

Small Boat Survey “Goes Large”

A small boat hydro survey for a big boat’s requirements

The recent arrival in Bridgetown, Barbados of the massive Cunard flagship *Queen Mary II* caused a minor parking problem. With a length of 345m (1,132 ft) and a draft of 9.7m (31.82 ft), there is now a need to investigate the further dredging of an extended docking area that could be used as an auxiliary haven for smaller cruise ships. A recent hydrographic survey by Hart, Hutchinson & Field (HHF), a local Barbados survey firm, was used to chart depths to ascertain the feasibility of extending the dredging to the area currently used as a grain terminal. If made deeper, this basin could then be used for overflow berthing of cruise ships when required.

The survey firm is actively involved with projects throughout some twenty islands within the Caribbean. One of the technical requirements that was clearly identified in the early development of HHF’s business was the need for truly portable hydrographic survey equipment that could be easily transported by light passenger aircraft or by local ships to sites within the Islands.

The portable system used for the Bridgetown survey consisted of an Ohmex SonarMite Bluetooth echo sounder with software, a Trimble Recon PocketPC data logger, Ashtech Z surveyor rover, an Ashtech static base station, and last but not least, a shallow draft boat nicknamed *Poco Loco* that could easily maneuver within the berth areas. This was particularly useful as



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the survey quickly detected areas of dredging that were missed by the contractor.

Ohmex's portable SonarMite echo sounder is based on their WinSTRUMENT concept; it uses the latest portable computers integrated with new measurement technologies using Bluetooth communications. Because the use of wireless technology enables the instrument to be water-proof, it can be used in a "hostile" environment, while the more sensitive computer features can be located in a more "computer friendly" environment up to 50m away from the instrument. In this case the computer used was the Recon unit which was ruggedized for survey use in any situation. A new feature of the SonarMite is the inclusion of a six axis solid-state accelerometer with calculated output of integrated Heave, Pitch and Roll measurements.

The datalogger used was the Trimble Recon, a rugged PocketPC handheld designed for the harsh hydrographic fieldwork. It comes with Microsoft PocketPC 2003 software, an all-day battery with easy to change cartridge, two Compact Flash slots for multiple card formats, a standard D9 serial port, and Bluetooth connectivity provided by a standard SD card.

The technology used in the Recon display is a combination of "transmissive" and "reflective" LCD technology. With a transmissive device, an electronic substrate emits a fluorescent white 'backlight' passing through the LCD to enable it to be seen by a viewer. This is the form used by most PC displays making them ideal for viewing indoors or under low light levels. A reflective display enables light (such as daylight) to pass into the LCD and be reflected back from a passive substrate. Ideal for outdoor use, these devices consume very little power. Their visibility performance is in proportion to the available light. By using a combination of these two technologies the new types of computers designed for field use can be used in most light conditions. A flaw that was recently observed during the Bridgetown survey was that the backlight tends to be either on or off; in the situation of following hydro survey lines it was found that the display went from sunlight to shade during the critical time of swinging the boat around, making it difficult to view the current depth parameter. It was also noted that it was



The Queen Mary II and survey boat Poco Loco



difficult to detect if the backlight was currently on in strong sunlight conditions. Apart from the increased power consumption, this also resulted in a 'flickering' effect on the display. A suggestion made to the manufacturer was that they consider a simple light sensor to vary the backlight according to ambient light.

The software used on the Recon was the PocketPC version of the SonarMite program from Ohmex. This software performs the functions of capturing, displaying and saving data from both the echo sounder and the GPS. All data is color coded by depth so both the tracking plot and the echo datagram provide real feedback on the depth and coverage of the survey.

One of the typical quality control functions of a hydrographic survey is to preform a "Barcheck" to check the calibration and performance of the echo sounder. This routine is simplified using the SonarMite together with 'event marker' facilities within the WinCE software. The user can easily raise and lower the checking plate as a numeric check also moving the plate in and out of the echo sounder beam as a functional test using the event marks for later reference.

New features recently added to the PocketPC version of the SonarMite software include the addition of waypoints and events. The waypoints can be either loaded from a file of XY coordinates providing a simple reference frame



HEAVE PITCH ROLL WINDOW

splitter window bar

GPS POSITIONING WINDOW

ECHO SOUNDER WINDOW

menubar area

CONTROLBAR WINDOW

control icons

SonarMite layout and screenshot of "Barcheck"

to help follow survey lines on screen, or as a waypoint event that is stored at the current location to provide a marker or return reference point. Similarly numbered events can be entered to provide reference points in the stored data set, the most common use of these being associated with "Barchecking" procedures to calibrate the echo sounder.

As HHF's team of early technology adopters have quickly found, using equipment like the SonarMite, connected by Bluetooth, gives the advantages of the seamless integration between Windows CE and Windows XP processing software. *A*

Gregory Hutchinson's experience in all aspects of land surveying has involved many projects throughout the Carribean islands and the United Kingdom. Licensed since 1982, he is currently a shareholder and director of Hart, Hutchinson & Field Land Surveying and Development (HHF Inc) on the island of Barbados.

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