

Small Object Detection Using SHOALS Bathymetric Lidar

*Eric Yang (1), Paul LaRocque (1), Gary Guenther (2)
Karen Francis (1), David Reid (1), Wenbo Pan (1), Michael Sitar (1)*

(1) Optech Incorporated, 300 Interchange Way, Vaughan, Ontario, Canada L4K 5Z8

(2) Optech International, 7225 Stennis Airport Rd., Kiln, Mississippi, USA

For the past decade, the SHOALS bathymetric airborne lidar has proven to be an efficient and cost-effective means for large-area coastal mapping projects. However, its competence in the rapid reconnaissance of small underwater obstructions has been less appreciated, despite a demonstrated history regarding successful detection and spatial identification.

Historically a function of less sophisticated algorithms, detection has typically been restricted to targets of approximately 2 m in diameter when analyzing returns from the laser footprint. Recent studies using new object extraction algorithms have now enabled very high detection capability of sub-meter objects (as small as 0.5 m in diameter). Since the SHOALS lidar bathymeter is capable of illuminating the entire water bottom along its track, given known water depths and planning parameters, the overall probability of detecting suspended, sub-meter objects can also be determined.

This paper presents the enhanced target detection capability of the SHOALS bathymetric lidar given recent developments in target detection algorithms.