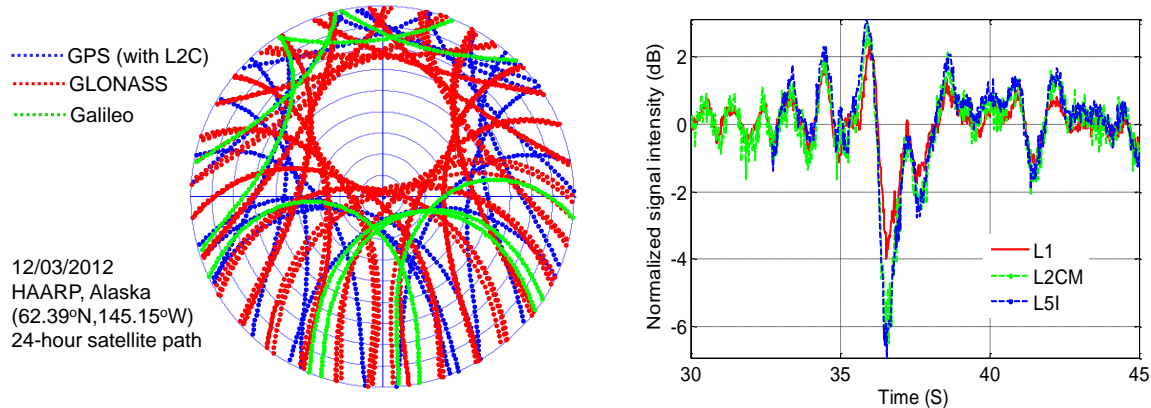


# Multi-Band Multi-Costellation GNSS Receivers for Scintillation Studies

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Ionosphere scintillation is a naturally occurring phenomenon that impacts spaced-based navigation, communication, and surveillance systems. The recent GPS modernization effort included a new signal, the L5 signal, at the restricted Aeronautical Radio Navigation Services band to provide assured accuracy, continuity, and integrity of positioning and navigation services. This new signal, however, has lower frequency and wider bandwidth; both factors adversely affect GPS receiver performance during ionosphere scintillation. This project focuses on the development of a flexible radio frequency front end to be used in a spaced GNSS receiver array at Gakona, Alaska, and subsequent receiver signal processing algorithms. This same front end will also be configured to collect Russian's GLONASS satellite signals to fill in a spatial void of GPS signals at the high altitude data collection site. Comparative studies of the GPS signals at all three bands (L1, L2, and L5) and the GLONASS signals will be conducted to infer ionosphere scintillation dependency on frequency, bandwidth, spatial distribution, season, and solar cycle.

## Further Readings:

- [1] Peng, S., Y. Morton, W. Pelgrum, F. van Graas, "High latitude ionosphere scintillations at L5 band," Proc. ION GNSS, Portland, OR, Sept. 2011.
- [2] Peng, S., Y. Morton, W. Pelgrum, "Ionosphere scintillation signal parameter modeling based on triple frequency software GNSS receiver measurements," Proc. ION GNSS, Nashville, TN, Sep. 2012.