Summary of Results from NASA/EPSCoR Travel Support

- 1. Name, address, and telephone number of person traveling Chris Jenkins, ME Dept., 394-2406
- 2. When the travel took place Sunday Tuesday, February 3 5, 2002
- 3. Where the person went, name of NASA Center or NASA Headquarters Jet Propulsion Laboratory, Pasadena, CA
- 4. Name(s) of the point(s) of contact at NASA Dr. Yoseph Bar-Cohen, Dr. Moktar Salama
- 5. Summary of Results

Dr. Jenkins currently has a Phase I (6 month) award from NASA that will expire in July of 2002. This award is to investigate the possibilities for incorporating active control elements, such as shape memory metals and piezoelectric polymers, into gossamer spacecraft. NASA JPL and U. Montana are co-investigators on this award.

A meeting was held February 3 - 5, 2002 to seek funds for a Phase II of the project. An outline of the Phase I work was developed and is provided on the next page.

The February meeting lead to an invitation to attend the Gossamer Apertures Workshop in Pasadena, California (schedule attached). The purpose of the meeting was to review Phase I progress and seek continued funding (Phase II) from interested agencies. Dr. Jenkins attended this workshop and made a presentation. Support of NASA EPSCoR is greatly appreciated.

Enabling Fabrication, Deployment, and Control of Precision Gossamer Apertures through Adaptive Gore/Seam Architectures

JPL Contract 1233915 (NAS 7-1407) Phase I Report

C.H. Jenkins (SDSM&T), Yoseph Bar-Cohen (JPL), Moktar Salama (JPL), Aleksandra Vinogradov (Montana State Univ.)

Executive Summary

- 1. Introduction
 - 1.1 Precision Gossamer Apertures
 - 1.2 PGA Requirements
 - 1.3 PGA Fabrication
 - 1.4 Scope of Work
- 2. Control Architecture
 - 2.1 Control Issues for PGAs
 - 2.2 The Tool Box Concept
 - 2.3 PGA Tool Box
 - 2.4 Summary
- 3. Candidate Active Materials
 - 3.1 Material Selection Procedure
 - 3.2 Assessment of Active Materials
 - 3.3 Short List of Candidate Active Materials for PGAs
 - 3.4 Sensors and Actuator Development
 - 3.5 Summary
- 4. Active Seam Concept Development
 - 4.1 Concept Development Approach
 - 4.2 Classes of Active Seam Concepts
 - 4.3 Active Seam Concept Examples
 - 4.4 Summary
- 5. Active Seam Modeling
 - 5.1 Structural Modeling for PGAs
 - 5.2 Control Modeling for PGAs
 - 5.3 Active Seam Model Examples
 - 5.4 Summary
- 6. Conclusion
 - 6.1 Summary
 - 6.2 Technology Development Roadmap
 - 6.3 Future Work
- 7. References

Appendices

A1 Selected Material Properties

GOSSAMER APERTURE TECHNOLOGY WORKSHOP Old Pasadena Courtyard by Marriott 180 N. Fair Oaks Ave., Pasadena, California May 15-16, 2002

PRELIMINARY AGENDA

StartEndName of SpeakerName of Company/Institution7:308:00Coffee/ Registration8:008:15Introduction8:159:00Hill, LisaTRW Space and Technology Division9:009:45McKinley, WilliamRaytheon Company9:4510:00Break10:0010:45Hyde, RodLawrence Livermore National Laboratory10:4511:30Early, JamesLawrence Livermore National Laboratory11:3012:15Dekany, Richard G.California Institute of Technology12:1513:30LunchLawrence Livermore National Laboratory13:3014:15Barbee, Jr., Troy W.Lawrence Livermore National Laboratory14:1515:00Chen, PeterNASA/Goddard Space Flight Center15:0015:45Ealey, MarkXinetics Inc.15:4516:00BreakAir Force Research Laboratory16:4517:30Jones, RuthNASA/Marshall Space Flight Center16:4517:30Jones, RuthNASA/Marshall Space Flight Center16:4910:45Introduction8:159:00TBD9:009:45Knowles, Timothy R.Energy Science Laboratories, Inc.9:4510:00Break10:0010:45Dooley, JenniferJet Propulsion Laboratory10:4511:3012:15TBD	<u>Start</u>			
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