

Actran SNGR

Simulation tool for fast flow noise computation



Product overview

Predicting the noise generated by turbulent flows from steady RANS solutions

Actran SNGR is a finite element based acoustic solver for predicting the noise generated by turbulent flows. Actran SNGR retrieves aerodynamic noise sources from steady flow simulations performed with most of the current CFD codes such as Fluent™, StarCCM+™, OpenFOAM, etc. The complete simulation procedure involves three steps:

1. A steady RANS simulation is performed by the CFD code. The CFD solution (mean flow, turbulent kinetic energy, and dissipation rate) is stored in its own native format or in the Enight™ Gold format.
2. Actran SNGR computes the aero-acoustic noise sources from the CFD results produced in step 1. This involves synthesizing the noise source from steady CFD solution and mapping them from the CFD mesh to the acoustic mesh.
3. The radiated acoustic field is then computed. This produces a wide set of relevant results: acoustic pressure, velocity or intensity maps, frequency response functions of various local (e.g. pressure) or global (e.g. power) quantities.

Actran SNGR allows addressing the noise generated from turbulent flows in a much faster way than classic aero-acoustic approaches: the use as input of steady RANS solutions allows drastically reducing the overall analysis time as these are much faster than unsteady CFD computations. Specifically, Actran SNGR is useful when fast and relative levels between different designs are needed rather than absolute levels such as in optimization loops. Furthermore, this tool allows addressing aeroacoustic analyses when unsteady CFD simulations are industrially unpractical such as complete vehicles exterior acoustic responses.

Actran SNGR offers all the advantages of classic aero-acoustic simulations: (1) Each part of the work can be done independently by different engineers, departments or even companies with different responsibilities or skills. (2) A single CFD simulation can feed different acoustic simulations (e.g. with different acoustic treatments). (3) Actran SNGR can be combined with Actran VibroAcoustics in order to address aero-vibro-acoustic challenges.

Actran SNGR is integrated with high performance solvers; parallel processing features and is fully integrated in Actran VI.

Target applications

- Aero-acoustic optimization of HVAC ducts
- Full vehicles aeroacoustics
- Aircraft landing gear noise
- Vehicle side mirror noise

Key features

- All Actran Acoustics features (see dedicated flyer)
- Hybrid aero-acoustic approach: steady RANS CFD followed by acoustic radiation
- Direct interface to most leading CFD codes using native CFD file formats, or through Enight™ Gold format
- Lighthill analogy for synthesizing aeroacoustic sources from steady RANS CFD results
- Conservative integration technology for source mapping from CFD mesh to acoustic mesh
- Compatible with other Actran modules for aero-vibro-acoustic simulations
- Direct and iterative solvers for reduced CPU times
- Available platforms: Windows, Linux and most Unix platforms
- Integration in Actran VI

Actran SNGR

Actran software suite

Actran is a complete acoustic, vibro-acoustic and aero-acoustic CAE software suite.

Empowered by the technologies of finite/infinite element methods (FE/IFE), as well as the Discontinuous Galerkin Method (DGM), Actran provides a rich library of materials, elements, boundary conditions, solution schemes and solvers. Actran is a high accuracy, high performance and high productivity modeling tool suiting the needs of the most demanding engineers, researchers, teachers and students for solving the most challenging acoustic problems.

Free Field Technologies (FFT)

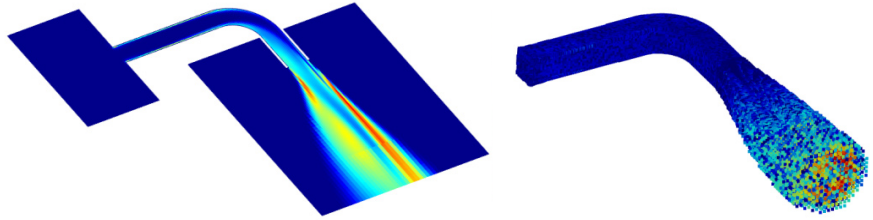
Free Field Technologies is focused on three main areas:

- Developing Actran software for acoustic, aero-acoustic and vibro-acoustic simulation;
- Providing technical services, support, training and delivering acoustic engineering projects;
- Researching innovative technologies and methods for efficient and accurate acoustic analysis.

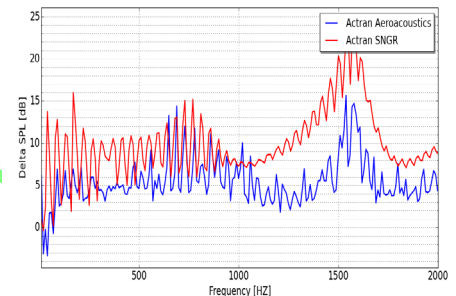
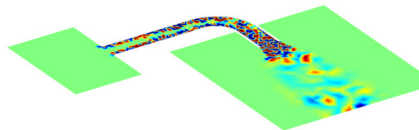
Free Field Technologies is the technical leader in acoustic CAE and with a wide range of customers around the world active in the Automotive, Aerospace, Shipbuilding, Electronic and Heavy Equipment industries as well as in the Educational and Research sectors.

FFT is a wholly owned subsidiary of MSC Software Corporation.

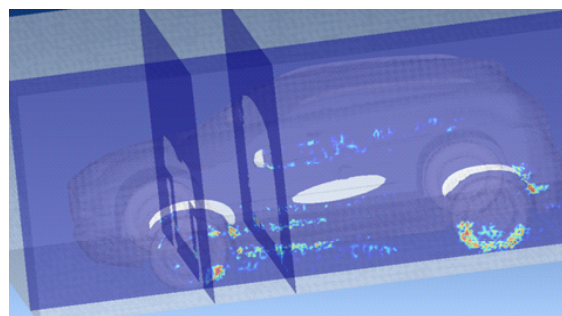
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Turbulent Kinetic Energy from steady RANS solution. Synthetic Velocity Sample.



Integrated Aero-Acoustic Source. Relative level comparison between Actran SNGR and Actran AeroAcoustics.



Full vehicle aeroacoustic sources identification. Model & results courtesy of Mitsubishi Motors.

View Actran videos on 

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