

26th IAA SYMPOSIUM ON SMALL SATELLITE MISSIONS (B4)
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SATELLDRONE – VERY LOW EARTH ORBIT (VLEO) BASED SMALL SATELLITE
CONSTELLATION

Abstract

Advancements in battery technology, solar cells and lightweight structures have given impetus for development of High-Altitude Pseudo Satellites (HAPS) around the world. HAPS platforms have high persistence over a target and offer much higher spatial resolutions as compared to small satellites in low earth orbit. Typically, HAPS operate at 20km where the RF power requirement is order of magnitude lesser than satellites. Satelldrone concept has been developed to meet the challenges posed by HAPS to Satellite Earth Observation (SatEO) and Satellite Communication (SatCom) industry.

Satelldrone are small satellites with low-cross sectional drag area and air-breathing propulsion system which are designed to operate at Very Low Earth Orbits (VLEO) with perigee below 200 km. These are akin to Unmanned Aerial Vehicles (UAVs) flying at orbital speeds in VLEO. The decrease in altitude from LEO to VLEO provides significant improvement over optical aperture, communication RF power and radar RF power.

Advent of multiple small satellite launch vehicles provides low-cost and easy access to VLEO.

This work outlines the approach towards constellation design, details conceptual design of Satelldrone and explains what measure have been taken to address the particular challenges of operating in VLEO.