

Gold Coast City Council use CEE JET™ PWC for Beach Nourishment Surveys on Long-Running Monitoring Transects

Use of the CEE JET™ turnkey personal watercraft hydrographic survey vehicle allows surveyors at Australia's Gold Coast City Council to replace laborious leveling measurements with a CEESCOPE™ echo sounder and RTK GNSS bathymetry system. In order to maintain the tourist industry in the region, intensive and long running beach surveys are conducted with both land survey and hydrographic survey methods. The CEE JET™ saves significant survey time and reduces disruption for beach visitors in the nearshore surf zone region where neither land survey or traditional hydrographic survey approaches are suitable.

Australia's Gold Coast stretches along 57 kilometres (35 miles) of coastline and the region is home to over half a million people. Beyond the city's beautiful beaches are vast, sub-tropical rainforests; large numbers of tourists travel to the region and their contribution to the city's economy is significant. The Gold Coast Council, Australia's second-largest city council has been monitoring the level of beach sand for many years. Indeed, the City of Gold Coast has been at the forefront of coastal management since the 1960s; the oldest Gold Coast transect has been continuously surveyed for the past 60 years.



In order to maintain the economic engine behind the growth of the Gold Coast region, management activities include dredging, sand bypassing, sand nourishment, and the construction of protection structures. The council's extensive monitoring of beaches and of coastal patterns, and the data gathered over many years provides valuable information about coastal processes and their impact on the coastline.



One survey method used by the Gold Coast council hydrographic section has changed little over this time. Levelling measurements are used to obtain surf zone bathymetry data to map the movement of sand, particularly before and after large tropical storms that have a

potentially enormous impact on sand distribution. First, a 20m spaced grid is pegged out on the beach to guide the survey crew along the transects. Then, a swimmer with a level rod is dropped into the water from a jet ski. The swimmer then uses the rod to identify the bottom along the transect and a surveyor on the shore with a total station measures the elevation of the rod. When one discrete measurement is recorded, the rod is moved to the next point along the transect. The method is time-consuming, laborious, and includes substantial disruption to the beach activities. Surfing in the survey area is affected, and the beach markers that are laid out are a nuisance.

It takes the council 6 weeks to obtain their required measurements using this methodology. After learning about the prospect of using a jet ski with a single beam echo sounder to conduct these bathymetric surveys in a fraction of the time, the council purchased its first CEE JET™ hydrographic survey system from CEE HydroSystems.



With a survey-grade CEESCOPE™ single beam echo sounder, RTK GNSS, on-board computer for data collection, and HYPACK® software, the CEE JET™ allows collection of high quality bathymetry data in the often substantial area of the surf zone. The CEE JET™ is a standard Sea-Doo personal watercraft (PWC), modified at the CEE

HydroSystems factory with concealed internal cabling and custom equipment mounting brackets. As the CEESCOPE™ is a uniquely small form factor echo sounder that contains both the RTK GNSS receiver and the UHF radio modem for communication with the local RTK base station, it can be installed inside the small waterproof compartment available on the PWC. A high-grade waterproof display mounted on the handlebars and joystick mouse allows the surveyor to collect, view and manage bathymetry measurements along the pre-defined survey transect lines. With soundings collected at 20 Hz, the council will benefit from the ability to collect significantly more data on their surveys - and in a fraction of the time.



HYPACK Acquisition software display

The depth soundings are converted into an elevation above the survey datum by using RTK GNSS tide correction. The accurate GNSS antenna height is continuously recorded in HYPACK® and the sounding depths are automatically and instantaneously translated into bottom elevation, giving the Gold Coast Council a sonar-derived data set consistent with their previous surveys.