

1. **Research Title:** Global Navigation Satellite Systems Monitoring for Assured Navigation
2. **Individual Sponsor:**

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3. **Academic Area/Field and Education Level**

Academic Area: Electrical Engineering, Computer Engineering, Computer Science
Field: Software Defined Radios; Positioning, Navigation and Timing
Education Level: MS or PhD level

4. **Objectives:** The objective of this research effort is to develop a flexible and modular system for triggering and recording digital samples of navigation signals in L-band.

5. **Description:**

Continuous monitoring and detection of interference or deviations beyond normal operating behavior is a critical component of GPS and Global Navigation Satellite Systems (GNSS). GNSS signals have historically occupied two fixed frequencies, L1 (1575.42 GHz) and L2 (1227.6 GHz), in the L-band (1-2 GHz). However, recent developments in GNSS and low earth orbit (LEO) based satellite navigation have begun to expand to other frequencies within the L-band. The rapidly evolving spectrum usage of current and future satellite navigation necessitates a flexible and adaptable monitoring station architecture which can be addressed with the usage of software defined radios (SDRs).

This project focuses on utilizing SDRs for spectrum monitoring, interference detection, and interference/signal analysis across the L-band for GNSS applications. Researchers should consider strategies for rapidly re-tuning or sweeping the center frequency of the SDR to monitor the entirety of the L-band and methods for saving and archiving high-rate samples of an interference or anomalous event for detailed post-processing analysis. Due to hard drive storage limitations, continuous recording of digital samples is unfeasible. An exploration of algorithms capable of detecting anomalous activity of L-band signals, including GNSS, and triggering a collection of digital samples should be explored and implemented.

6. **Research Classification/Restrictions:** Unclassified
7. **Eligible Research Institutions:** All

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