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Direct wave suppression using wavelet transform for bistatic sonar

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The bistatic sonar is often influenced by the direct wave, especially when the target approaches the baseline of the system. The direct wave is above 50dB higher than the scattering signal level. The paper analyzes the effect of the direct wave, and proposes a new method based on wavelet transform for direct wave suppression. The strong direct wave is well eliminated while maintaining the weak scattering signal almost unchanged. The basic idea is that the direct wave is firstly removed from the received signal after wavelet transform. Then the signal is reconstructed in time domain, finally the cross-correlation is achieved to show the doppler frequency shift of the weak scattering signal. Computer simulation is given. The cross-correlations of the received signal for both before and after the direct wave suppression are compared. It shows that the influence of the direct wave is correctly removed, the time delay and Doppler frequency shift are shown in the figure and the target is detectable.