

# Space Radiation Shielding Program, Scientific, and Facility Accomplishments

## Programmatic Accomplishments

- Established a core team of Program Management
  - Program Manager
  - Program Scientist
  - Principal Investigators
  - Technical Monitors
  - Resource Analyst
  - Schedule Analyst
  - Website Developer
  - Contractor Support
- Organized, supported, and documented results of two workshops
  - Space Radiation Shielding Consortia Kickoff meeting (March 17-18, 2003)
    - Developed Technology Roadmaps to support NASA HQ guidelines
  - Deep Space Test Bed Engineering Requirements Workshop (June 9-10, 2003)
    - Established Engineering Requirements for the gondola that will be used to support the material testing in the Deep Space Test Bed environment
- Supported the development process for NASA Research Announcements (NRA) which resulted in the selection of 5 new proposals in July 2003 for scientific research in the area of material science
- Completed the design and development of a new Space Radiation Shielding website to provide a centralized location for all information associated with the program (August, 2003)
  - Provides definition of the Program and anticipated areas of accomplishment
  - Defines the “key” personnel currently involved in programmatic, technical, and scientific aspects of the program
  - Defines current workshops/conferences
  - Links to other sites pertaining to related science
- Submitted draft language supporting an NRA released October 2003
  - Developed on-line interactive calculation capability for estimation of radiation shielding effectiveness of material elements/composites
- Complete all procurement actions associated with new awards resulting from 02OBPR02.
- Designed an advertisement published in the Journal of Metals magazine to solicit interest and participation in the Space Radiation Shielding Program with respect to material science research
- Established open communications via monthly telecons with consortium leads resulting in program synergies building on the One NASA team effort

- Established a relationship with Missile Defense Agency representatives for potential sharing of research accomplishments and other program synergies

### **Research Accomplishments**

- Authored, published, and received acceptance of three new material science research papers that were presented at International Conferences and in the Radiation Research journal.
- Conducted a Non-advocate Review (NAR) to review the mini-magnetospheric propulsion (M2P2) concept for potential application as a non-material shielding capability
- Presented research at the 28<sup>th</sup> International Cosmic Ray Conference concerning a new detector system to be used for measurements of light fragments from heavy ion interactions in radiation shielding materials.
- Completed and delivered the 0-degree detector ahead of schedule
- Provided and tested MSFC developed new composites at NIRS-Chiba, Japan
- Provided and tested MSFC developed composites for the first official run at BNL
- Successfully added and tested a new detector component associated with the 0-degree detector to measure nuclear fragmentation cross-sections for heavy ions at angles up to 5 degrees
- Developed beam time requirements and standards for exposure data output to material scientists
- Planning for a dedicated physics run at BNL which will improve the program experimental effectiveness within the Measurements consortium
- Added two new research scientists to the MSFC science team to provide additional support in monitoring the technical progress and success of the program's PIs

### **Facilities Accomplishments**

- Initiated the planning for a new Space Radiation Shielding Materials development laboratory at MSFC.
  - Facility will include equipment such as:
    - Milling machine
    - Engineering lathe
    - Oven and Freezer
    - Banc Saw
    - Drill Press
    - Test Frame
    - Autoclave
- Completed the purchase of a Beowolf computer cluster to be housed at MSFC to support the execution of testing and verification of specific program developed modeling techniques assisting in the prediction of material shielding capabilities.
  - Computer cluster will be available for use by all scientists across the program