

Lotus Mechanism: Validation of Deployment Mechanism Using Structural and Dynamic Analysis

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Abstract : The purpose of this paper is to validate the concept of the Lotus Mechanism using Computer Aided Engineering (CAE) tools considering the statics and dynamics through actual time dependence involving inertial forces acting on the mechanism joints. For a 1.2 m mirror made of hexagonal segments, with simple harnesses and three-point supports, the maximum diameter is 400 mm, minimum segment base thickness is 1.5 mm, and maximum rib height is considered as 12 mm. Manufacturing challenges are explored for the segments using manufacturing research and development approaches to enable use of large lightweight mirrors required for the future space system.

Keywords : dynamics, manufacturing, reflectors, segmentation, statics

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