

COE CST Fourth Annual Technical Meeting

Flight Test of Communications in Space via
Commercial Satellite Networks on Suborbital
Spacecraft: Implications for Space Traffic
Management

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*Satellite Communications
and Aerospace*

**October 29-30, 2014
Washington, DC**

**COE CST Fourth Annual Technical Meeting (ATM4)
October 29-30, 2014**



Agenda

- Team Members
- Task Description
- Schedule
- Goals
- Results
- Conclusions and Future Work

Team Members

- Principal Investigators
 - M. Brian Barnett, Satwest - PI
 - Dr. Pat Hynes (NMSU) – Co-PI
- Organizations
 - Satwest llc
 - >\$150K matching funds to date
 - New Mexico Space University



Flight Opportunities



Commercial Participants

- Lead commercial participant

Satwest

- Other commercial participants

- Iridium, Globalstar, UP Aerospace, Virgin Galactic



Task Description

- 4. Theme 1: Space Traffic Management & Operations
 - Can commercial satellite networks in LEO and GEO provide data and voice communications to/from suborbital and orbital spacecraft in space and at rocket velocities?
- 5. Theme 2: Space Transportation Operations, Technologies & Payloads (Program 2.4 Payload Safety Research)
 - Task NEW-ND1 INTEGRATION AND EVALUATION OF IRIDIUM PAYLOADS
 - Task NEW-ND2. Integration and Evaluation of GLOBALSTAR PAYLOADS

Schedule

- June 2013-NASA Flight Opportunities Program (FOP) selects Satwest's technology proposal
- September 2013-Flight test on Near Space Corp. high altitude balloon to 97,000 feet.
- November 2013-Sent first commercial text to space . UP Aerospace sounding rocket
- Q2, 2015, Flight test on Virgin Galactic SS2

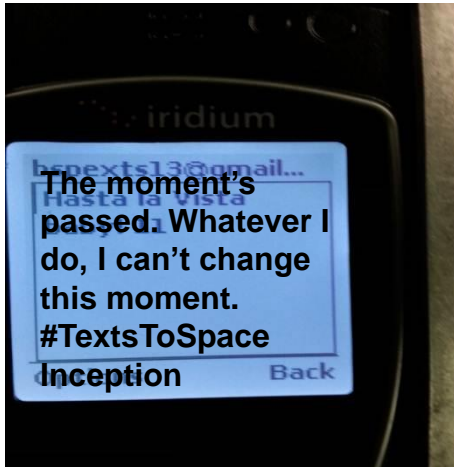
Goals

- Research goal
 - To conduct enough flight testing to prove the efficacy of providing data and voice communications services in space via commercial satellite networks.
- Relevance to Commercial Space Industry
 - Space Traffic Management (ADS-B)
 - On-board Wi-Fi/Internet and voice communications for commercial crew
 - Two-way payload communications for ground-based researchers
 - Commercial communications services for spacecraft operators and government agencies

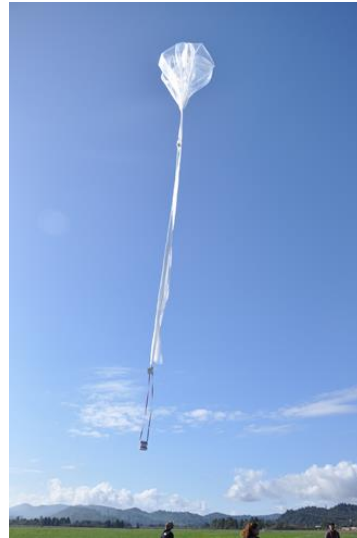
Results

- Successfully tested Iridium based payloads in sub orbit
 - Proved that two-way data works
- Preparing more tests of Iridium and Globalstar payloads.

Results



1ST Known COMMERCIAL TEXT TO SPACE, 67.4 miles

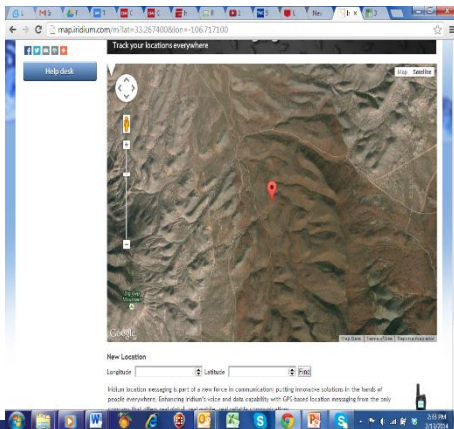


Satwest high altitude balloon flight test, Sept. 2013, 97,000 ft.

Landing Site of payload



NASA/UP Aerospace flight test, Nov. 12, 2013, 72.7 miles 383,556 ft.



Results

- Technical reports and journal articles resulting from this task.
 - "Flight Test of Communications in Space via Commercial Communications Satellite Networks on-board Suborbital RLV and High Altitude Balloon: Implications for Space Traffic Management“, Emory Riddle Space Traffic Management Conference, Florida, Nov. 2014
 - "Flight test of Satwest’s Space Communications Technology on Suborbital RLV and High Altitude Balloon“, NASA SBIR Technology Commercialization conference, Cleveland, Sept. 2014
 - Next Generation Suborbital Researchers Conference, Colorado, July 2013
 - NASA Flight Opportunities Program (FOP), post flight reports

Conclusions and Future Work

- Final Remarks

- Satwest's tests demonstrating that commercial satellite networks are a promising means for providing space traffic management and payload/crew/researcher communications

- Next Steps

- Flight test through NASA's FOP (Q2 2015)
 - Virgin Galactic's Spaceship 2 (SS2)
 - Testing Wi-Fi, tracking, voice calls
- Look forward to further partnering with FAA in of space-based ADS-B capabilities.

