



www.cometacoustics.com

SPECIFICATIONS



### Comet Acoustics® Overview

COMET Acoustics is a computer simulation software for solving sound and vibration problems. COMET offers advanced capabilities that make it the most comprehensive acoustic software available. COMET utilizes boundary and finite element methods as well as analytical techniques to accurately predict the propagation, radiation and transmission of acoustic waves in a variety of media including fluids, foams, and solids.

COMET allows systematic analysis and design improvement of acoustic products at the early stages of product development and as a result reduces the need to rely on costly physical prototypes. The ability to perform the analysis and design at the early state of design process enhances the quality of the product as well as reduces the time for the product to reach the market thereby reducing overall cost.

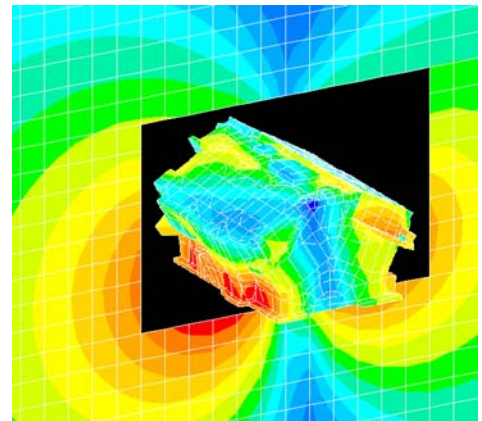
### Comet Modules

- ◆ **BEAT:** Boundary element based technique for acoustic analysis of fluid and fluid-structure interactions
- ◆ **CAPE:** Graphical user interface based process for optimization of automotive interior noise
- ◆ **SAFE:** Finite element method for acoustic analysis of structures, elastic porous materials and fluids.
- ◆ **SoRT:** Integrated experimental/numerical technique for complex noise source identification
- ◆ **Trim:** Acoustic performance, inverse characterization and optimization analyses of noise control materials
- ◆ **Vision:** Graphical user interface for pre- and post-processing

### Comet BEAT

#### Boundary Element Analysis Technology

BEAT is a boundary element method (BEM) based program for the acoustic analysis of fluids and fluid-structure interactions. This primary module of COMET is used to analyze noise fields within enclosures such as automotive or aircraft interiors and to evaluate the acoustical performance of products that radiate noise. BEAT consists of many advanced features that are useful and necessary for evaluating and improving the acoustical performance of products in many industries including coupled structural acoustic analysis, panel acoustic contribution analysis (PACA), sensitivity analysis, diffuse field analysis, mean flow analysis and multi-domain analysis. In addition to frequency response (harmonic) analysis, BEAT can also perform acoustic eigenfrequency and transient analyses.



### Analysis Types

- Frequency response (harmonic) analysis
- Eigenfrequency analysis
- Transient analysis
- Uncoupled acoustic analysis
- Coupled structural-acoustic analysis
- Embedded frequency response analysis
- Diffuse field analysis

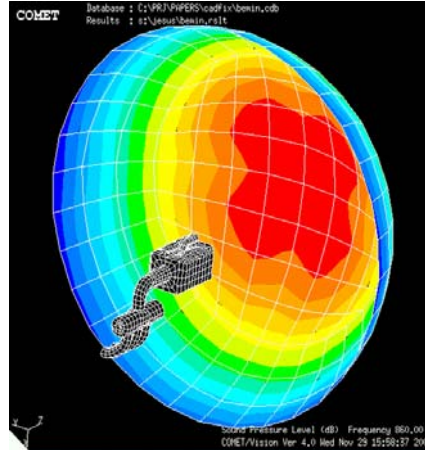


### Solution Methods

- Direct Boundary Element Method
- Indirect Boundary Element Method
- Enhanced Rayleigh Integral Method

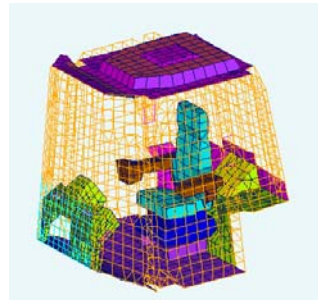
### Special Features

- Regularization for exterior problems
  - CHIEF, SuperCHIEF for direct BEM
  - UNIQUE for indirect boundary element method
- Mean flow capability
- Viscous effects inclusion
- Acoustic sensitivity analysis
- Panel Acoustic Contribution Analysis (PACA) for intuitive noise reduction within enclosures
- Modeling of complex (real and imaginary) material properties for acoustic media
- Multi-zone modeling
- Non-linear matrix interpolation technique for multi-frequency analysis
- Automated detection and handling of junctions and free edges
- Multi-level restart capability
- Engine acoustics with multiple loaded cases



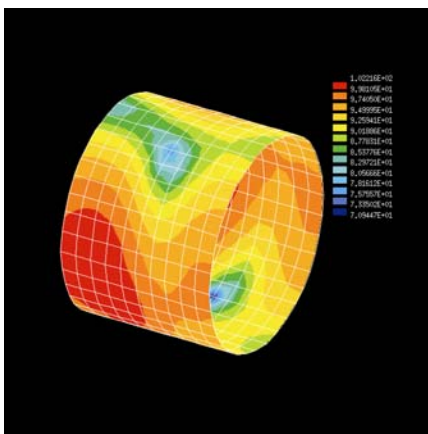
### Geometric Modeling Features

- Interior & exterior regions
  - Multi-zones or sub-domains
- Symmetry
  - Half
  - Quarter
  - Eighth



### Boundary Condition Types

- Acoustic pressure
- Acoustic particle velocity
- Acoustic impedance
  - Simultaneous structural velocity and impedance
  - Discontinuous impedance across structural surface
- Monopole, dipole, quadrupole and plane wave sources
- Frequency dependent boundary conditions
- Half-space with impedance boundary condition
  - Acoustically rigid
  - Pressure release
- Structural boundary conditions
  - Displacement
  - Acceleration
  - Rotation
  - Force
  - Moments



### Solvers

- In-core solvers
- Out-of-core blocked solvers
- Iterative solvers

### APPLICATION AREAS

- ◆ Aerospace
- ◆ Automotive
- ◆ Engine & Powertrain
- ◆ Consumer Products
- ◆ Audio/Electronics
- ◆ Acoustic Materials
- ◆ Computers & Peripherals
- ◆ Environmental Noise
- ◆ Exhaust Systems
- ◆ Heavy Equipment
- ◆ HVAC
- ◆ Recreational Vehicles
- ◆ Transducer Design
- ◆ Underwater Acoustics

### Data Interfaces

- ◆ HyperMesh
- ◆ I-DEAS
- ◆ PATRAN
- ◆ ABAQUS
- ◆ ANSYS
- ◆ NASTRAN
- ◆ COSMOS
- ◆ STAR-CD
- ◆ B & K

### Computer Platforms

- ◆ Windows XP
- ◆ Unix Workstations
  - HP
  - IBM
  - SGI
  - Sun

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