Preliminary Results from the Auroral GPS Scintillation Array

G. Bust*[(1)], S. Datta-Barua[(2)], S. Skone[(3)], K. Deshpande[(4)]
(1) Geospace and Earth Science Group, JHUAPL, Laurel Maryland, USA
(2) Mechanical and Aerospace Engineering, Illinois Institute of Technology, Chicago Illinois, USA
(3) Schulich School of Engineering, University of Calgary, Calgary Alberta, Canada
(4) Electrical and Computer Engineering, Virginia Tech University, Blacksburg Virginia, USA

We have recently deployed three GPS scintillation receivers located in Calgary Alberta. These three receivers have been deployed in and around the University of Calgary as an initial "test array", that will allow us to understand some of the issues involved in using multiple closely spaced receivers at high latitudes to study some of the spatial-temporal structuring of irregularities. In particular we want to investigate and test several methods of computing the cross-correlations between receivers to estimate horizontal drift velocities. Once this preliminary analysis is complete we intend on redeploying a full seven receiver array at a site, still to be selected, a little further poleward, that will allow us to study the night-side transition region between "dipolar" field lines, and "stretched" field lines that are part of the magnetospheric tail.

In this presentation we present preliminary results and "quick look" analysis of the spatial and temporal evolution of phase and amplitude scintillations observed from this array. The baselines of the three receivers are ~ 50 meters between two of the receivers and ~ 1.5 km between the two close receivers and the third one. This choice of baselines allows for investigations of phase fluctuations that are expected to occur in the auroral oval region, and have spatial scales ~ 1 km or so. The short baseline can serve both as a "baseline" test and as a diagnostic as to whether there are smaller scale structures present.

The receivers that are deployed are the new CASES space-weather software GPS receivers developed by Cornell and ASTRA. Thus a further preliminary result will be analysis on the performance of the CASES receivers, when compared with a Novatel GSV 4004 GPS scintillation receiver, which is widely considered the standard of comparison.