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# THE DEVELOPMENT OF DIMENSIONALLY STABLE CFRP CAMERA STRUCTURE

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**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 Ø 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 a dedicated measurement 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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