Shielded Mars Balloon Launcher (SMBL), Phase I

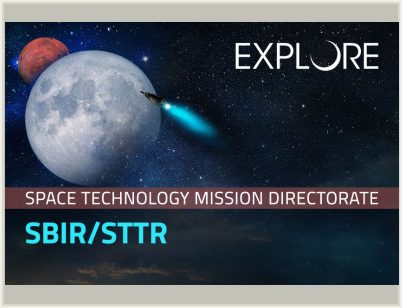
Completed Technology Project (2009 - 2009)

Project Introduction

Aurora Flight Sciences, along with its partner Vertigo Industries, proposes a novel approach to deployment of balloon-based payloads into the Martian atmosphere. Balloon-based Mars exploration has the capability to cover a larger portion of the Martian surface than is accessible via a rover and to provide better resolution than is available from satellites. Due to the low density of the Martian atmosphere, the balloon envelope for even a small payload is quite large (tens of meters in diameter); therefore, balloon deployment is a major challenge for a Mars balloon. A ground launched balloon, as compared to descent launched, allows a longer time constant for deployment, more control over the timing of the deployment, and, if coupled with a rover, also allows more control over the location of deployment. A challenge to ground deployment is the possibility of the envelope being damaged during deployment by winds, surrounding rocks, or parts of the associated lander. Aurora's Shielded Mars Balloon Launcher (SMBL) concept addresses this challenge by using inflatable structures to provide a safe environment for balloon inflation and deployment. The proposed SMBL system has a 15 kg mass and packed volume of 0.15 m^3, and is therefore feasible as a secondary payload on existing Mars exploration missions.

Anticipated Benefits

Potential NASA Commercial Applications: The SMBL concept is also marketable in terrestrial applications where autonomous exploration is valuable. Examples of such an application include on demand weather balloon deployment and autonomous surveying of difficult terrain. There are also potentially military applications for a autonomously launched balloon payload, such as providing aerial video or atmospheric sampling data in response to seismic disturbances.



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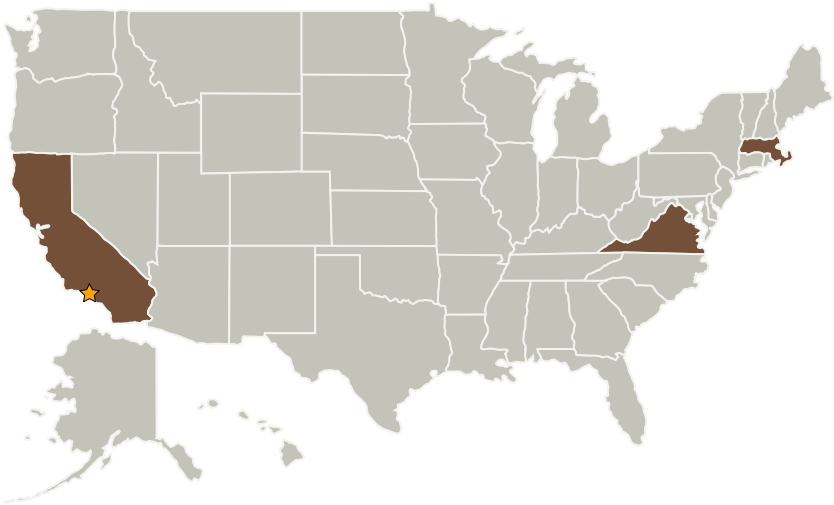
Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★Jet Propulsion Laboratory(JPL)	Lead Organization	NASA Center	Pasadena, California
Aurora Flight Sciences Corporation	Supporting Organization	Industry	Cambridge, Massachusetts

Primary U.S. Work Locations	
California	Massachusetts
Virginia	

Project Transitions

January 2009: Project Start

July 2009: Closed out

Closeout Summary: Shielded Mars Balloon Launcher (SMBL), Phase I Project I mage

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Jet Propulsion Laboratory (JPL)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

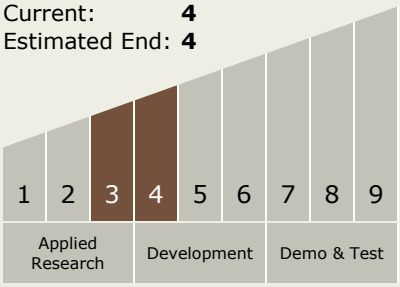
Carlos Torrez

Principal Investigator:

Joseph Parrish

Technology Maturity (TRL)

Start: **3**
Current: **4**
Estimated End: **4**



Technology Areas

Primary:

- TX09 Entry, Descent, and Landing
  └ TX09.2 Descent
    └ TX09.2.1 Aerodynamic Decelerators