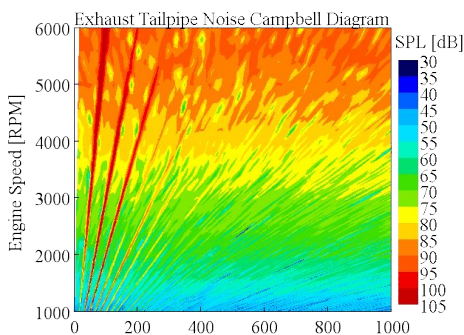


Acoustic Simulations

Analysis of Intake and Exhaust System Acoustics

GT-SUITE offers a reliable and easy-to-use solution for acoustic simulations. GT-SUITE's advanced features enables engineers to predict noise and pressure loss caused by air flow at the intake and exhaust of an engine system. By utilizing advanced Navier-Stokes equations, GT-SUITE captures pressure wave dynamics within the simulated system. Acoustic analysis can also be performed with GT-POWER, the industry standard engine simulation tool.



Highlights and Advanced Features

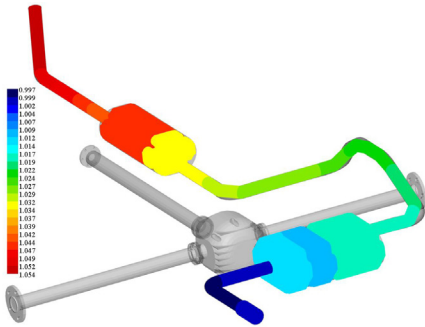
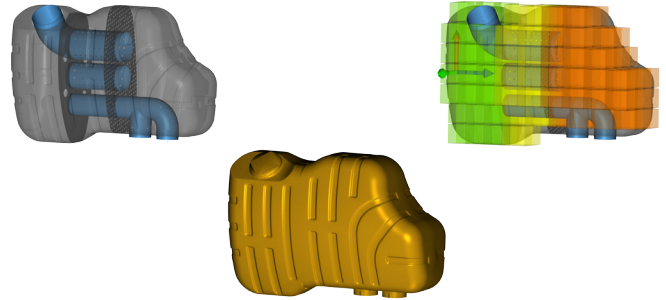
- Microphone model for predicting noise radiated from intake and exhaust opening
- Intuitive 3D CAD based preprocessor for importing, cleaning, and meshing complex geometries
- Transmission loss (TL) simulation
- Advanced post-processing for easy creation of Campbell diagrams, order cuts, waterfall plots, etc.
- Audio output generation for subjective sound quality assessments
- Fast linear analysis for rapid concept evaluation

Since 1994, Gamma Technologies has set the standard in system simulation, thanks largely to solving deep multi-physics with an easy to use interface. GT-SUITE's multi-physics approach to simulation empowers engineers to tackle their design and modeling challenges at every stage of the development cycle.

GT-SUITE Solutions

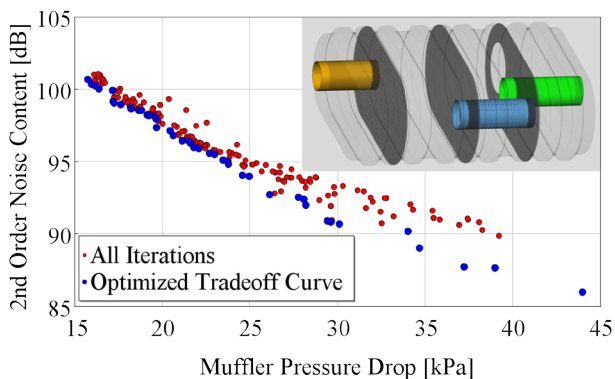
Rapid Modeling of Complex Geometries

- Transition from 3D CAD to a 1D GT-POWER model, then quickly and accurately access simulation results
- Automatically mesh to reduce modeling time from hours to seconds while also eliminating errors
- Capture prominent 3D acoustic effects of components at run times indicative of 1D simulations
- Clean, defeature, and modify existing CAD models



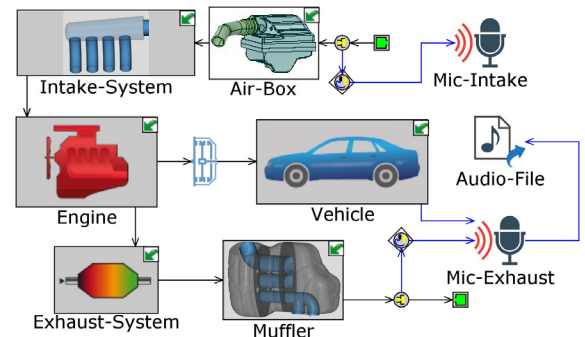
1D Simulation in GT-POWER

- Perform steady state and transient simulations
- Model an accelerating vehicle and create an audio file that predicts the resulting exhaust noise
- Simulate pressure drop of individual components and complete systems
- Include passive/active valves and active noise cancellation devices
- Create engine noise sources for integration with vehicle noise simulators



GEM3D Pre-Processing

- Design intake and exhaust systems, including airboxes, resonators, manifolds, and mufflers
- Import CAD or build a model from scratch
- Handle baffles, perforates, sleeves, absorbing materials, and more
- Create dimensional relationships in a GEM3D model to easily and quickly make multiple iterations to the geometry for use in design studies and optimizations



Optimization, Linear Acoustics, and More

- Wrap GEM3D model into a batch process or 3rd party optimization tool for optimizing various parameters of the components such as mufflers
- Target noise levels while also constraining back pressure
- Utilize non-linear (Navier-Stokes) or linear (wave equation) solvers depending on the complexity of the simulation
- Include custom weighting/transfer functions to predict noise at multiple locations such as the driver's ear
- Find system nodes/anti-nodes and mode shapes