Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Development of a new ABS Acoustic Bubble Spectrometer®© system XIONGJUN WU, Dynaflow Inc, JAMES PEREA, MICHEL TANGUAY, CHAO-TSUNG HSIAO, GEORGES CHAHINE — DYNAFLOW has developed an acoustic based device, the ABS Acoustic Bubble Spectrometer®©, that measures bubble size distributions and void fractions in liquids based on the measurement of sound propagation through the liquid. In the original system, a pair of hydrophones is used to transmit and receive short monochromatic bursts of sound at different frequencies through the liquid. These signals are processed and analyzed to obtain the frequency dependent attenuation and phase velocities of the acoustic waves. Subsequently, the bubble size distribution is obtained following solution of an inverse problem. In the new system, we have utilized multiple hydrophone pairs that have different frequency response ranges to cover a wider range of bubble size measurement. A transmission signal amplifier is integrated into the system to improve the signal noise ratio. We have also implemented an adaptive control scheme that automatically adjusts the transmitting signal strength and acquisition resolution to optimize the measurement process and used a rectangular and a sine acoustic wave pattern to improve accuracy of signal analysis.

Xiongjun Wu
Dynaflow Inc

Date submitted: 03 Dec 2006 Electronic form version 1.4