Small Object Detection Using SHOALS Bathymetric Lidar

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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.