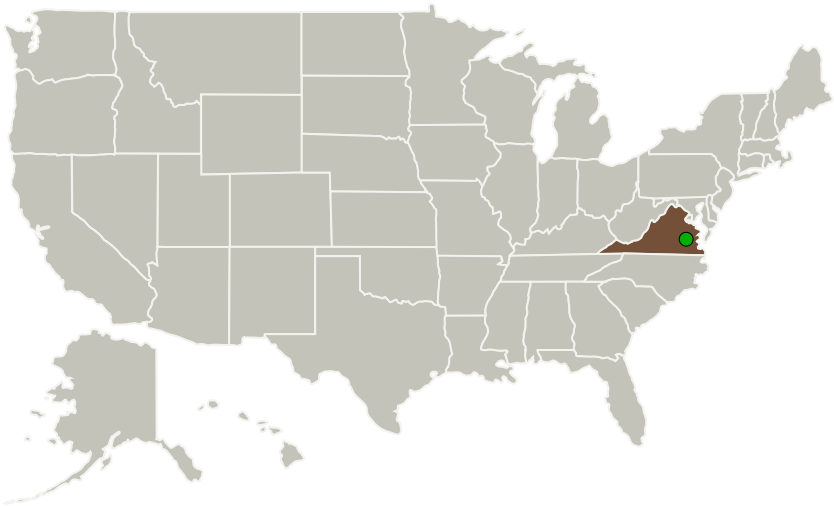
Nanotube MMC for Structural Applications, Phase I

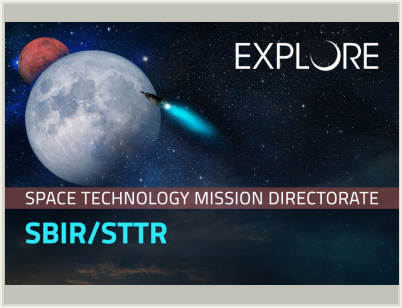
Completed Technology Project (2011 - 2011)

Project Introduction

Aluminum based metal matrix composites are particularly attractive in aviation and aerospace applications because of their exceptional strength and stiffness-to-density ratios and superior physical properties. A vast range of composites have been fabricated with reinforcements such as glass, ceramic particulates and fibers, and more recently carbon nanotubes. Carbon nanotubes present considerable improvement in properties of the composite but suffer from problems of galvanic corrosion at the interfaces. Other nanotubes that are not galvanically detrimental to the composite are required for design of ultrastrong composites. Boron nanotubes are attractive in this respect, as they are lighter than carbon and are not very far removed from aluminum in the electrochemical series, thus avoiding corrosion issues, while retaining the excellent mechanical properties of carbon nanotubes. MMI's proposed technology that produces composites comprising boron nanotubes will have the considerable impact on future structural applications of NASA.

Primary U.S. Work Locations and Key Partners





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Organizations Performing Work	Role	Type	Location
Materials Modification, Inc.	Lead Organization	Industry Small Disadvantaged Business (SDB)	Fairfax, Virginia
Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia

Primary U.S. Work Locations
Virginia

Project Transitions

February 2011: Project Start

September 2011: Closed out

Closeout Summary: Nanotube MMC for structural applications, Phase I Project Image

Closeout Documentation:
- Final Summary Chart Image*(https://techport.nasa.gov/file/138344)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Materials Modification, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

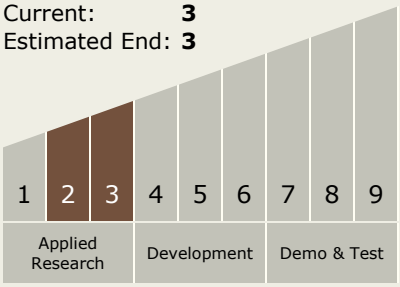
Tirumalai S Sudarshan

Co-Investigator:

Tirumalai Sudarshan

Technology Maturity (TRL)

Start: **2**
Current: **3**
Estimated End: **3**



Technology Areas

Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
  └ TX12.1 Materials
    └ TX12.1.1 Lightweight Structural Materials

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System