Using Simulation Technology to Evaluate and Demonstrate the Benefit of Laminated Glass

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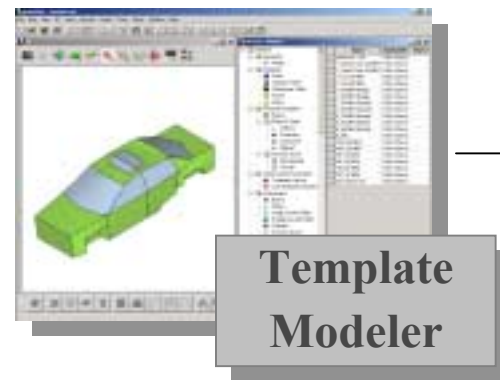
Motivation

- Develop customized AutoSEA2 Graphical User Interface and related SEA models to predict the acoustical contribution of glass laminates to the interior sound quality.

Custom GUI   **AutoSEA Models**   **Sound Quality results**
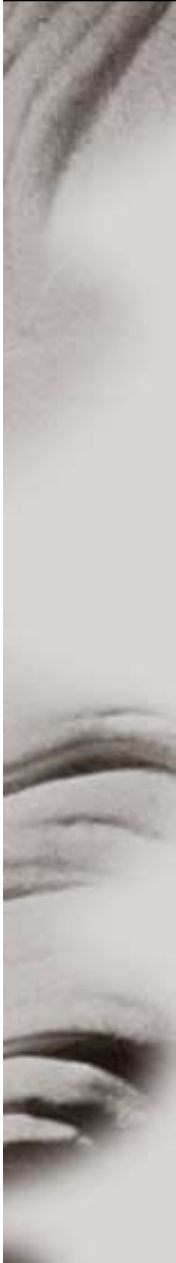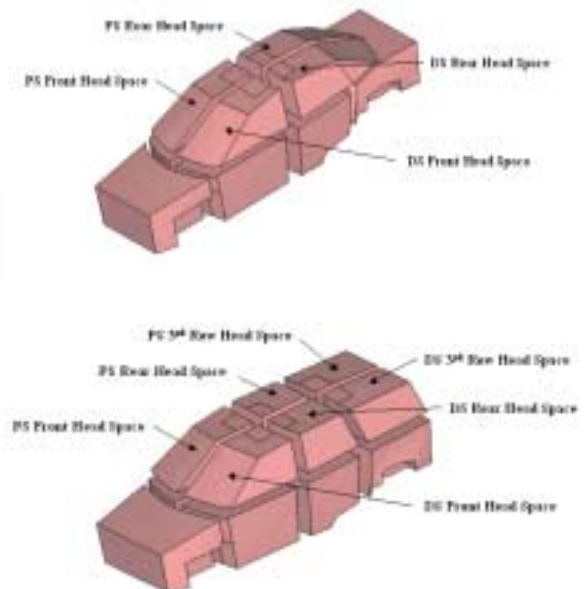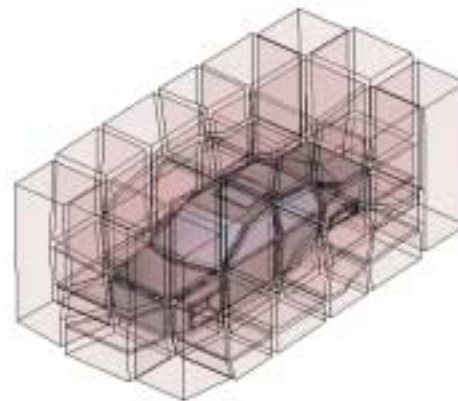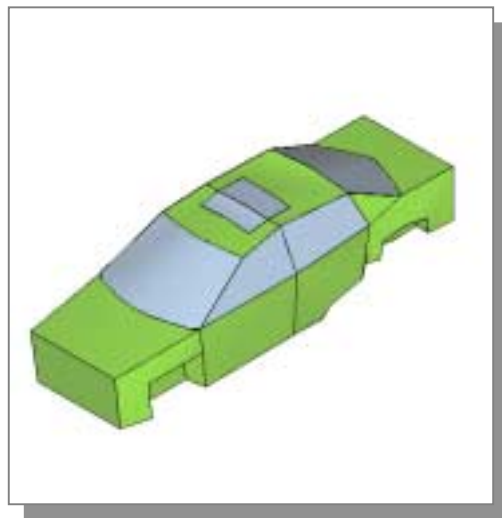
Template Modeler

General Specifications

- ## Graphical User Interface
  - **Multi-tab Wizard type interface**
  - **Used to:**
    - **Introduce Solutia and glass products**
    - **Define glass properties, type of vehicle, operating load,**
    - **Visualize acoustic and solar results**
    - **Generate report and results data file**
  - **Visual Basic Language**
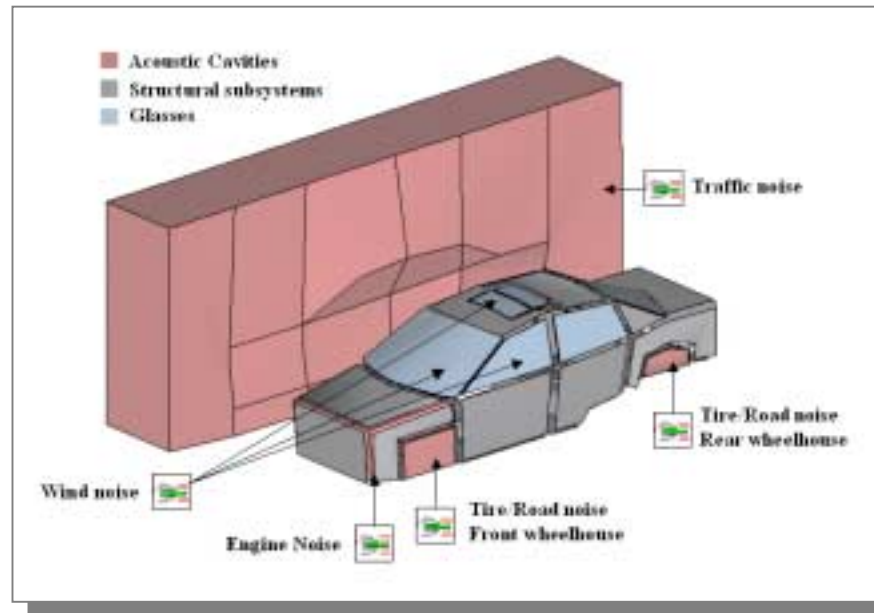 - **Full Control of AutoSEA2, TemplateModeler, MS products**

General Specifications

- SEA Model: subsystems
  - Coarse SEA model of different vehicle types
  - Glasses modeled as resonant subsystems
  - Other vehicle components modeled as TL and α
  - Interior and exterior acoustic subsystems
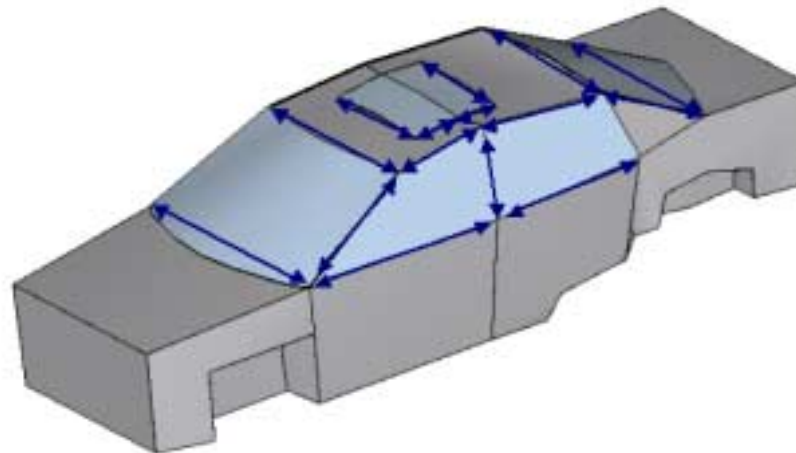 - SIF to simulate free field conditions
  - Sound package level definition

General Specifications

- SEA Model: operating conditions
  - **Engine noise**
  - **Tire/Road noise**
  - **Wind noise**
  - **Environmental noise**

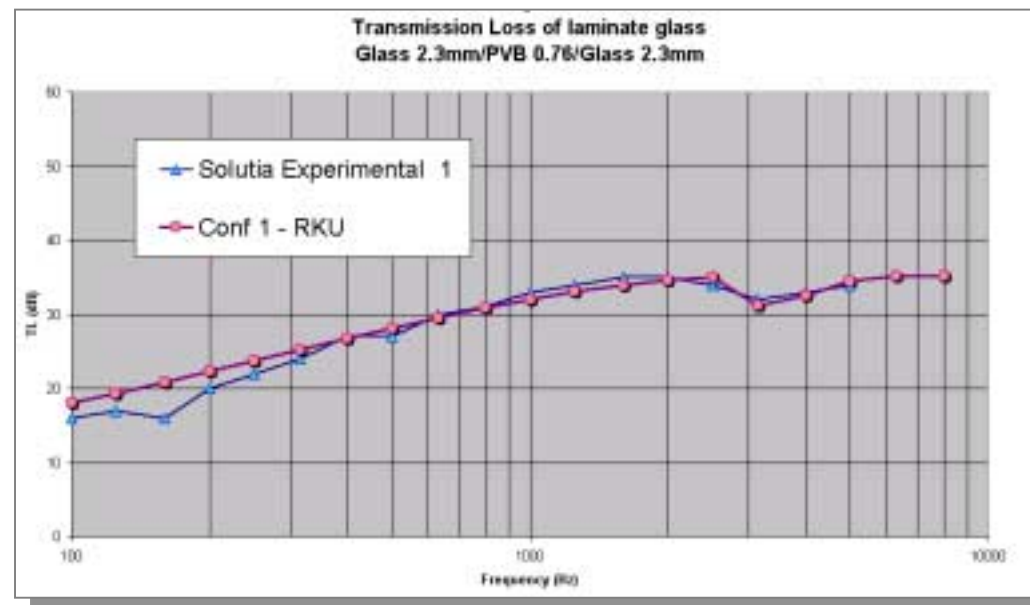 ***All spectrum obtained from measurements**

General Specifications

- ## SEA Model: Morphing geometry
  - Node locations are derived from the Glass Simulator GUI
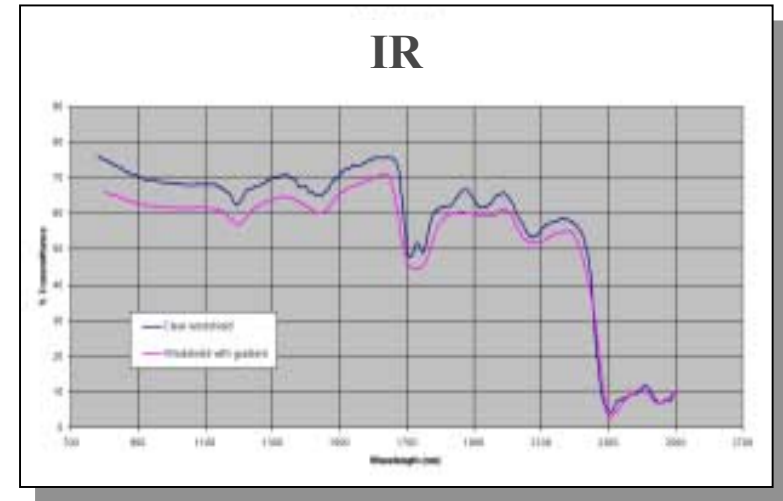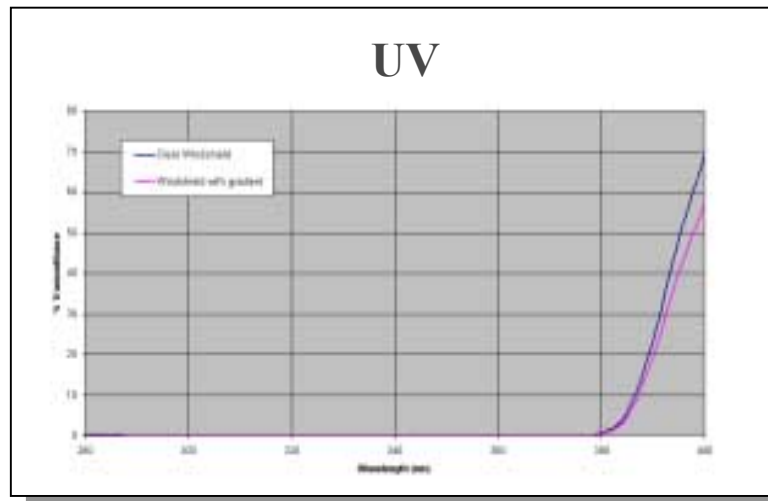 - TemplateModeler morpher updates the geometry

General Specifications

- ## SEA Model: Glass modeling
  - **Monolithic: regular flat panel**
  - **Laminate: Constrained layer damping system**
    - **Equivalent properties derived from Damping Script (RKU)**

Transmission Loss of laminate glass
Glass 2.3mm/PVB 0.76/Glass 2.3mm

General Specifications

- Solar calculation: UV, IR
  - Indication of discoloration and heat built up in vehicle
  - Data from Solutia's Database of glass transmittance
  - Different colors, patterns and gradient bands available for appropriate glass
  - Transmittance are plotted in the results section

Vibro-Acoustic Sciences

Live demonstration

- Alpha version …
  - **Pay attention to the process, NOT the numbers!!!**
  - **Setup for validation of the GUI at the moment**

Questions