Analysis of Variation in Satellite to Ground Path Losses in Apparent Clear Sky

Doctoral Research Proposal Presentation
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Abstract

Diurnal variations observed on satellite beacon experiments were often ascribed to changes in satellite antenna beam pointing due to the satellite not being in a truly geostationary orbit, or to variations in pointing due to diurnal heating effects on the satellite antenna. However, experiments in Papua New Guinea which used co-located radiometer and satellite beacon receivers, detected diurnal, season and annual variations in the received satellite beacon signal level during clear sky that suggested the atmosphere played a role in the signal variation. These effects were termed as atmospheric tides, and could significantly affect the fade margin calculations in low margin systems. Additional evidence supporting the existence of atmospheric tides on communications satellite links to temperate regions were found through an investigation of time series propagation data held in the National Aeronautics and Space Administration (NASA) data bank. We propose to seek further evidence of atmospheric tides in other propagation data banks, identify the factors that contribute to the existence of atmospheric tides as well as develop procedures that can help limit these effects in measuring clear-sky mean levels.