



Low Cost Suborbital Reusable Launch Vehicle (sRLV) Surrogate

Problem Statement

- There is currently no way to effectively exercise CONOPS and supporting systems for the new class of sRLV systems as they transit the National Airspace System (NAS).
- Requested flight will allow the FAA to evaluate ADS-B, ATC radars, comms and ATC procedures for sRLV flight safety and effectiveness in a realistic, safe, comprehensive manner.
- The primary potential users of the matured technology are the FAA and commercial spaceports. Additional/future flights could also support effective training of ATC and Spaceport personnel.

Technology Development Team

- PI: Tim Lachenmeier, NSC, tim.lachenmeier@nsc.aero
- Payload Materiel Support: FAA-AST (Nick Demidovich; 202-267-8437), NSC
- Potential Partners: FAA-AST, CNS Aviation, Embry Riddle Aeronautical University (ERAU), Spaceport America

Proposed Flight Experiment

Experiment Readiness:

- The proposed experiment will be ready for flight in April 2013.

Test Vehicles:

- Requested platform: High-altitude balloon – Near Space Corporation, High Altitude Shuttle System (HASS)

Test Environment:

- Drop shuttle from 100kft with a gliding return to a horizontal landing - HASS has flown repeatedly using the same general flight profile as proposed.

Test Apparatus Description:

- Proposal is to fly the current/existing HASS shuttle as a surrogate for sRLVs to exercise FAA and commercial spaceport procedures and systems.
- Flight profile to mimic that of representative sRLVs returning to earth.
- Test apparatus includes the HASS shuttle with a payload consisting of an ADS-B transceiver, Mode-S transponder, a radar reflector, and an ATC voice radio relay.



Technology Maturation

- HASS and 978KHz ADS-B UAT (Embry Riddle) are currently TRL-8.
- Mode-S transponder and ATC radio relay are COTS or integrated from COTS and will be tested in NSC altitude chamber. →TRL-8/9 following test flights.

Objectives of Proposed Experiment

- Evaluate effectiveness of FAA ATC CONOPS (vs. sterilizing airspace) for sRLVs as they transit the NAS prior to operational sub-orbital system flights.
- Evaluate effectiveness of ADS-B in a suborbital vehicle.
- Characterize effectiveness of existing ATC radars to track returning RLVs transiting the NAS from 100kft to the surface.
- Test/evaluate voice comm infrastructure & procedures between ATC and suborbital vehicle transiting the NAS.
- Flight data to be evaluated will include ADS-B, radar and transponder track data, and ATC voice transcripts and experiences.