Abstract Submitted
for the DFD08 Meeting of
The American Physical Society

**Experiments and simulations of flow noise inside a cylinder aligned with the flow**[1] THOMAS ELBOTH, University of Oslo, ØYVIND ANDREASSEN, BJØRN ANDERS REIF, Norwegian Defense Research Establishment (FFI) — This work uses Lighthill's acoustic analogy to investigate noise generated by a turbulent boundary layer surrounding a cylinder aligned with the flow direction. Based on a DNS of channel flow with a Reynolds number $Re_\tau = 180$, both the direct and the acoustic pressure fluctuations (self-noise) from the turbulent boundary layer surrounding the cylinder are computed. The computational domain is surrounded by a Perfectly Matched Layer (PML) absorbing boundary conditions. The result from the simulation is compared with noise data recorded on a purpose built experimental seismic streamer towed in the ocean. We do this to gain knowledge about how turbulent flow noise in a "towed" cylinder behaves and to compare the turbulent flow noise with other sources of noise found in towed sonar arrays, commonly used for maritime surveillance and geophysical exploration. Based on both simulations and measurements we present spectral estimates of the acoustic field and estimates of the spatial coherence "distance" of the noise.

[1]Supported by NFR through grant 175921/S30.

Thomas Elboth
University Of Oslo

Date submitted: 01 Aug 2008 Electronic form version 1.4