Underwater Flow Noise Simulation

S. H. Abadi[1], A. T. Lim[1]

[1]University of Washington, Bothell, WA, USA

Abstract

Sound is the most reliable tool to study the ocean. Underwater acoustics is an area that studies the sound propagation in water and the interactions with other objects and water boundaries. There are many technologies available for acoustic exploration of the ocean. Autonomous Underwater Vehicles (AUV) is a robot used in ocean sciences that travels underwater autonomously and can tow a hydrophone as a mobile sensor to record sound. The turbulent flow induced by the towing hydrophone generates low frequency flow noise which can interfere with the hydrophone recordings. This flow noise is a problem in low frequency sound studies such as marine mammal bioacoustics. This project uses the COMSOL Multiphysics® software to model flow noise recorded by a towed hydrophone. Using the COMSOL® software, a model of the hydrophone system is created to preform turbulent flow simulations (Figure 1). Moreover, the transient acoustic-solid interaction interface is used to model the propagation of sound signals around the hydrophone. Multiple simulations are undertaken to predict the flow noise level at the variety of Reynolds numbers (i.e. the towing speed).

Figures used in the abstract

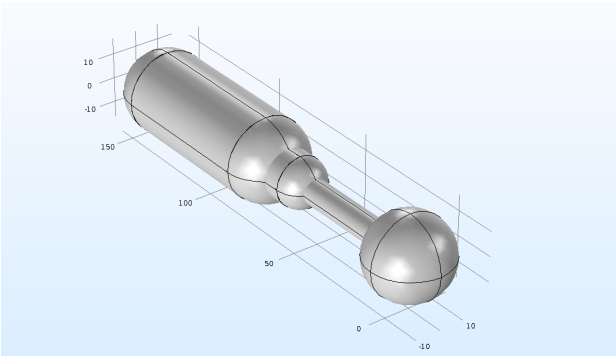

Figure 1: hydrophone CAD model