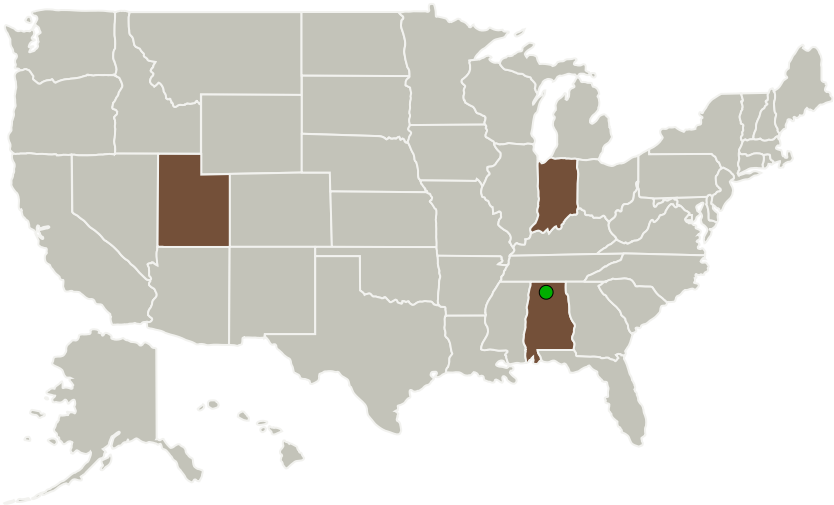
Novel Low Cost Booster Propulsion Development and Demonstration, Phase I

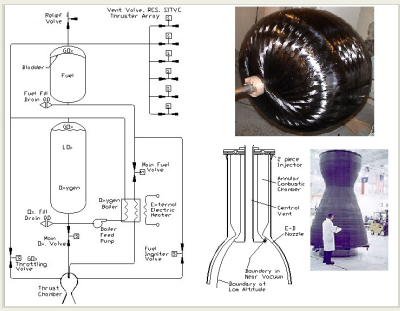
Completed Technology Project (2013 - 2014)

Project Introduction

The proposed contract effort is for the design, development and proof-of-concept demontration testing of a low cost, pressure-fed liquid rocket booster propulsion system concept. The contract focus will be on four key component technologies in the booster system; (1)composite propellant tanks, (2)pump-fed propellant heat exchanger, (3)self-cooled engine with altitude-compensating nozzle, and (4)annular liquid-liquid engine injector. All four components will be designed and built in subscale in Phase, and will be sized for later incorporation into sub-orbital flight test vehicle. The Phase 1 contract culminates with cold flow testing of the propellant feed subsystem, which is the most novel aspect of the booster. The proposed low-cost booster design also has a low impact on natural resources, and can utilize inexpensive, renewable biofuels. The raw materials used in the contruction of the booster do not include any expensive, exotic, or stategically sensitive substances. The prospect of reusability of most of the booster mass further reduces raw material and energy consumption per launch.

Primary U.S. Work Locations and Key Partners





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Organizations Performing Work	Role	Type	Location
Compositex, Inc.	Lead Organization	Industry	Sandy, Utah
Marshall Space Flight Center(MSFC)	Supporting Organization	NASA Center	Huntsville, Alabama
Purdue University-Main Campus	Supporting Organization	Academia	West Lafayette, Indiana

Primary U.S. Work Locations	
Alabama	Indiana
Utah	

Project Transitions

May 2013: Project Start

May 2014: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/138374)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Compositex, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

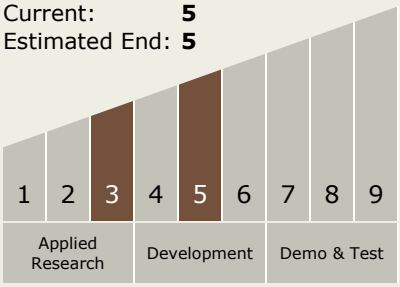
Carlos Torrez

Principal Investigator:

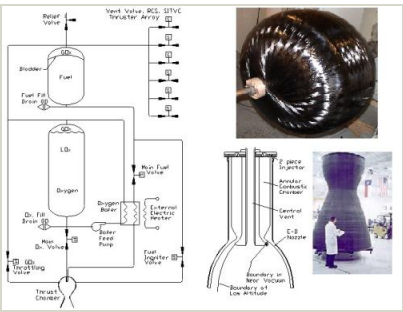
Daniel Moser

Technology Maturity (TRL)

Start: **3**
Current: **5**
Estimated End: **5**



Images



Project Image
Novel Low Cost Booster Propulsion Development and Demonstration
(https://techport.nasa.gov/image/131566)

Technology Areas

Primary:

- TX01 Propulsion Systems
  └ TX01.1 Chemical Space Propulsion
    └ TX01.1.3 Cryogenic

Target Destinations

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