The HF Radar component of GoMOOS

High frequency radar units have been used for 25 years to map ocean surface currents. Each radar installation produces radial surface velocities versus range and bearing; where the signals from two or more units overlap, two-dimensional surface velocity vectors are provided. Recent advances in this technology have lead to the development of a compact and affordable 5 MHz system (Long Range CODAR) that has a nominal range of 200 km and a resolution of approximately 3 km (range) and 5^o (bearing). Recent comparisons of tidal currents measured by CODAR and acoustic Doppler current profilers show rms differences of approximately 0.025 ms^{-1}. CODAR is therefore more than accurate enough delineate the major surface circulation features of the offshore and inshore Gulf of Maine, and to provide tidal current observations in the Gulf with an unparalleled combination of spatial resolution and accuracy.

The Gulf of Maine Ocean Observing System (GoMOOS) has been funded by the Office of Naval Research through the National Ocean Partnership Program (NOPP) as a pilot program for the envisioned national ocean observing system. The HF radar system described in this application is a central element in the GoMOOS. As indicated in Figure 1, four long-range CODAR units installed along the coastline will be capable of monitoring surface currents for essentially the entire Gulf of Maine from Cape Cod to Nova Scotia. The data from this system will be available hourly at a spatial resolution similar to SST derived from NOAA AVHRR, unimpeded by clouds and fog. As a result, general circulation features, such as the Gulf of Maine coastal current system, will be directly and continuously monitored throughout the Gulf and throughout the year.

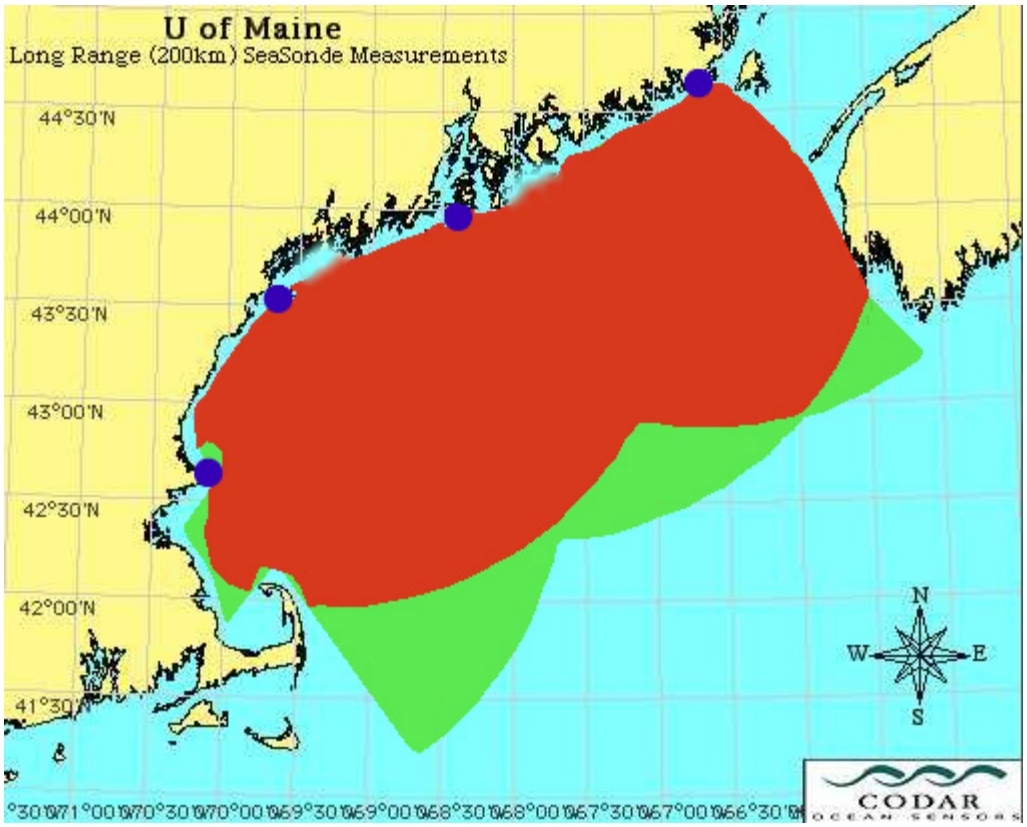

Figure 1. Diagram of CODAR coverage from four proposed sites in the Gulf of Maine (Blue Dots). The red region denotes the area of two-dimensional current coverage, while the green indicates radial currents from the nearest single site. This application applies to the first antenna to be installed (the one at approximately 44 ^{o} N).