98 -- 2017-03-08 01:25:59 Session 5A Paper 3 Jean, Marc: Virginia Tech James, Controy: Virginia Tech Scales, Wayne: Virginia Tech

## **Multi-Constellation GNSS Scintillation at Mid-Latitudes**

Scintillation of Global Positioning System (GPS) signals has been extensively studied at low and high latitude regions where it has been shown that amplitude scintillation tends to be most severe at low latitudes while phase scintillation is more significant at high latitudes. Unlike low and high latitude regions, mid-latitude scintillation has not been extensively studied. However, recent advancements in mid-latitude HF radar research indicate that ionospheric irregularities which may lead to scintillation can occur more frequently than previously thought.

In this paper, scintillation measurements acquired using a multi-constellation, multi-frequency GNSS receiver were analyzed for an eleven day period to investigate mid-latitude scintillation activity. It was observed that GPS frequency band L5 scintillates less than L1 and L2 at mid-latitudes. It was also found that Galileo signals typically have less scintillation than GPS signals while GLONASS signals routinely report the highest scintillation.

A second data set taken during a small geomagnetic storm was also analyzed and is used to show the potential severity of amplitude scintillation at mid-latitude. It is shown that amplitude scintillation during the storm degraded the carrier to noise ratio of GPS and GLONASS signals in some instances by as much as 9 dB-Hz.