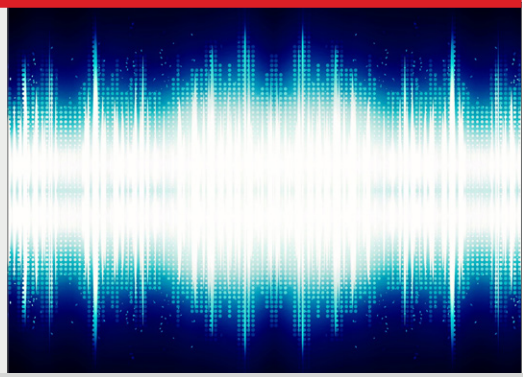
DATASHEET



# Actran™ SEA

## Extend Your Range of Analysis

## Product Overview

**Efficient Mid- and High-Vibro-Acoustic CAE Module**

The Actran SEA module offers the possibility to extend the usability of existing vibro-acoustic finite elements models to mid- and high- frequencies.

Statistical Energy Analysis approach offers an efficient solution to study noise and vibration propagation inside large systems at mid- and high-frequencies. The global system is reduced to a set of coupled subsystems and energy balance between them is computed.

Building an SEA model with classical approaches usually requires access to experimental data or analytical expressions that limit the range of geometrical objects that can be handled. With Actran SEA module and its Virtual SEA approach, CAE engineers can use their existing Finite Elements vibro-acoustic models (mode shape and eigen values) to create an SEA model. Based on automatic or user-defined subsystems definition, the SEA parameters are efficiently extracted from the Finite Elements model.

Even without SEA expertise, sound and vibration analysis at mid and high frequencies can be performed, along with energy transfer path analysis. Combined with a unique frequency extrapolation method, the Actran SEA module offers an insight to the behavior of existing vibro-acoustic finite elements models at high frequencies.

The complete system vibro-acoustic performance can be predicted thanks to realistic physical excitations including spatially and frequency dependent distributed load and pressure as well as diffuse sound field and turbulent boundary layer.

## Target Applications

- Aerospace: Vibration response and transfer path analysis of fuselage submitted to turbulent boundary layer or diffuse sound field excitations. Rocket payload integrity analysis at take-off.
- Automotive: vibro-acoustic response and transfer path analysis of complete vehicle submitted to structural and acoustical loads.
- Shipbuilding: Onboard noise prediction due to machinery noise and flow induced vibration.
- Railway: Interior acoustic comfort prediction of train coach
- Machinery: heavy-machinery cabin vibro-acoustic analysis

## Key Features

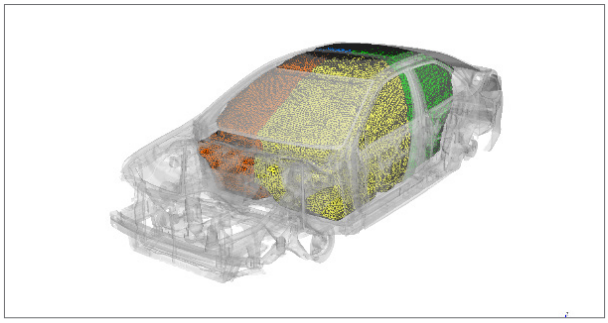
- Vibro-acoustic coupling
- Extraction of SEA parameters (CLF & DLF) based on FE models
- User-defined sub structuring
- Frequency and spatial averaging
- Easy access to extrapolated CLF & DLF at high frequencies
- Energy transfer path analysis
- Advanced random vibro-acoustic excitations including diffuse sound field, turbulent boundary layer and rain-on-the-roof models
- Full support of non-congruent meshes
- Fast solution computation based on reduced energy model
- Integration in Actran VI
- Parallel solvers for reduced CPU times





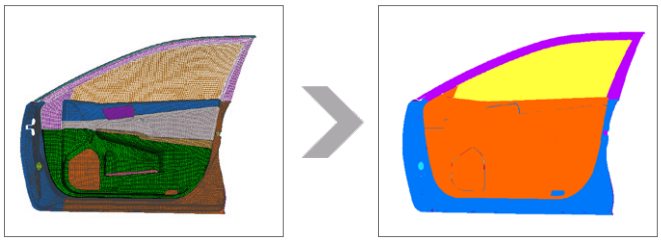

# Actran™ SEA

## 1. Import Fluid and Structure Mesh and Normal Modes from MSC Nastran



MSC Nastran FE vibro-acoustic model of a car

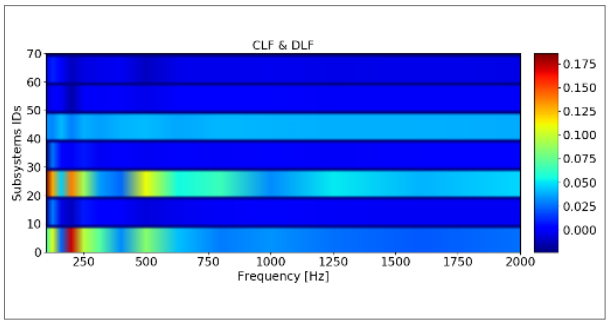
## 2. Define Your SEA Sub-Structuring Based on Your FEA Mesh



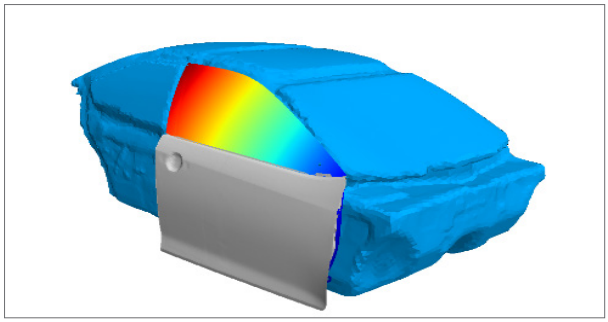
FEA PIDs

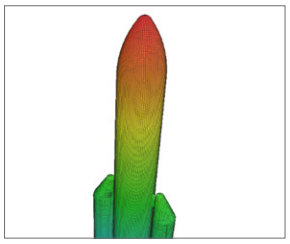
User-defined SEA Substructuring

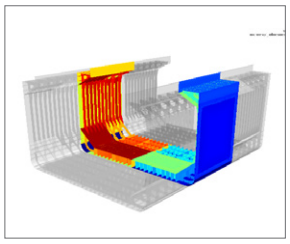
## 3. Let Actran Build the SEA Matrix and Compute System CLF & DLF



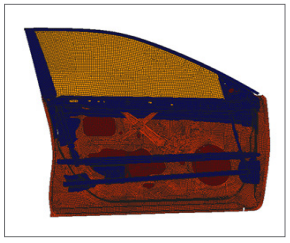

## 4. Select the Excitation



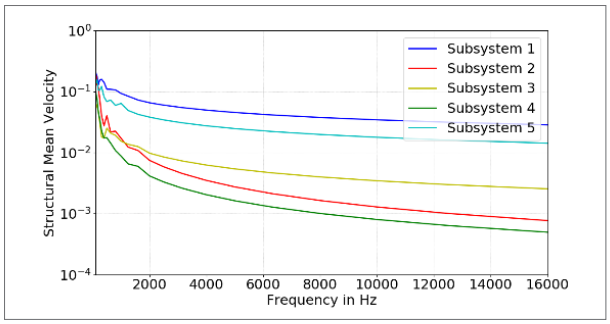




## 5. Compute the Solution, Extend the Frequency Range and Post-Process the Results



Energy fluxes visualisation




Vibration levels on subsystems

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