

Proposal No. X6.03-8797 - Long Duration Space Shelter Shielding

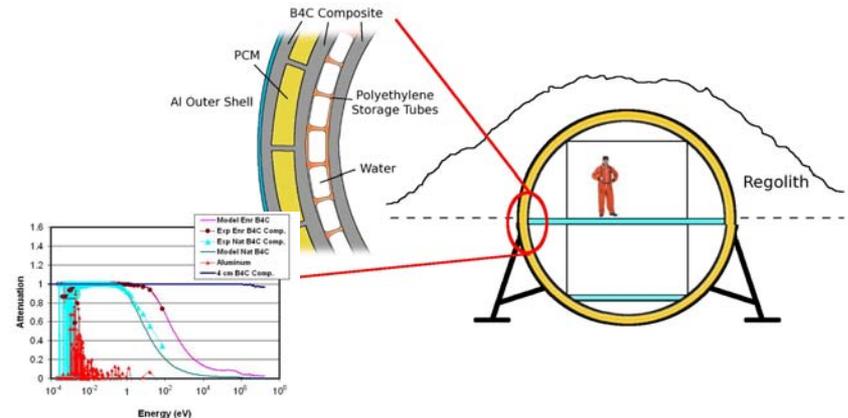
PI: Dr. John W. Steinbeck

Physical Sciences Inc. – Andover, MA

Identification and Significance of Innovation:

- Lightweight boron carbide ceramic composite shielding
 - ❖ Enhanced GCR and SPE protection compared to Al
 - ❖ Broad spectrum protection against neutrons
 - ❖ Enhanced ballistic protection
- Multifunctional shelter wall
 - ❖ Thermal management
 - ❖ Water storage – fuel/waste
- Modular shelter system – wall fillers can be added as needed

Expected TRL Range at the end of Contract (1-9): **3-4**



Technical Objectives and Work Plan

1. Shield Specification Study
Objective: Use radiation codes (HZETRN) to determine shield parameters
2. Process Development
Objective: Optimize B4C composite processing
3. Strength and Radiation Testing
Objective: Demonstrate shield materials will meet needs for long duration service
4. Preliminary Wall Design
Objective: Design a prototype wall segment to be built during Phase II

NASA Applications:

- Long duration lunar and Martian shelters
- Long duration space flight
- Large ceramic composite engine structures – SCRAM, gas turbine

Non-NASA Applications:

- Large ceramic composite structures for nuclear plants (NGNP)
- Advanced armor systems for vehicles/personnel
- Next generation gas turbine systems

Firm Contacts:

PI: Dr. John W. Steinbeck, steinbeck@psicorp.com, (978) 738-8148
Business: Dr. B. David Green, green@psicorp.com, (978) 689-0003