

Introduction: Analysis of Gossamer Spacecraft

IN this second of four special sections of the *Journal of Spacecraft and Rockets*, we are pleased to bring you a selection of papers originally presented at the 2001 Gossamer Spacecraft Forum (42nd AIAA Structures, Structural Dynamics, and Materials Conference, Seattle, Washington). Gossamer spacecraft (GS) have captured the imagination of many engineers and scientists of late because the technology is enabling of many applications and missions such as large communications and imaging apertures, solar sails and solar thermal propulsion, and planetary exploration and habitation.

The analysis of GS is challenged by the highly nonlinear behavior characteristics of ultralightweight and compliant structural systems. Because reduction in weight is usually achieved through some combination of reduction in girth or modulus (materials with lower densities often are accompanied by lower modulus) or both, GS typically exhibit high structural compliance or flexibility. Furthermore, materials of interest for GS are themselves com-

plex, exhibiting nonlinear and often time-dependent constitutive behavior.

Today, a number of issues in the analysis of GS are being addressed, including 1) large deformation static and dynamic modeling, 2) membrane wrinkling, 3) thermoelasticity, 4) vibrations, 5) interface modeling, 6) column/strut analysis, and 7) modeling of active and multifunctional GS.

We are pleased to be able to bring a selection of recent reports on such issues to you.

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