the orbit of the International Space Station (ISS), but also useful in estimating the effects of dust collisions on the ISS and of its own emission of debris. MPAC is consisting of three identical units (numbered 1 to 3), each containing silica aerogel [hereafter aerogel], polyimide foam and an aluminum witness plate. It is mounted on a frame about 1 m long, which it shares with the Space Environment Exposure Device (SEED), a materials exposure experiment, and deployed on the exterior of the Russian Service Module (SM) of ISS. Three SM/MPAC&SEED units were launched aboard Progress M-45 on 21 August 2001, and attached side-by-side on a fixture mechanism attached to a handrail outside the SM on 15 October. The first unit (hereafter SM1/MPAC&SEED) was retrieved via EVA after 315 days of exposure, and brought back to Earth on board Soyuz TM-34. Then SM2/MPAC&SEED was retrieved after 865 days of exposure and SM3/MPAC&SEED was retrieved after 1403 days of exposure. All SM/MPAC&SEED units were retrieved safely. In this paper we focus on the post flight analysis, especially (1) Visual inspection of the whole surface of MPAC&SEED units, and (2) Impact feature morphology and track analysis in the MPAC silica aerogel.