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**Examples of high frequency variability in underwater acoustic systems**

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In this paper we will look at examples of high frequency variability encountered by the author during the design and implementation of underwater acoustic systems over the last 20 years. These systems include those for radiated noise measurements, short baseline tracking, tomographic correction of numerical ocean models, marine mammal detection, and diver detection. The examples will highlight the different physical sources of variability and their effects on system performance. Methods used for mitigating the effects both in the physical design of the sensor system and in the signal processing will also be discussed.

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