

ACOUSTICS2008/2877 ultra-deep low-frequency sub-bottom profiler for AUV and ROV

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Acoustical techniques for ultra-deep sub-bottom exploration are still little investigated. IXSEA and IFREMER have launched in 2006 the development of a new deep-sea low-frequency sub-bottom profiler, working up to 6000 meters depth. Based on the Janus-Helmholtz broadband technology, two acoustic sources have been modelled, achieved and in-tank and at-sea measured : a single transducer working in the [1.8, 6.2 kHz] frequency band, and a three-transducer array operating in the [2, 8 kHz] frequency band. In both cases, vertical resolution is better than 20 cm. Comparison between finite element modelling and in-tank measurements is presented, together with the specific constraints linked to very-deep water and AUV mounting. Power electronics and impedance matching unit have been specifically optimised to deliver a sound level of 190 dB (ref. 1 μ Pa @ 1 m), with 48 VDC supply voltage and 250 W available electric power. The receiving part is made up of a three-hydrophone array with a loss of sensitivity lower than 1 dB between 0 and 600 bar. This ultra-deep light system has been mounted on an IFREMER's AUV and the first results at sea are presented and discussed.