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Oceanology today

USING SPACE TO EXPAND THE
OCEANS OF KNOWLEDGE

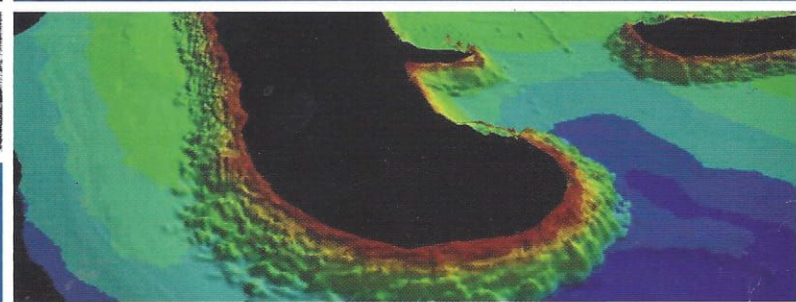
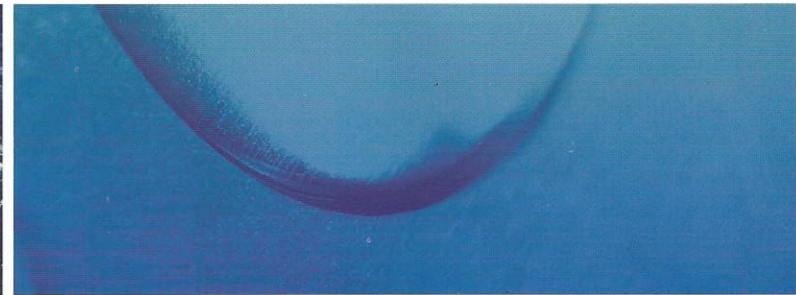
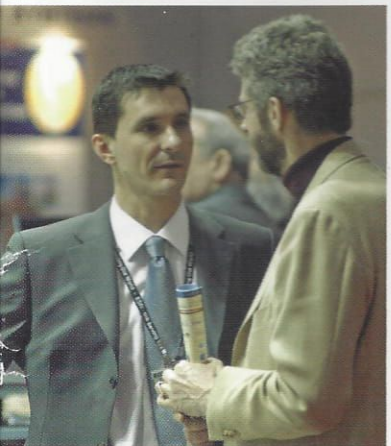
CONSERVING FOR THE FUTURE

IT'S ALL BEEN DONE BEFORE

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THE GPS FOR UNDERWATER

Trimble have been involved in GPS Systems for over 26 years from their headquarters in Sunnyvale, California

ONE OF THEIR CLIENTS, FLORIDA DREDGE and Dock are based in Tarpon Springs, Florida. Founders Don and Chet Fletcher provide dredging services throughout the region. Some of their key dredging projects include: Marinas, Channels, Passes, and



Phosphate Mines, and they have been using Trimble equipment since 1995.

Measutronics Corporation have installed the following guidance equipment for Florida Dredge and Dock on their dredges: two Trimble® DSM 132 DGPS with integrated Beacon differential capability (the two GPS receivers provide heading and the horizontal position of the dredge and cutterhead), Trimble Dredge head depth measurement unit (bubbler), Trimble HYDROpro™ (Dredge) software and Valeport tide gauge with UHF radios for telemetry.

The dredge guidance system provides the operator with horizontal and vertical guidance for systematically and effectively dredging an area; as well as keeping track of where the dredge and cutterhead have been.

The DSM132 DGPS antennae (normally

mounted fore and aft) receive GPS signals and MSK radio beacons. Sub-meter position updates at up to 10Hz (10 per second) are fed into HYDROpro software to provide heading and position. The GPS receivers have the Trimble Everest® technology installed. This option mitigates the effects of multipath which, if ignored, will degrade the positioning accuracy of the system.

The Bubbler unit provides HYDROpro with the depth of water above the cutterhead.

The bubbler unit uses a low volume air pump and sensors to measure the pressure at the end of a hose installed along the ladder and terminated at the cutter head.

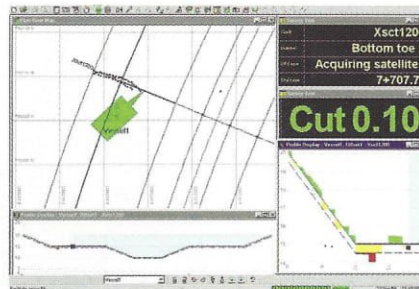
The pressure translates into an accurate water depth once the unit has been calibrated.

The Trimble HYDROpro software is installed on a standard desktop PC running a Windows operating system to provide the dredge operator with a visually intuitive interface. Key features and benefits of the software include a plan view map dynamically displays: the dredge vessel; any background maps (.dxf format) or images; user-defined guidance lines; and events such as a "bread crumb trail" of where the cutterhead has been. A text display, which is uniquely customisable, provides real time information such as: cutterhead cut/fill distances to desired grade, guidance information to line (distance left of, distance right of, distance along, distance to go), and water surface elevation. A profile view graphically, shows the cutterhead in relation to the desired elevation. The HYDROpro

project file can be configured so that all position data is logged and output daily to a file for further viewing and analysis using the Trimble Terramodel® software.

The Valeport pressure reading transducer, tide data logger and radios are installed near the project on a static platform, such as a dock or piling. The radio tide gauge is configured such that the actual water surface elevation is broadcast at five minute intervals, via line-of-sight UHF radio, to the dredge and displayed on the HYDROpro software. This provides an automated method of ensuring the dredge vessel and cutterhead elevation change proportionally to any change in the water surface level.

In areas of minimal fluctuation, a manual



tide entry may be keyboard inputted as an alternative to the auto tide monitoring system.

"The system is more efficient than the old way," said Chet Fletcher. "It saves me money and reduces the manpower required in keeping track of the position of the dredge.....we are confident with a 1 to 2 inch accuracy of the cutterhead's horizontal position using this system."