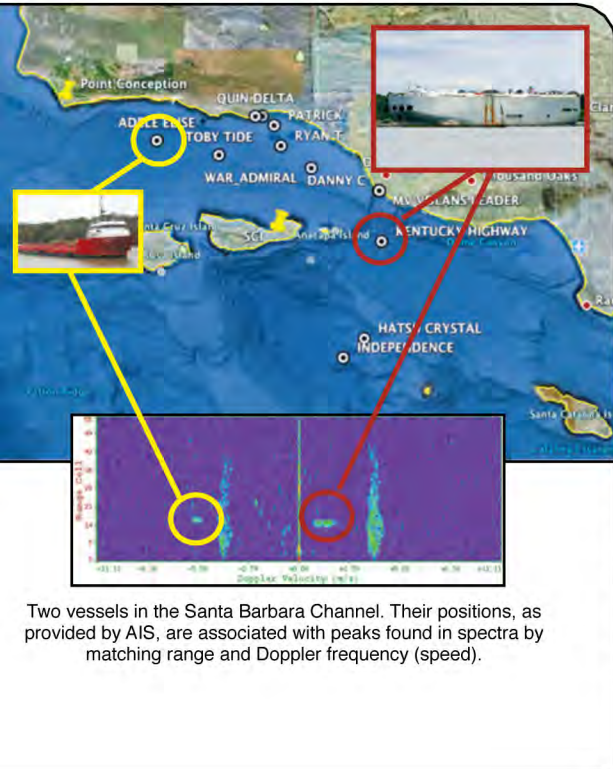
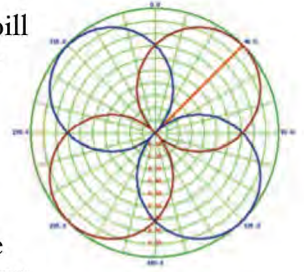


Antenna Patterns Made Even Easier

As the use of HF radar current maps for operational purposes such as search and rescue and spill response is increasing, so too is the need to ensure that each system is producing the highest quality data products possible. One of the most important steps operators can take to this end is to measure the directional response of the receive antenna, referred to as its pattern. While HF antennas leave the factory perfect, they will have interaction with the near-field environment, altering its pattern. This interaction, which occurs with all HF antennas, has been both understood and dealt with for decades. At CODAR, we have worked to streamline this antenna pattern measurement (APM) process over the years to make it easier both to perform the measurement and implement the field pattern data in real-time processing, as part of the calibration process. With the only commercially available HF transponder and a suite of user-friendly software to process the signal, it can take as little as an hour to begin processing data with a fully-calibrated SeaSonde antenna pattern.



Two vessels in the Santa Barbara Channel. Their positions, as provided by AIS, are associated with peaks found in spectra by matching range and Doppler frequency (speed).

Going back beyond 30 years, the traditional method for APM includes mounting a transponder device to a small boat, airplane or helicopter which makes a pass along an arc trajectory around the HF antennas. As streamlined as this process has become, however, developing an automated method for APM collection will be even simpler and increase the likelihood that a system remains calibrated, in accordance with best practices guidelines.

In 2010, CODAR, in partnership with Brian Emery and Libe Washburn of the University of California Santa Barbara, was awarded a Phase I SBIR from NOAA to develop a method for automatically making antenna pattern measurements by combining Automatic Identification System (AIS) data and HF Doppler echoes of passing vessels. With the installation of a VHF receiver collecting vessel speed, direction and position broadcast from its AIS transponder, each vessel Doppler echo can be associated with its vessel's bearing. This is intended to run in real-time alongside standard surface current processing. While transponder-based pattern measurements will still be recommended during installation or in time-critical situations, an automated process such as this under development will save time and money on maintenance measurements and could even warn operators when a pattern may have changed. The SBIR Phase I funding has provided the opportunity to prove the feasibility of this method and now Phase II funding is being sought to bring this technology to market.