

# Senior Design Project in Electrical & Computer Engineering



# DGPS Antenna Modeling

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Figure 1: DGPS Coverage Plot of the US East Coast

## Project Background

The Differential Global Positioning System (DGPS) augments the GPS system by broadcasting differential corrections to a local area. In May 1999, the Coast Guard declared the system at full operational capability (FOC).

However, several system problems have occurred, including antenna insulator disintegration and transmitter outages in inclement weather. The Coast Guard RF Working Group was created to address these problems. The Academy contributes technical expertise in antenna performance and modeling to this group.

## Differential GPS Cost vs Efficiency

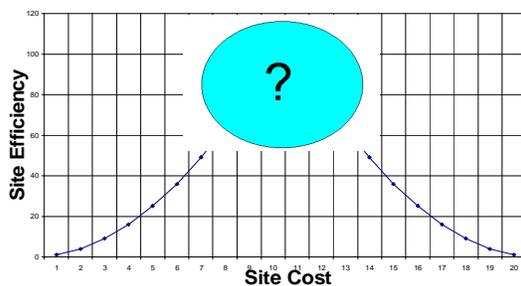


Figure 2: Simulated Cost-Efficiency Curve

## Project Goals

This project will predict the overall efficiency of DGPS in its various components. Using NECWIN, a powerful antenna modeling application, characteristics of actual antennas can be predicted. These predictions will be compared to an actual installed antenna in order to confirm the theoretical measurements. Ground characteristics near antennas will be examined to determine the best site properties. The result should be more efficient and supportable antennas, thereby providing better coverage and service to maritime and other user communities at lower cost.

## Project Plan

This project will use and interpret data compiled last year to maximize the overall DGPS efficiency. New data will be gathered regarding ground composition and how it affects antenna performance.

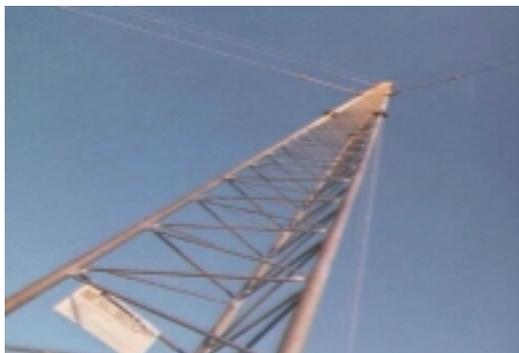


Figure 3: DGPS tower at Kenai, Alaska