OSIRIS-REx Low-Gravity Regolith Sampling Tests

Problem Statement

- How to sample asteroids and comet nuclei
- The technology being tested is regolith fluidization and collection by gas injection
- This flight opportunity will test 5 sampler head regolith combination/flight to determine sample collection in low gravity
- Missions to sample asteroids e.g. OSIRIS-REx, and to sample comet nuclei

Technology Development Team

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- Arlin Bartels, GSFC, OSIRIS-REx Contract #NNG12FD66C with LMSSC
- GSFC, University of Arizona

Proposed Flight Experiment

Experiment Readiness:

- Ready for May 15 – 18, 2012 Flights; all equipment shipped 5/7/12

Test Vehicles:

- Parabolic aircraft

Test Environment:

- Sampling system flown in reduced gravity in 2007 and on FAST flights in 2009.
- Request reduced gravity parabolic flights at near zero gravity

Test Apparatus Description:

- One of 3 test fixtures shown (test chamber left, pressure control right); two additional test fixtures with two chambers each; five test chambers/flight

Technology Maturation

- TRL 6 achieved when sample collection of representative regolith demonstrated in the relevant environments
- Ground testing: ambient, vacuum, hot, cold
- Reduced gravity tests correlated with ground tests
- TRL 6 by 3/15/13 OSIRIS-REx PDR

Objective of Proposed Experiment

- Conduct sampling tests: 5 tests planned / flight with a range of regolith simulants
- Flight data is the sample collected of the range of regolith simulants
- Data to be compared to ground test data

Technology Areas addressed by this technology: 4.1.5 Robotics..& Autonomous Systems , 7.1.2 Resource Acquisition , 7.5.3 Remote Mission Operations