



# Demonstration of Enabling Communications Technologies for Future Low-Cost Small Earth Return Vehicles

## Problem Statement

- Small Earth return vehicles allow for high frequency utilization of the space environment in a cost effective manner.
- Suborbital flight test will demonstrate mission-enabling communications and other low-cost components.
- These technologies are applicable to the TVA RED-4U and other NASA/Commercial small Earth return vehicles.

## Technology Development Team

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- Partners: Embry-Riddle Aeronautical University, Parachute Systems Design, FAA

## Proposed Flight Experiment

### Experiment Readiness:

- Payload will be ready for flight no later than end of March 2015 for an April/May flight.

### Test Vehicles:

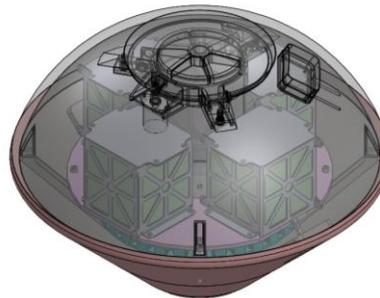
- High-altitude balloon from Near Space Corporation desired.

### Test Environment:

- A suborbital drop test of the test vehicle (capsule) follows a trajectory profile matching an orbital reentry by a similarly sized Earth return vehicle.
- No need for micro-gravity environment for the stated test objectives.

### Test Apparatus Description:

- Small capsule 20.1 inches in diameter and approximately 48 lbs.



## Technology Maturation

- Successful performance of the communications and other components during the drop test will advance TRL as follows: ADS-B (TRL 4 to 6), Improved Iridium (TRL 5 to 6), Flight Computer (TRL 4 to 6), Parachute (TRL 6 to 7).
- The integrated system for TVA's small payload return vehicle is advanced to TRL 6 upon completion of the drop test.

## Objective of Proposed Experiment

Objective 1) Demonstrate mission-enabling low-cost communications systems: (1A) space-capable ADS-B, (1B) Iridium with unrestricted GPS, (1C) RF transparency of new conformal TPS materials

Objective 2) Verify integrated functionality of a representative small Earth return vehicle: (2A) compact packaging, (2B) low-cost parachute and other components.