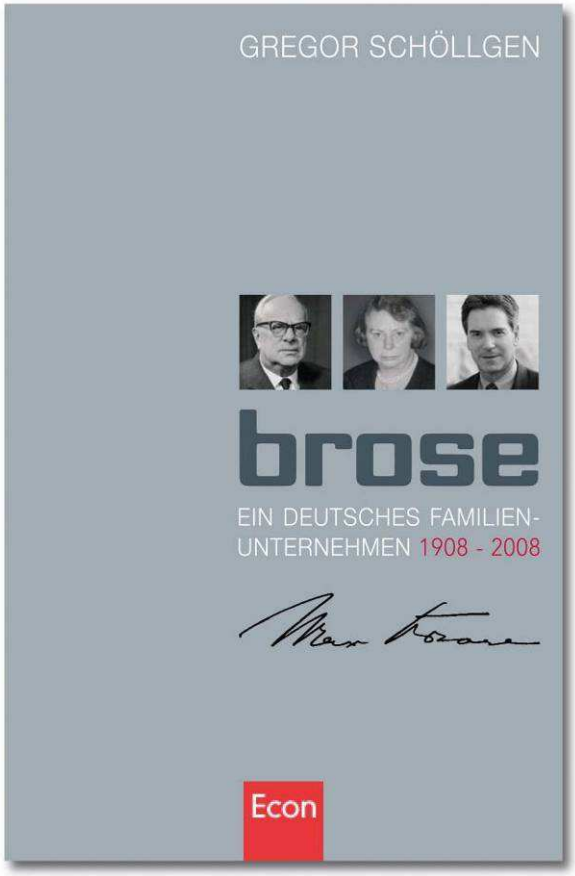
Positioning of Car Seat Structures

06.06.2013 - S. Sinne, F. Richter

Agenda

Agenda

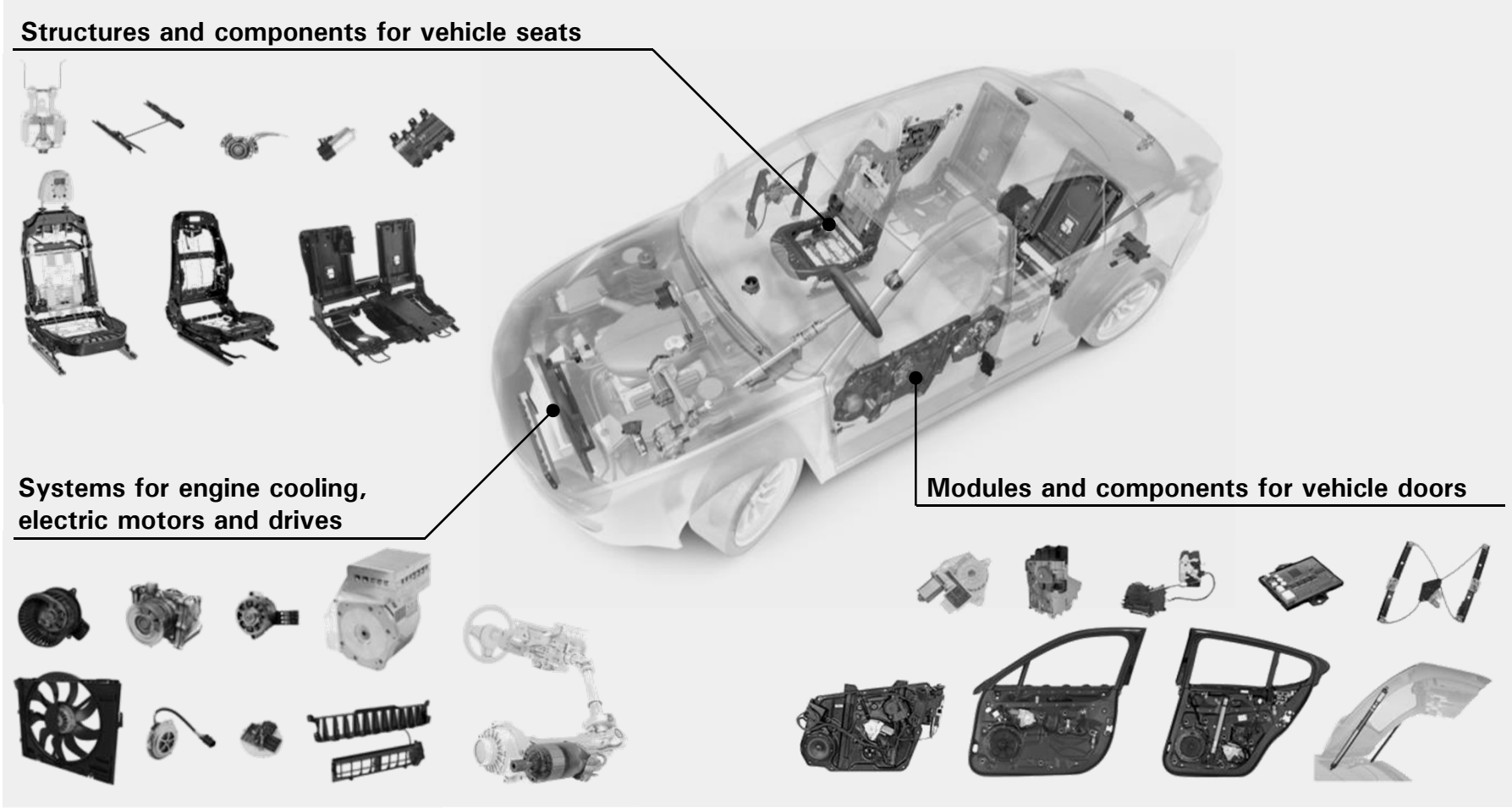
Founding and building of a family-owned company
Three generations in 100 years



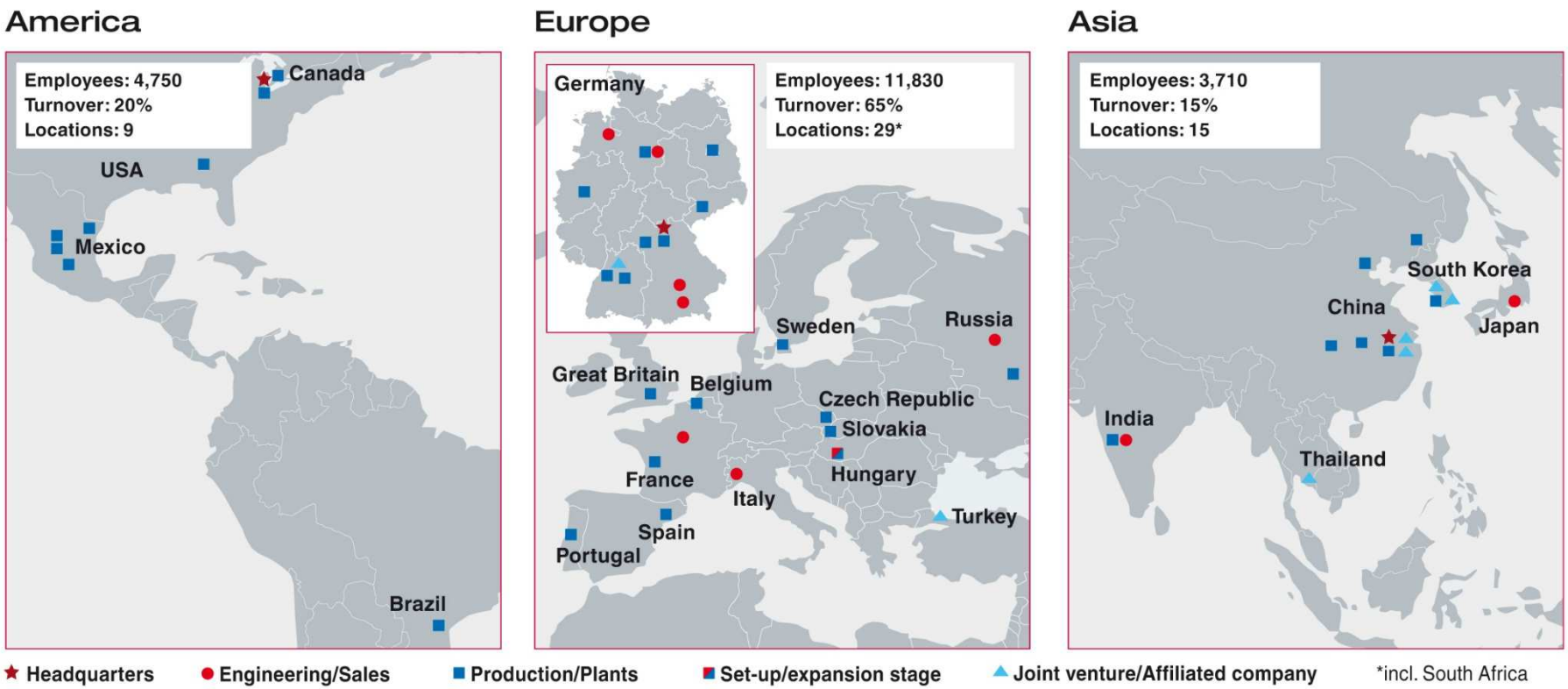
Max Brose
Gisela Brose
Michael Stoschek

Product range

Mechatronic Systems and Drives for Automobiles



Global presence
53 locations in 23 countries



Customers worldwide

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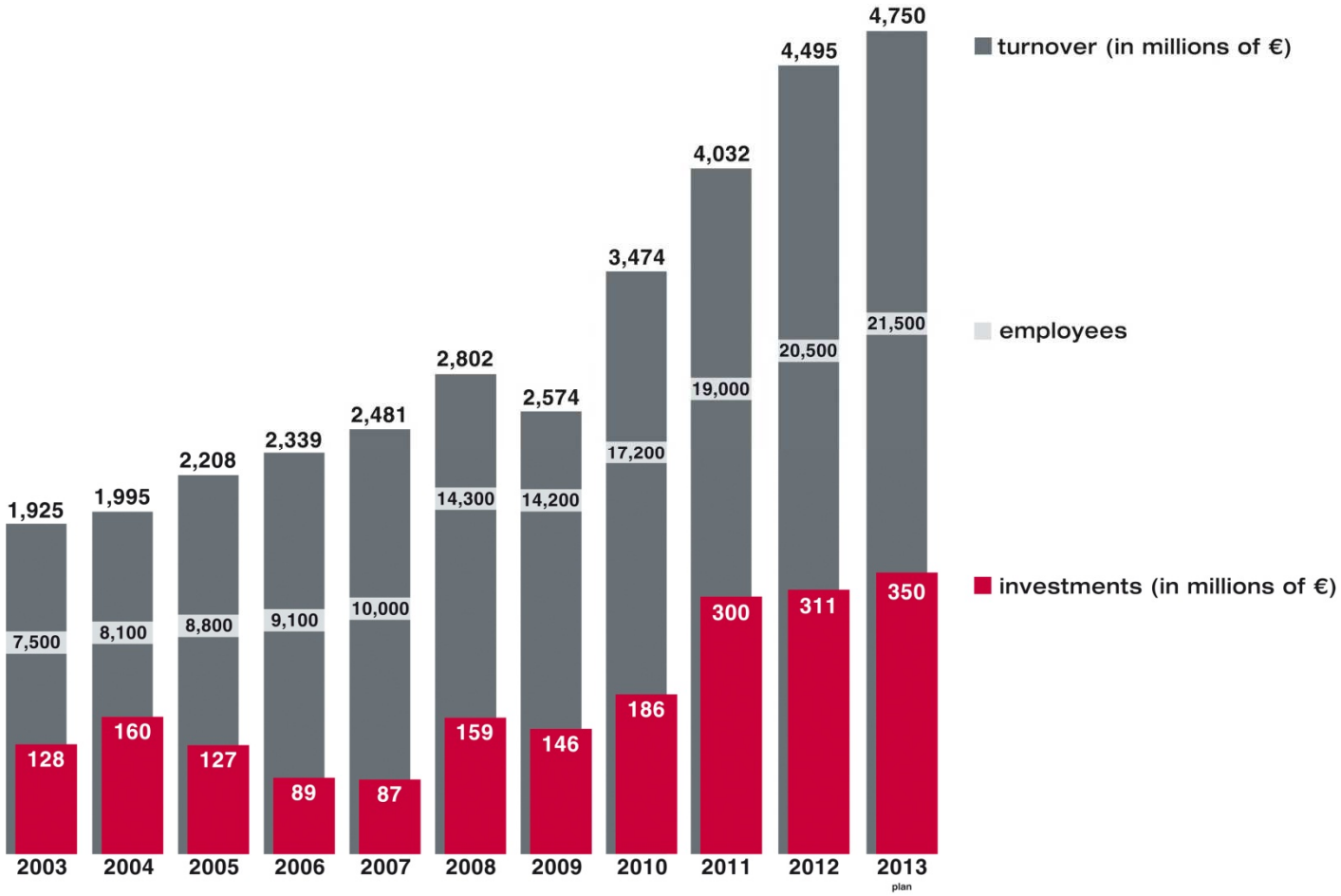
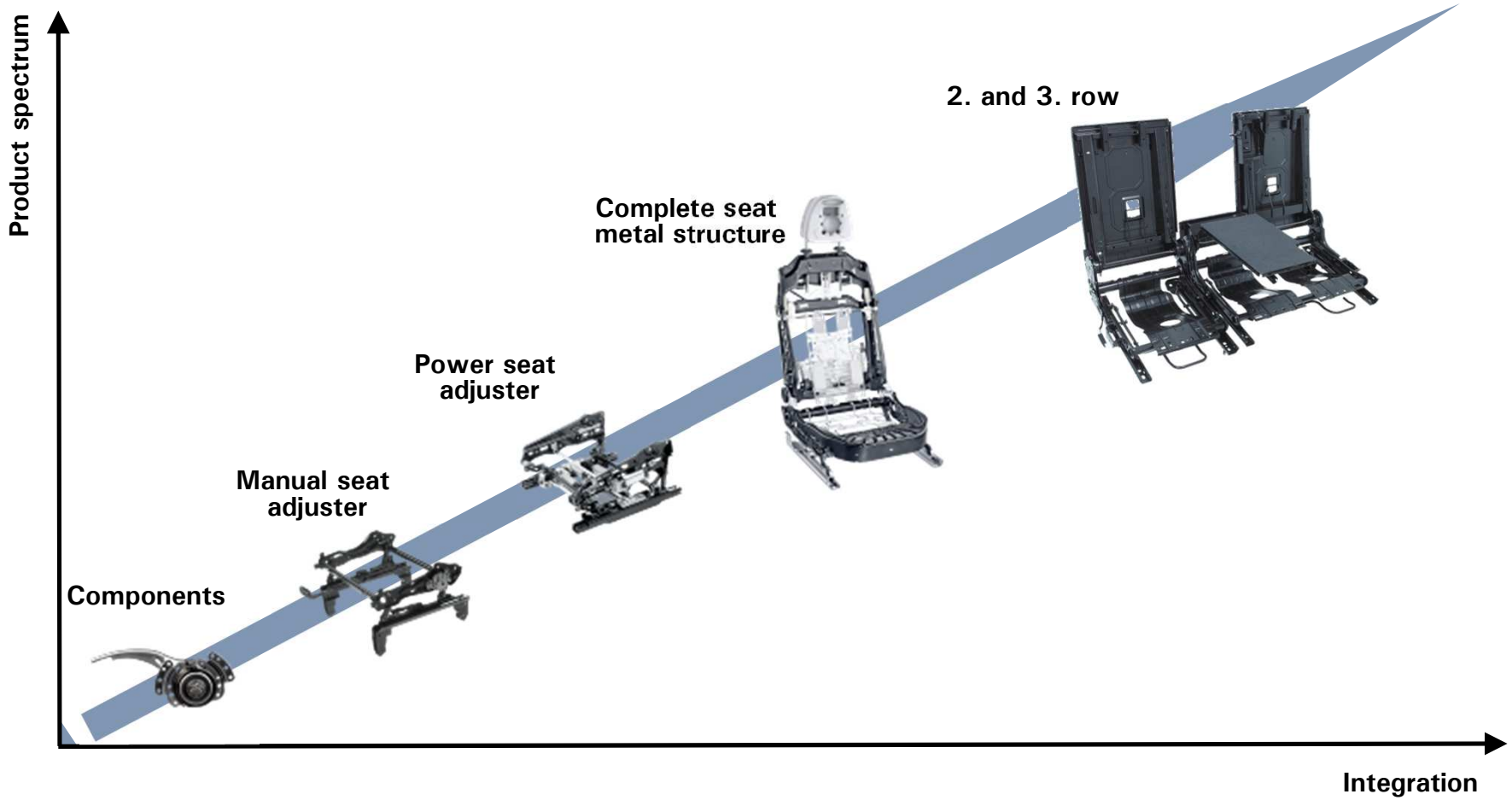
Business development
Continuous self-generated growth

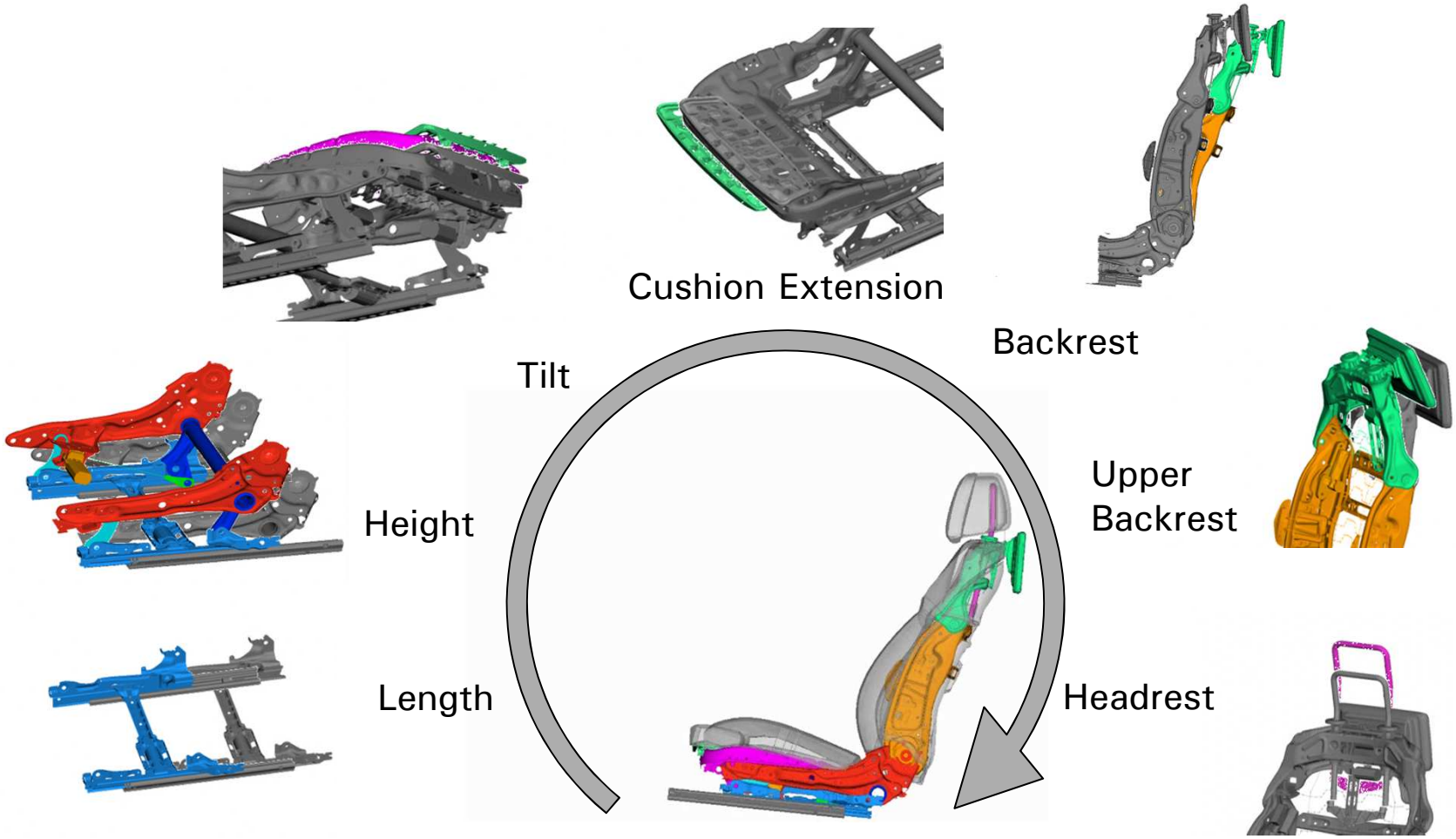


System expertise vehicle seat

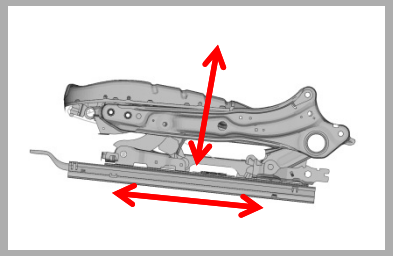
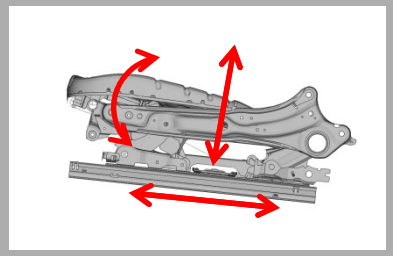
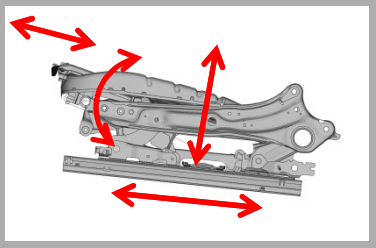
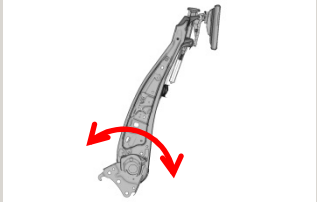
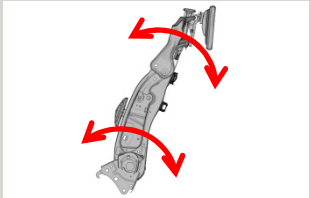


Agenda

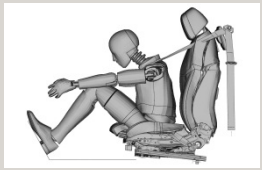
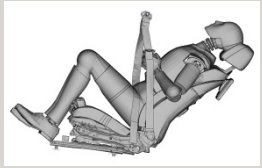
Seat Positioning
Overview



Seat Types

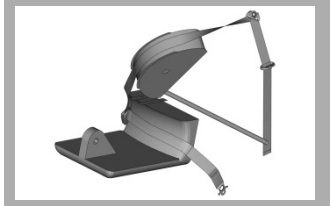
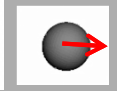
Adjuster / Backrest		4 – way		6 – way		8 – way	
							
		man	pow	man	pow	man	pow
Basic 	man	●		●		●	
	pow	●	●	●	●	●	●
Comfort 	man			●			
	pow				●		

Test Requirements
Crash

	w/o Dummy			5%-ile			50%-ile			95%-ile		
	P1	P2	P3	P1	P2	P3	P1	P2	P3	P1	P2	P3
Frontal Impact 		●		●	●		●	●			●	●
Rear Impact 				●			●	●			●	●
Cargo Load 			●						●			

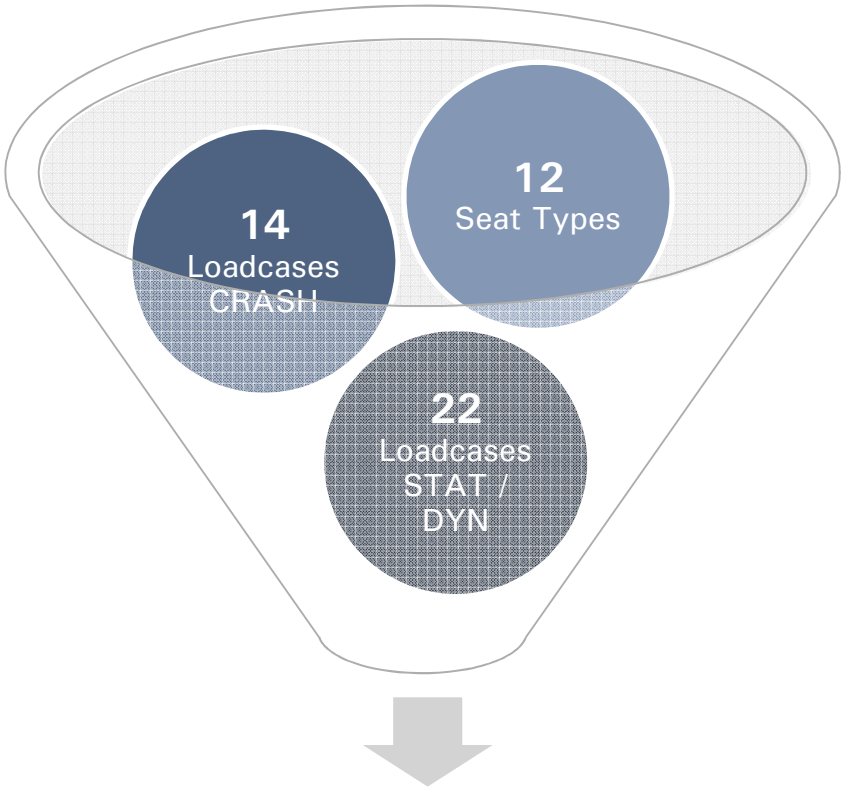
14 Loadcases CRASH

Test Requirements
static / dynamic

	Belt Anchorage Test	ISOFIX			Moment H-Point	Headrest Test		
								
		right	straight	left		static	dyn. front	dyn. rear
Position 1	●	●	●	●		●	●	●
Position 2	●	●	●	●	●	●	●	●
Position 3	●	●	●	●		●		

22 Loadcases STAT / DYN

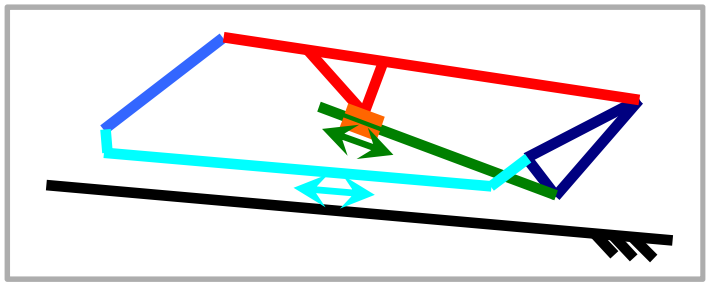
Validation Matrix



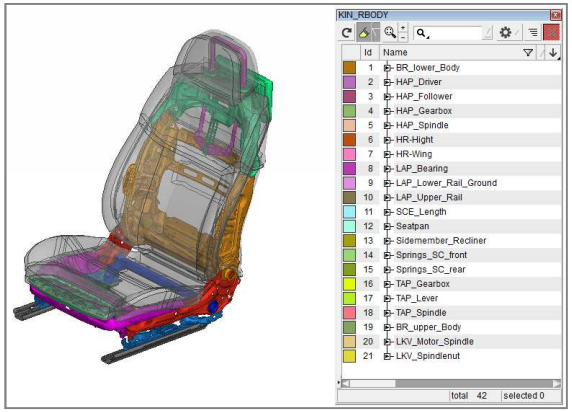
> 400 FE-Runs

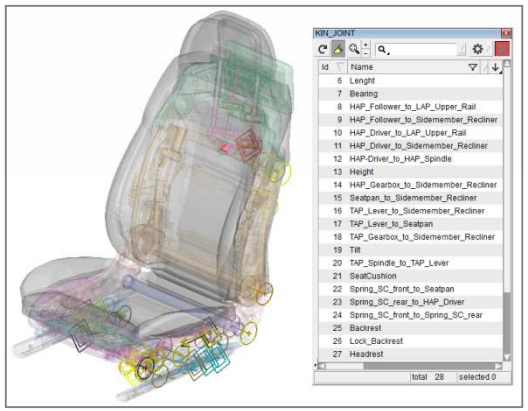
Agenda

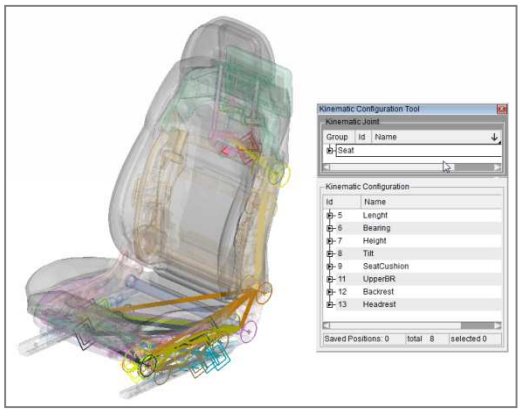
ANSA Kinematic
Model built up



Kinematic Body → **Kinematic Joint** → **Kinematic Configuration**

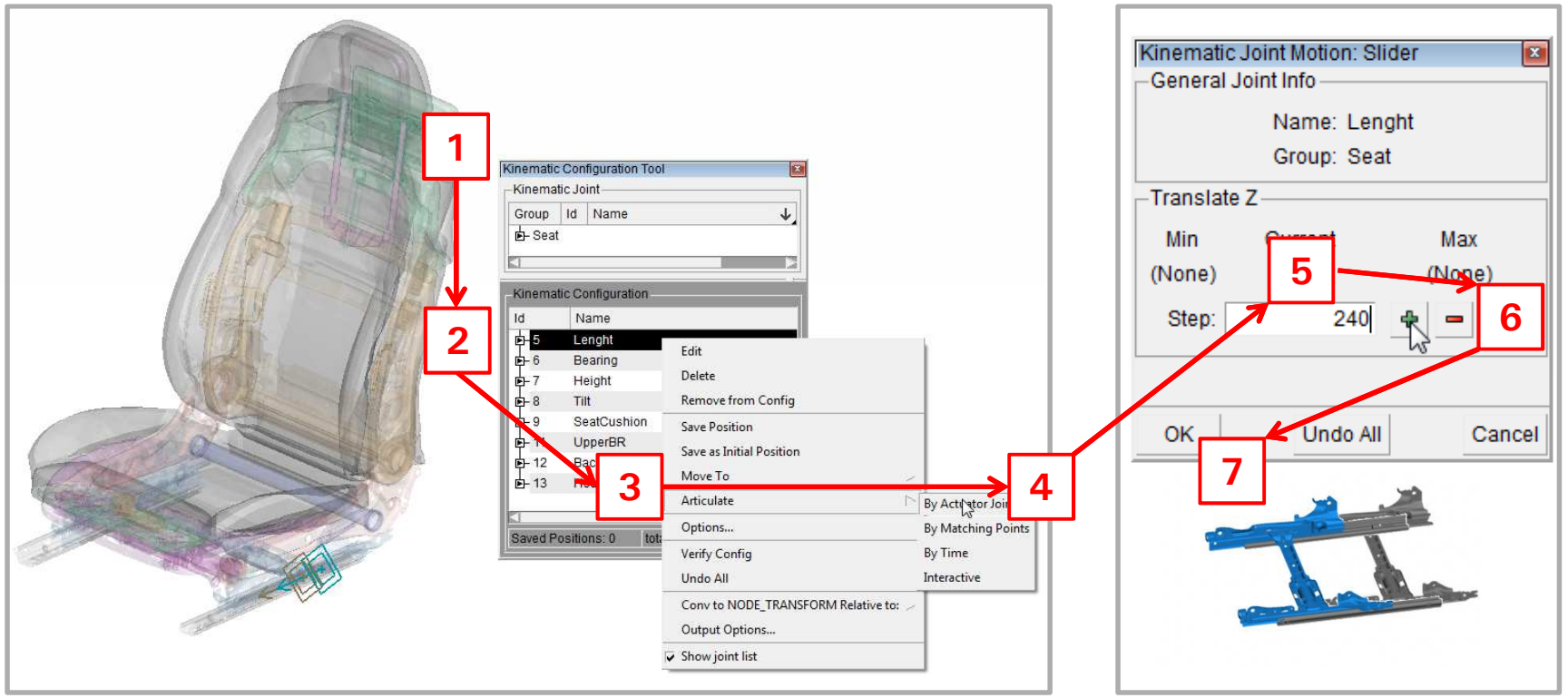






User interactive kinematic articulation

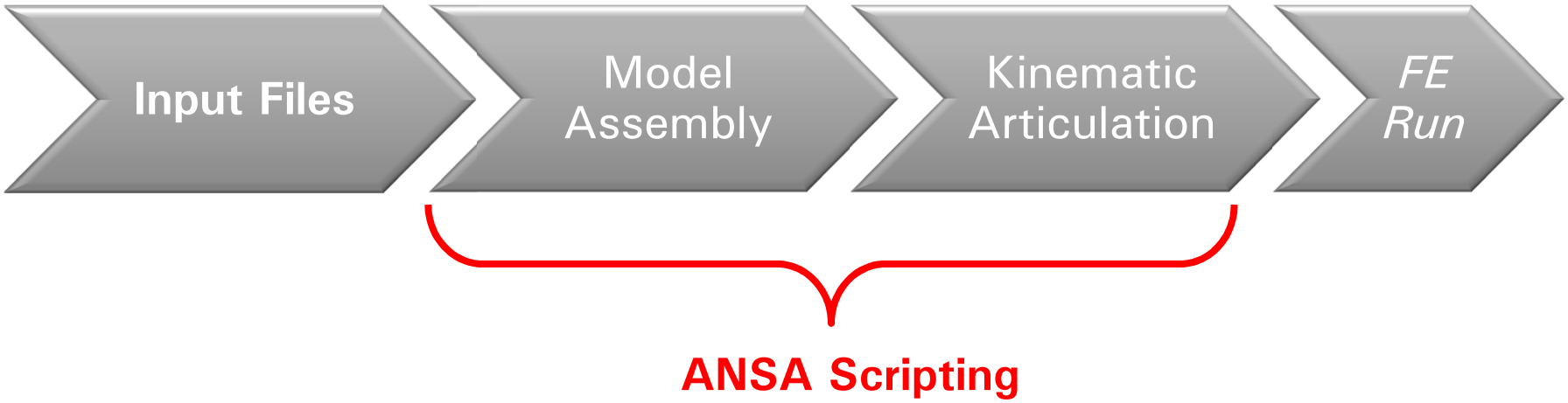
Example: Length adjustment



➡ 7 Clicks per Adjustment x 8 Configurations = **56 User Interactions**

➡ **Time consuming and error-prone model adjustment in case of many loadcases !**

Automation approach
Overview



Requirements:

- **Error free model handling**
- **Speed up model assembly**
- **Speed up seat positioning**
- **Reproducability of setting up FE-runs**

Kinematic automation approach
Input Files

Routing File

```
*KEYWORD
$
*PROJECT_NAME
5th ANSA & µETA International Conference
$
$Ansa_Includefile
*ANSA_INCLUDE_FILE
C:\Conference\ansa2013_include.k
$
$Ansa_Kinematic
*ANSA_KINEMATICS_FILE
C:\Conference\ansa2013_kinematics.ansa
$
$ANSA Seatadjustment
*ANSA_KINEMATICS_POSITION
$K_CONFIG       , min, max, value,   direction
Lenght          ,    ,    ,   240, TRANSLATE Z
Height          ,    ,    ,   100, TRANSLATE Z
Tilt            ,    ,    ,    40, TRANSLATE Z
SeatCushion     ,    ,    ,    60, TRANSLATE Z
UpperBackrest   ,    ,    ,    13, TRANSLATE Z
Headrest        ,    ,    ,    80, TRANSLATE Z
$
*END
```

LS-Dyna Include File

ANSA Kinematics File

Kinematics Parameter

Kinematic automation approach
Model Assembly

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Model Assembly

Routing File

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*ANSA_KINEMATICS_FILE
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$
$ANSA Seatadjustment
*ANSA_KINEMATICS_POSITION
$K_CONFIG       , min, max, value,   direction
Lenght          ,    ,    ,   240, TRANSLATE Z
Height          ,    ,    ,   100, TRANSLATE Z
Tilt            ,    ,    ,    40, TRANSLATE Z
SeatCushion     ,    ,    ,    60, TRANSLATE Z
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Headrest        ,    ,    ,    80, TRANSLATE Z
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*END
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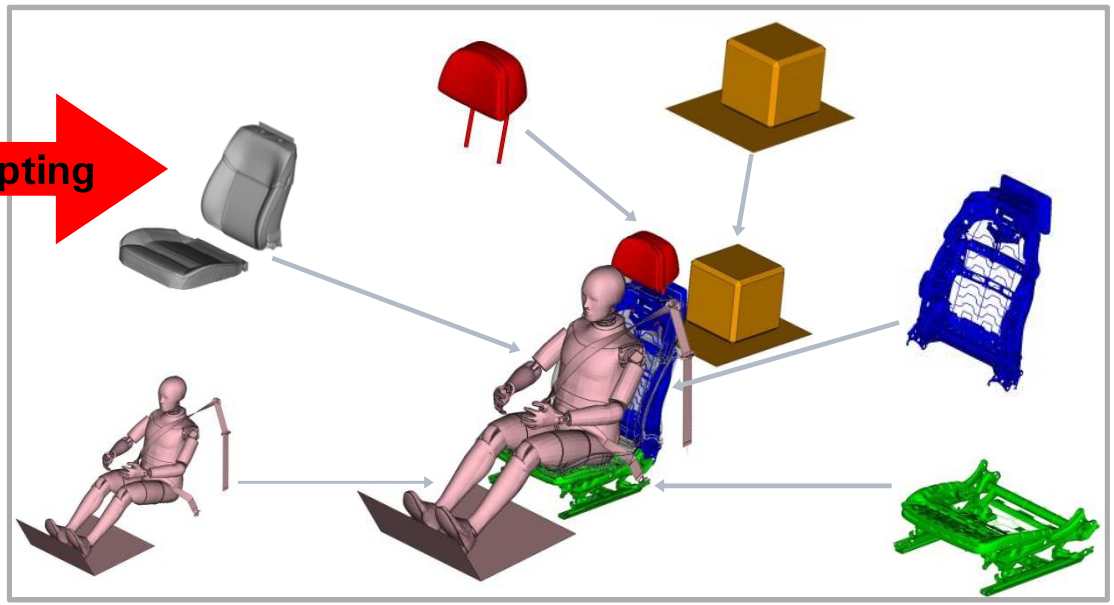
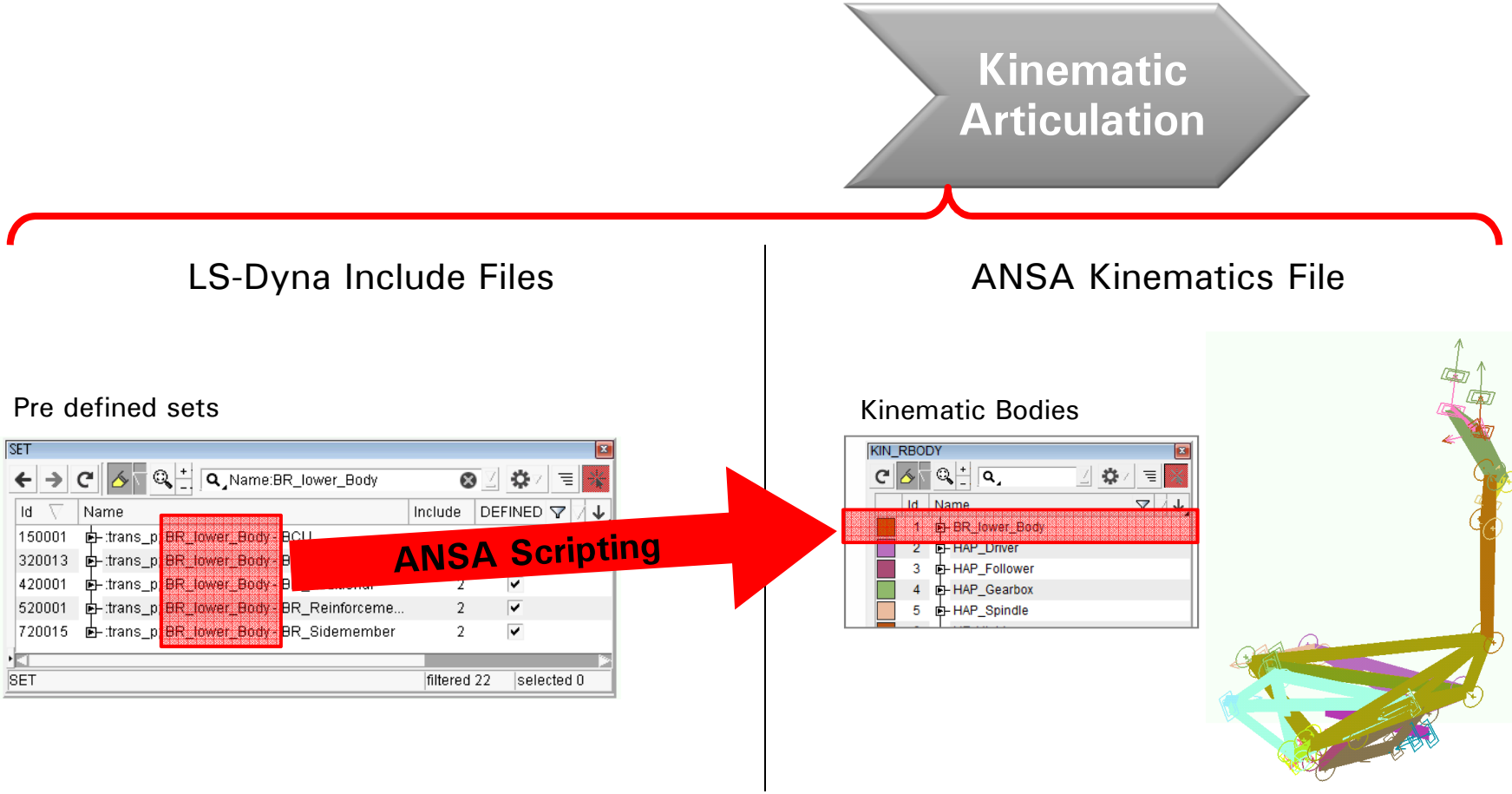
ANSA Scripting



Kinematic automation approach
Assignment of sets



Kinematic automation approach
Kinematic Articulation

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Kinematic Articulation

Routing File

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5th ANSA & µETA International Conference
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*ANSA_INCLUDE_FILE
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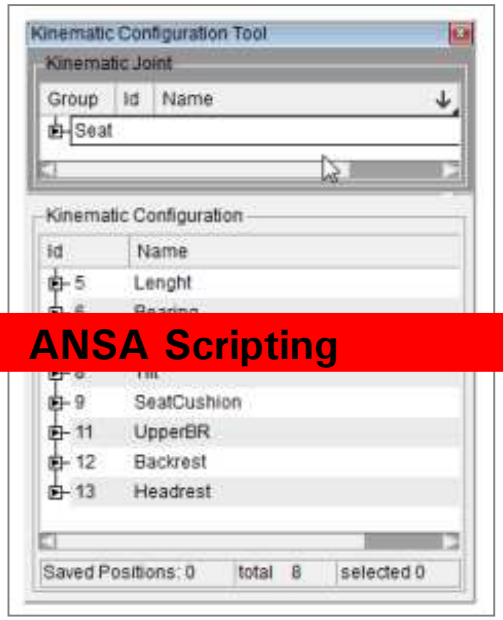
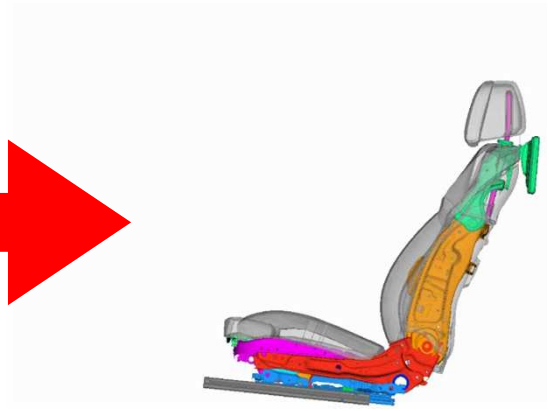
$
$Ansa_Kinematic
*ANSA_KINEMATICS_FILE
C:\Conference\ansa2013_kinematic
$
$ANSA Seatadjustment
*ANSA_KINEMATICS_POSITION
$K_CONFIG       , min, max, value,   direction
Lenght          ,    ,    ,   240, TRANSLATE Z
Height          ,    ,    ,   100, TRANSLATE Z
Tilt            ,    ,    ,    40, TRANSLATE Z
SeatCushion     ,    ,    ,    60, TRANSLATE Z
UpperBackrest   ,    ,    ,    13, TRANSLATE Z
Headrest        ,    ,    ,    80, TRANSLATE Z
$
*END
```

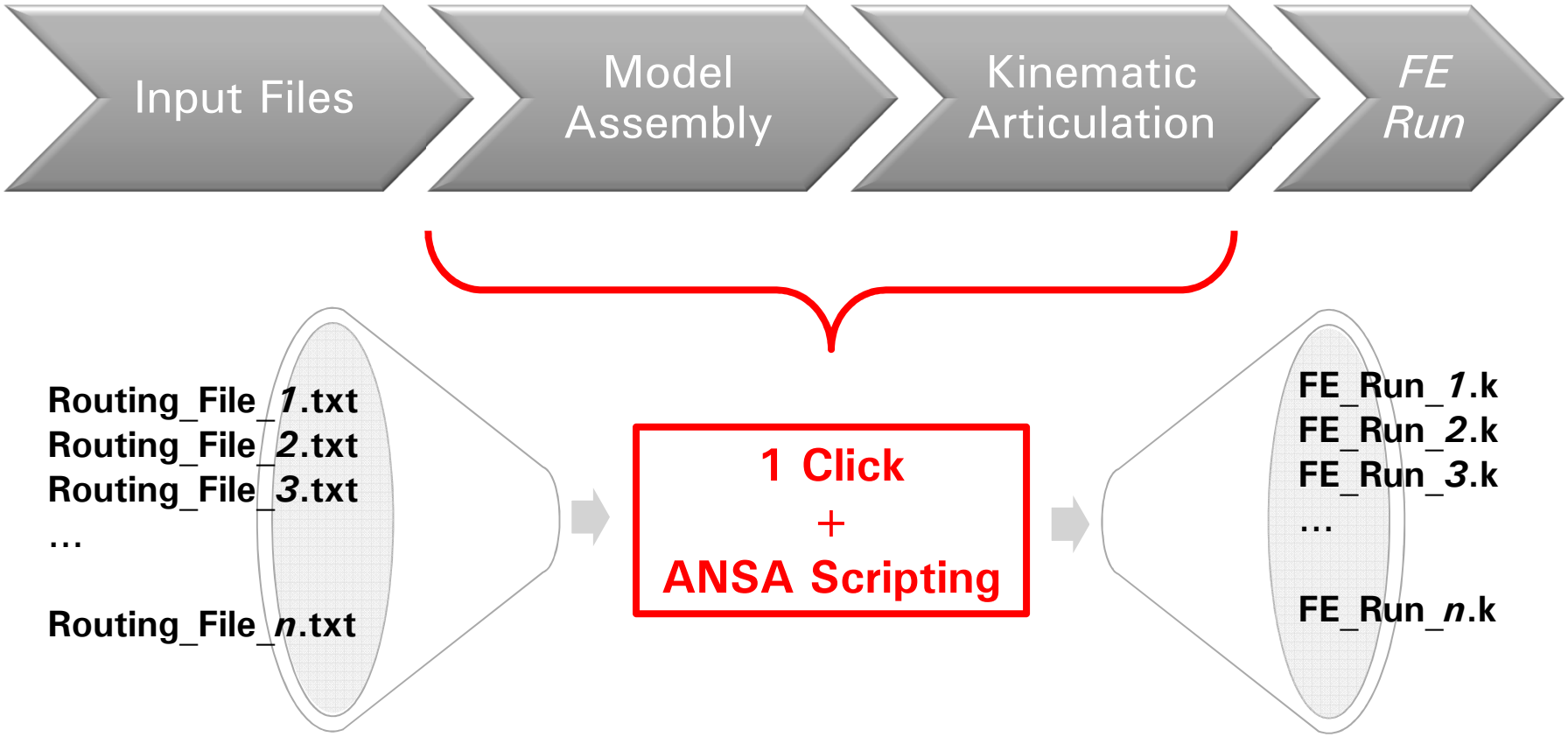
ANSA Scripting





Kinematic automation approach

From Input to FE-Run



Agenda

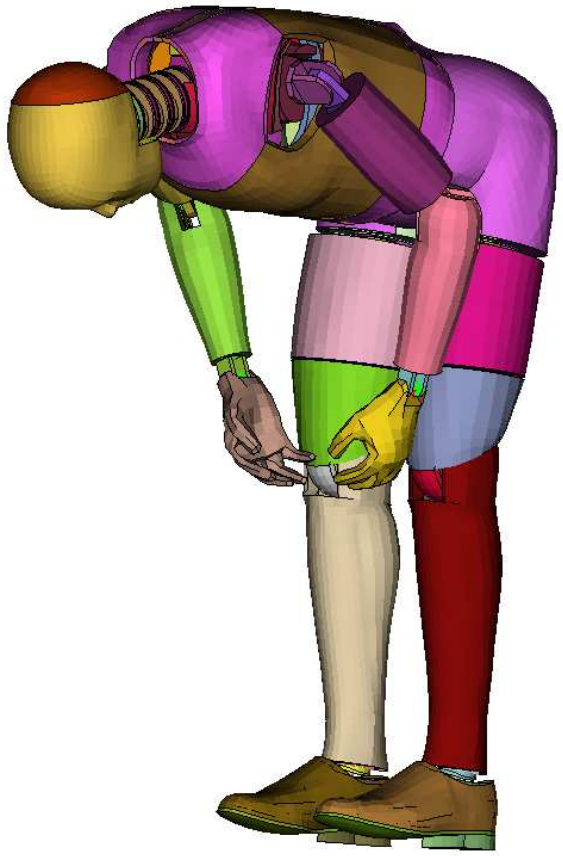
1	Brose – system supplier of the international automotive industry
2	Seat Types & Test Requirements
3	Seat Positioning
4	Summary

Summary

- The needed standardization for the automation leads to consistent model build up
- Process automation is successfully realized
- Error free model assembly and seat positioning
- Time to set up FE-runs is enormously reduced

➔ **Efficient handling of various seat types in combination with many load cases**

Thanks' for your attention!



Brose –
system supplier of the international automotive industry