Application of CFD/EFD for vehicle development

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Events in vehicle developments

Feasible study

★Concept approval 　　　（many →　some）

　1/3 Scale-model 　←CFD

★Exterior sketch approval 　（some →a few）

　1/1　Clay-model 　←CFD & EFD

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CFD
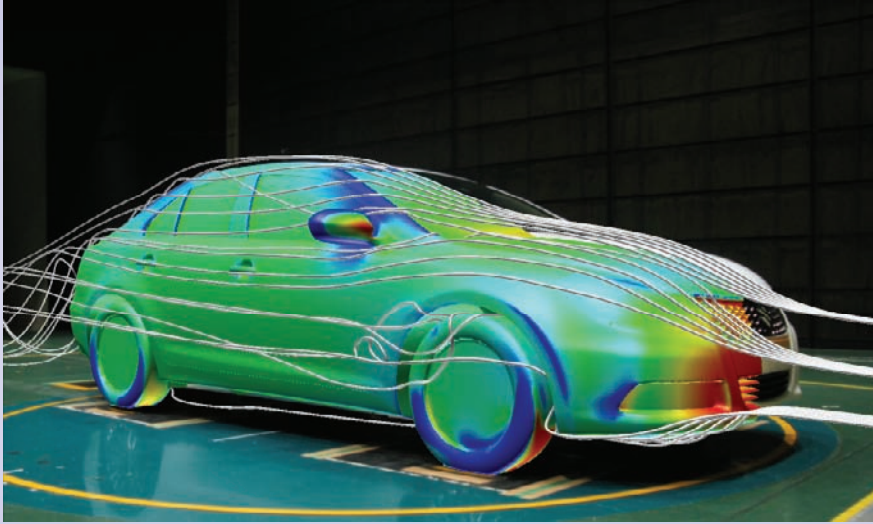
Steady State（Low Reynolds k-w sst) by STAR-CCM

60millions trimed cells

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★Exterior sketch approval 　（some →a few）

　　1/1　Clay-model 　←CFD & EFD

★Exterior design freeze 　Other CAE 　（one）

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EFD –NSI using clay-model

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NSI(Noise Source Identifier)

Top array

Side array

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　　1/1　Clay-model　←CFD & EFD

★Exterior design freeze　Other CAE

　　　　　　　　　　　　（one）

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Events in vehicle developments

Part design　　　　←CFD, other CAE final

★Parts design finished

★Design prototype

　Experiments(EFD)

★SOP

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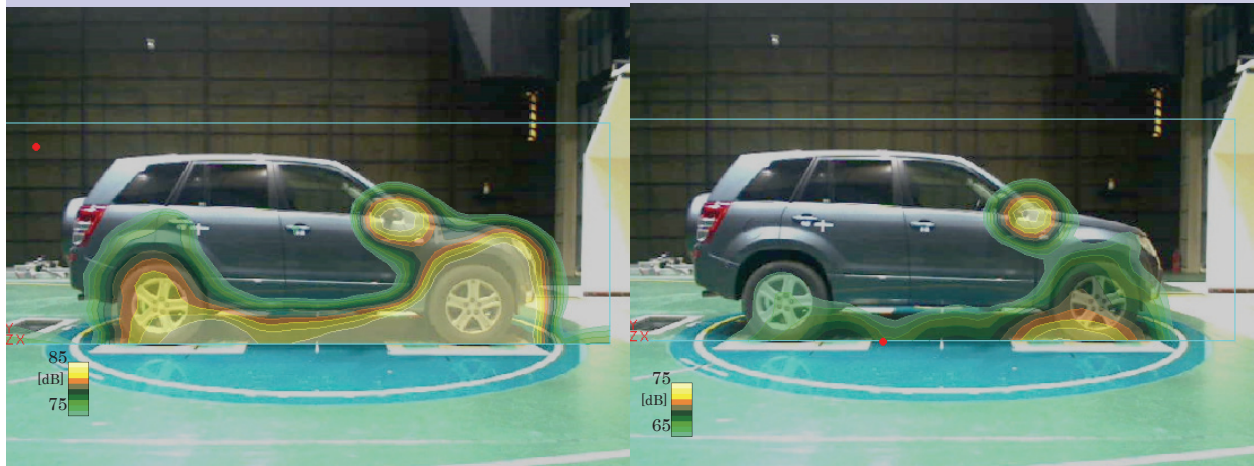SUZUKI MOTOR CORPORATION

Noise source by top array 2kHz
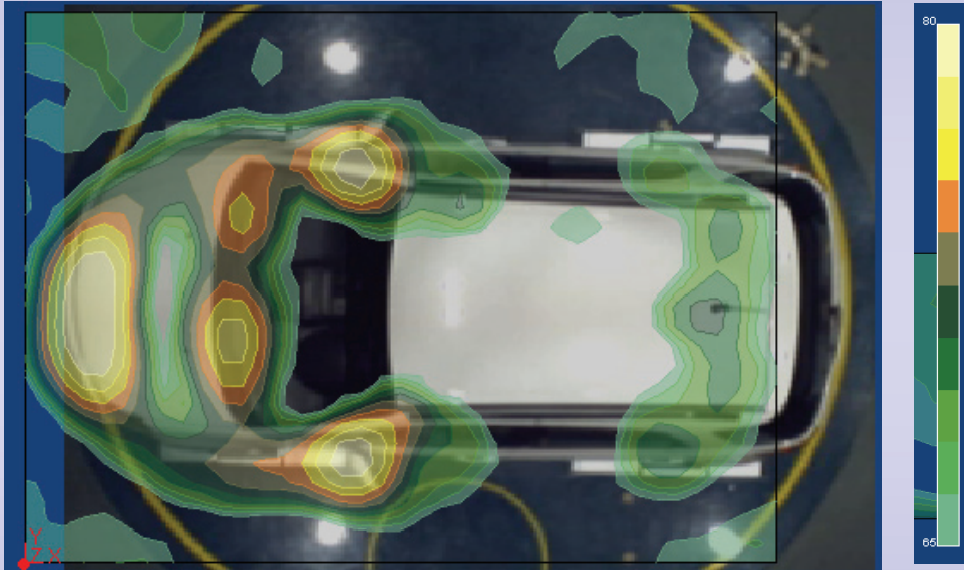
Noise source by side array 2kHz
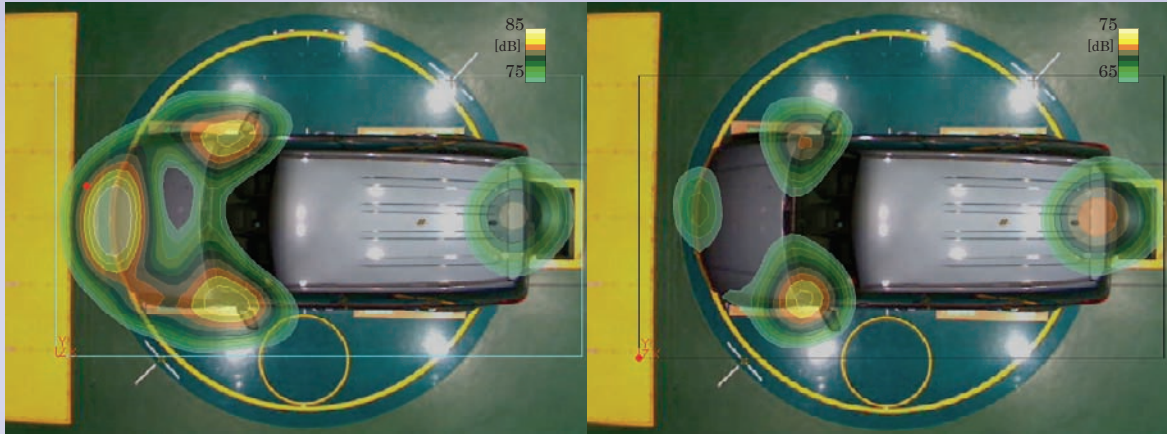

Noise source map

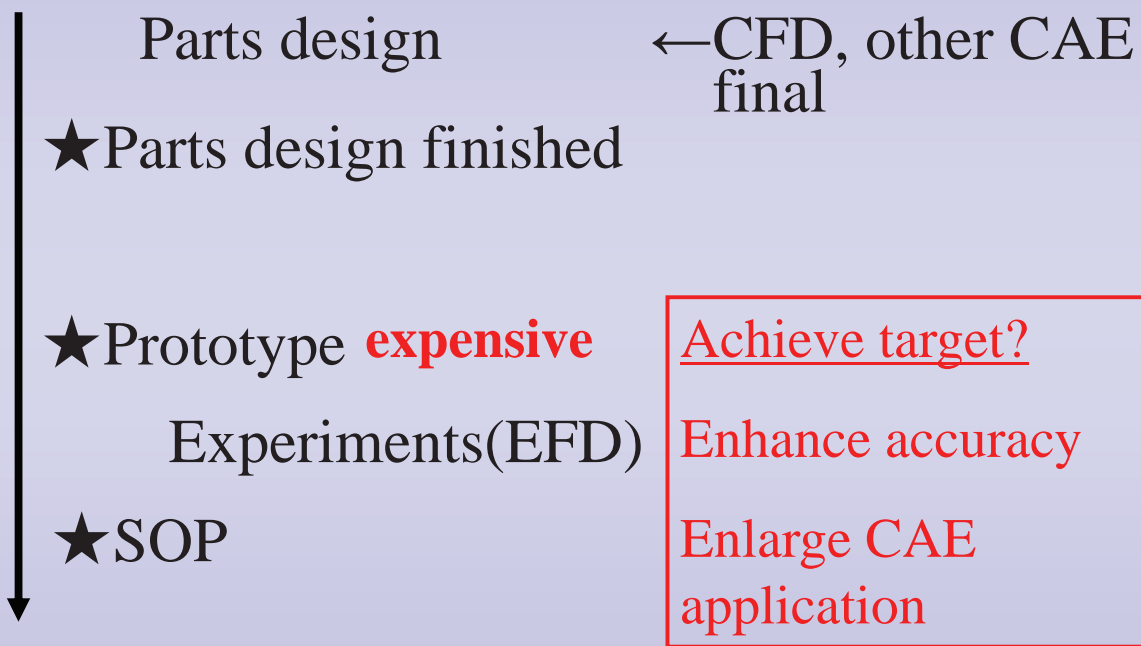Coherence map

Noise source by top array 2kHz

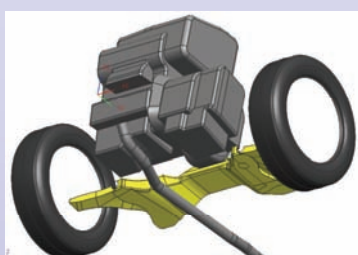Noise source map   Coherence map

Events in vehicle developments
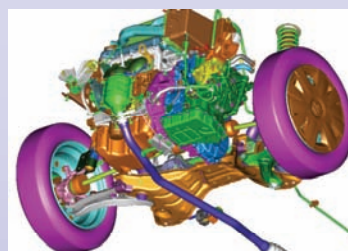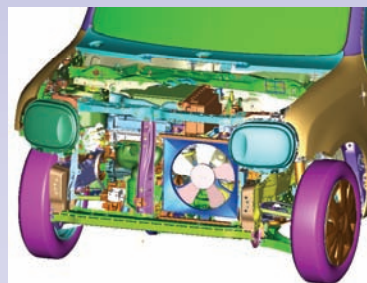
Parts design   ←CFD, other CAE final

★Parts design finished

★Prototype **expensive**

Experiments(EFD)

★SOP

Achieve target?

Enhance accuracy

Enlarge CAE application

Enhance accuracy in the case of aerodynamics

Target accuracy $\Delta Cd \leqq 0.01$

Simple model

Detail model

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Summary

1. Prediction of wind noise, soiling etc.

2. Enhance accuracy of aerodynamic CFD

3. High speed model generation

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