

Small Satellites (13)

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APOD OBSERVATIONS BY MULTIPLE TECHNIQUES

Abstract

APOD (Atmospheric density detection and Precise Orbit Determination) satellites, a set of four CubSats, are projected for atmospheric density in-situ detection and derivation via precise orbit. The APOD satellites carry a number of instruments including density detector, dual-frequency GNSS (GPS/BD) receiver, SLR reflector, and VLBI X/S beacon. Since three space geodetic techniques (i.e. GNSS, SLR, and VLBI) are co-located on APOD nano satellite, the observations can be used for combination and validation in order to detect the systematic differences. This paper shows the precision of orbit determination by both overlapped comparison and SLR observation validation. The preliminary results of observing APOD satellite by IVS (International VLBI Service for Geodesy and Astrometry) geodetic VLBI radio telescopes are analyzed in detail, considering continental-size VLBI observing networks and the small telescopes with sufficient speed. The experience obtained from APOD multiple observations pave a way for reference frames unification by co-location in space.