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

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WRAP-RIB ANTENNA DEPLOYMENT ANALYSIS BY RAYLEIGH RITZ METHOD

Abstract

A wrap-rib antenna has been developed at i-QPS and is used in space to provide high gain radio wave transmission/reception for synthetic aperture radar mission. The antenna is sowed during the launch phase and is deployed in orbit. It is essential to have an accurate deployment dynamic model to evaluate deployment procedure in space from gyro and accelerometer data on the satellite main body. FEM models are commonly used but a classical approach of Rayleigh-Ritz method is adopted so that various deployment steps can be easily confirmed by integration of a simple analytical model. The antenna is represented by 24 radial flexible beams whose tips are inter-connected with additional beams. A stepwise model construction and verification will be described, leading to a clarification of the overall antenna dynamics during deployment in space.