Ultra-lightweight Core Materials Project

Game Changing Development Program | Space Technology Mission Directorate (STMD)

ANTICIPATED BENEFITS

To NASA funded missions:

In a potential NASA follow-on activity, a sandwich panel skirt segment (applicable to SLS upper stage) will be produced from ultra-lightweight core sandwich structures for subsequent testing.

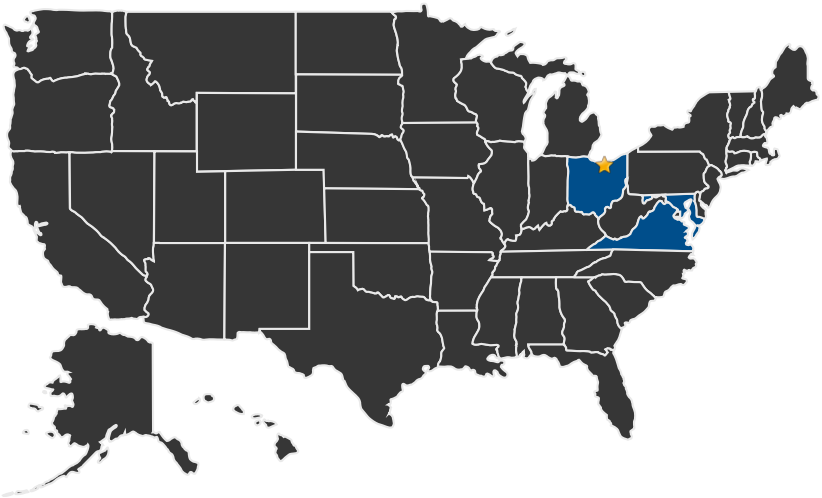
To the commercial space industry:

The development of ultra-lightweight, multifunctional structures will enable significant reductions in the structural mass of future aerospace vehicles

DETAILED DESCRIPTION

Power and data cables for avionics and other parts of spacecraft add considerable weight to the vehicle

U.S. WORK LOCATIONS AND KEY PARTNERS



U.S. States With Work

Lead Center:
Glenn Research Center

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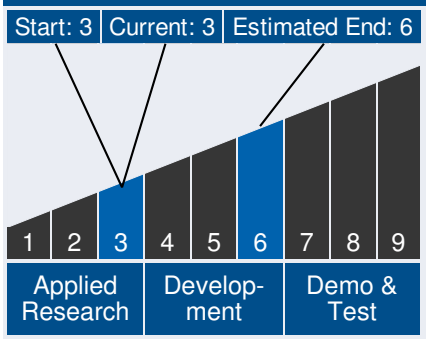
Technology Maturity



Management Team

Program Executive:
- Lanetra Tate

Program Manager:
- Mary Wusk

Continued on following page.

Management Team *(cont.)*

Project Manager:

- Azlin Biaggi-labiosa

Principal Investigator:

- Phillip Abel

Technology Areas

Primary Technology Area:

Nanotechnology (TA 10)
└ Engineered Materials and Structures (TA 10.1)
  └ Lightweight Structures (TA 10.1.1)
    └ Nanotube Reinforced Structural Composite (TA 10.1.1.1)
    └ Nanotube Reinforced Structural Composite (TA 10.1.1.1)

Additional Technology Areas:

Nanotechnology (TA 10)
└ Engineered Materials and Structures (TA 10.1)
  └ Lightweight Structures (TA 10.1.1)
    └ Nanolattice (TA 10.1.1.2)
    └ Graphene Sheets (TA 10.1.1.6)

DETAILS FOR TECHNOLOGY 1

Technology Title

Ultralightweight Core Materials for Efficeint Load-Bearing Composite Sandwich Structures

Technology Description

This technology is categorized as a material for ground scientific research or analysis

Reduce the structural mass of future aerospace vehicles through the development of ultra lightweight materials and structures through the use of:

•Carbon nanotube reinforcements and composites
•Ultralightweight core materials for efficient load bearing composite sandwich structures
•Mature technologies and demonstrate benefits through a combination of ground and flight tests

Capabilities Provided

30+% reduction in skirt panel weight over conventional honeycomb

Potential Applications

NASA will use these cores to fabricate and ground test a segment of the Composite Exploration Upper Stage Skirt as part of a risk-reduction effort under the Composite Exploration Upper Stage Project.