Internship

Renault - Free Field Technologies

**Subject:**  Virtual SEA Simulation for Automotive vibro-acoustic in the mid and high frequency ranges

**Description:**  Virtual prototyping is more and more resorted to for accelerating the product design process. In such context, efficient numerical simulation tools (accurate, easy-to-use and computationally performant) are needed for assessing the vibro-acoustic performance of structural components or systems. While the finite element method has demonstrated its robustness in the so-called low frequency-range (LF), dedicated methods able to tackle higher modal densities and variability effects need to be developed. As electric motors are quieter than thermic engines, the main noise sources contributions for electric vehicles is mainly in the mid and high frequency range. Free Field Technologies has worked in the past few years on setting up a Virtual SEA tool which provides an answer to this industrial need, while fully-leveraging and allowing for a smooth and natural transition from LF FE-based models. The purpose of this internship is to apply and design best practice rules for the setup of Virtual SEA models on typical industrial models. In the framework of this internship, the trainee will apply this method and investigations on a realistic full Renault car. In particular, coupling of the structural model to an acoustic fluid cavity as well as frequency extrapolation rules have been recently added to the numerical simulation product and require modelling practice to be designed. The numerical results obtained in the internship will be compared to experimental results and alternative numerical methods provided by Renault, leading possibly to a scientific publication (international conference or scientific journal).

**Location:** Mont-Saint-Guibert, Brussels area, Belgium.

**Company:** Founded in 1998, Free Field Technologies (FFT, [www.fft.be](http://www.fft.be)) -part of the Hexagon group- ([www.hexagon.com](http://www.hexagon.com)) is a SME developing and supporting the ACTRAN software suite for acoustic simulation. Leading automotive companies (OEM’s and their suppliers), aircraft manufacturers, aircraft engine suppliers, audio system designers (and more) are using our technology to improve the acoustic performance of their products virtually, through simulation.

ACTRAN is used by hundreds of companies worldwide including Airbus, Boeing, Safran, Rolls Royce, Renault, BMW, Ferrari, Toyota, Honda, Volvo, Bose, Microsoft, Panasonic and many more.

Free Field Technologies operates from its Belgian headquarters (close to Louvain-la-Neuve) and from branch offices in Toulouse (France), Tokyo (Japan), Beijing (China), Bangalore (India) and Troy (Michigan).

This internship will be done in collaboration with Renault (models, regular web meetings, sharing exp results).

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