OHMEX Ltd - Manufacturer of portable equipment and computer software used in Hydrographic and Topographic Surveying

Survey Operations Ltd - JetSki System

The first example of this novel use of equipment is the mini hydrographic system built around a JetSki by Survey Operations Ltd. of Skelmersdale in the UK.

The system comprises a Leica 530 RTK GPS with a SonarLite working in slave mode with its data saved on the Leica control unit.

Compass Hydrographics - JetSki System

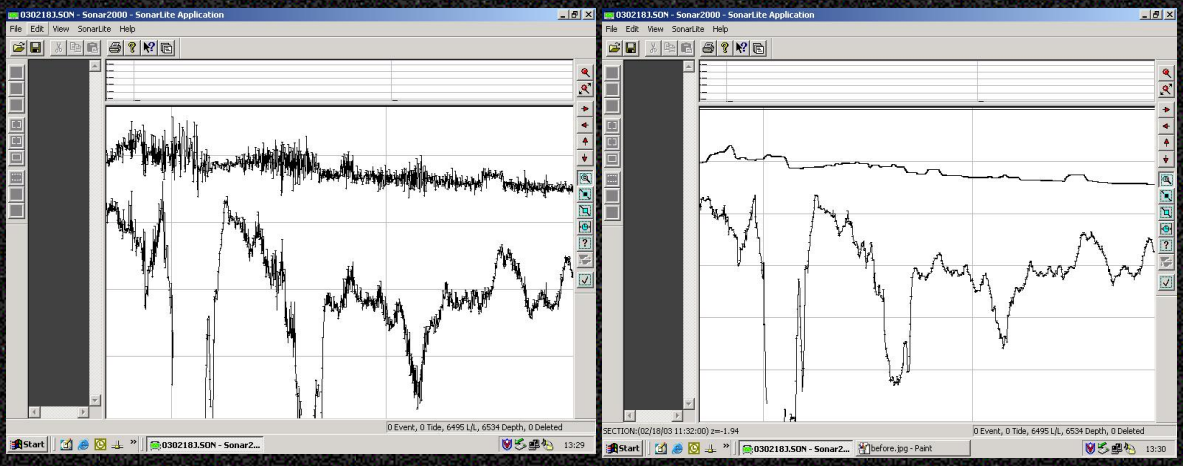
The second example of a novel use of equipment is the mini hydrographic system designed around a JetSki by the University of East Anglia and operated for them by Compass Hydrographic Systems from Essex. Contrary to popular opinion a JetSki is not a lot of fun when used for surveying purposes on the east coast of England during the winter. Jon Taylor of Compass has used an integrated data collection system based around a JetSki with Topcon RTK positioning and a SonarLite echo sounder.

JetSki system surveying in East Anglia

The system was used by UEA Marine Studies Dept. for comparative hydrographic surveys mapping changes to 'Sandbars' in a project along the East Anglia coast. An important factor in the project was to get a temporal snapshot of both the bathymetric and tidal forms using a lightweight vessel. The reasons for using a JetSki for this type of surveying are ...

- Very fast at getting on station at the survey location.
- Very stable for the slower moving data collection phases.
- An extremely stable and safe working platform.
- Pump drive propulsion enabling very shallow water working.

The combination of high resolution GPS, lightweight vessel and working in choppy exposed conditions produced an unforeseen residual effect in the bathymetric data, small amounts of latency in depth measurements becoming an artefact in the bottom data. Latency in bathymetry is a known effect in that depth measurement takes a small amount of time compared to the speed/position of the vessel. Normally the Z effect of wave motion is compensated by the mass of the vessel or by working in relatively calm conditions. In this case the flat bottomed JetSki was required to take measurements even in 'choppy' conditions as can be seen in the example data shown below. To compensate this effect a software wave filter was added to the SonarLite data processing software to filter the Z values of the GPS prior to the depth measurement being subtracted.



Example before / after of Lo-Pass Z filter

The screen shots of the software show a section of the data before and after the filter was applied. Before the filter was applied it is clear that waves seen by the GPS antenna are also apparent as artefacts in the bottom (bathymetric) trace. After filtering the waves from the GPS height values the resulting bottom trace is the more normal smooth trace. Another important feature of the RTK Z data is that in addition to high frequency waves (1 Hz) distinct patterns of wave grouping can clearly be

seen at about 60 second intervals. This information although effected by the boat mass was also useful information for another part of the analysis showing wave patterns, tidal gradients and swell measurement.

In conclusion these recent applications help to illustrate that with the use of modern equipment the boundaries between topographic, hydrographic and even oceanographic surveying are blurring. The prudent application of modern technology such as RTK positioning and miniature DSP echo sounders adds a new dimension to an area that was previously considered to be a grey area of surveying.

"Some lead, others follow" ...