BATHYMETRY USING RADAR SIGNATURES

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The results obtained from the computer study on N00014-79-C-0160 indicated that a monocycle radar is applicable for the detection and identification of salt water wedges beneath fresh or brackish water and may be a useful tool for rapid, remote bathymetric measurements.

Both laboratory and field tests were performed in an attempt to verify the computer results. The monocycle radars used consist of a pulse generator, a transmit/receive switch, an antenna and a receiver. These components were designed and fabricated by BTI on ONR contract N00014-80-C-0450.

Laboratory tests using four special purpose coaxial lines verified the computer predictions. The pulse reflected from the simulated salt water wedge stayed positive for a long time. This was thought by some to be an aliasing problem in the computer model. Laboratory tests confirmed these results and the positive trailing edge is called the "salt water effect". Additional laboratory tests using the tower tank at Dalhousie University showed that a distinct and diffuse salt water wedge could be detected under a 9 meter fresh water column. The antenna was both on the water and 3 meters above the water. The formation of a thermocline did not influence the results. With the antenna above brackish water (15.8%), both air/brackish water interface and brackish water/concrete interface (the bottom of the test tank) were detected.

Field tests on the Connecticut River gave additional credence to the monocycle radar's ability to detect and identify a salt water wedge through both fresh water and naturally occurring layers of brackish water above the wedge.

The monocycle radar presents a simple method of performing radar measurements without using a carrier. The broad spectral content of
the pulse makes it possible to identify as well as detect objects.

This final report is presented in summarized form because the plethora of data and results in monthly reports to ONR would fill many volumes of a book.