THE IONOSPHERIC OCCULTATION EXPERIMENT (IOX) ON PICOSAT: A GPS OCCULTATION MISSION WITH AN IONOSPHERIC FOCUS

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The Ionospheric Occultation Experiment (IOX) is a dual-frequency GPS receiver with a single Earth-limb viewing antenna, similar in design to the SunSat and Ørsted receivers. IOX is one of four instruments on the US Air Force's PICOSat mission. PICOSat was launched into a 67ř inclination, 800 km altitude orbit on September 30, 2001 and IOX has been routinely collecting dual-frequency observations since November 22, 2001. The PICOSat orbital inclination causes the satellite to precess through all local times every ≈ 50 days, enabling IOX to make ionospheric measurements at all local times and seasons under near-solar maximum conditions. The character of the dataset derived from IOX will be described together with initial scientific results. Comparisons between electron density profiles derived from the IOX measurements and climatology indicate that current models significantly underpredict the peak height of the F-layer in the post-sunset equatorial region. The models also appear to underestimate F-region densities under some conditions, particularly in the mid-latitudes. Fluctuations in the measurements of the C/A code signal-to-noise ratio made at a 1 Hz cadence seem to clearly indicate the presence of ionospheric scintillation, enabling IOX to map out scintillation morphology.