



**Campaign Dates: October 1-2, 2012**  
**Total payloads: 1**  
**Flight Provider: Near Space Corporation**  
**Platform: Nano Balloon System (SBS)**



#	Title/ Payload #	PI/Organization	Description/Objective
1	UAT ADS-B Transmitter Prototype 033-B	ERAU Daytona Beach	<p>Developed under a contract with the FAA's Commercial Space Transportation Office (AST), the UBR-ERAU upgrades the design of the UBR-TX in order to support some of the constraints of space flight. The previous design's commercial GPS receiver has been replaced with a high-end GPS capable of supporting space velocities and altitudes. A daughter board was produced in order to physically integrate the new GPS with the legacy board design. Lastly, components on the legacy board design were upgraded to their MIL-spec equivalents to allow for the environment of space flight.</p> <p>A sRLV flight will allow the system to demonstrate its capabilities of 1) operating above the current altitude restrictions of commercial GPS units and 2) operating under the extreme atmospheric conditions of near-space operations. The flight time would be at a minimum 30 minutes and exceed an altitude of 100,000 ft MSL. The result of this flight opportunity will be that the system as a whole will be raised from TRL 4 (a laboratory tested prototype) to TRL 5 or 6 (a field demonstrated prototype).</p>



# Initial Flight Testing of a UAT ADS-B Transmitter Prototype for Commercial Space Transportation Using a High Altitude Balloon

## Problem Statement

- ADS-B technology such as the MITRE UBR-TX have great potential for tracking assets in commercial space transportation.
- The UBR-ERAU is a prototype based upon the UBR-TX that utilizes an unrestricted GPS to support operations in excess of current ITAR/COCOM velocity and altitude limits.
- This proposal seeks flight opportunities to test and refine this prototype.

## Technology Development Team

- Richard S. Stansbury, Embry-Riddle Aeronautical University, [stansbur@erau.edu](mailto:stansbur@erau.edu), PI
- Nick Demidovich, FAA Commercial Space Transportation (AST), [nickolas.Demidovich@faa.gov](mailto:nickolas.Demidovich@faa.gov)
- Partner organizations:
  - ERAU
  - FAA
  - MITRE

## Experiment Readiness:

- Initial balloon flight proposed
- Components utilized have existing flight history
  - UBR-TX: high altitude balloons and sounding rockets
  - Javad TR-G2 GPS: NASA KSC tested
- Key components replaced with mil-spec equivalents.

## Test Vehicles:

- This proposal requests operation on the Near Space Corporation's Nano Balloon System (NBS).



## Test Environment:

- The UBR-TX, the basis for this prototype, has flown on a number of rocket flights.
- Proposal requests operation on NSC's NBS
  - Altitude > 105,000 ft.
  - Duration up to four hours
  - Exposure to near-space environment

## Technology Maturation

- Component technologies vary in maturity
  - UBR-TX, TRL 6
  - Javad TR-G2, TRL 6
  - Antennas, TRL 4+
  - Daughterboard, TRL 3
  - Firmware, TRL 3
- Local dynamic tests shall validate integrated system to TRL 4.
- NBS Flight will provide necessary validation to raise readiness from TRL 4 to TRL 5 or 6 (field demonstrated prototype)

## Objective of Proposed Experiment

- The objective of the proposed flight opportunity is to create a path through empirical analysis to mature the UBR-ERAU prototype toward a design that can be utilized by NASA, FAA, and commercial space transportation providers such as Virgin Galactic to support asset tracking and better airspace integration.

This effort addresses Technology Area 13-26: "Tracking, Surveillance, and Flight Safety Technologies"