ANSYS®

Good Ideas to Great Designs

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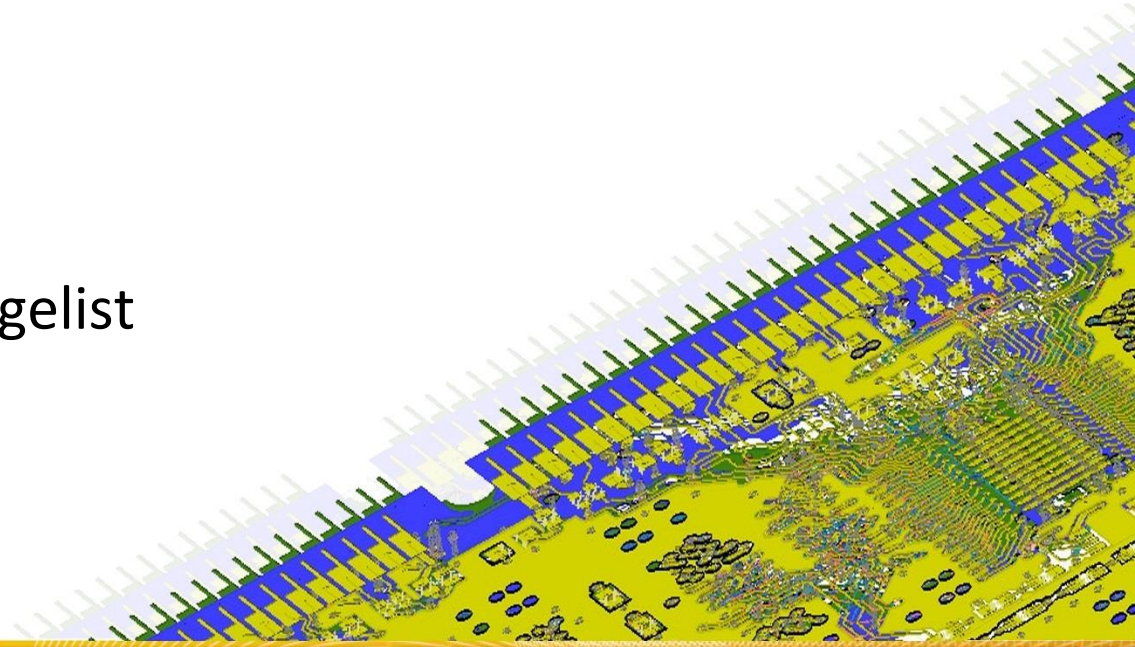

"There's a tremendous amount of craftsmanship in between a good idea and a great product. The idea changes and grows, and you find there are tremendous tradeoffs you have to make."

Steve Jobs

"There's a tremendous amount of Simulation and Optimization between a good idea and a great product.

Good Ideas → Great Designs

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Electric

400 km range

0 – 100 km/h in 3.3 s

5-Star crash rating

17” HD touchscreen

Good Ideas → Great Designs

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Reusable rocket system

50 % reduction in launch costs

Environmentally friendly

Self-pressurising propellant

Carbon composite structure

FIREFLY

Good Ideas → Great Designs

Good Ideas → Great Designs

Antenna performance increased by factor 5

Reduction in radiated power limits health hazards

Smaller size more suitable for wearing

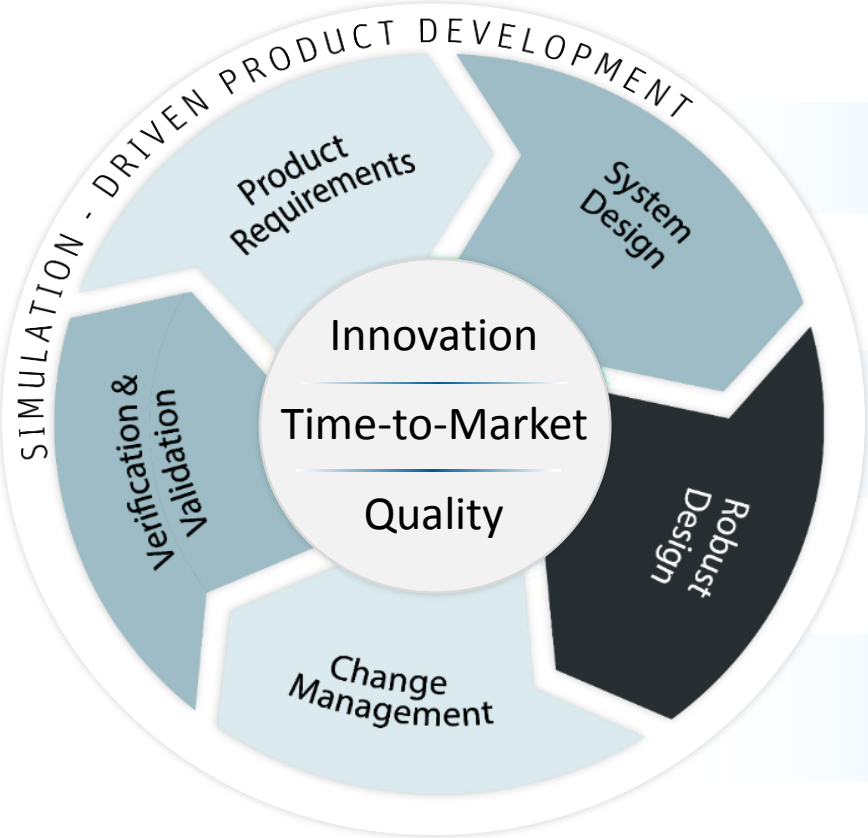
Strong signal with small package

SYNAPSE

Simulation-Driven Product Development

Simulation-Driven Product Development Process

Concept



Detailed Design

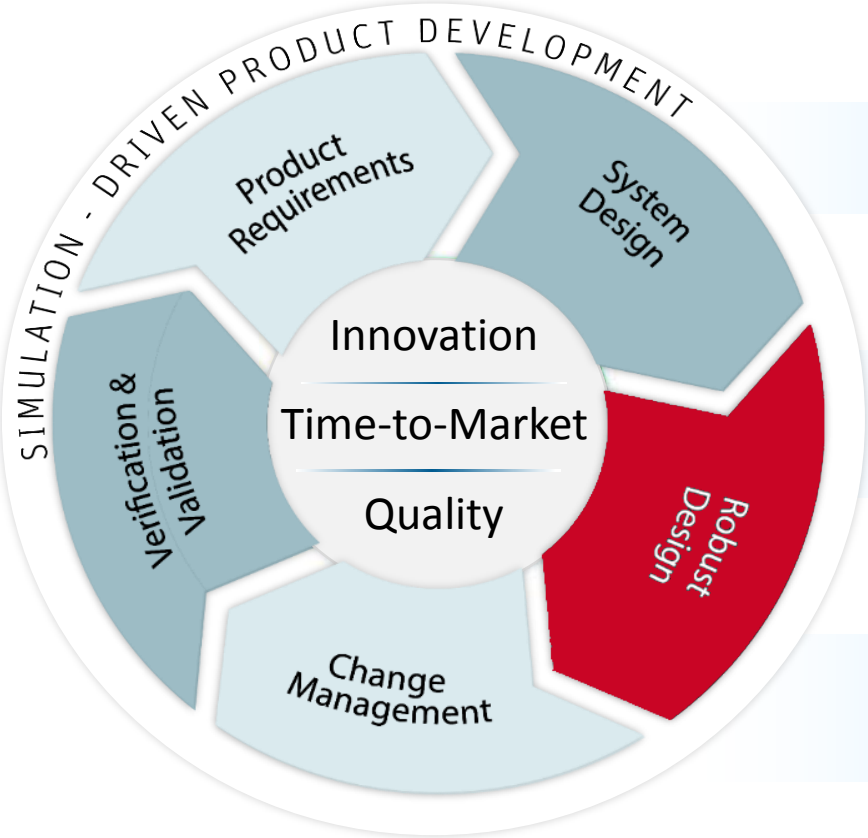
Physical Testing

Production

Simulation-Driven Product Development

Simulation-Driven Product Development Process

Concept



Detailed Design

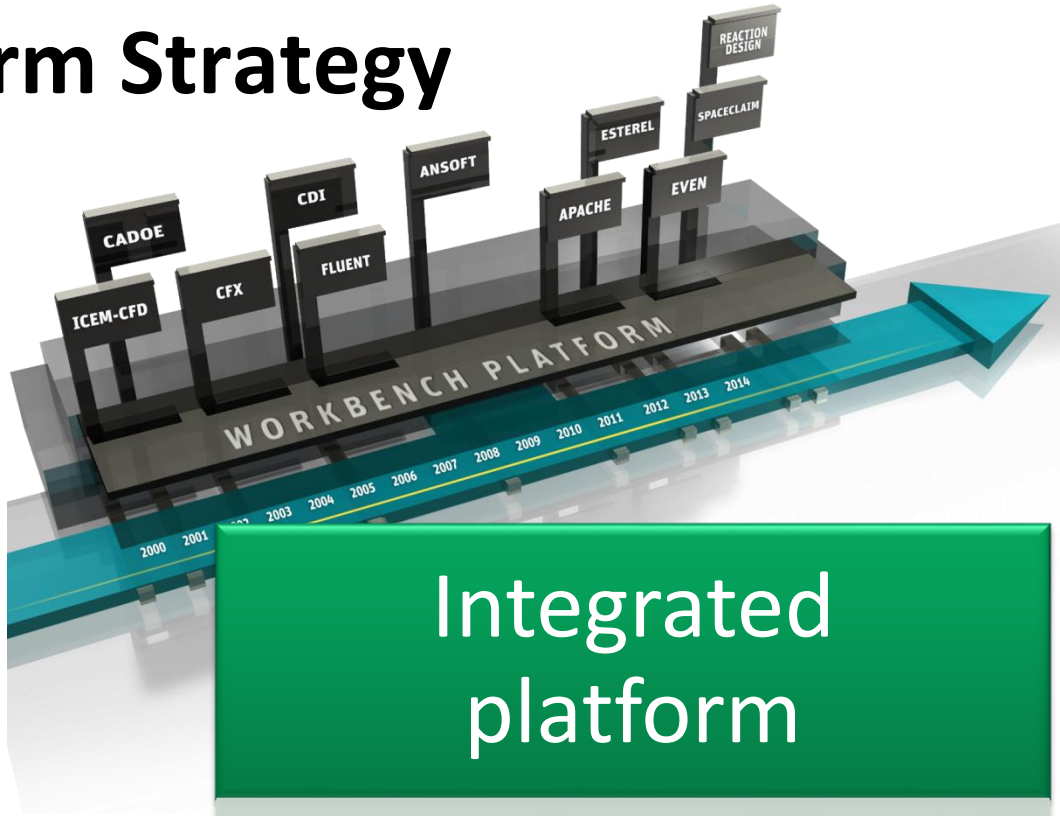
Physical Testing

Production

Platform Strategy

Simulation trends

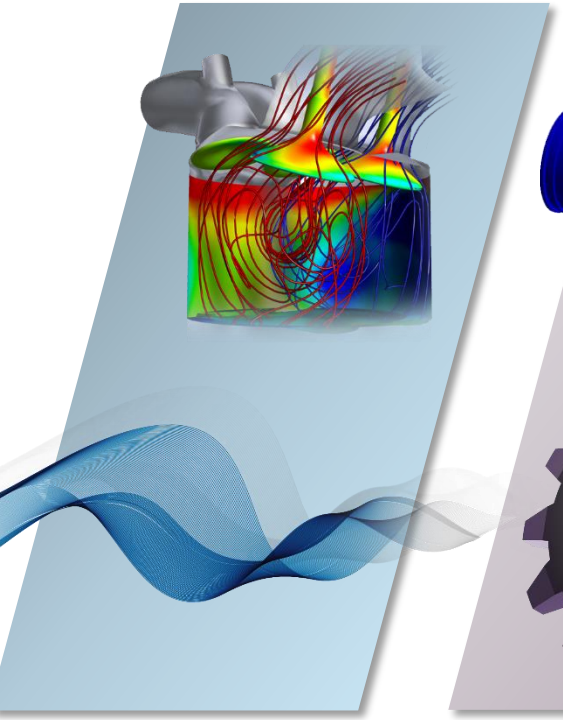
- Multiphysics & multiscale
- Systems engineering
- Earlier use of simulation @ design
- Robust Design



Integrated platform

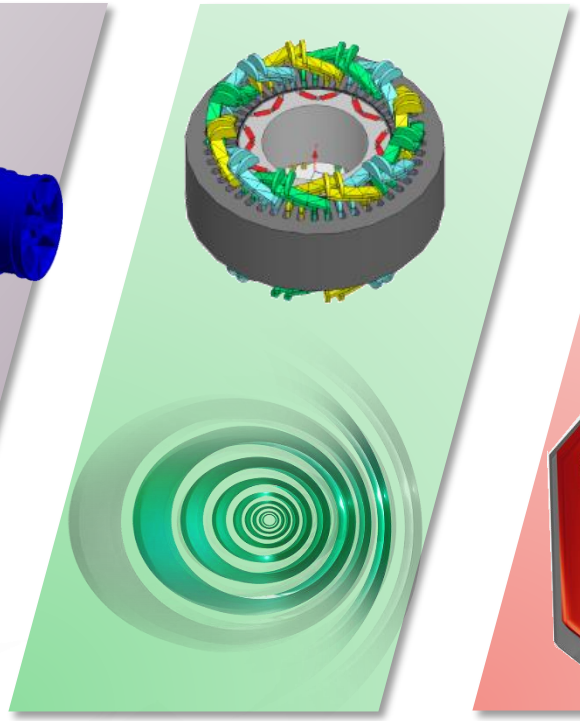
- Managed data
- Connected tools
- Automated workflows
- Parametric
- Open & extendable
- Interactive & automated (batch)

Comprehensive Multiphysics Solutions from ANSYS

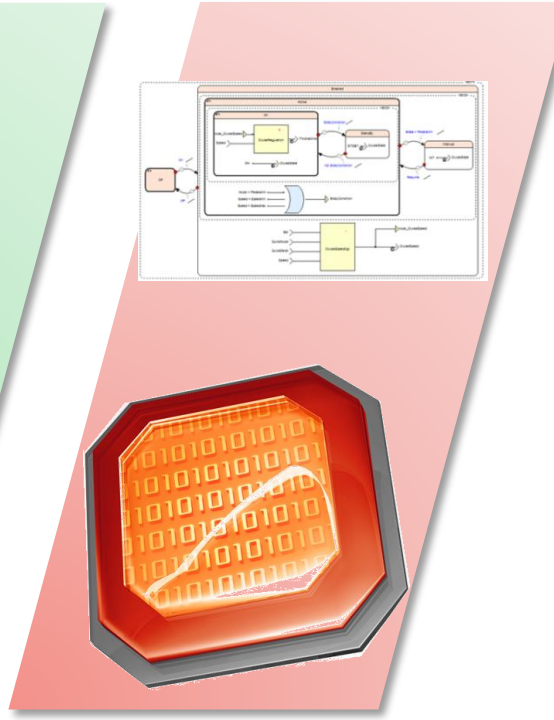


Fluids

Structures

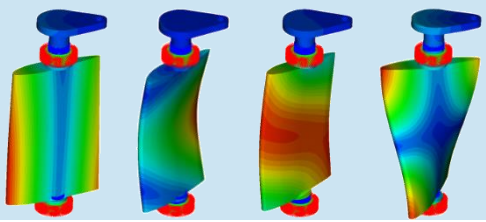
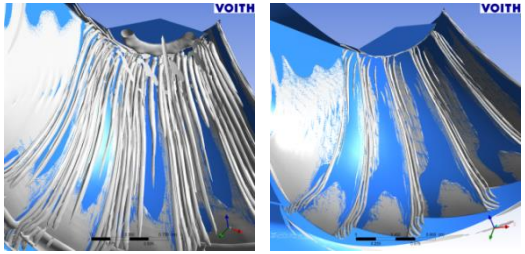
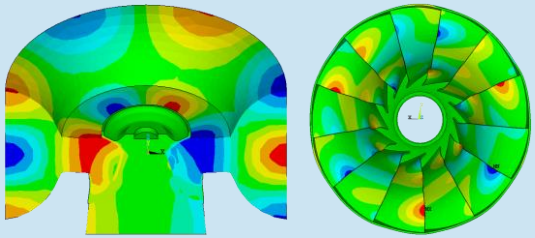


Electronics

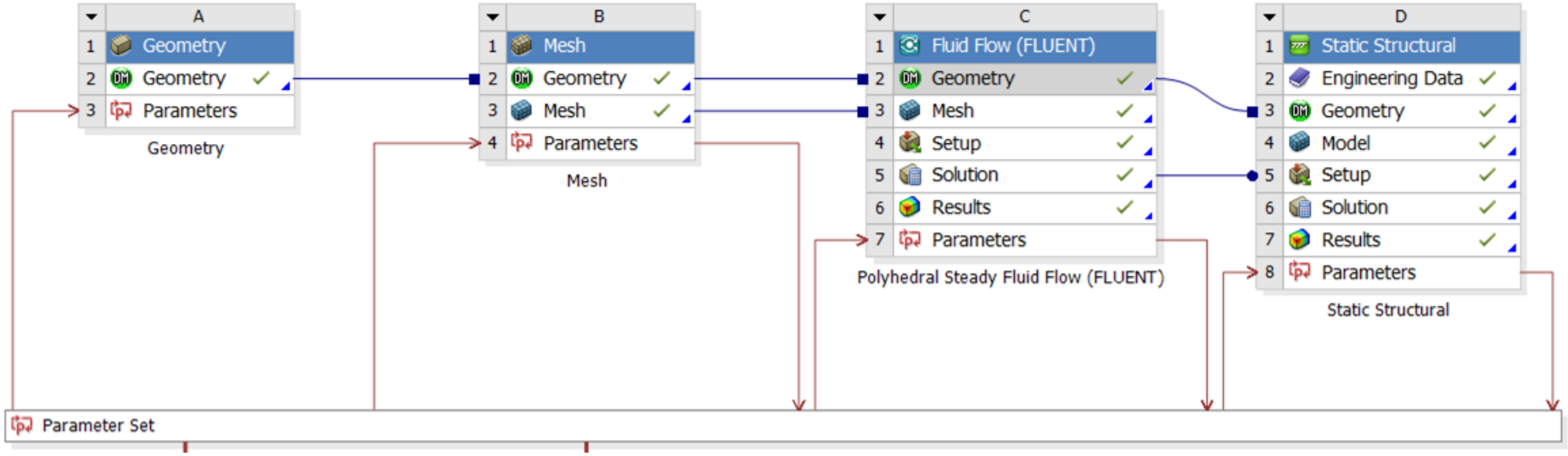


Software

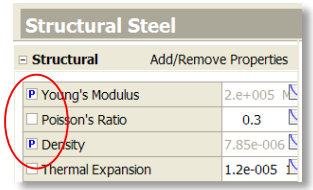
Fluid-Structure-Interaction

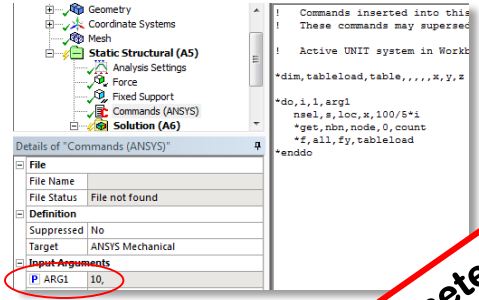
Physics	Results	Insight	
 Structures Only			Natural frequencies don't agree with measured frequencies
 Fluids Only			Predicts vortex shedding, but doesn't explain upstream vibration
 Fluid-Structure Interaction			Predicts frequencies & source of excitation

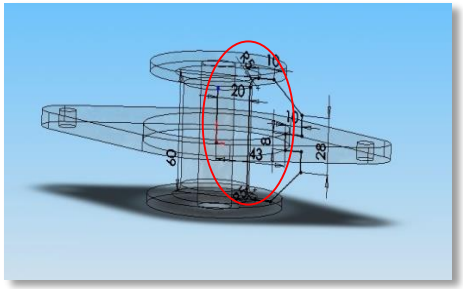
This is how every engineer should perform simulation

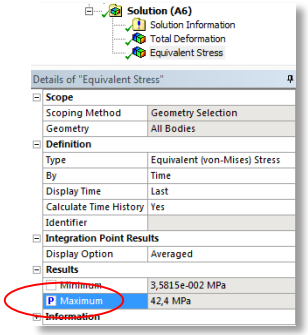


Check the box to create parameters!









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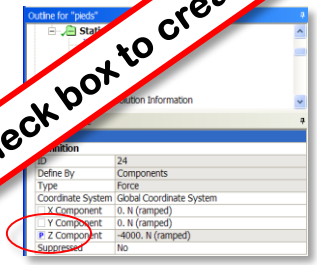
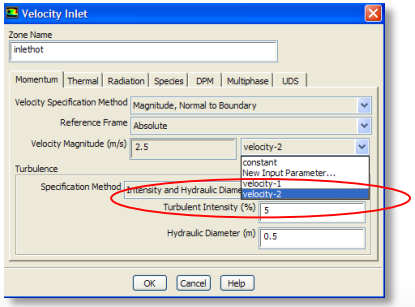
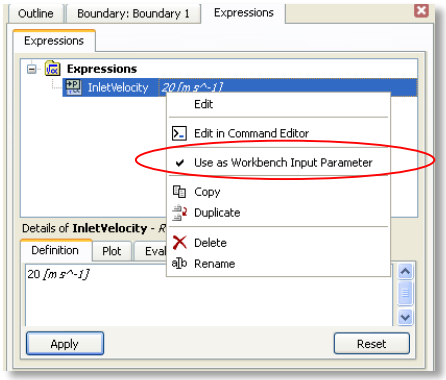
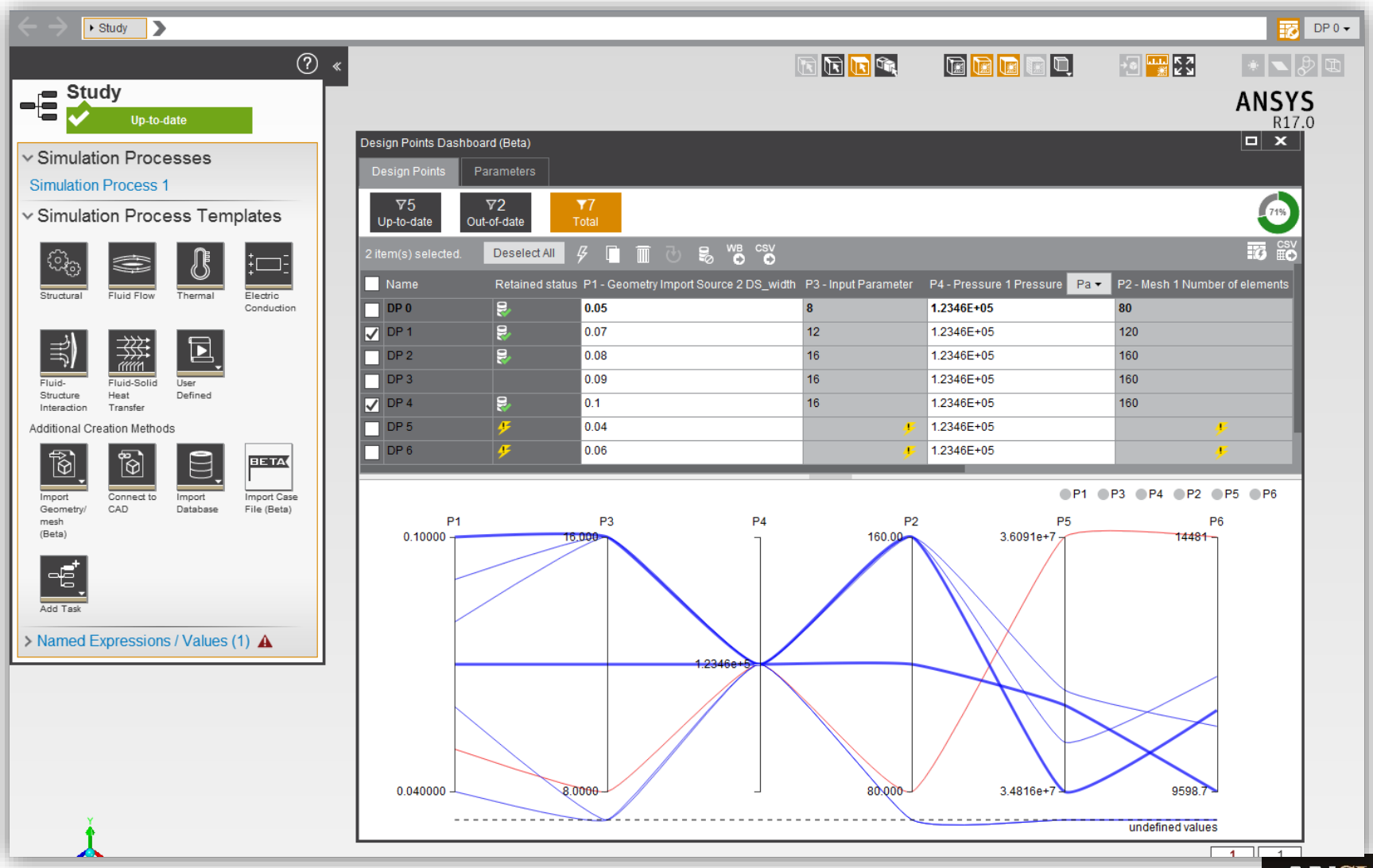




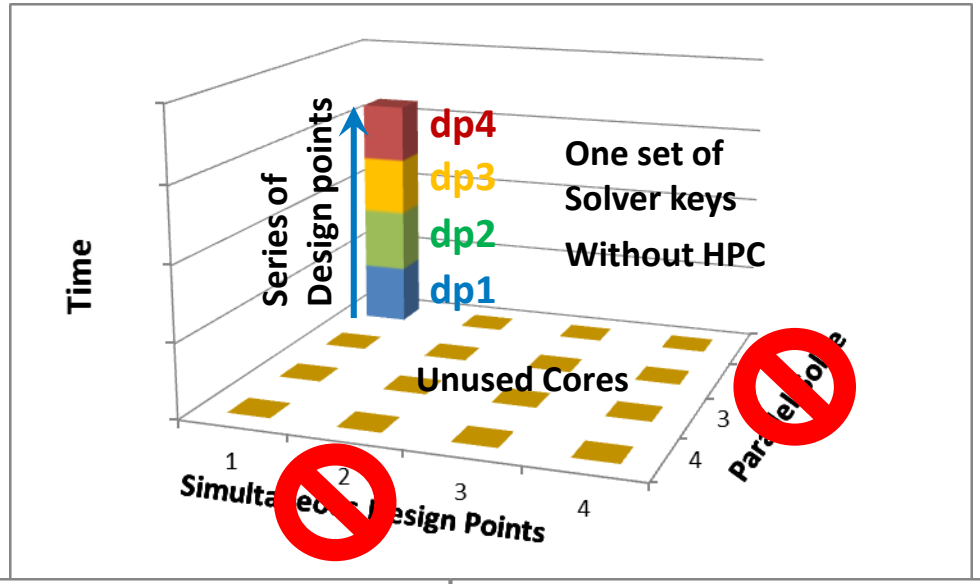


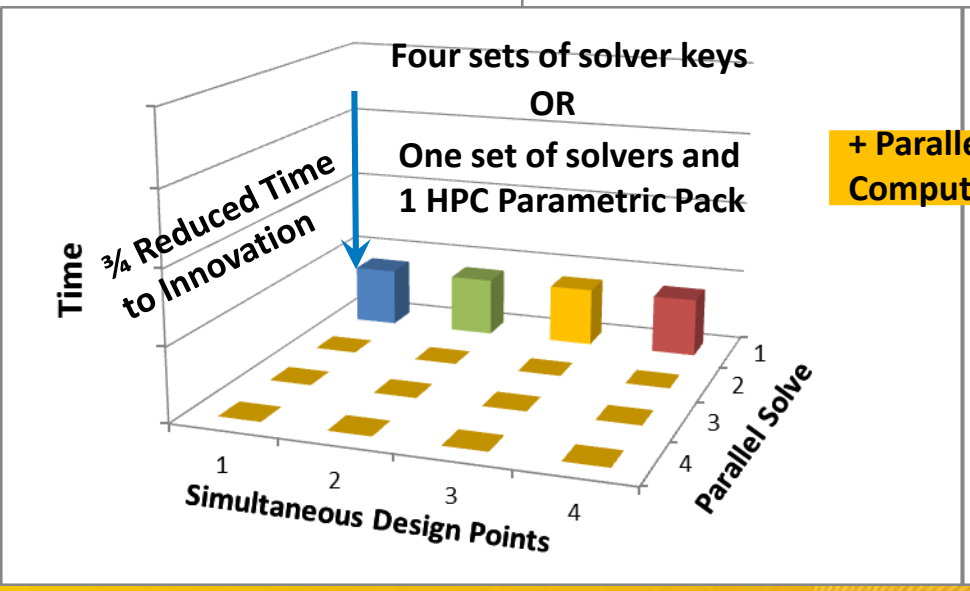
ANSYS Integrated Multiphysics - AIM

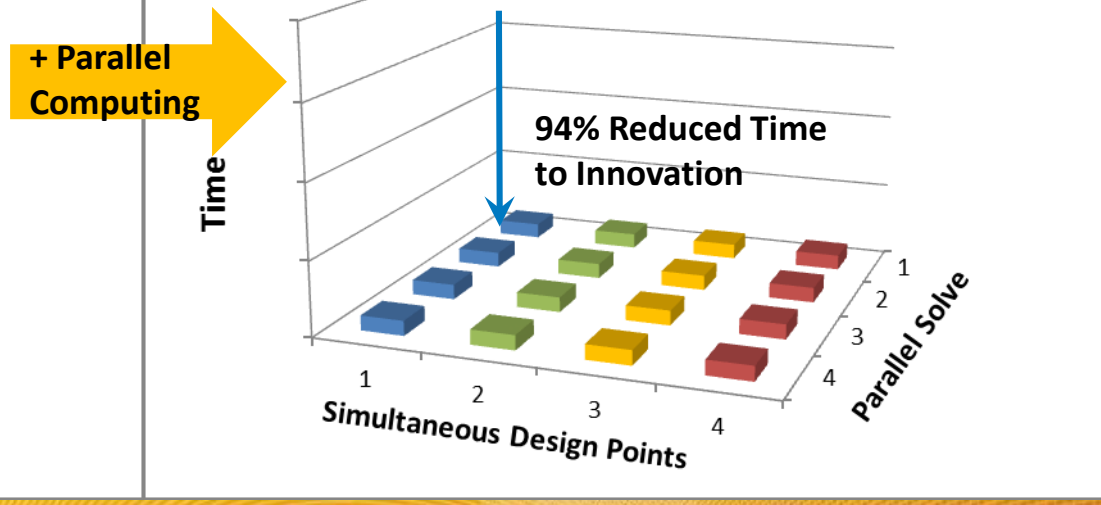
“What-If” in AIM



HPC to reduce simulation time and improve cost efficiency







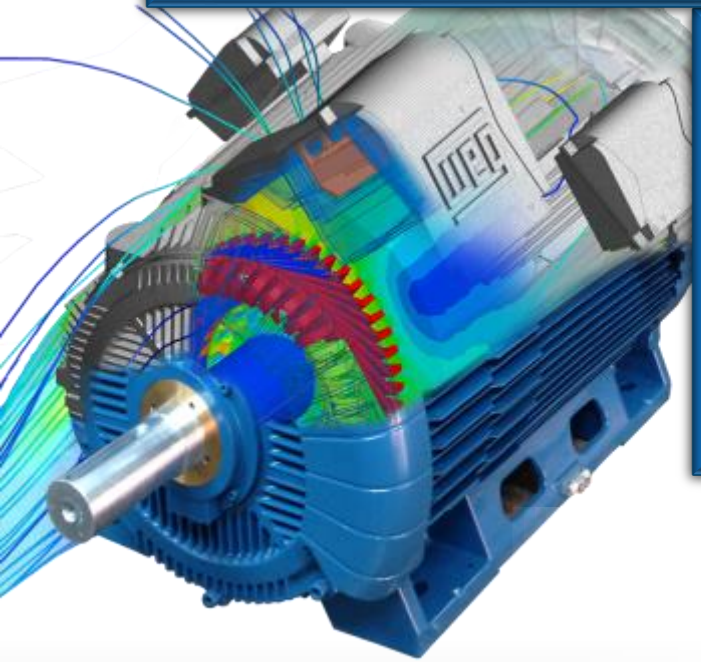
Robust Electric Machine Design through Multiphysics

Robust Electric Machine Design

- WEG needed to develop a new motor with improved energy efficiency, reduced operating noise and increased bearing life.
- The company wanted to streamline its development process to create an optimized design while taking into account all the requirements.

ANSYS in Action

- Use ANSYS CFD, structural and electromagnetic multiphysics simulation to reduce fan losses, minimize aerodynamic and electromagnetic noise, reduce bearing operating temperature and automate the design process.



Key Results

- Multiphysics trade-off studies helped substantially reduce fan losses without sacrificing electromagnetic performance
- Noise reduction and energy efficiency targets were met

Increased number of CFD simulations from four per month to 800

Improved bearing life by 150%

ANSYS multiphysics tools help WEG deliver best-in-class performance for electric motors while substantially reducing the lead time and cost of the development process.

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José R. Santos, Product Development and Application Department
WEG Equipamentos Elétricos S.A.

ANSYS Simulation Ecosystem

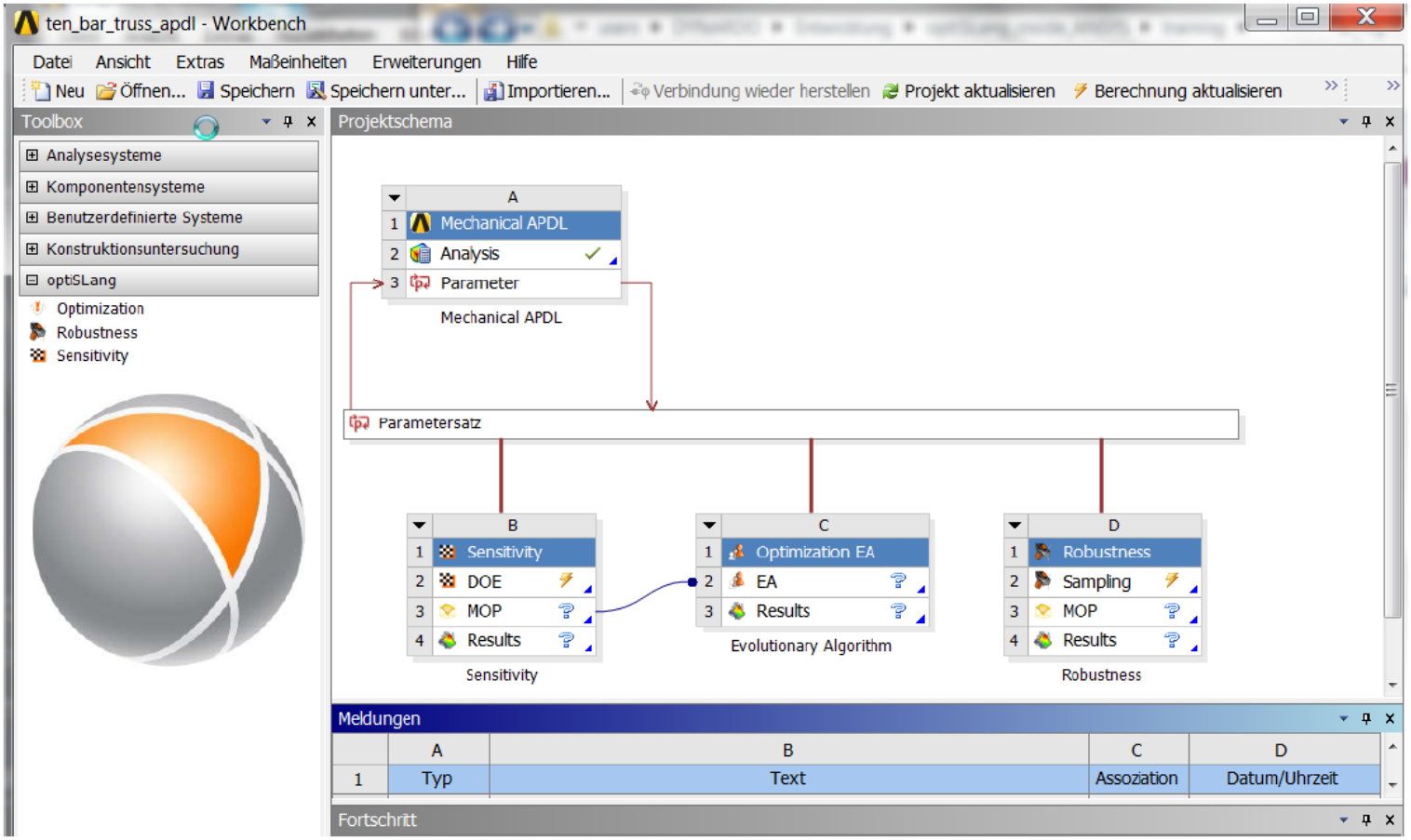
110 • Software partnerships

70 • Hardware partnerships

110 • Academic partnerships

optiSLang inside ANSYS Workbench

optiSLang modules of Sensitivity, Optimization and Robustness evaluation provide easy to use „best practise" optiSLang functionality



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