MATERIALS AND STRUCTURES SYMPOSIUM (C2)
Space Structures - Dynamics and Microdynamics (3)

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MICRO-VIBRATION MEASUREMENTS ON THERMALLY LOADED MULTI-LAYER INSULATION SAMPLES

Abstract

Some scientific missions require to an extreme extent the absence of any on-board micro-vibrations. Recent or planned missions to be named to this respect are GOCE and MICROSCOPE.

Based on evidence from previous missions, multi-layer insulation (MLI) type thermal control blankets were identified as a structural element of spacecrafts which might deform under temperature variations as caused by varying thermal irradiation on orbit. Any such deformation exerts tiny forces which may cause small reactions resulting in micro-vibrations, in particular by exciting the spacecraft eigenmodes.

In order to quantify such micro-vibration events under simulated on-orbit conditions, respectively as a more general approach, to support the assessment of structure elements with respect to thermal creak, a dedicated test bench and specific test procedures were established to resolve micro-vibration events in the range of some 10 micro-g.

In this paper, the test bench and the related test performence procedures will be explained. Also, the results to obtained from real test applications will be presented.