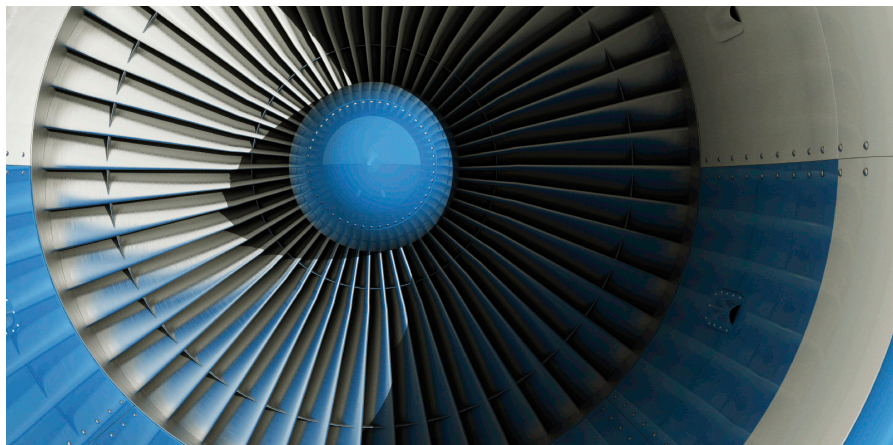


The leading solution for turbomachinery noise prediction

KEY FEATURES

- > All ACTRAN Acoustics features (see dedicated flyer)
- > Acoustic propagation and radiation on top of a non-uniform mean flow
- > Accurate modeling of liners including the effects of the flow (Myers–Eversman formulation)
- > Infinite elements for unbounded domains
- > Excitation defined by incident acoustic duct modes
- > Harmonic analysis
- > 2D, axisymmetric and 3D analysis
- > Complete finite element library (tria, quad, tet, hex, prism, pyra, all in linear and quadratic forms)
- > Direct and iterative solvers for improved efficiency
- > Available platforms: Windows 32 & 64 bits, Linux and most Unix platforms
- > Streamlined interface with leading CFD tools, including Fluent™, STAR-CD™ and Powerflow™ for importing mean flow
- > Identification of the incident duct modes amplitudes from CFD simulations using a triple plane pressure matching technique
- > Integration in Actran VI



Product overview

A powerful acoustic CAE tool for turbomachinery noise prediction

ACTRAN™ is the reference CAE tool for analyzing the sound radiated by turbo machines and for optimizing the related acoustic treatments. ACTRAN™ is used extensively by many leading aerospace companies that rely on the tools' accuracy, ease-of-use and performance for reaching their strategic acoustic design goals.

ACTRAN™ contains all advanced modeling features required for turbo machinery noise analysis. To capture the important convection and refraction effects, the sound waves propagate on top of a non-uniform background mean flow which can be calculated by ACTRAN or imported from a CFD simulation. The influence of the mean flow on the performance of acoustic liners is accounted for thanks to the Myers boundary condition. The acoustic source is defined in terms of incident duct modes of arbitrary order and their amplitude can be defined in a variety of ways (e.g. normalized amplitude, intensity, equal distribution of energy on all propagating modes) or

derived from pressure fluctuations calculated on a set of planes by one of the supported CFD tools. Both 3D and axisymmetric models can be defined.

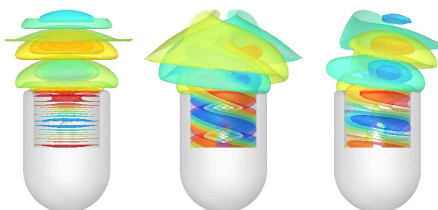
One of the challenges of acoustic CAE is to handle large models associated to high wave number and to large geometrical size and complexity. ACTRAN™ meets this challenge thanks to its efficient solver technology that includes advanced parallel processing.

ACTRAN™ is used not only for optimal aircraft engine nacelle liner design but also on inlet and outlet liners for helicopter turbines, environmental control systems (ECS) or auxiliary power unit (APU). ACTRAN™ is also used for non aerospace applications like computer cooling system noise and more.

ACTRAN™ can be complemented by ACTRAN DGM to solve problems involving complex shear layers and flow gradients occurring at the engine exhaust.

Target applications

- > Aircraft engine noise, including nacelle design
- > Ducted cooling systems (electronic devices)
- > Blower systems (air conditioning modules)
- > Helicopter turbine noise



THE ACTRAN SOFTWARE SUITE

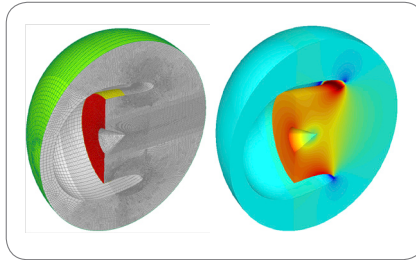
ACTRAN is the most complete acoustic, vibro-acoustic and aero-acoustic CAE software suite. Under a common technological umbrella provided by the finite and infinite element method, ACTRAN provides a rich library of elements, material properties, boundary conditions, solution schemes and solvers. ACTRAN is a high performance, high productivity, high accuracy modeling environment suiting the needs of the most demanding engineers, researchers and teachers and empowering them with the tool they need for solving the most challenging acoustic problems.

FREE FIELD TECHNOLOGIES

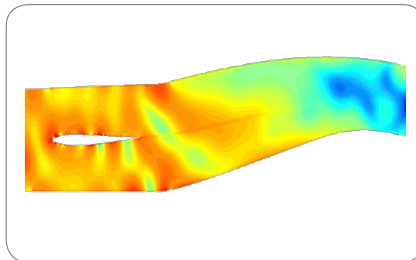
Free Field Technologies develops, maintains, supports and sells the ACTRAN acoustic CAE software suite. The company also provides related support, technology transfer, engineering, technical support, training and customization services.

FFT operates from its headquarters in Mont-Saint-Guibert (Belgium) and from local offices in Toulouse (France) and Tokyo (Japan). ACTRAN is distributed worldwide by a dense network of partners; please contact us for details of your nearest partner.

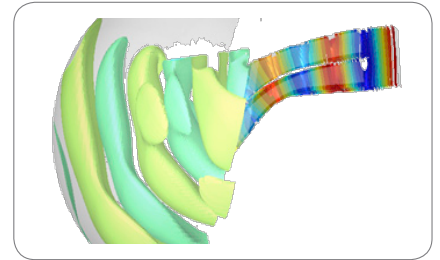
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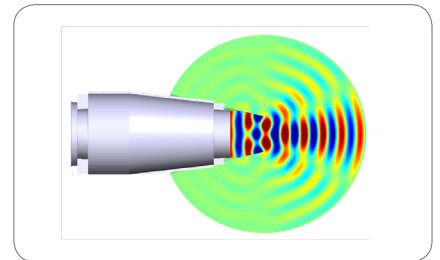
Mesh of a half nacelle model (left) and the associated computed flow magnitude (right). Model courtesy of Airbus™.



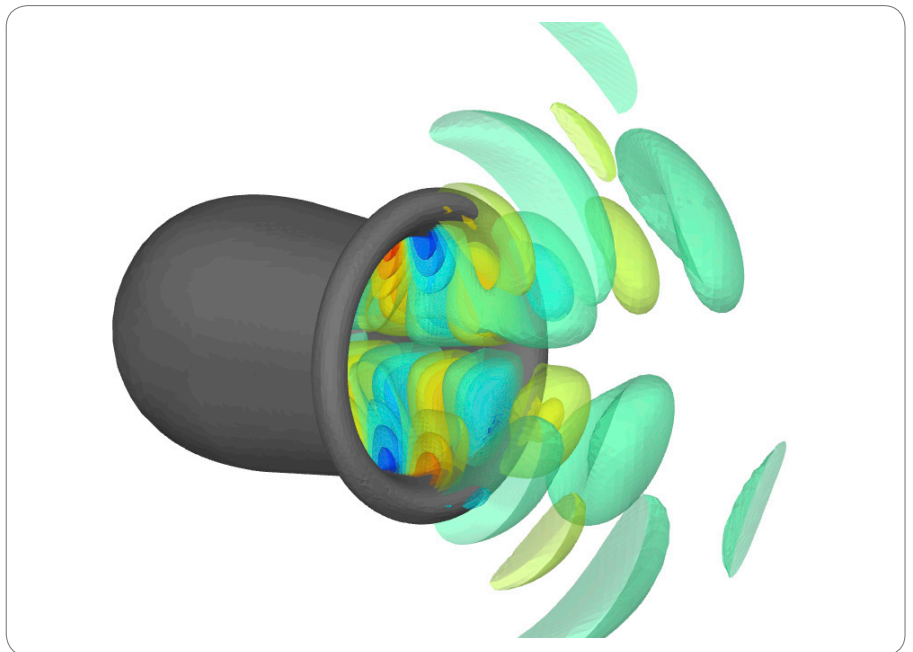
Influence of a splitter within a duct - Model courtesy of Airbus™.



Sound propagation through an APU unit - Model courtesy of Airbus™.



Visualization of the sound directivity generated by a turbine - Model courtesy of Airbus™.



Nacelle duct mode propagation - Model courtesy of Alenia Aermacchi™.

FREE FIELD TECHNOLOGIES

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