

STAL Structural Acoustics Laboratory

The University of Alabama

Purpose

Whether for a soldier on the battlefield, the victim of a building collapse, or an experiment on the International Space Station, the goal of the **Structural Acoustics Laboratory** is to develop new technologies in the areas of structural vibrations and acoustics.

By gaining a fundamental understanding of the generation, transmission, and radiation mechanisms associated with sound and vibration, the needs of industry, government, and engineering education can be met in these areas.

Goals

- Meet needs of the U.S. military, industry, and other organizations by developing:
 - New noise & vibration control methods
 - Improved modeling and experimental techniques
- Strengthen relationships with industry and government in order to meet current and future needs in engineering workforce development



Compound Bow Project



Fuel-Cell Dynamic Modeling

THE UNIVERSITY OF ALABAMA
Center for Advanced Vehicle Technologies

Research Projects

- Acoustic Sensor Development
- Mild Brain Injury Studies (*new*)
- Automotive NVH Modeling
- Dynamic Force Reconstruction Techniques
- Vibration Control of Space Station Rack Shelf
- Fuel Cell Dynamics and Acoustics
- Structural Damping Evaluation Methods
- Microgravity Vibration Isolation
- Gearbox Active Vibration Control



Capabilities and Instrumentation

To serve the needs of externally supported research, engineering education, and contracted testing, the Structural Acoustics Lab has the following instrumentation and capabilities:

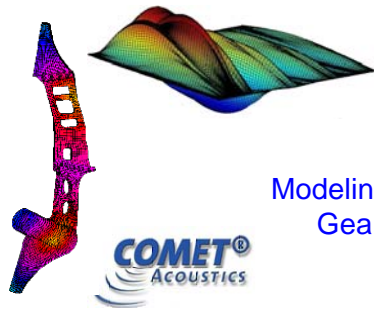
Experiment and Measurement

Acoustics

Hemi-Anechoic Chamber. Detailed Acoustic Characterization
Acoustic Intensity and Source Location
Source Directivity and Other Acoustic Characterizations

Vibrations

Vibration Damping & Isolation Characterization
Mode Shape and Precise Node Location
Drive Point Impedance
Low Frequency Measurements (*DC Accelerometers*)
Spatial Vibration Measurements via *Scanning Laser Vibrometer*



Analysis and Computation

Dynamic Simulation and Finite Element Modeling
Acoustic Radiation and Structural Vibration Modeling
Acoustic Modeling via *Comet Acoustics*
Modeling of Structures containing Frequency-Dependent *Viscoelastic Materials*
Gear Dynamic Modeling via Discrete/Lumped Dynamic Representations
Damping Characterization for Beam- and Plate-Like Structures

Facilities



Chamber & Sound Enclosures

- **Hemi-Anechoic Test Chamber**
 - 23'×19.5'×15' with large access doors
 - 100 Hz ISO3745, NC-19
 - 80 Hz Free Field to 2 meters
 - Reconfigurable to Anechoic, Ventilated
- **Medium Component Sound Enclosure**
- **Small Component Test Lab**
- **Graduate Research Lab and Offices**

Contact

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