

Active Radiation Shield, Phase I Project

SBIR/STTR Programs | Space Technology Mission Directorate (STMD)



ABSTRACT

DEC-Shield technology offers the means to generate electric power from cosmic radiation sources and fuse dissimilar systems and functionality into a structural component to create a Multi-functional Structure (MFS). DEC-Shield integrated into MFS technology can be used to generate electric power and provide radiation protection in a space vehicle; even maximizing that protection by spreading the required systems and components across the structure. GTL will develop several DEC-Shield concept designs, fabricate test articles and test them in a representative radiation environment to demonstrate proof of concept. Further, GTL will analyze the test results and develop an optimized proof of concept DEC-Shield design. The Phase II effort will culminate with the design, fabrication and testing of DEC-Shield prototype Demonstration Panel that incorporates electrical power generation from GCR and solar wind sources.

ANTICIPATED BENEFITS

To NASA funded missions:

Potential NASA Commercial Applications: GTL's Multi-functional Structure, DEC-Shield and Adaptive radiation protection technology offers means to maximize the performance of a space vehicle structure providing electric power generation from cosmic radiation, radiation protection for astronauts in space stations, space vehicles, transfer vehicles and habitats. This capability supports NASA's space and exploration programs. The DEC-Shield has the potential to provide power from cosmic and solar wind sources adding a new option for NASA space missions. The multi-functional aspects can also be used to reduce mass and parts count in unmanned systems, which could reduce cost of NASA satellites and spacecraft.

To the commercial space industry:

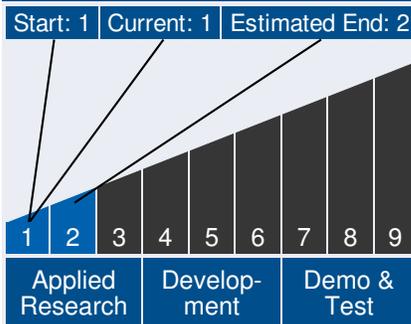
Potential Non-NASA Commercial Applications: The multi-functional aspects can also be used to reduce mass and parts count in satellites and launch vehicles (Commercial, DoD and



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Technology Maturity



Management Team

Program Executives:

- Joseph Grant
- Laguduva Kubendran

Program Manager:

- Carlos Torrez

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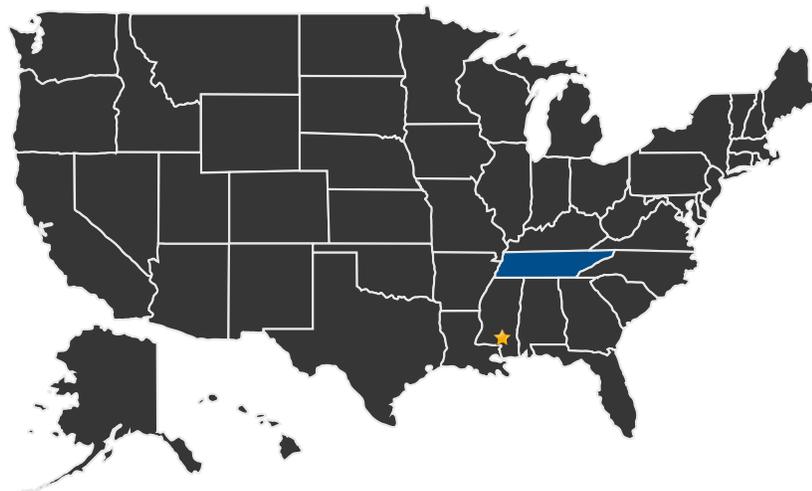
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NASA). Multi-functional technology could also be applied in commercial aircraft to increase capability, reduce parts count and cost.

U.S. WORK LOCATIONS AND KEY PARTNERS



■ U.S. States
With Work

★ **Lead Center:**
Stennis Space Center

Other Organizations Performing Work:

- Gloyer-Taylor Laboratories, LLC (Tullahoma, TN)
- Tonya Mathes (Knoxville, TN)

PROJECT LIBRARY

Presentations

- Briefing Chart
 - (<http://techport.nasa.gov:80/file/23291>)

Management Team *(cont.)*

Principal Investigator:

- Paul Gloyer

Technology Areas

Primary Technology Area:

Space Power and Energy
Storage (TA 3)

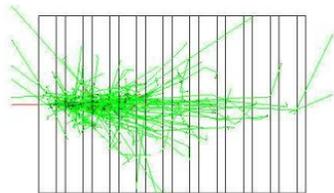
- └ Power Generation (TA 3.1)
 - └ Energy Harvesting (TA 3.1.1)

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IMAGE GALLERY



DEC Cascade Geant4 Calorimeter Example

Active Radiation Shield, Phase I

DETAILS FOR TECHNOLOGY 1

Technology Title

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Potential Applications

GTL's Multi-functional Structure, DEC-Shield and Adaptive radiation protection technology offers means to maximize the performance of a space vehicle structure providing electric power generation from cosmic radiation, radiation protection for astronauts in space stations, space vehicles, transfer vehicles and habitats. This capability supports NASA's space and exploration programs. The DEC-Shield has the potential to provide power from cosmic and solar wind sources adding a new option for NASA space missions. The multi-functional aspects can also be used to reduce mass and parts count in unmanned systems, which could reduce cost of NASA satellites and spacecraft.