

MATERIALS AND STRUCTURES SYMPOSIUM (C2)

Space Structures II - Development and Verification (Deployable and Dimensionally Stable Structures) (2)

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A HIGH-ACCURACY MICRO-DEFORMATION MEASUREMENT METHOD FOR
HIGH-RESOLUTION SPACE CAMERA COMPLEX STRUCTURED**Abstract**

The requirement for ever-increasing-resolution space cameras drives focal length and diameter of optical lenses be increasing. High-frequency vibration in the process of launching and complex environmental conditions of the outer space generate micro deformation in components of space cameras. As a result, images from the space cameras are blurred. Therefore, it is necessary to measure the micro deformations in components of space cameras in various experiment conditions. This paper presents a high-accuracy micro deformation measurement method. The method is implemented as follows: (1) fix Tungsten-steel balls onto a space camera being measured and measure the coordinate for each ball under the standard condition; (2) simulate high-frequency vibrations and environmental conditions like the outer space to measure coordinates for each ball under each combination of test conditions; and (3) compute the deviation of a coordinate of a ball under a test condition combination from the coordinate of the ball under the standard condition and the deviation is the micro deformation of the space camera component associated with the ball. This method was applied to micro deformation measurement for space cameras of different models. Measurement data for these space cameras validated the proposed method.