



TVA SELECTED BY NASA FLIGHT OPPORTUNITIES PROGRAM FOR DEMONSTRATION OF SMALL PAYLOAD RETURN CAPSULE AND TECHNOLOGIES

ATLANTA, GA, April 14, 2015 – Terminal Velocity Aerospace, LLC (TVA) was recently selected by the NASA Flight Opportunities Program (FOP) for demonstration of a small payload return capsule and associated technologies via a high-altitude drop test. Flight test of the prototype capsule will demonstrate mission-enabling communications technologies and verify integrated performance, including functionality of its parachute recovery system. This activity is directly aligned with TVA's efforts to develop a small reentry device, RED-4U, capable of returning the payload mass and volume equivalent of four or more CubeSats. In addition, as part of this drop test, a payload provided by Dr. Abba Zubair of the Mayo Clinic in collaboration with the Center for Applied Space Technology (CAST-ARMM) and Morehead State University will serve as a pathfinder for the transportation of high value space-based research products from space back to a terrestrial laboratory.

The flight test involves release of the capsule from a high-altitude balloon at an altitude of approximately 100,000 feet. Aerodynamic descent of the capsule from this “edge of space” altitude will emulate a large portion of the trajectory of an orbital entry. The high-altitude balloon is operated by FOP-approved flight provider Near Space Corporation (NSC), and the balloon launch will take place from NSC facilities in Tillamook, Oregon. The flight test is scheduled for May 2015 as weather allows.

"We are grateful to NASA for this opportunity to test our capsule system and technologies in a directly relevant environment," said Terminal Velocity CEO Dominic DePasquale. "This is an important milestone in the development of TVA's reentry devices that advances the maturity of these technologies for use in government or commercial space missions."

The suborbital flight test will demonstrate two low-cost communications and tracking technologies, Automatic Dependent Surveillance-Broadcast (ADS-B) and Iridium. Use of these widely-available communications systems for the application of Earth entry have the potential to significantly reduce operational complexity and cost. The flight test will demonstrate the ability to transmit communications signals through a new formulation of Silica-based conformal thermal protection system materials developed at NASA Ames Research Center. These materials are particularly attractive for small Earth entry vehicles because their manufacturability and expected radio-frequency transparency properties simplify mission and flight system design.

In addition to the space technology demonstration objectives, the capsule will carry a scientific research payload provided by Dr. Abba Zubair of the Mayo Clinic in partnership with the Center for Applied Space Technology, Professor Bob Twiggs, and his students at Morehead State University. The payload will assess the transportation of cryogenically-frozen adult stem cells as part of ongoing research by Dr. Zubair in growth and harvesting of stem cells in space. Applications for stem cells include use in the

treatment of human diseases through regenerative medicine and tissue engineering; however, the capacity to generate enough stem cells to achieve effective therapy is limited on Earth. Stem cells grown in the microgravity environment of space hold potential for faster, more productive growth.

TVA partnered with Embry-Riddle Aeronautical University for customization of a space-capable ADS-B unit, and with Parachute Systems Design, LLC for the low-cost parachute. Additional support was provided by the FAA Office of Commercial Space Transportation for testing and verification of ADS-B.

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Terminal Velocity Aerospace, LLC (TVA) is a company dedicated to improving reentry safety and furthering the utilization of outer space. TVA offers small devices for data collection during reentry, and for safe return of small payloads from space. Applications include improving our understanding of spacecraft atmospheric entry and breakup, flight test of high-temperature materials, low-cost recovery from space to facilitate high-frequency space-based research, and small scientific probes for exploration of other planets. TVA is a member of the Advanced Technology Development Center and has a research and commercialization partnership with the Georgia Institute of Technology Space Systems Design Laboratory.

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