HF Racar Surface Current Mapping

Introduction

High frequency radar stations transmit radio signals over the water and determine water speed through observation of the frequency shift in the return signal reflected off of ocean waves. Each station measures "radials", surface currents going directly towards or away from a receive antenna in all directions. Radials from two or more sites are combined on a user defined grid in order to produce a map of total current velocity vectors. Regional and national HF radar networks provide hourly updates of surface current maps in near realtime.





Long range CODAR SeaSonde[®] systems operating at 4-6 MHz measure current in the upper 2.5 meters of the water column out to a maximum range of 140 to 220 kilometers offshore.

Radial current velocities observed at CEDR station.





Mid-Atlantic 25 Hour Composite Surface *Current Field (5MHz systems) for June 2* 2012 05:00 UTC (+/- 12 hours)

Cedar Island HF Radar Site

The old Coast Guard Station on the north end of Cedar Island hosts one of the Mid-Atlantic region's long range 5 MHz HF radar stations. Despite challenges presented by environmental conditions, remote location and changing shorelines, a site has been successfully maintained here since December 2006.





Transmit antenna

HF Radar Applications

♦Search & Rescue

Mid-Atlantic HF radar data have been available in Coast Guard SAROPS since May 2009 and National Network data were added in 2011.



♦ Oil Spill Response

Deepwater Horizon Oil Spill forecast: "Currents were obtained from several models (...) and HFR measurements"









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The Virginia Institute of Marine Science Eastern Shore Lab has been a partner in efforts to maintain the Cedar Island station, providing transportation to the island, assistance with labor onsite and most recently, new high speed communications for remote monitoring through a wireless bridge from the seawater lab to the island.

Thanks to the Folly Creek Corporation for permission to site the antenna on their property.

♦ Fisheries Management

An important component of a new butterfish habitat model under development by Mid-Atlantic scientists, government and industry experts is upwelling observed by HF radar.



 \diamond Recreational Boating San Francisco State University researchers' *IPad/Iphone app for boaters:*



 \diamond Pollution Tracking & Water Quality Maritime Safety/Security **Model Forecasting (Data Assimilation) Storm Research (e.g. Hurricane Irene, Tsunamis)**

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