## MATERIALS AND STRUCTURES SYMPOSIUM (C2) Space Structures II - Development and Verification (Deployable and Dimensionally Stable Structures) (2)

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## THE DEVELOPMENT OF DIMENSIONALLY STABLE CFRP CAMERA STRUCTURE DEOGGYU LEE1, EUNGSHIK LEE1, SUYOUNG CHANG1, ANDREAS KASEMANN2, DIETMAR SCHEULEN2, TOM BUTTERS2 1 KOREA AEROSPACE RESEARCH INSTITUTE, 45 EOEUN-DONG, DAEJEON, 305-333, SOUTH KORE

## Abstract

The main instrument of the Earth Observation satellite KOMPSAT 3 (Korean Multi-Purpose Satellite 3) is a large optical camera consisting of mirrors out of ZERODUR Primary Mirror, a high performance CFRP structure and a Focal Plane Assembly with 2 panchromatic and 4 multi-spectral channels from 450 to 900 nm wavelength. The  $\emptyset$  1.2 x 2 m-sized CFRP camera structure has been developed for this project and confirmed achieving an extreme dimensional stability of 0.2 m/1K and simultaneously a Coefficient of Moisture Expansion of nearly Zero for the most critical distance between Primary and Secondary Mirror through very tight and accurate control for the fibre angle during the lay-up, resin content and other manufacturing parameters. For the verification of the performances the usual environmental test procedures have been applied (thermal cycling, TV-test, vibration and shock test), but they have been extended by high precision absolute dimensional measurements using 3D-measurement machine before and after the tests and stability measurements under temperature loads and vacuum. For the dimensional stability measurements device with ZERODUR rods and optical sensors has been designed and established. It provides accuracy in the sub-m range, even under temperature changes and vacuum. The paper mainly focuses on the CFRP camera structure, the manufacturing of the hardware and the tests for verification.

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