Josef Fürfanger, 5.6.2013

5TH ANSA & META INTERNATIONAL CONFERENCE

AN INSIGHT TO APPLICATIONS BASED ON ANSA TO THE BMW CAE PROCESSES

BMW GROUP

APPLICATIONS BASED ON ANSA TO THE BMW CAE PROCESSES
AGENDA

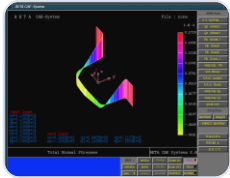|	
1	**History of BMW – BETA Cooperation**
2	**Mapping Deep-Drawing Simulation**
3	**Convertible Top Lid Kinematics**

APPLICATIONS BASED ON ANSA TO THE BMW CAE PROCESSES

HISTORY OF BMW – BETA COOPERATION

BMW starts working with the Software tool BETA
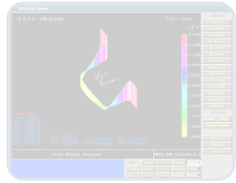
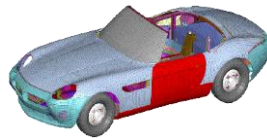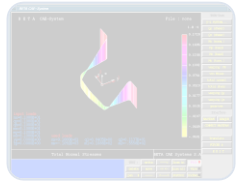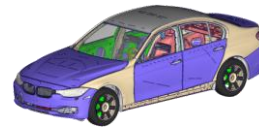| **Late 1980´s** | 1995 | 2005 | 2007 | 2008 |

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BMW starts using ANSA v5 as a mesher for complete models
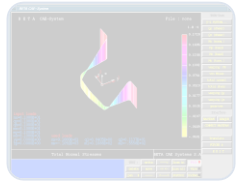
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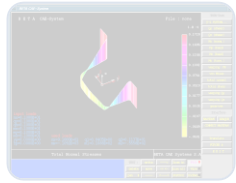
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BMW switches all crash projects to work with Abaqus Explicit

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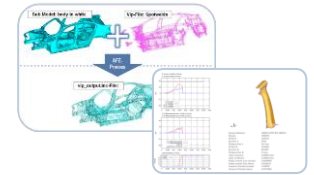**BMW starts using ANSA v5 as a mesher for complete models**

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AFE – Spotwelding with Failure + Postprocessing

| Late 1980´s | 1995 | 2005 | 2007 | **2008** |

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HISTORY OF BMW – BETA COOPERATION

Dummy/seat kinematics

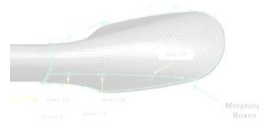| **2008** | 2008 | 2009 | 2010 | 2011 |

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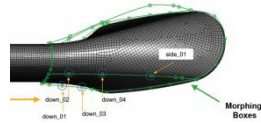
Morphing & Optimization

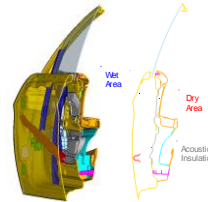| 2008 | **2008** | 2009 | 2010 | 2011 |

APPLICATIONS BASED ON ANSA TO THE BMW CAE PROCESSES
HISTORY OF BMW – BETA COOPERATION

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Dummy/seat kinematics

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EF Chassis Meshing

| 2008 | 2008 | 2009 | **2010** | 2011 |

APPLICATIONS BASED ON ANSA TO THE BMW CAE PROCESSES
HISTORY OF BMW – BETA COOPERATION

Dummy/seat kinematics	Morphing & Optimization	Doorbag Generation Sideimpact	EF Chassis Meshing	Roof Kinematics
2008	2008	2009	2010	**2011**
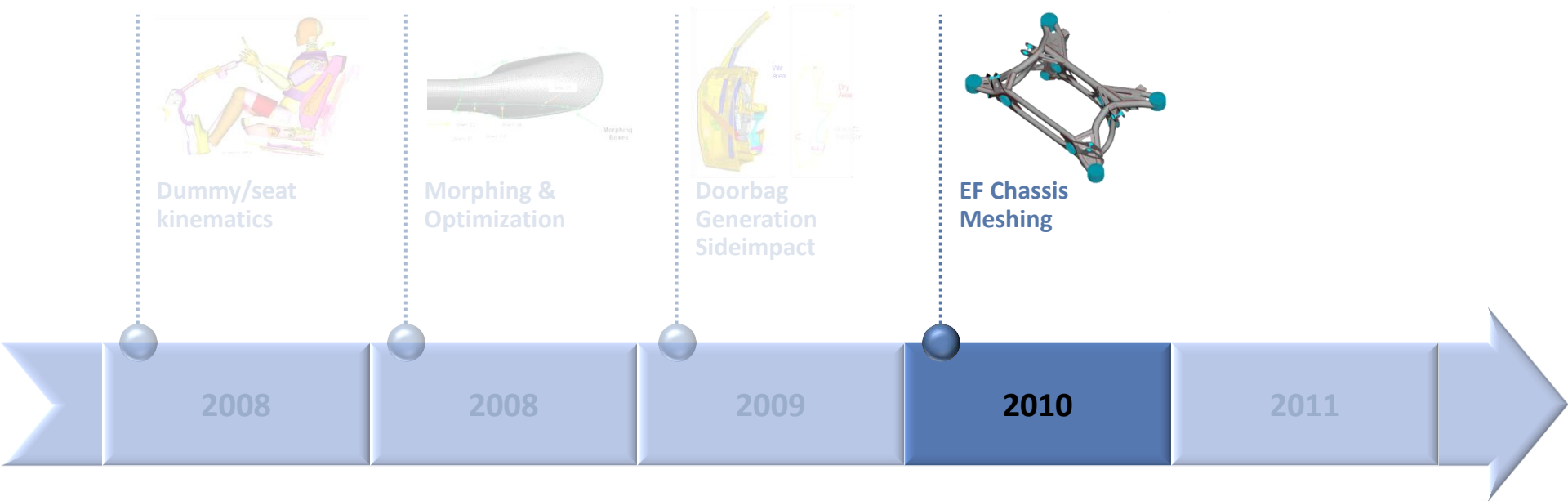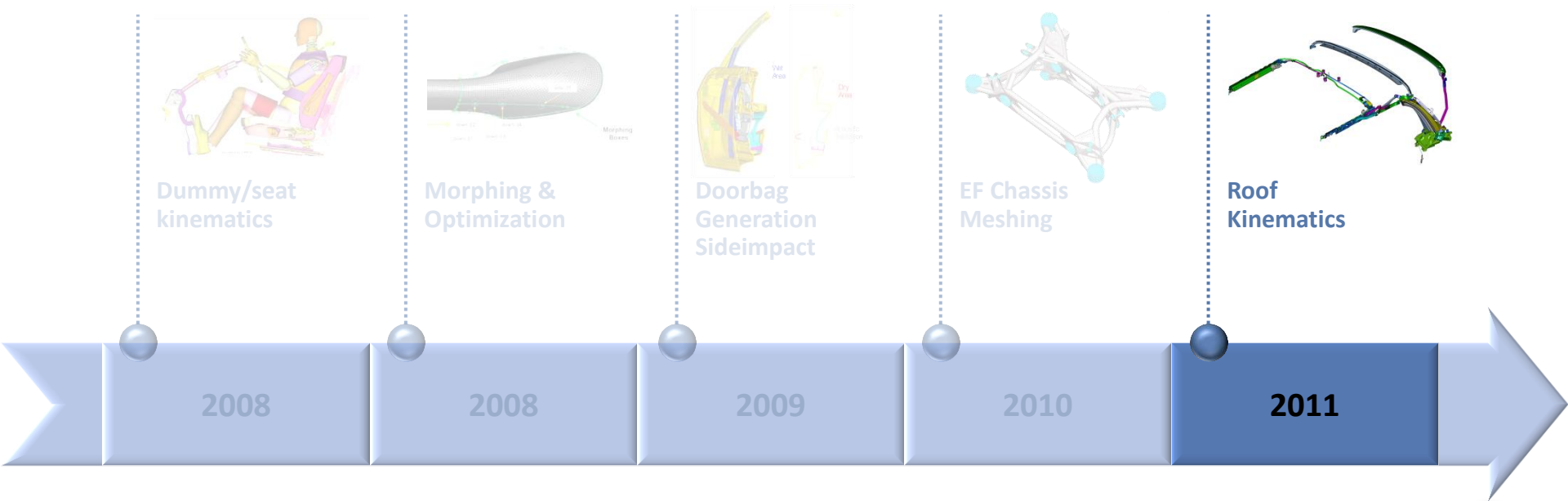
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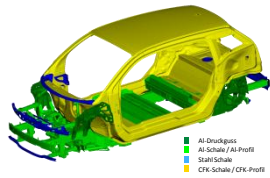
Composites Modeling

2011	2011	2012	

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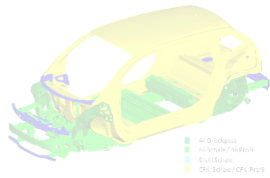
Composites Modeling
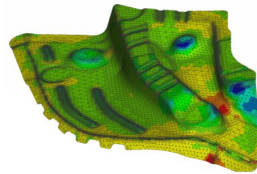
Mapping Deep-Drawing Simulation

2011

2011

2012

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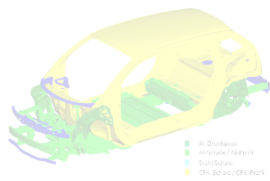
Composites Modeling

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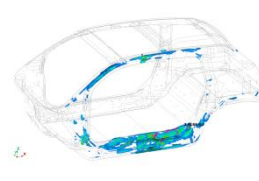
CFK Post Processing

2011	2011	**2012**

MAPPING DEEP-DRAWING SIMULATION THICKNESS AND HARDENING RESULTS

Influences on crash simulation

Using the deformation history of the material as input in a crashsimulation, provides significantly better simulation results (deformation and cracks) and helps to reduce material consumption and to optimize the weight of the part

Stamping-Simulation
(mesh and results)
thickness distribution is displayed

Crash-Simulation
(mesh and results)
mapped thickness distribution

Crash-Simulation
(body with stamping results)
degree of hardening is displayed
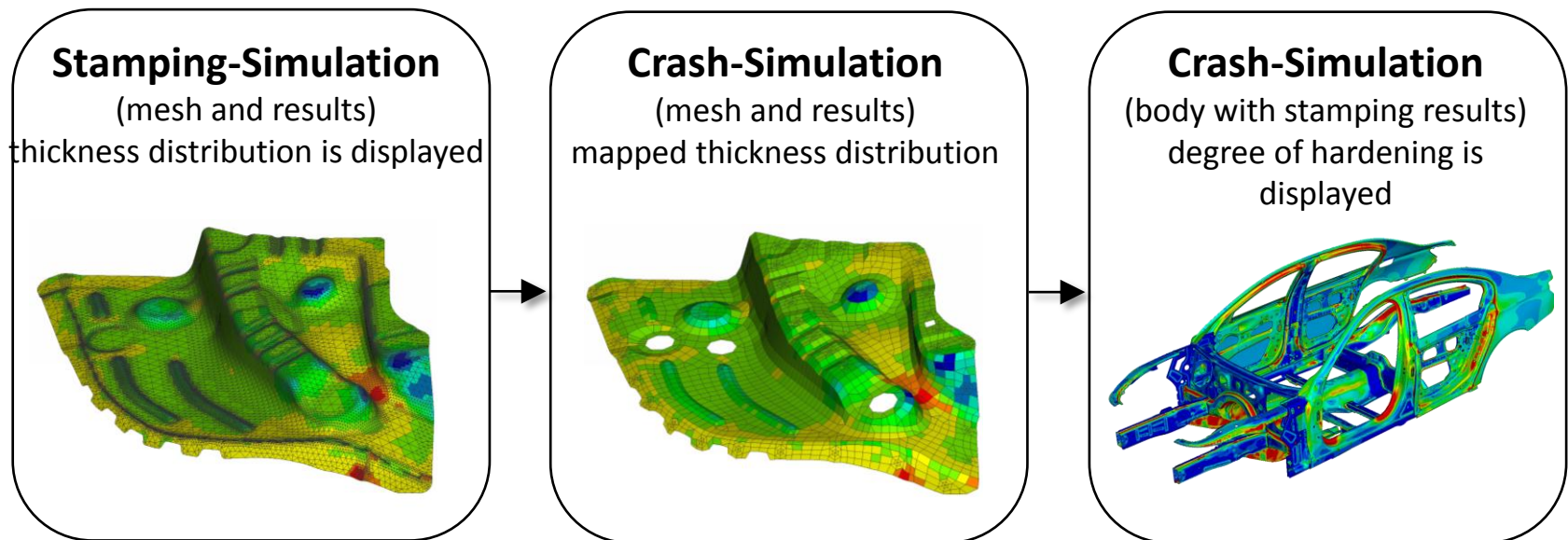
END-TO-END CAE PROCESSES FOR COMPOSITE CRASH, DRAPING, FILLING AND WARPAGE MODELS
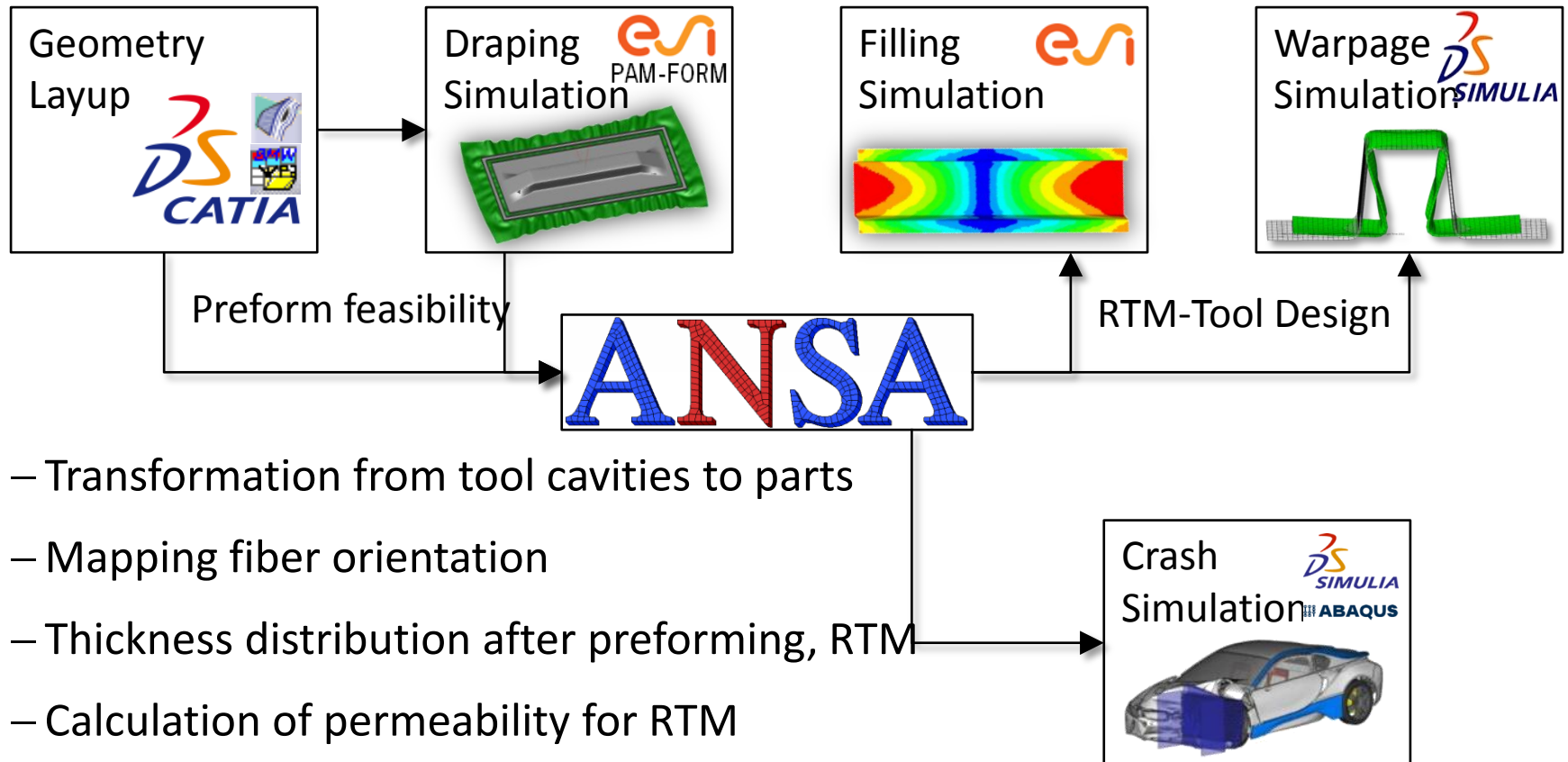
− Transformation from tool cavities to parts

− Mapping fiber orientation

− Thickness distribution after preforming, RTM

− Calculation of permeability for RTM

− Fiber volume content

− Laminate properties

APPLICATIONS BASED ON ANSA TO THE BMW CAE PROCESSES
PROCESS OVERVIEW. ROOF KINEMATICS.

CAD Model (CATIA V5)
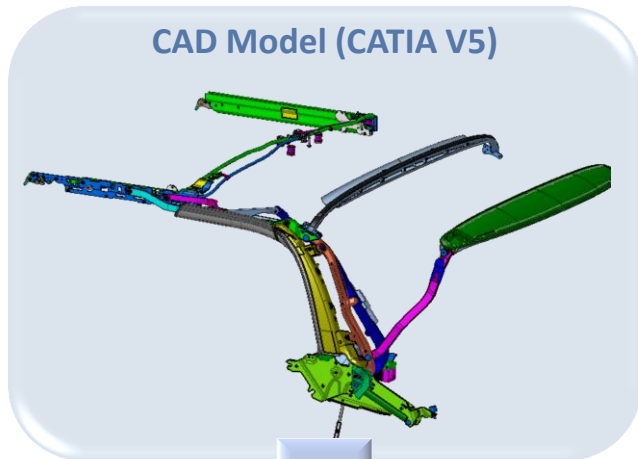
Disadvantages

- Convertible hood "only" consists of independent parts (Dead GEO)
- Connections are "not" converted (CAE) acceptably
- CAE starts again right from the beginning
- Every modeling step by hand

translate

FE Model (ABAQUS)
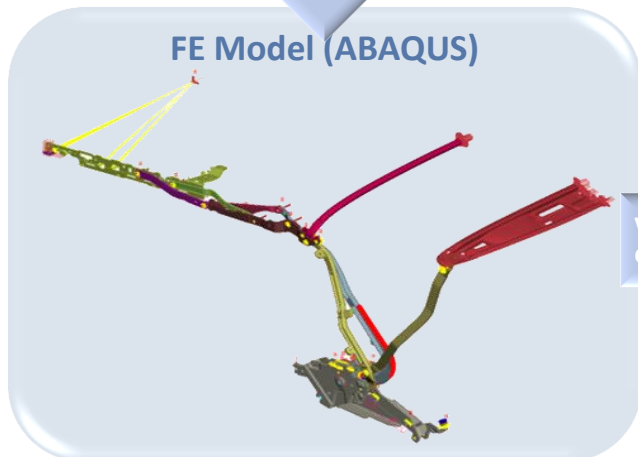
virtual dimensioning

NVH	• Stiffness • Acoustics
KINETMATIC	• Opening process • Closing process
STRENGTH	• Dimensioning Conv. parts • Joint loads
CRASH	• High Speed Crash (Front, Side, Rear)

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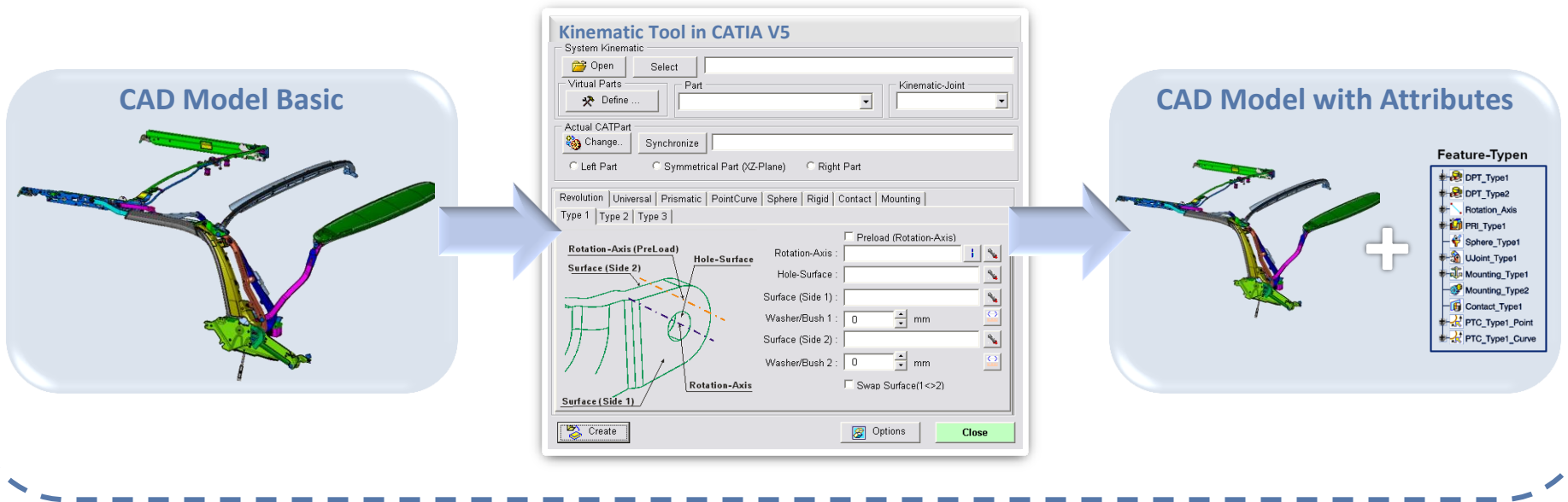
Add intelligence to the system

PROCESS OVERVIEW. ROOF KINEMATICS.

Add intelligence to the system
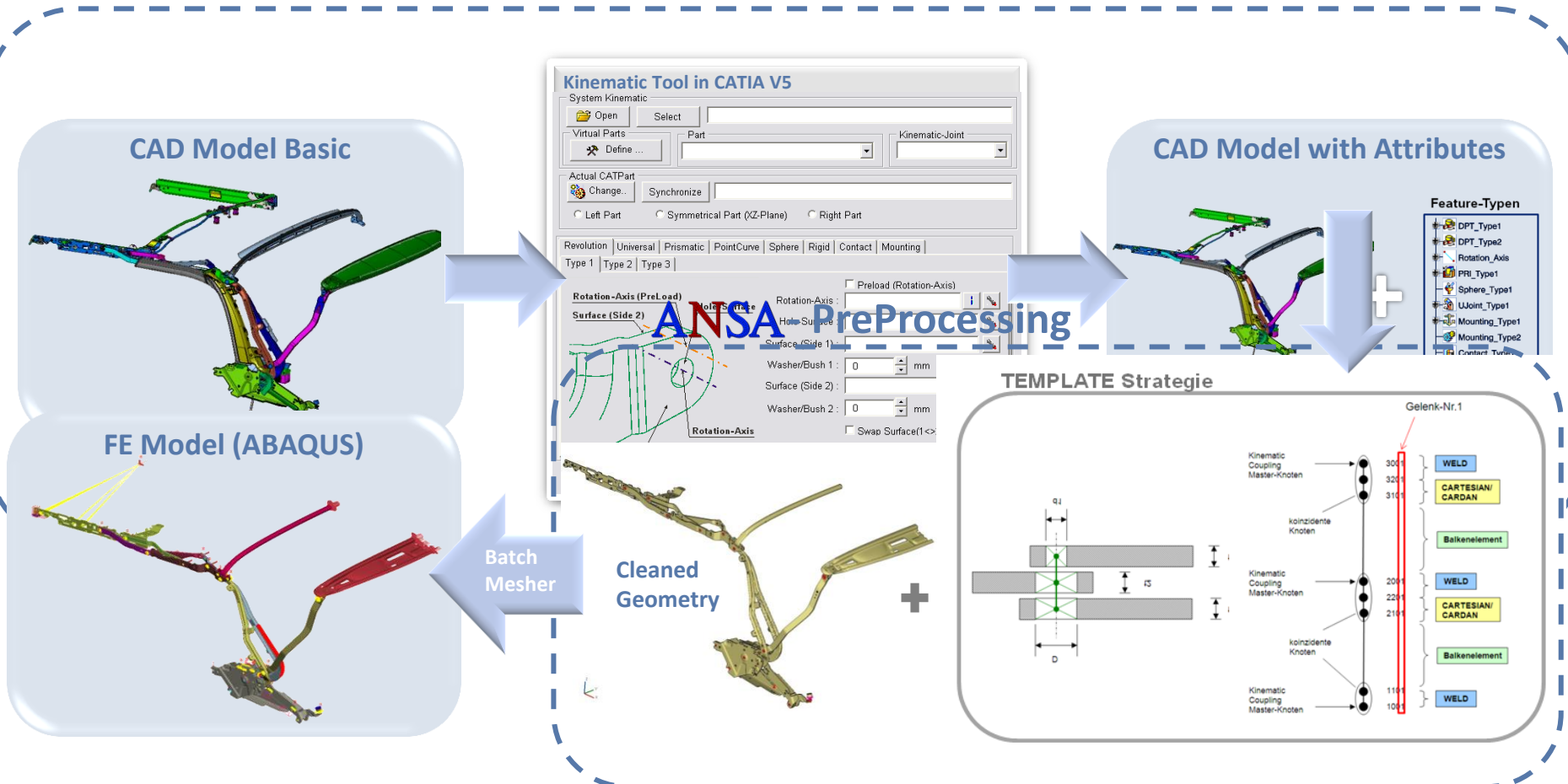
PROCESS OVERVIEW. ROOF KINEMATICS.

Starting with a Task template

PROCESS OVERVIEW. ROOF KINEMATICS.

step 5a: Select Kin-attr file

PROCESS OVERVIEW. ROOF KINEMATICS.

step 7: Build the ANSA Kinematic Model

APPLICATIONS BASED ON ANSA TO THE BMW CAE PROCESSES
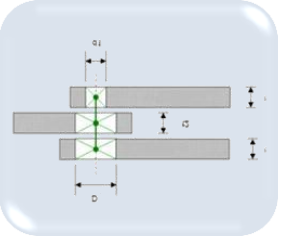## PROCESS OVERVIEW. ROOF KINEMATICS.

Model Meshing
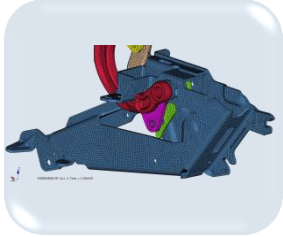
3,5 weeks — Old Process

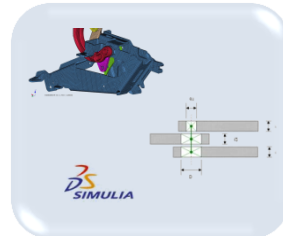2 days — New Process

Add Kinematics

2,5 weeks

1 d

Start of Simulation

4 days

1 d

Total Time

ca. 5,5 weeks

4 days

| 0 | 1 | 2 | 3 | 4 | 5 | time in weeks |

Legend:
— Old Process
— New Process

THANK YOU FOR YOUR ATTENTION!

roof_for_tryfon_bmw.ansa,   Current Part: 008000_A_MODEL_SOLIDS