

ACOUSTICS2008/3003 Doppler Geo-Spectroscopy in the Makai Experiment

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Using data collected during the 2005 Makai experiment, acoustic parameters of a coral-sand seabed were obtained using the Doppler spectroscopy inversion technique. A light aircraft was used as a low frequency (80 - 400 Hz) sound source over an isovelocity shallow water channel. A microphone near the ocean surface and a hydrophone near the seabed were used to record the Doppler spreading of each harmonic of the aircraft's engine and propeller. In the water column, spectral peaks with the greatest up and down Doppler shifts are associated with the shallow equivalent rays of normal modes. The least mean squares (LMS) adaptive filter was used to track and enhance the frequency of these propagating modes. The inversion relies on a full wave number spectral model of a moving source in a three-layer waveguide. The Doppler shifted modes in the water column are observed in the data and simulated in the model. The comparison of the two, in symphony with the aircraft's signal in the air, returns the geoacoustic parameters of the seabed. The inversion was performed on numerous over-flights and the results were averaged to show statistical confidence. Work supported by ONR.