Alternate Navigation Plan: Terrestrial Beacons

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Sponsor: NAVCEN

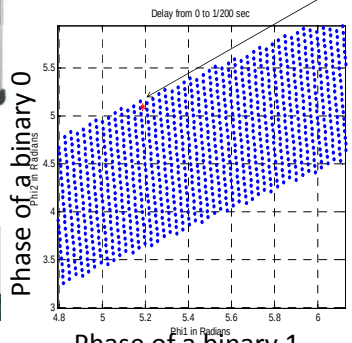
Project Goals

- Find range of useful DGPS propagation Using Signal Processing
- Verify techniques to Covert DGPS Signals to Ranges
- Integrated system for all Signals of Opportunity

Project Objectives

- Develop test plan for DGPS field strength.
- Write code to extract and plot field strength and range.
- Relate MSK phase to geographic position using Diophantine equations

Methods / System Design



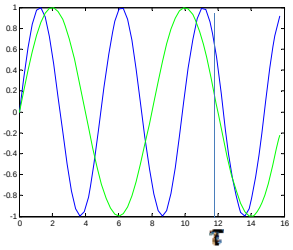
Future Plans

- Derive the maximum DGPS range from a beacon by analyzing data gathered by air, land, and sea during various conditions of the ionosphere.
- Construct a MATLAB script that can translate a ordered pair of MSK phase measurements into a geographic range from a beacon

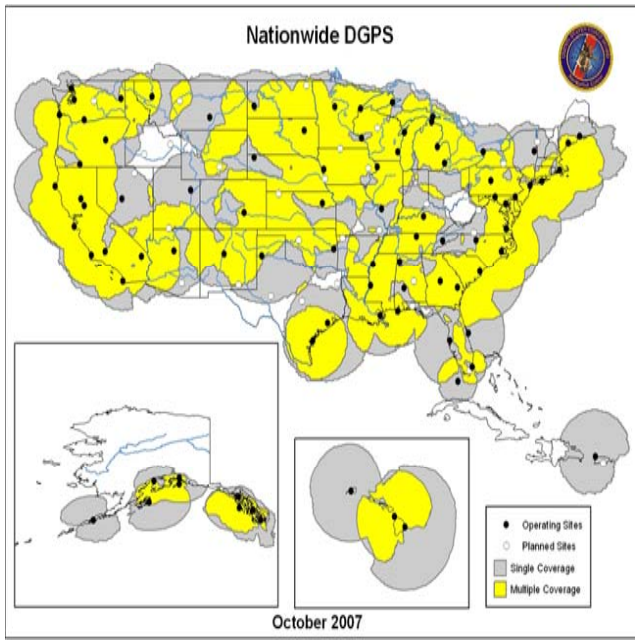
Background Information

$$\tau = k_1\left(\frac{1}{f_1}\right) + \frac{k}{4} = k_2\left(\frac{1}{f_2}\right) + \frac{k}{4}$$

Mapping f1 and f2 of MSK encoding to tau

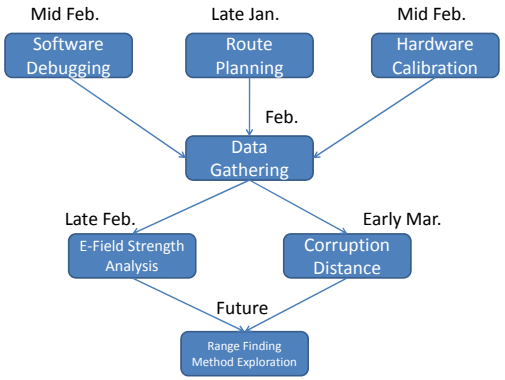


frequency of binary 1 and binary 0



Data Routes

Project Timeline



Gathering Methods