

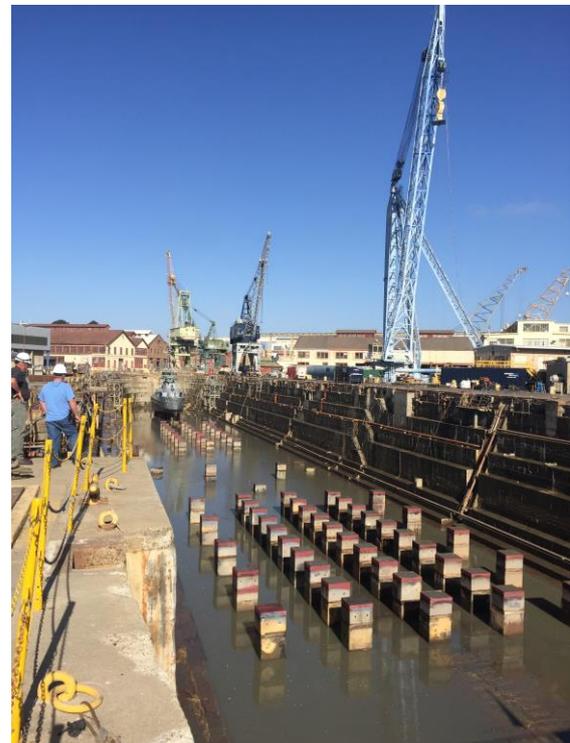
RTK CEESCOPE™ Used for Dry Dock Surveys at Historic Mare Island Naval Dockyard Site, California USA.

Grounding of a vessel leaving dry dock would be a disaster for the vessel operator and the dock owner. To prevent these events, dry dock operators diligently monitor sediment conditions around the docks. Near San Francisco, a historic Naval dockyard is home to Mare Island Dry Dock (MIDD). To obtain improved flexibility to conduct their own surveys whenever needed, MIDD fitted out their new survey boat with a CEESCOPE™ RTK system. Using HYPACK® software with local cell-phone RTK corrections from the California Real Time Network, MIDD can generate precise hydrographic surveys with a turnaround time of just one day.

To maintain safe egress from the large dry docks at the Mare Island Dry Dock (MIDD) facility on the historic site of the Mare Island Naval shipyard near Vallejo California, the dock operators need to regularly monitor sedimentation around the docks and caissons. The docks are situated at the mouth of the 55-mile long Napa river, that drains the famous wine-growing region of California. Sediment buildup can be very rapid, with dredging needed on a regular basis to maintain adequate draft for the vessels moored alongside and brought in and out of the dry docks.

While MIDD bring in local survey contractors for periodic hydrographic surveys, they had no way to conduct opportunistic surveys – for instance within a brief time window when a ship leaves a berth. Additionally, with the need for continuous surveying comes associated costs for the surveys. To improve flexibility and reduce long-term survey costs, the Mare Island site environmental team turned to CEE

HydroSystems to help institute an in-house hydrographic program.



Dry dock at Mare Island, California USA.

The RTK CEESCOPE™ was selected to provide an easy-to-use hydrographic survey system for MIDD's new survey launch, while at the same time the use of HYPACK® software and precise RTK

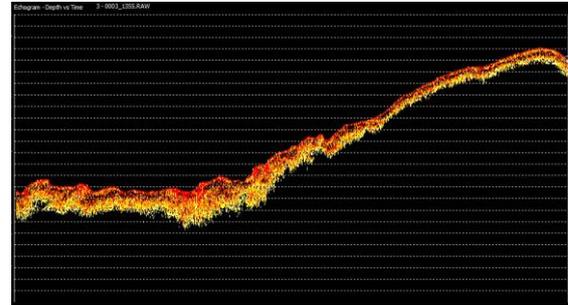
corrections offered final survey accuracy at least as good as paid single beam surveys from third party contractors. To allow precise correction of tide variation, and offer horizontal positioning accuracy of just a few centimeters, MIDD took advantage of a local California Real Time Network RTK reference station broadcasting NTRIP corrections over the internet. With a cell phone or modem connected to the acquisition PC, HYPACK's NTRIP caster provides a very convenient way to route RTK RTCM 3.x corrections to the CEESCOPE's internal NovAtel 729 RTK GNSS. While all the survey data are output to the acquisition PC over a single Ethernet cable, the NTRIP corrections simply pass through the same cable back to the CEESCOPE; easy.



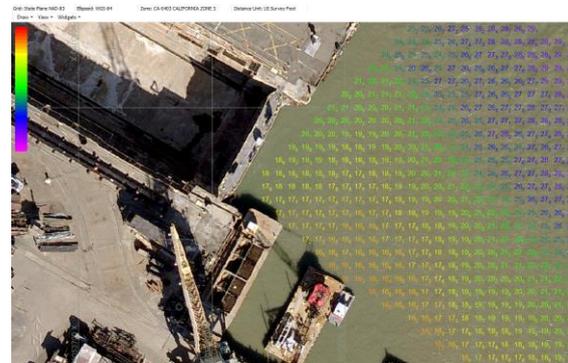
MIDD survey boat with transducer installed.

Sounding QC is available using the CEESCOPE's full water column

echogram viewed in HYPACK, and MIDD can use a nearby US Army Corps of Engineers tide benchmark for survey calibration, and local NGS control points for GNSS horizontal position checks. Final survey data may be easily referenced to the local tide datum using the VDATUM feature in HYPACK.



HYPACK water column echogram (200 kHz).



HYPACK XYZ survey results (10ft grid).

Sound velocity data are gathered using the Valeport SWiFT profiler with the capability of direct import to HYPACK.

Avoiding complex and potentially time-consuming mobilization that might have been a feature of older-generation hydrographic equipment, MIDD can now obtain the bathymetry results needed in-house. Using HYPACK allows data transferability between MIDD and their survey contractors, as well as access to the industry-leading HYPACK support.