Abstract Submitted for the NWS10 Meeting of The American Physical Society

Acoustic Target Location and Scattering Feature identification for a solid cylinder utilizing reversible Synthetic Aperture Sonar filtering¹ GRANT EASTLAND, TIMOTHY MARSTON, PHILIP MARSTON, Washington State University — Understanding the scattering features of proud and partially exposed cylinders is relevant to understanding the high frequency scattering by a variety of simple targets. We performed various experiments where partial exposure was studied by lowering a solid aluminum cylinder through a flat free surface into a tank of water insonified at grazing incidence with short pulses to identify different features while monitoring evolution of the scattering as a function of the amount of exposure. The present investigation also allows for the recording of bistatic scattering and reversible filtering based on a form of synthetic aperture sonar (SAS). The slope of the feature timing, derived using ray theory, expressed by the derivative dt/dh where t is the measured time of the feature, depends on the feature type as well as the source and receiver grazing angles. Free surface interactions for features revealed by the slopes are accurately identified using reversible SAS filtering.

¹Supported by ONR.

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Date submitted: 17 Aug 2010

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