

PRESS RELEASE

Acoustic simulation advances help manufacturers innovate to cut transport noise

Actran 2020 embeds fast and accurate acoustic simulation into design processes so manufacturers can reduce noise pollution and improve passenger comfort

Mont-Saint-Guibert, Belgium, December 12, 2019 – Free Field Technologies, part of Hexagon’s Manufacturing Intelligence division, today announced the Actran 2020 suite comprising new acoustic, vibro-acoustic and aero-acoustic technologies that enable aerospace and automotive manufacturers to build more accurate noise production and optimization into their design processes.

Aircraft operators face growing restrictions on noisy aircraft and more stringent International Civil Aviation Organization (ICAO) noise management regulations. Reducing noise has become a business priority due to landing fees, flight curfews, or fleet being excluded from some airports. This is driving aerospace innovation, with engine technology paramount for effective aircraft noise reduction.

At the intake, engine noise is dependent on both the axial flow through the turbo fan and the associated swirl, but the combined effect on noise propagation was historically challenging to model. Actran’s award-winning aircraft engine noise prediction [1] now automatically accounts for the mean flow swirl component in acoustic duct modes excitation, which avoids mismatches between nacelle inlet flow and boundary conditions. The more accurate simulation enables engineers to understand how design changes such as shortening the nacelle affect noise emissions so they can optimise the placement of acoustic treatments.

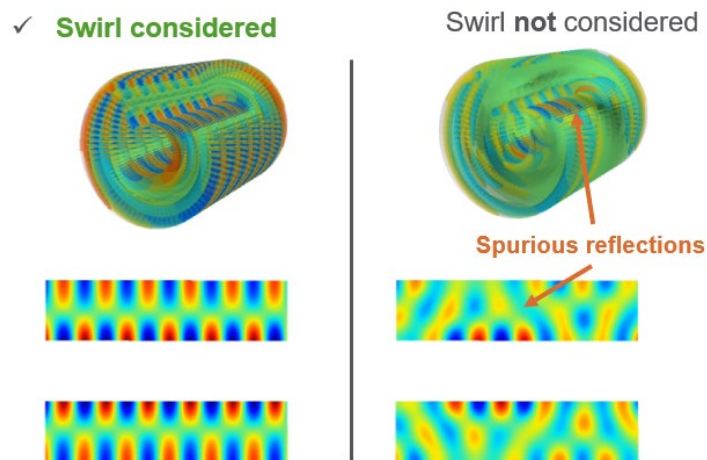


Figure 1 - Impact of flow swirl consideration in acoustic duct mode propagation

At the exhaust, simulating the indirect combustion noise of aircraft engines was rarely feasible due to the cost of computation. The Cumpsty and Marble compact model is now implemented in Actran, applying inexpensive modelling to assess indirect combustion noise in a turbomachine. Recently developed and validated against measurements together with Safran Helicopters Engines [2], the model enables manufacturers to predict the combustion noise emitted in engines.

The forthcoming ISO 360-1 standard reflects growing pressure to reduce automotive pass-by noise, with tyre noise expected to contribute 60% by 2024. A new dedicated noise assessment utility in Actran maps rotating tyre time domain vibrations from frequently used tools such as Abaqus onto a tyre-deformed mesh. This model is transposed into the frequency domain to predict tyre noise radiation in-situ so that acoustic mitigation solutions can be optimized accurately within a single acoustic engineering environment.

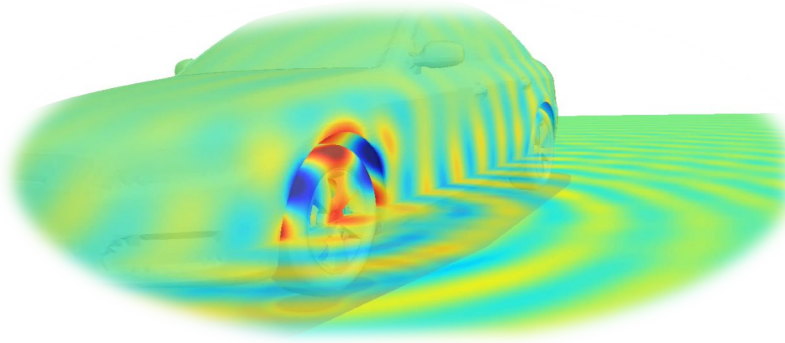


Figure 2 - Tyre noise radiation in-situ conditions

Decision making is also improved for Noise, Vibration, and Harshness (NVH) engineering workflows. Test results required by metrology and quality teams are now automatically produced for virtual tests in accordance with standard acoustic test procedures for power radiation and automotive pass-by noise measurements including ISO 3744, ISO 3745, SAE J1074 and IEC 61672-1.

Electric vehicles manufacturers can now effectively address interior noise from electric motors, which is very pronounced at mid and high frequencies using Actran SEA. Its meshless simulation engine simulates large vibro-acoustic systems based on existing (low frequency) finite element models in MSC Nastran. Acoustic engineers can now model a whole vehicle including multi-layer poro-elastic materials at mid to high frequencies and optimise the insulation, damping and absorption effects of acoustic treatments within weight and cost constraints.

“Actran 2020 integrates cutting edge acoustic research and technologies to address today’s transport noise challenges,” said Yves Detandt, Technical Director at FFT. “Inspired by new acoustic challenges, this new release provides a set of tools and methods empowering users to better model advanced acoustic problems in the design of the next generation of quieter products.”

Actran 2020 is designed to make model set-up and definition more efficient with a reorganized analysis tree, components and boundary conditions categories and a new layout and native unit conversion system offering further productivity enhancements. Actran 2020 is available immediately.

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Hexagon is a global leader in sensor, software and autonomous solutions. We are putting data to work to boost efficiency, productivity, and quality across industrial, manufacturing, infrastructure, safety, and mobility applications. Our technologies are shaping urban and production ecosystems to become increasingly connected and autonomous – ensuring a scalable, sustainable future.

Free Field Technologies (FFT) is a leading global company focused on acoustic simulation and engineering services. Actran, FFT’s software product, leads numerous technology trends of vibro-acoustic and aero-acoustic modeling since 1998, when the company was founded by Prof. Jean-Pierre Coyette and Prof. Jean-Louis Migeot, two renowned pioneers in the domains of numerical acoustics. Learn more at www.fft.be.

Hexagon’s Manufacturing Intelligence division provides solutions that utilize data from design and engineering, production and metrology to make manufacturing smarter. For more information, visit hexagonmi.com.

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[1] <https://www.fft.be/news/msc-software-actran-awarded-2017-institute-acoustics-peter-lord-award>

[2] <http://pub.dega-akustik.de/ICA2019/data/articles/001384.pdf>