

43rd AIAA/ASME/ASCE/AHS Structures, Structural Dynamics, and Materials  
Conference

10th AIAA/ASME/AHS Adaptive Structures Conference  
4th AIAA Non-Deterministic Approaches Forum  
3rd AIAA Gossamer Spacecraft Forum  
Denver, Colorado 22 - 25 Apr 2002  
Abstract Submission Deadline : 21-Aug-01

"Ultralightweight Space Deployable Primary Reflector Demonstrator

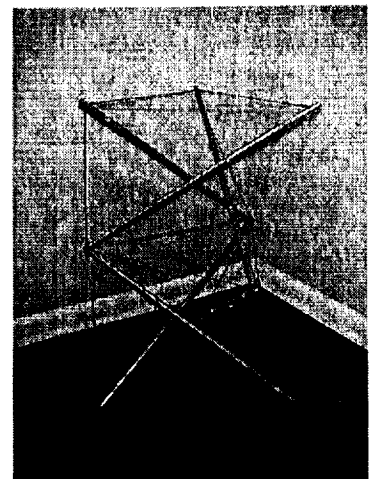
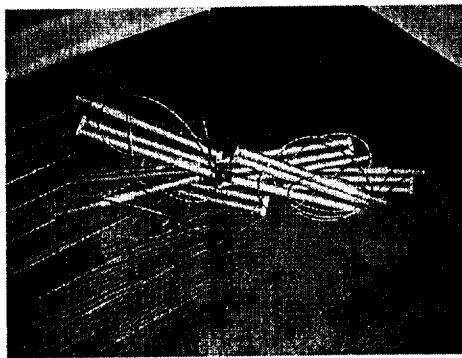
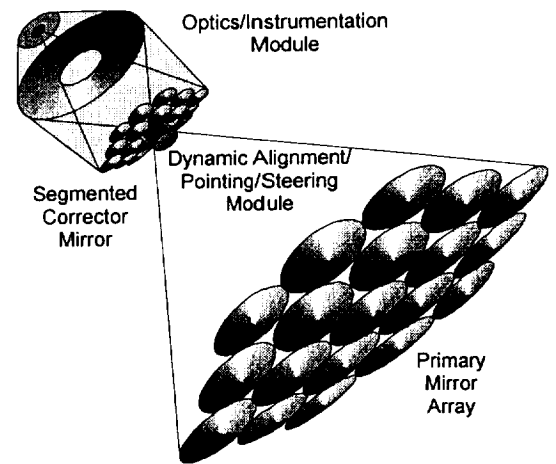
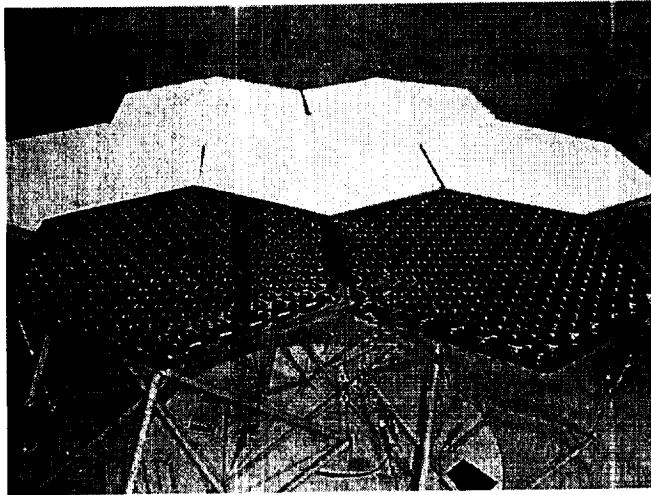
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#### Abstract

A concept has been developed and analyzed and several generational prototypes built for a gossamer-class deployable truss for a mirror or reflector with many smaller precisely-figured solid elements attached. will, for at least the next several decades, minimize the mass of a large primary mirror assembly while still providing the high image quality essential for planet-finding and cosmological astronomical missions. Primary mirror segments are mounted in turn on ultralightweight thermally-formed plastic panels that hold clusters of mirror segments in rigid arrays whose tip/tilt and piston would be corrected over the scale of the plastic panels by the control segments.

Prototype panels developed under this program are 45 cm wide and fabricated from commercially available Kapton sheets. A three-strut octahedral tensegrity is the basis for the overall support structure. Each fundamental is composed of two such octahedrons, rotated oppositely about a common triangular face. Adjacent modules are joined at the nodes of the upper and lower triangles to form a deployable structure that could be made arbitrarily large. A seven-module dowel-and-wire prototype has been constructed. Deployment techniques based on the use of collapsing toggled struts with diagonal tensional elements allows an assembly of tensegrities to be fully collapsed and redeployed. The prototype designs will be described and results of a test program for measuring strength and deformation will be presented.



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| Synopsis | Registration | (PDF) Reg Form | Hotel & Transportation | Speaker Info |  
Professional Development Courses | Chairs | General Info |

Program Info:

| Monday-22-Apr-2002 | Tuesday-23-Apr-2002 | Wednesday-24-Apr-2002 |  
| Thursday-25-Apr-2002 |

SDM: Innovative Technologies for Affordable, Reliable, and Efficient Design and Support of  
Structures in the 21st Century

The 43rd Structures, Structural Dynamics, and Materials (SDM) Conference is sponsored by AIAA, ASME, ASCE, AHS, and ASC. This established conference is a widely acknowledged annual event that provides a unique forum dedicated to the latest developments in the collective disciplines of structures, structural dynamics, materials, design engineering, and multidisciplinary design optimization. Keynote and special lectures will focus on Innovative Technologies for Affordable, Reliable, and Efficient Design and Support of Structures in the 21st Century. Each year topics of special interest are emphasized by special sessions and Forums. The SDM conference for 2001 includes several special sessions and three Forums described below:

Adaptive Structures Forum

The Adaptive Structures conference brings together people interested in the advancement of adaptive structures technology and its application to aerospace systems. As such, the range of topics addressed is broad, including aerospace vehicle applications (fixed-wing, rotary-wing, and spacecraft); design and simulation approaches; control methodologies; health monitoring; noise, vibration, and shape control; active damping; sensor and actuator devices; and development of active transducer materials. This year's ASF begins Tuesday morning and continues until Wednesday afternoon. The ASF Keynote Address is on Wednesday morning.

Non-Deterministic Approaches Forum

During the past four years the NDA Forum has become a popular venue for the communication of non-deterministic methodologies for both structural and nonstructural applications. The 2002 NDA forum will begin with a Sunday afternoon workshop on emerging computer codes for non-deterministic analysis and design. The workshop is open to all SDM participants. Monday morning the NDA forum will continue with a panel discussion on emerging technologies for potential NDA development and applications. On Monday afternoon there will be two parallel sessions on methodology development and applications. Tuesday Morning the NDA keynote lecture will focus on future potential applications of non-deterministic methods. Immediately following the NDA keynote, there will be a session on probabilistic fatigue. Two sessions on Tuesday afternoon will investigate probabilistic design and methodology development. Wednesday morning's session will be on the development of uncertainty quantification methods. Two sessions on Wednesday afternoon will be on model validation for uncertainty quantification and applications. The last NDA session on Thursday morning will also be on applications. The 2002 NDA forum has 54 papers from diverse fields that promise synergistic benefits for enhanced communication and the growth of new approaches.

Gossamer Spacecraft Forum

The 3rd Gossamer Spacecraft Forum (GSF) is continuing to be a showcase of membrane and inflatable structure technologies that will enable the development of deployable, large, and light weight spacecraft for a host of space missions such as deep space and planetary imaging, earth imaging, power and communication antennas, solar sails, and concentrators. The objective of the GSF is to provide an active forum for sharing of current research results, technical interchange, and development of future applications.

This year's GSF sessions span the length of the SDM conference with over 50 papers in sessions covering

materials and membrane development, design and analysis, active control, testing, and advanced concepts. On Wednesday afternoon of the conference, a special panel session will be held where various issues of interest to the Gossamer community will be discussed such as needed technology development, project planning, and funding requirements. On Wednesday night, the first meeting of the newly formed AIAA Gossamer Spacecraft Technical Committee will be held. On Thursday morning, the Gossamer Conference Keynote Lecture will be given. Please join us in one of the best and foremost gatherings of "Gossamerians" from across the U.S. and the world.