



# Senior Design Project in Electrical & Computer Engineering



# Directional Signal Strength Meter for DGPS

Cadets 1/c Everette & 1/c Armstrong

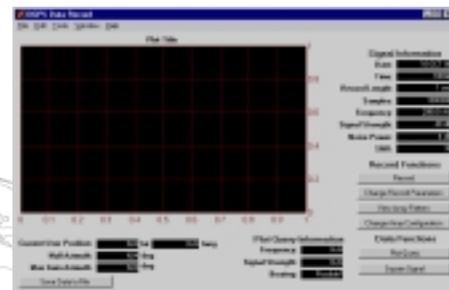
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Sponsors: C2CEN/NAVCCEN

## Project Goals

- Design, build and prove the concept of a portable directional signal strength meter.
- Use design to validate DGPS Beacon Propagation Prediction Models.
- Assist in RF site certification using designed receiver.
- Provide a tool to assist in troubleshooting RF interference of current DGPS transmitter sites.

## General Data Display Graphical User Interface



## Project Background

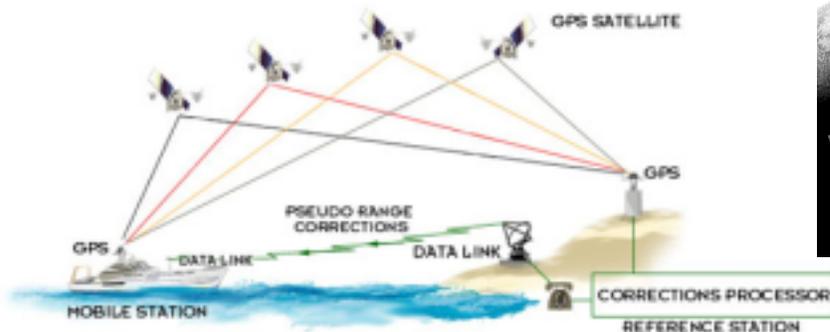
The U. S. Coast Guard currently does not have the ability to validate propagation prediction models for Differential GPS beacon transmitters. This ability to validate a predicted coverage area is necessary in order to provide the mandated coverage required by the Nationwide Differential Global Positioning System (NDGPS).

Currently, a method to easily make directional field measurements of the signal strength radiated by a DGPS beacon transmitter does not exist. This results in having to use more resource intensive measurement techniques. The ability to quickly measure the signal strength of a transmission antenna has many more applications than just those associated with DGPS.

## Project Results

Using MATLAB®, initial software has been written to interface with Analog to Digital Converters and implement various DSP algorithms. These algorithms read data in from an antenna array, process it, and display the strength of the signal of interest in the form of various graphical plots.

Currently, the software only looks in one direction. Procedures are being developed to enable the signal-strength meter to electronically “scan” 360° in order to display all the signals present, and their strength, within the DGPS band, along with their relative bearing. In addition, the user will have the ability to automatically log the processed data to disk for later analysis, enabling unattended operation over a period of time.



Typical Differential GPS Operation

