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

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A TWO METERS CLASS TELESCOPE DESIGNED FOR HIGH STABILITY ACHIEVEMENT

Abstract

In the frame of SNAP (Super Novae Acceleration Probe) one of the candidate missions for Dark Energy, CNES, working with the US DOE (Department of Energy), awarded a contract to Thales Alenia Space for the Optical Telescope Assembly (OTA) assessment study. SNAP telescope is a Korsch type with an entrance aperture of two meters. The mission requirements have been derived in terms of geometrical stability performance on the telescope and notably on the M1/M2 distance stability to be less than 20nm/hour including M1 mirror radius of curvature stability. These demanding requirements within a disturbed thermal environment (daily communication slew) have been drivers for telescope concept selection. Thales favoured a telescope design based on zerodur mirrors and CFRP structure for the low CTE of these materials that are mandatory for the achievement of the required stability. This telescope concept is therefore based on well known technologies securing development and programmatic and recent Zerodur machining improvements give attractive mass/area ratio (less than 50kg/m) for a such large primary mirror. Detailed design of the telescope has been done to demonstrate the achievement of stiffness, mass and overall performances under launch loads and thermal environment. Analyses have been focused on the primary mirror behaviour with a particular attention on its image quality under gravity: A whole verification approach has been proposed to manage the telescope performance from step by step measurement up to an end to end final test.