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Small Launchers: Concepts and Operations (7)

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LAUNCHERONE: DEDICATED, FREQUENT, AND RESPONSIVE LAUNCH FOR SMALL SATELLITES

Abstract

We are in the midst of a small satellite revolution and with technology advancement packing more capability in smaller packages, small satellites are progressively providing solutions for remote sensing, communications, earth observation and other low-Earth orbit needs. Currently, a small satellite operator is typically forced to ride as a secondary payload, constrained to the primary payload's launch schedule and orbit. However, Virgin Orbit's small launch vehicle, LauncherOne, will soon begin providing frequent, affordable, and dedicated transportation to orbit for small payloads.

LauncherOne is a two stage, liquid propulsion (LOX/RP) rocket launched from a Boeing 747-400. By utilizing air-launch, the system is designed to conduct operations from a variety of locations, removing the complexity and scheduling typically associated with traditional launch ranges. LauncherOne will allow customers to select from various launch azimuths, including equatorial inclinations and will increase available orbital launch windows. In addition, Virgin Orbit's platform allows for responsive launch capability to rapidly deploy or reconstitute satellites in mission-designed orbits and promote agile development and testing of new space systems and concepts.

The Long Beach, California, USA facility where the team is based has been outfitted with the equipment needed for the manufacture of the LauncherOne rocket, and currently staffs over 600 employees. The team is well under way in the manufacture and test of flight hardware, having already successfully completed test campaigns for pressure-fed demonstrator engines for both the upper and booster stage of LauncherOne. Virgin Orbit is now testing the NewtonThree and NewtonFour engines, which have already undergone full duration tests on two new state-of-the-art test stands designed, assembled, and installed by Virgin Orbit in Mojave, CA, USA. In addition to engine tests, Virgin Orbit has successfully completed fairing separation tests, multiple launch campaign rehearsals, and captive carry flights with our 747-400 and our LauncherOne rocket. Last year, Virgin Orbit conducted a drop test over Edwards Air Force Base in California, and is currently preparing for first launch this year. This presentation will summarize the technical progress made on the LauncherOne platform in the past year, and discuss its capabilities for dedicated, responsive, and flexible launch to orbit for small satellites.