

ACOUSTICS2008/1678 Passive Synthetic Aperture as an Experimental Tool

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The use of autonomous undersea vehicle towed arrays offer an inexpensive way to carry out oceanographic measurements. Due to the small size and limited power of such vehicles, the physical aperture of the array is necessarily limited and the tow speed is low. However, there is an advantage in that short arrays at low speeds can have no flow noise. In addition the use of passive synthetic aperture (PSA) to provide spatial resolution and gain can play a major role. Here, we describe the use of two forms of passive synthetic array processing used in a shallow-water experiment. A six-element towed array, with 0.75 meter spacing, was used to estimate the horizontal wave numbers of a propagation channel. A narrow-band form of PSA will be described which was used to generate coherent spatial gain by generating an aperture hundreds of wavelengths and provided accurate estimates of the horizontal modal wave numbers at frequencies less than 600 Hz. A broadband form of PSA was used to provide bearing estimation of a ferry passing through the area. The ferry's broadband propulsion noise, which was in the 900 Hz region, was used as the source. An overall increase in gain is demonstrated.