Acoustical Modeling and Design Tools

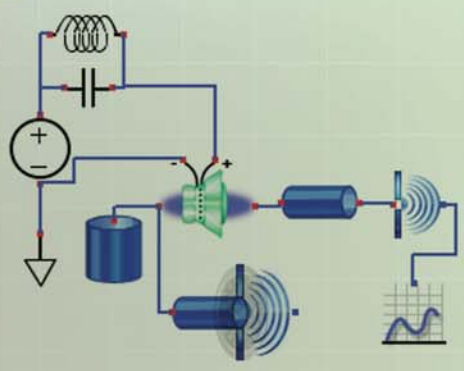
ARES

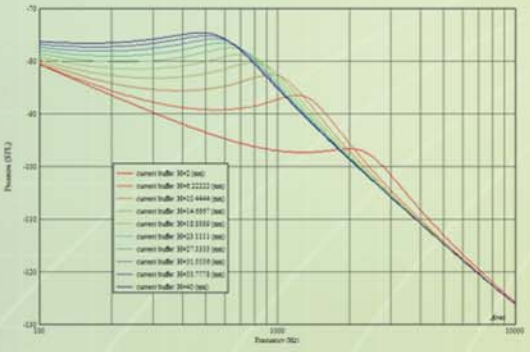
Modeler

An icon based modeler that allows you to quickly place speakers, microphones, volumes, ports, radiators, etc. and connect them in arbitrary topologies to simulate any configuration. Simulations typically take a fraction of a second. A parameter iteration feature allows for instant sensitivity analysis.

The modeler primarily uses lumped parameter analysis, a well established technique for simplifying acoustical systems that effectively captures the behavior of speakers, headphones, cellphones, tablets, etc.

Ports are implemented as 1D waveguide with thermal and viscous damping fully accounted for. End correction between all elements are automatically handled. Acoustical impedance and frequency response measured data can be imported directly into the model





Many plotting options
26 history buffers
SPL, velocity, displacement, impedance
A, B, C, P50, psophometric weighting
Zwicker loudness Sone and Phon metrics
telephony RLR and SLR metrics
narrow, octave, 1/3rd octave bands
magnitude, phase, real & imaginary
import/export data to/from files/clipboard

Over 60 acoustic, electrical and mechanical elements
ITU ear simulator, horns, passive radiators op amps, transconductance amplifier, semi-inductance mass, spring, mech-acoust transformer
BL magnetic motor uses magnetic demagnetization curve

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MAE
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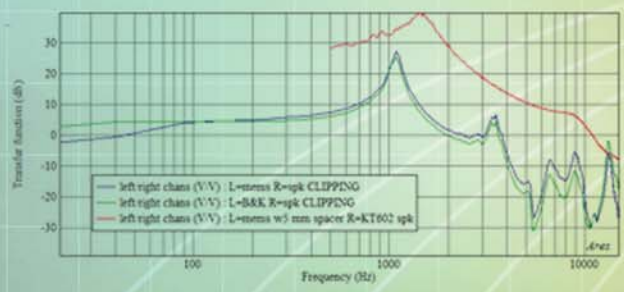
Impedance Measurement Apparatus

Knowing the exact acoustical behavior of your elements is important for obtaining an accurate model. The flow impedance apparatus (shown) experimentally measures the impedance through elements such as fabric or ports. The surface impedance apparatus measures the impedance into an acoustical systems such as speaker enclosures or horns. This data can be directly imported into modeler to ensure exact impedance is captured. Particle velocity is measured and controlled to avoid or measure nonlinear behavior.

Frequency Response Module

This module uses a PC sound card to perform two channel frequency response measurements. It supports RLR, SLR, TCLw, STMR telephony metrics as well as noise channel measurements.



Speaker Parameterization Service

Accurate speaker parameterization is also critical to obtain good modeling results. MAE measures both Thiele-Small and Aeroacoustic parameters with a special focus on micro-speakers (20mm or smaller).

Aeroacoustic parameters are a proprietary set of speaker parameters that captures high frequency modes and low frequency relaxation not captured with Thiele-Small. They can be used for piezo, balanced armature (hearing aid), or moving coil speakers.

Training and Consulting

MAE offers classes for fundamental acoustics, lumped parameter analysis and Ares training.
MAE can also consult on your acoustic/audio designs.