

Acquisition and installation of an array of High Frequency Doppler radars for the real-time observation of surface currents around Oahu

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## 1. Objectives

High Frequency (HF) Doppler Surface Current radars will be acquired and installed on Oahu, to measure surface currents to a distance of 100 km from the island, at a nominal resolution of 1.5 km, and averaging time of 1/4 hour. Higher resolution configurations of the radars will be used to cover specific near-shore areas where strong coastal and rip currents may occur. The resulting maps of surface currents will be processed in real time and made available over the Internet.

A HF radar consists of a low power transmitter (< 30 W) sending radio waves in the 10 to 150 MHz frequency band, and listening to the signal backscattered from ocean waves with a wavelength of half the transmitted radio wavelength, or about 15 to 1 m. The frequency of the return signal is shifted by the propagation of the waves and by the surface currents, and also contains information on the surface wave amplitude and on the wind direction. Two or more radars are used to reconstruct maps of vector currents

Other techniques such as moored current meters and satellite-tracked drifting buoys are expensive, requiring ships for maintenance, and are thus impractical for mapping currents over large areas and long periods. Because they do not require sea-going operations, HF radars are very economical to operate, resulting in a cost per data sample an order of magnitude less than "wet" techniques, and have thus become the most cost-effective operational solution for measurements of ocean currents.

Real time dissemination of the observations over the internet will aid many interests with a need for this information, such as ship routing, coastal zone management and nearshore sediment transport, civil defense, search and rescue operations, pollution monitoring and response to oil spills, as well as basic research and the general public.