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Author: Ms. Sirisha Bandla
Virgin Galactic L.L.C, United States

SPACESHIPTWO: A SUBORBITAL VEHICLE FOR HUMAN SPACEFLIGHT AND MICROGRAVITY RESEARCH

Abstract

Virgin Galactic, a privately funded company based in the United States, is on-track to become the world's first commercial space-line. Virgin Galactic is currently testing SpaceShipTwo, a reusable vehicle designed to reach space altitudes on frequent, affordable, and safe suborbital voyages.

Virgin Galactic's vehicles have been designed with the intention of setting new standards for human spaceflight safety, frequency, flexibility, and cost. Our suborbital spaceflight system consists of two vehicles: WhiteKnightTwo is a four-engine, dual-fuselage jet aircraft capable of high-altitude heavy lift missions, including but not limited to fulfilling its role as a mothership for SpaceShipTwo, a suborbital spaceplane designed to safely and routinely transport people and payloads to space and back. SpaceShipTwo will fly operational flights out of Spaceport America in New Mexico, USA, and can be utilized as a platform for tourism, science, technology development, and education by a variety of commercial and government customers.

Virgin Galactic's current vehicle, named VSS Unity, is presently undergoing flight testing at our facilities at Spaceport America in New Mexico. Unity made its maiden flight to space on December 13, 2018 reaching almost three times the speed of sound and an apogee of 82.7 km. The flight was piloted by Mark "Forger" Stucky and Frederick "CJ" Sturkow who received their FAA Commercial Astronaut wings in Washington D.C. after the flight. CJ, as a four-time Space Shuttle pilot, became the only person to have been awarded NASA and FAA wings. On February 22, 2019 Unity reached space for a second time reaching speeds of Mach 3.04 and an apogee of almost 90km. This flight carried three people into space - pilots Dave Mackay and Michael "Sooch" Masucci, and Galactic's chief astronaut trainer Beth Moses, who also received FAA Commercial Astronaut wings. Earlier this year, Virgin Galactic completed another major milestone with VSS Unity relocating from The Spaceship Company's manufacturing facility in Mojave, California, USA to the company's commercial operations center in New Mexico.

Virgin Galactic is on the cusp of safe, frequent flights to space for tourism and research. This paper will provide status updates on our flight test program as well as a technical overview on SpaceShipTwo for tourism, payload, and human-tended flight opportunities.