ESI GROUP
THE VIRTUAL TRY-OUT SPACE® COMPANY

Nafems NA Regional Summit 2008

2020 Vision of engineering analysis and simulation

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CREATE WITHOUT LIMITS

Milestones

Software
& Services for
Simulation-Based
Design

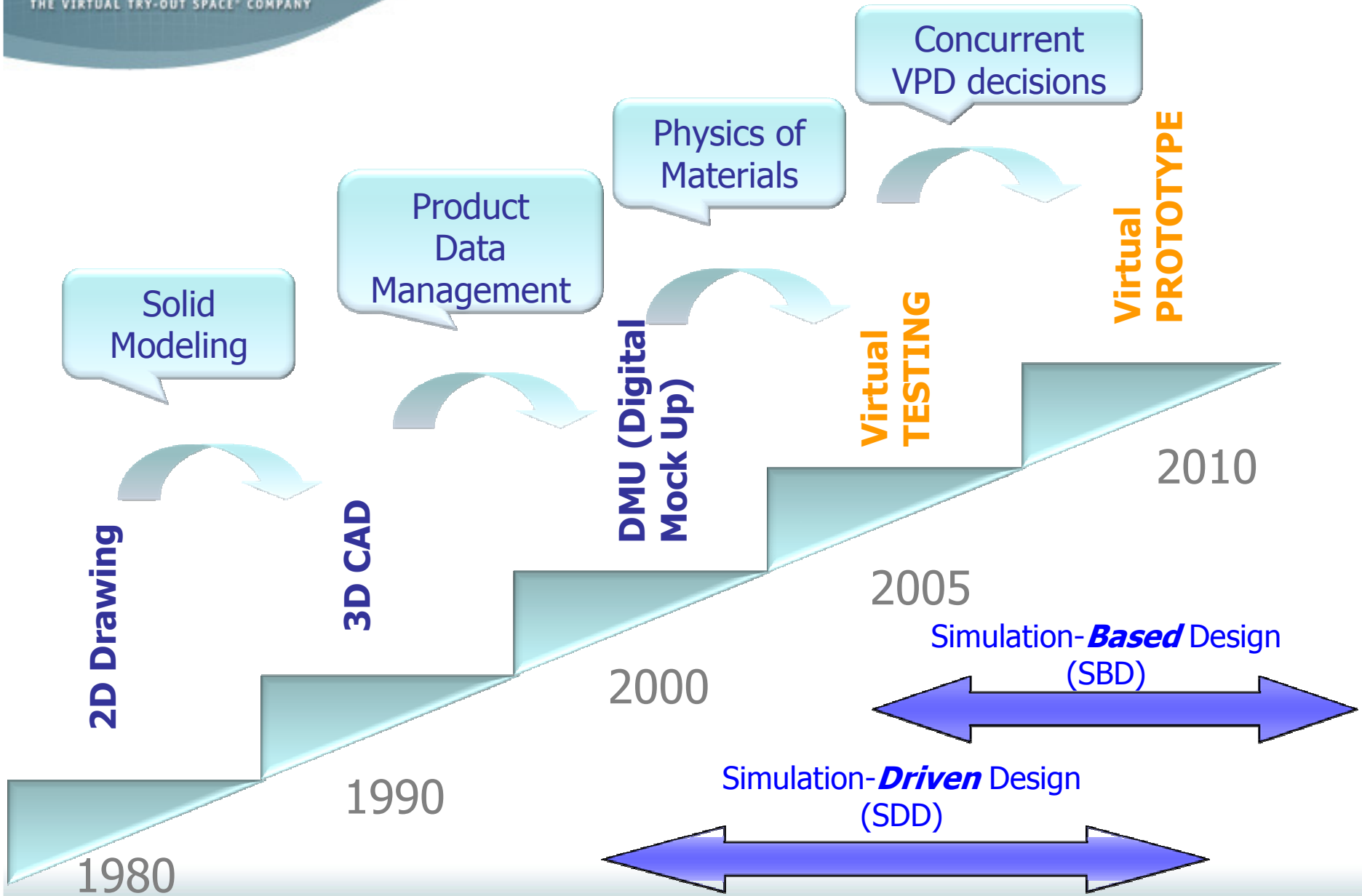
2020: A glance of the future

- An analysis of the history of technology shows that technological change is exponential, contrary to the common-sense "intuitive linear" view.
  - So we won't experience 100 years of progress in the 21st century -- it will be more like 20,000 years of progress
- Within a few decades, machine intelligence will surpass human intelligence, leading to The Singularity –

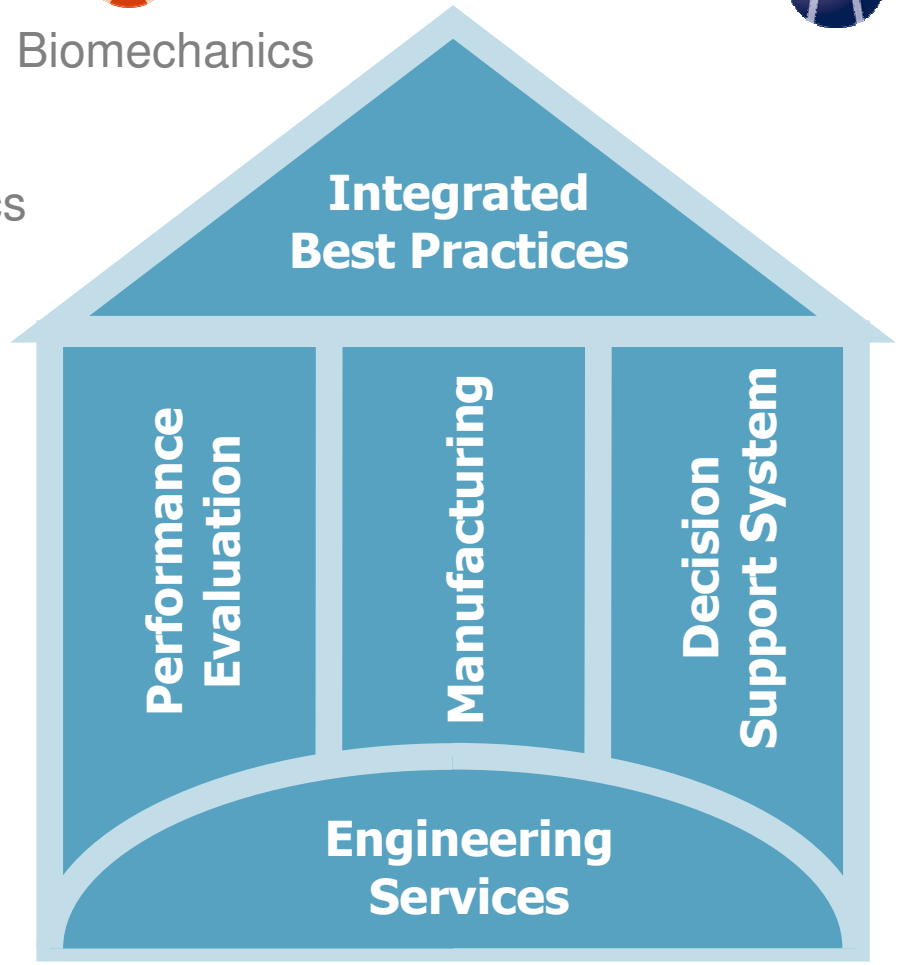
  By Randy Kurzweil "The singulartiy is near"

Software & Services for Simulation-Based Design

The PLM evolution



Components for "SBD"



Casting

Stamping/ Forming

Biomechanics

Fluid Dynamics

Composite Materials

Vibro Acoustics

Welding/ Heat Treatment / Assembly

System Integration

Electromagnetism

Multi-Physics

Shock/ Impact

NVH/Mechanisms

The value of simulation

Manage the simulation content and synchronize data and resources for multi-domain management within the PLM process

Extended value chain for simulation through the combination of multiple solutions sharing the same adaptive compute model per domain

CAE solutions for virtual component testing per domain

Virtual component testing

- 1st Generation simulation solution
  - Solve single engineering problems
  - Enables the virtual component testing
  - Validated through hardware prototype
  - Defines circumstances and limits of the design

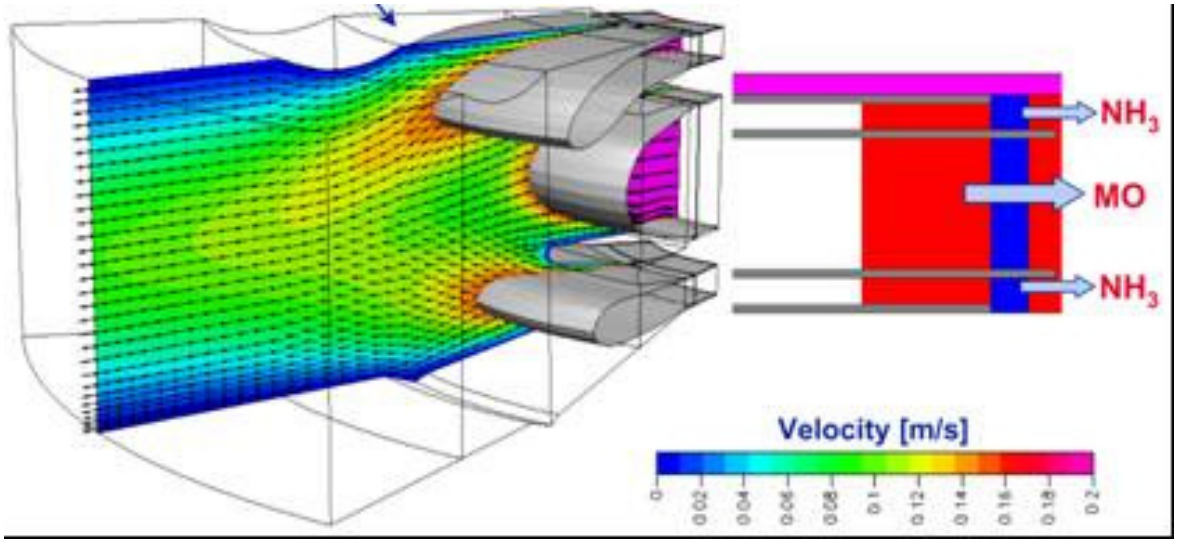
Energy - LED design

AIXTRON

Improvement of reliability and design costs reduction for new LED

(Energy saving; cleaner energy : reduction of CO2)

Example of architectural lighting using LED



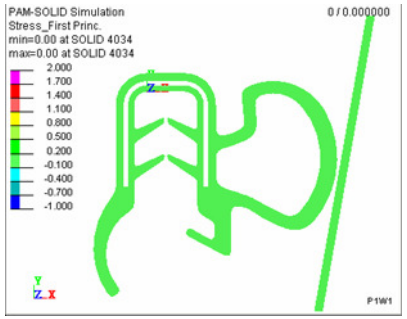
Simulation a gaz injector in AIXTRON Planetary Reactor® using CFD ACE+

Courtesy: AIXTRON

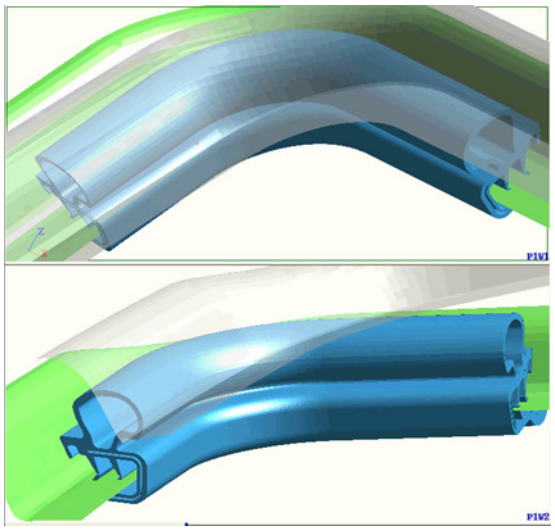
Simulation value chain

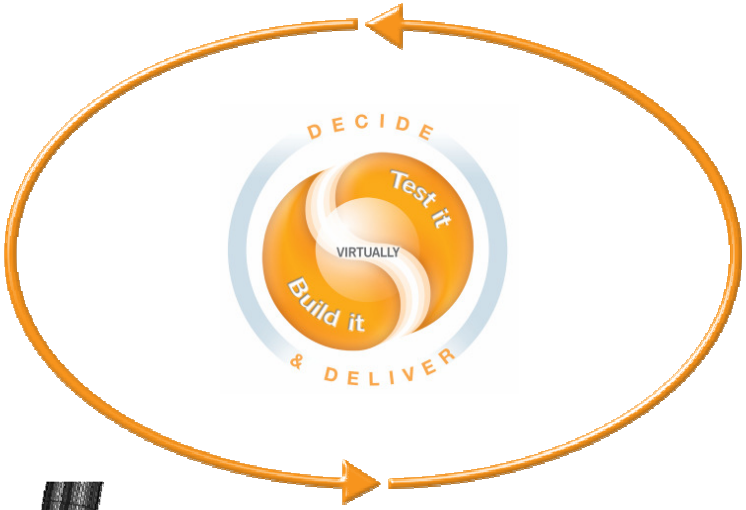
- 2nd Generation "Simulation value chain"
  - Chain multiple simulation solutions
  - Cover all physics per engineering domain
  - Use of single compute models
  - Control, adapt, transform models as required
  - Enables the use of full virtual prototypes

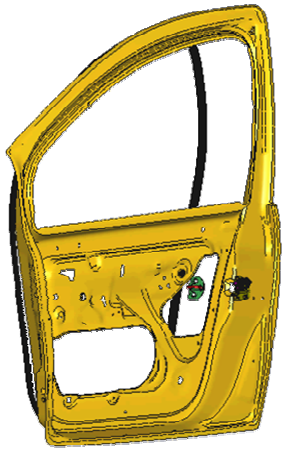
Door Closing and Slamming



2-D Seal functional simulation

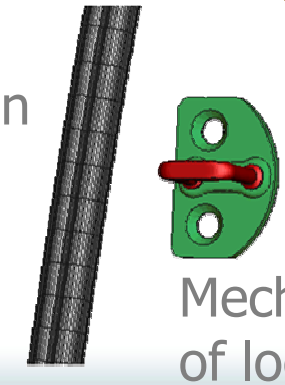


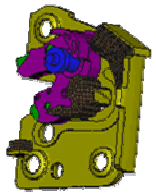




Door slam simulation

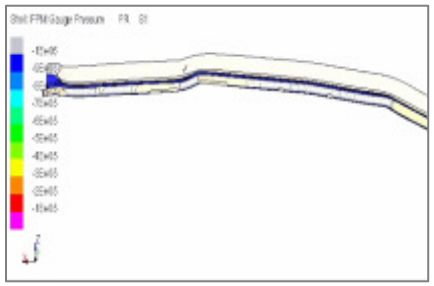
Seal assembly simulation



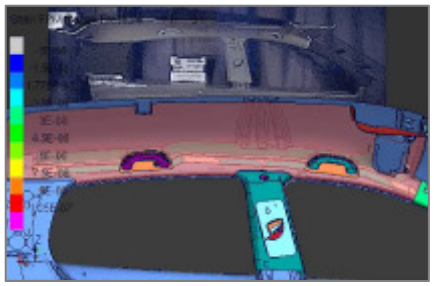


Mechanical simulation of locking mechanism

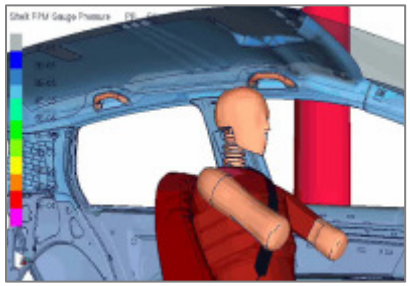
Airbag Design



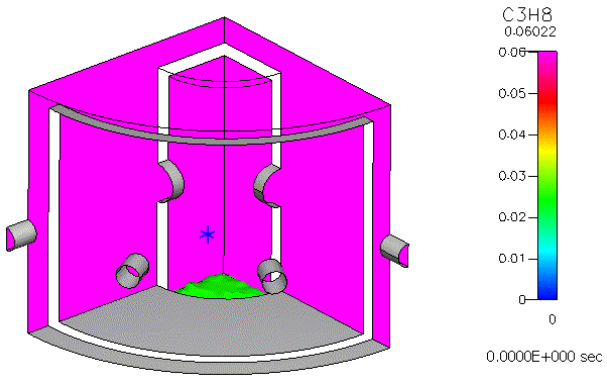
Airbag Design and Model Validation
Test vs. Simulation



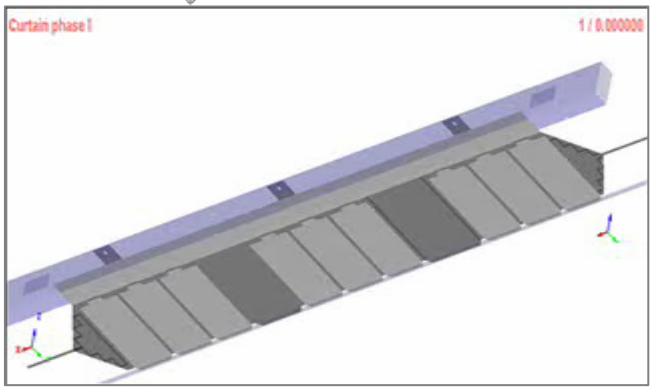
Integration into the Trim Structure (Assembly)



Full Integration into the vehicle (Safety)

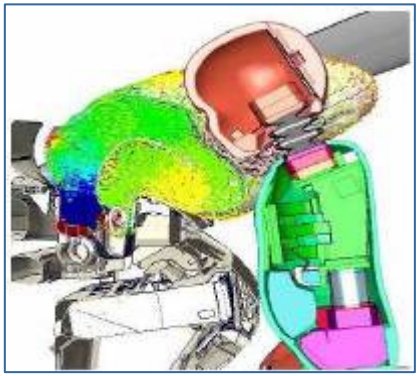


Airbag Inflator Simulation (CFD)



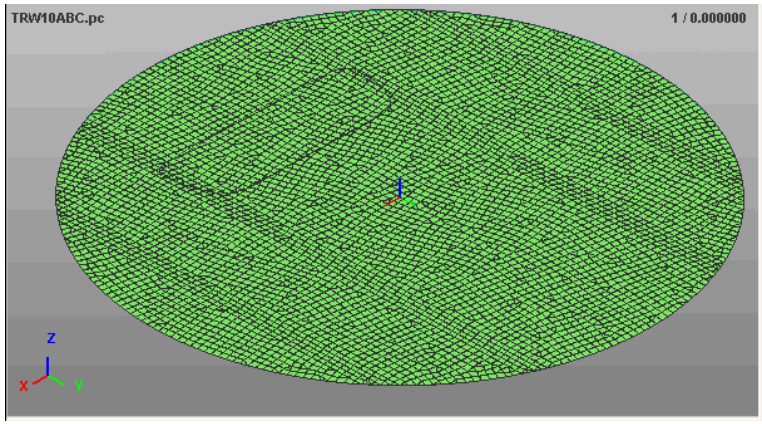
Airbag Folding (Manufacturing)

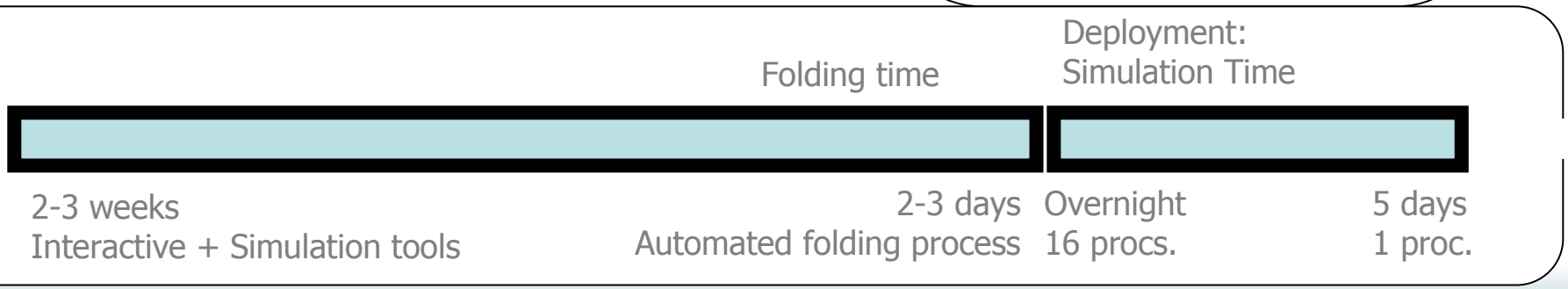
Airbag simulation value chain



Airbag Deployment

Automated Airbag Folding

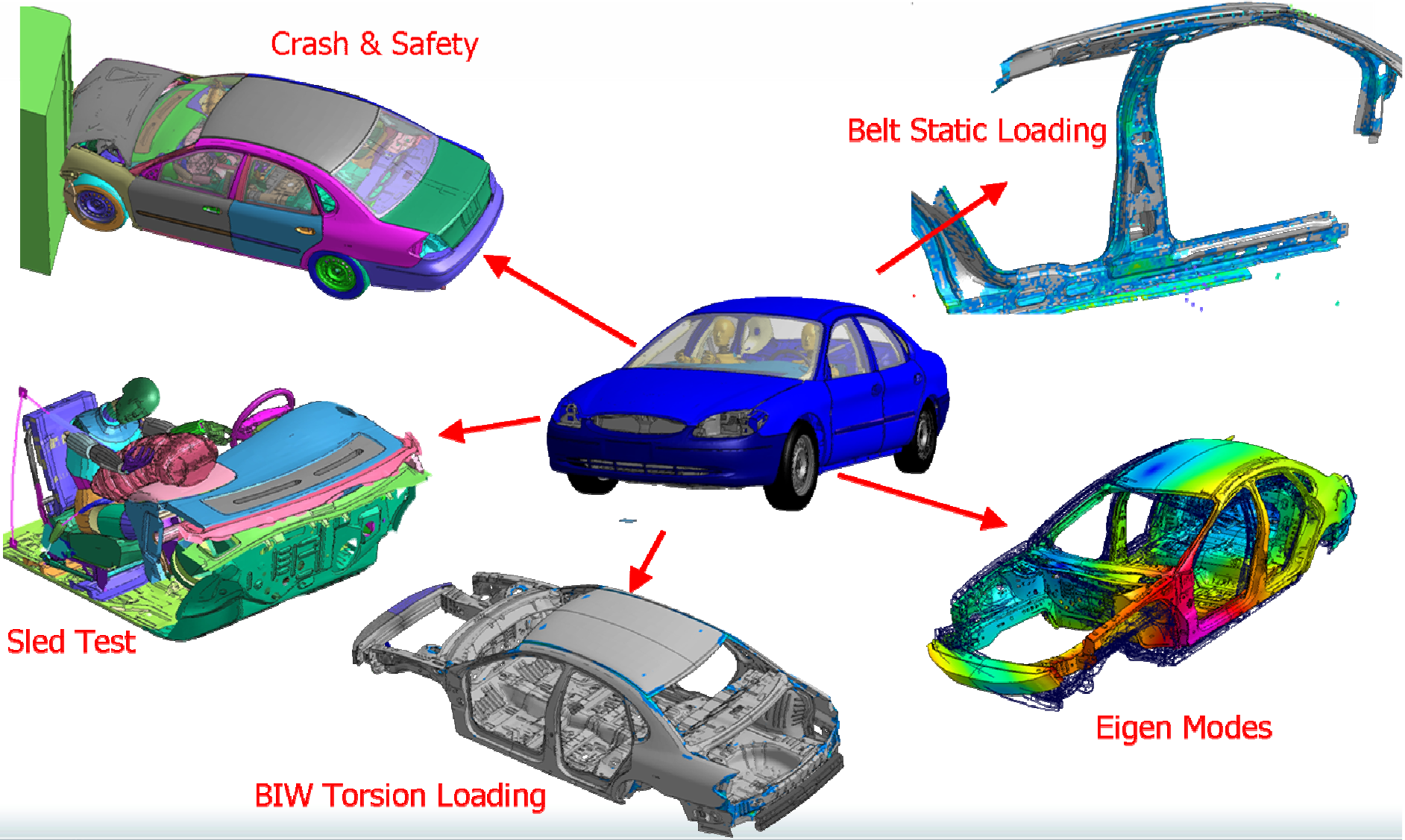




Combine Crash/Safety/NVH

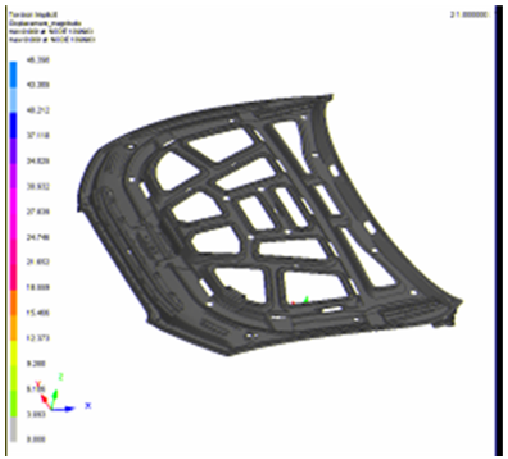
- One single model for vehicle performance
- Process chaining reduce significantly double-work, remodelling effort and errors

Automotive simulation tasks

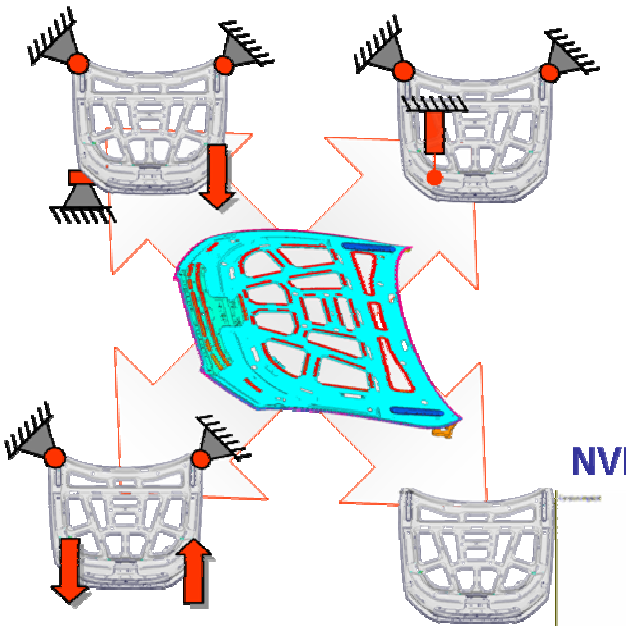


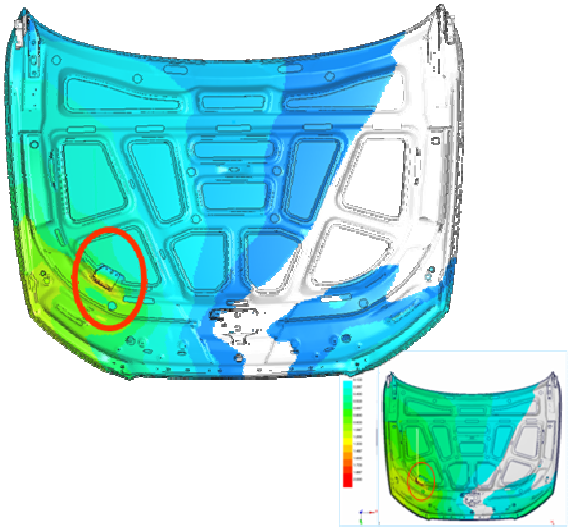
Process chain front hood

Torsion – linear static

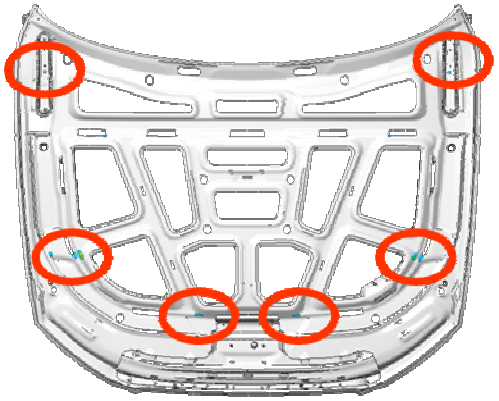


Support spring release - non-linear, geometric

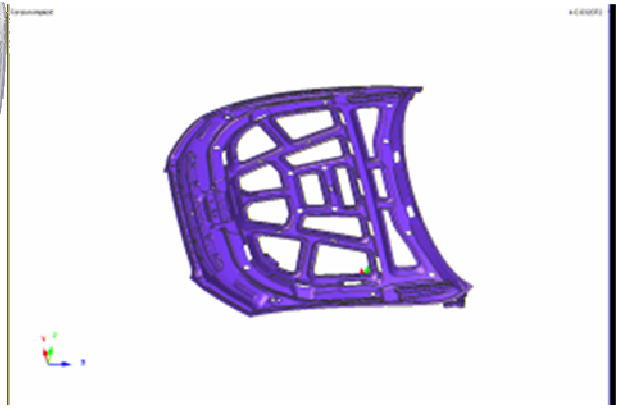




Misuse Torsion - non linear, material



NVH - Eigen Modes/Harmonic resp.



Courtesy Audi

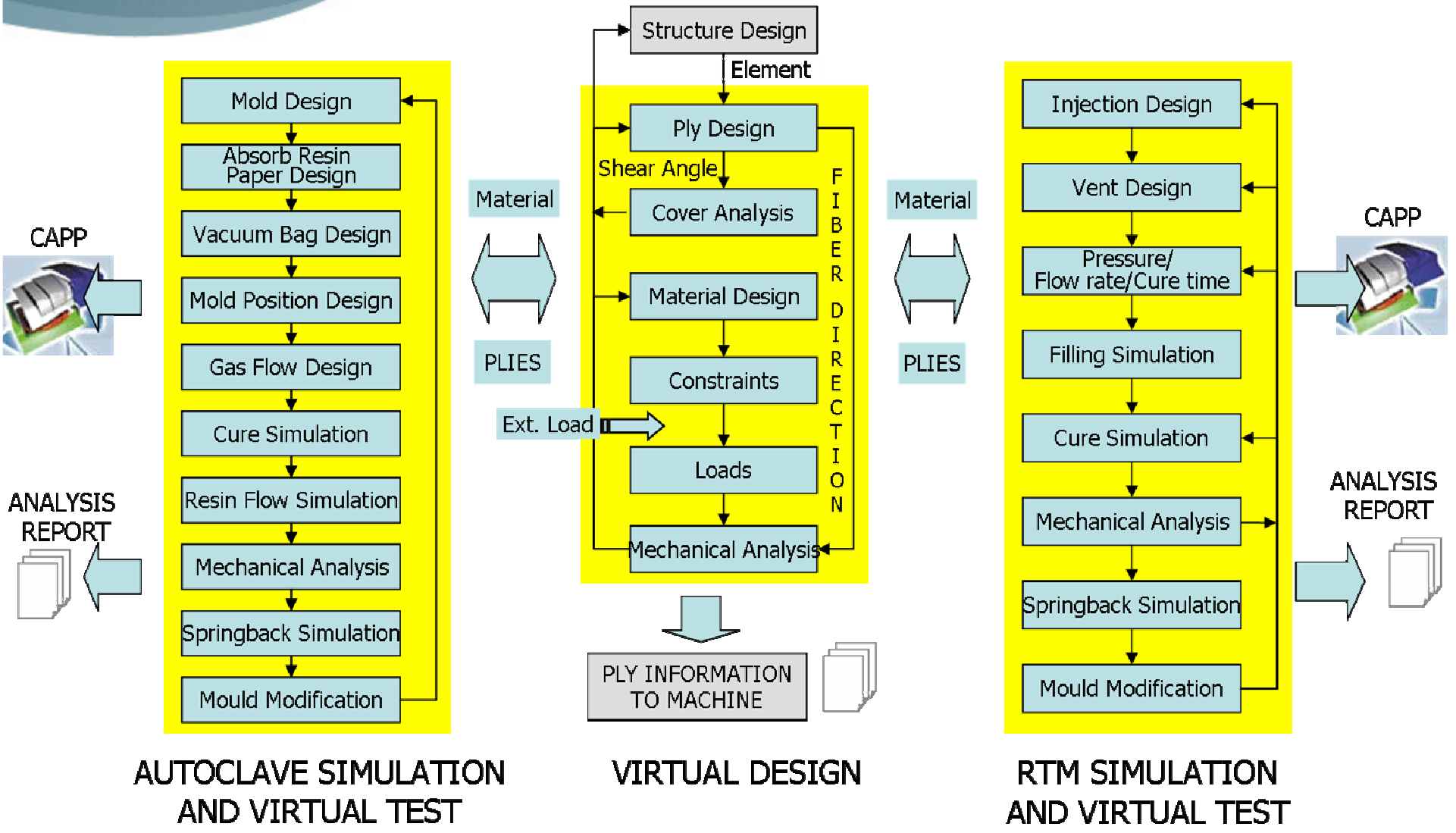
Managed simulation environment

- 3rd Generation "CAE content and team management"
  - Synchronized in the PDM process
  - Knowledge catalogue for pre-validated models
  - Full view on simulation project status
  - Enables simulation based design as integral part of PLM strategy

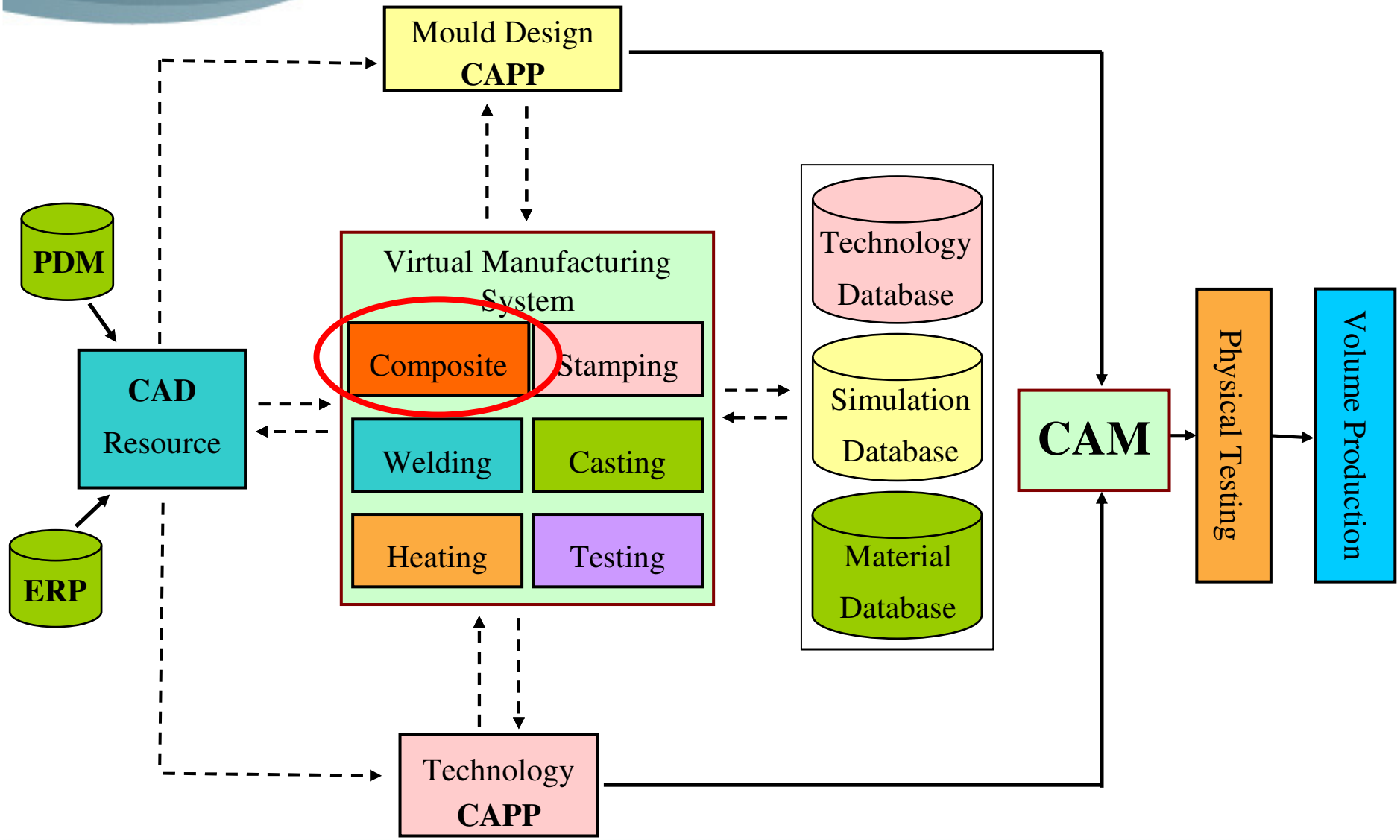
Virtual composite system

- Composite Design and Simulation
- Process Standardization
- Knowledge Management
- Improve communication and performance
- Improve design and simulation standards

Large aircraft OEM



Manufacturing simulation system outlook



One more thing

Available NOW! – visit Apple's AppStore and download

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Thank You !

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