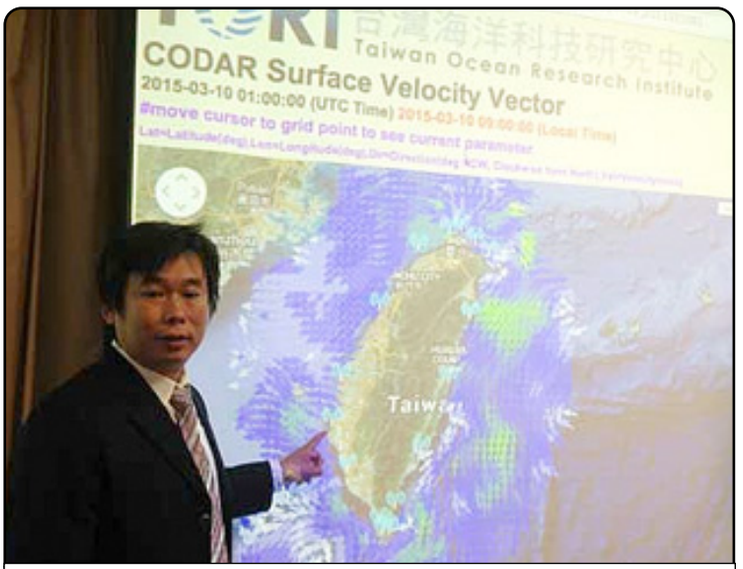
Taiwan Has World's First Contiguous National HF Radar Network

March 2015

On March 10th a special press conference was held to share details with the public of the Phase 1 completion in the "Ocean Surface Current Mapping Surrounding Taiwan by HF Radar Project". This is a backbone of Taiwan's EEZ monitoring program. More than 21 articles in Mandarin language and 2 articles in English reported this event. One of the English language articles is found online at:
http://www.taipeitimes.com/News/taiwan/archives/2015/03/11/2003613297

While not the largest network in the world, it grants Taiwan title of being the first country having complete, contiguous HF coverage of its nation's coastline. This network consisting of 17 SeaSonde radars offers coverage across approximately 190,000 square kilometers an area, over five times the size of Taiwan's entire land mass. This network is managed by Taiwan's National Applied Research Laboratories (NARLabs) Taiwan Ocean Research Institute (TORI).

Taiwan sovereign waters are critical to its economy and citizens' quality of life, and hence government policy places high priority and investment in Exclusive Economic Zone (EEZ) monitoring. Deploying radars for real-time data collection is only part of the equation. For maximum utility there must also be the right complementary tools downstream such as predictive nowcast and forecast models that can apply such data to operational and management decision-making. Last year ties were strengthened between U.S. Coast Guard (USCG), Taiwan Coast Guard and Taiwan Ocean Recreation Risk Management for Kenting National Park Headquarters, in the application of HF radar data to search and rescue activities. USCG provided these groups with additional training and support in implementing the USCG-built Search & Rescue Optimal Planning System (SAROPS), an operations support tool that can input environmental data such as currents from SeaSonde for improving drift predictions used in search and rescue operations. Previous field studies conducted by USCG show that use of SeaSonde data can reduce the predicted drift search area bya factor of three over a 96 hour time period, allowing responders to concentrate their resources into a smaller search box and giving best chance of achieving positive outcomes in rescue and/or recovery ops. Taiwan is already putting to good use the tools and skills shared by USCG.



Taiwan Ocean Research Institute research associate Lai Chien-wu introduces the National Applied Research Laboratories' Taiwan Ocean Radar Observing System in Taipei yesterday.
Photo: CNA

TAIPEI 台北時報 TIMES

New radar system to help in rescues

PROVEN EFFECTIVE:: The body of a drowned student was located and recovered last year, highlighting the effectiveness of the primarily research-focused network

By Sean Lin / Staff reporter

Wed, Mar 11, 2015 - Page 4

The National Applied Research Laboratories (NARL) yesterday unveiled its recently completed Taiwan Ocean Radar Observing System, which researchers said is capable of intensive monitoring of sea conditions, greatly bolstering the nation's capacity to analyze marine data, conduct rescue missions and contain pollution.

The system comprises 17 radar installations deployed along the nation's shore and is set to obtain more accurate information on surface currents, such as the Kuroshio current, as well as the tidal movement of the ocean.

Beyond its main mission, the system is expected to greatly assist with rescue efforts and containing ocean pollution, as it can be used to locate fuel leaks or objects adrift at sea, NARL Taiwan Ocean Research Institute research associate and project leader Lai Chien-wu (賴堅戊) said.

Taking advantage of the Doppler effect — the change in frequency of waves from a moving object — the radar installations emit electromagnetic waves in a similar fashion to those shot from a radar speed gun used by police, Lai said.

After hitting an object, the waves bounce back — a phenomenon known as backscatter — enabling analysis of the object's speed and location at sea, he said.

In the past, maritime rescue missions were carried out based on estimates of locations, determined after analyzing marine data produced over a span of 10 to 20 years. In contrast, the new system produces new data each hour and is capable of conducting analyses across an extensive area, he said.

Citing an incident last year in which a student was carried off by an ocean current after drowning in waters off Kenting's (墾丁) Nanwan area (南灣), Lai said his team helped the Coast Guard Administration locate the body while testing one of the radar installations near the Ma-anshan Nuclear Power Plant in Pingtung County.

"The student drowned in the afternoon and was still missing by nightfall. Early the next morning, just one hour before the Coast Guard Administration set out to sea to continue searching, they asked for our help," Lai said.

"Even though we did not know the exact location of the incident, we were able to infer the student's location by analyzing the tides affected by the southwesterly air streams blowing in the area. We located the body within four hours," he said.

He said that provided with coordinates indicating the location of an accident, the system can reduce the margin of error during rescue missions down to 1km or 2km, while operations conducted farther out at sea could be contained within a 10km radius for 12 hours — a major improvement to the nation's preparedness during maritime rescue missions.