

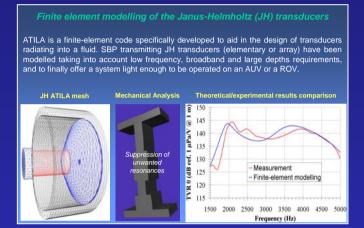


Ultra-deep low-frequency sub-bottom profiler for AUV and ROV

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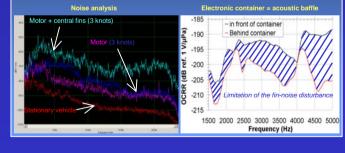
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Acoustical techniques for ultra-deep sub-bottom exploration are still little investigated. IXSEA and IFREMER have launched in 2006 the development of a new deep-sea low-frequency sub-bottom profiler (SBP), working up to 6000 m depth. Based on the Janus-Helmholtz broadband technology, two acoustic sources have been modelled, built and characterized in-tank and at-sea : a single transducer, and a three-transducer array. In both cases, vertical resolution is better that 20 cm. Power electronics and impedance matching unit have been specifically optimised to deliver a sound level of 190 dB (ref. 1µPa @ 1m), compatible with a 50 m penetration. The receiver is a three-hydrophone array with a loss of sensitivity lower than 1 dB between 0 and 600 bar.



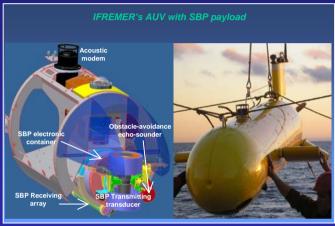
Noise analysis and improvement of the Signal to Noise Ratio (AUV

Due to the vicinity of several low-frequency noise sources (motor, fins), a careful analysis of radiated noises has been conducted, using Ifremer's autonomous acoustic recorder. It revealed that central fins could seriously affect the SBP performances. Thanks to the use of the electronic container as an acoustic baffle for the receiving array, an efficient fin-noise filter is obtained. Propulsion-noise effect on SBP is reduced by the array beam pattern.



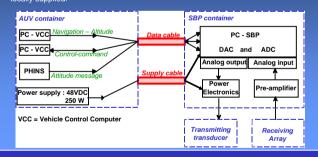
	El	lectro-				🖁 perf	ormances
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Frequency band :	 [1.8, 6.2 kHz] (single transducer) [2, 8 kHz] (three-transducer array)
Sound Level :	~ 190 dB (ref. 1 µPa @ 1 m)
Power amplifier :	 Pulse Width Modulation (PWM) Max. power : 1 kVA Efficiency : > 80 % Harmonic distortion : < 3 % Duty cycle : < 20 %
Signal length :	20 ms < T < 50 ms
Vertical resolution :	



AUV/SBP Interface

Roll, pitch and heave data coming from the inertial navigation system (PHINS) and navigation, altitude and depth data coming from Vehicle Control Computer (VCC) are received on PC-SBP (serial link or network). Control-command between PC-VCC and PC-SBP is performed via network. This equipment is (48 VDC/250 W) locally supplied.



Geological survey (AUV)

