**virtual product development in an international automotive environment –
Status @ Brose**

08.10.2012 - Thomas Resch

# Agenda

| 1 | Brose – system supplier of the international automotive industry |
|---|---|
| 2 | CAE @ Brose |
| 3 | Virtual development process @ Brose |
| 4 | CAE @ LCC |

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

GREGOR SCHÖLLGEN

**brose**

EIN DEUTSCHES FAMILIEN-
UNTERNEHMEN 1908 - 2008

Econ
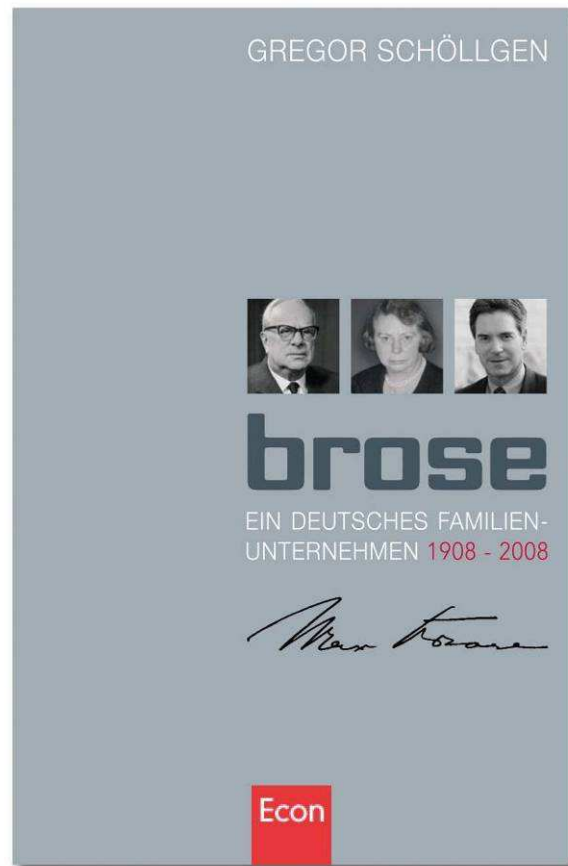
**Max Brose**
**Gisela Brose**
**Michael Stoschek**

# Product range
# Mechatronic Systems and Drives for Automobiles
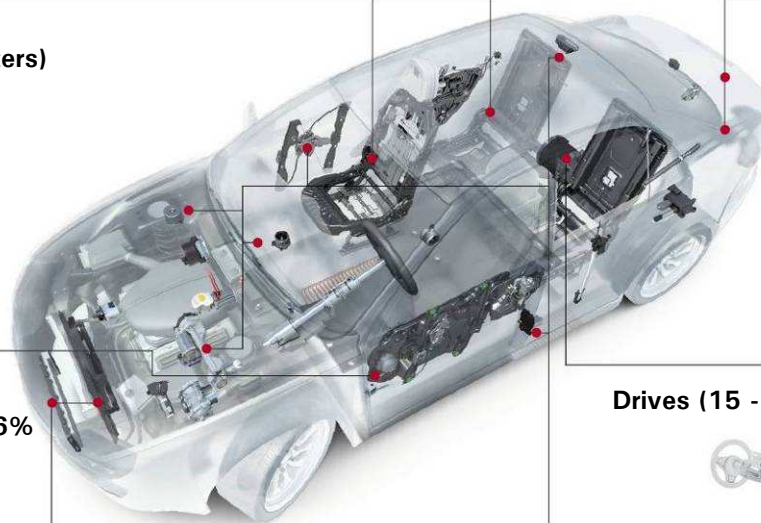
**brose**
Technik für Automobile

**Structures and components for vehicle seats**
Market share Europe: 55% (power seat adjusters)

**Liftgates and closure systems**
Market share worldwide : 10%

**Modules and components for vehicle doors**
Market share window regulators worldwide: 26%
Door systems worldwide: 42%

**Drives (15 - 150 kW) and charging systems for electric and hybrid vehicles**

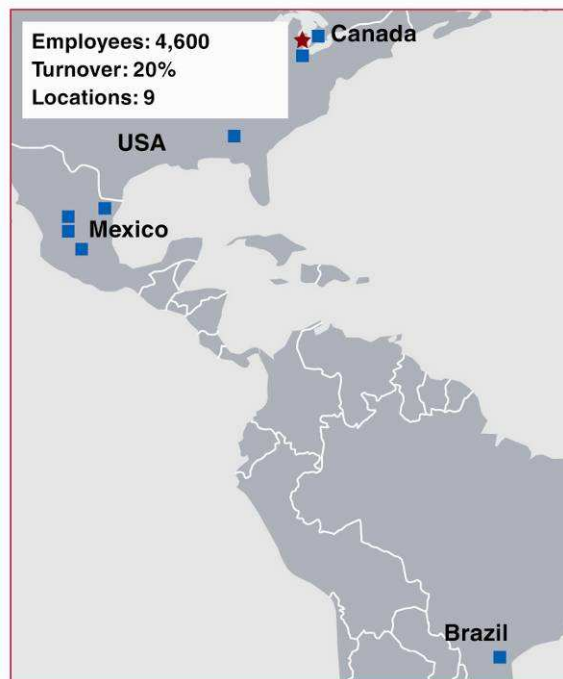**Systems for engine cooling**
Market share worldwide: 23%

**Electric motors and drives (0,1 - 1 kW)**
Market share worldwide : 25%

# Global presence
# 53 locations in 23 countries

**brose**
Technik für Automobile



## America

Employees: 4,600
Turnover: 20%
Locations: 9

Canada

USA

Mexico

Brazil

## Europe

Germany

Employees: 11,800
Turnover: 65%
Locations: 29*

Sweden

Russia

Great Britain

Belgium

Czech Republic

Slovakia

France

Hungary

Italy

Spain

Turkey

Portugal

## Asia

Employees: 3,490
Turnover: 15%
Locations: 15

South Korea

China

Japan

India

Thailand
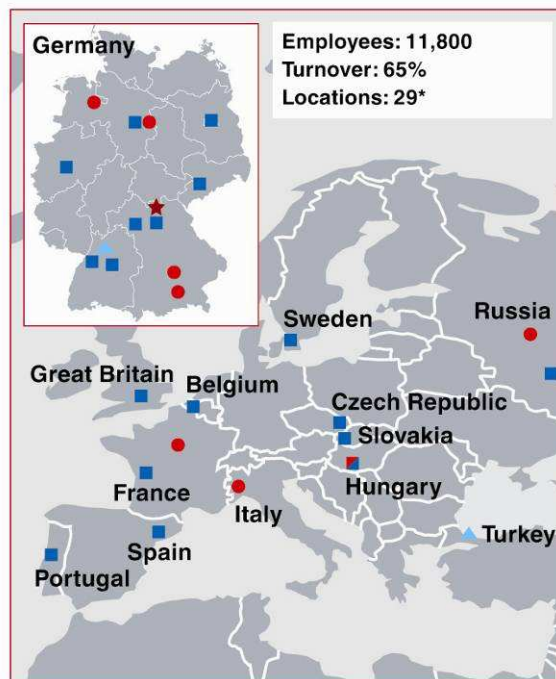
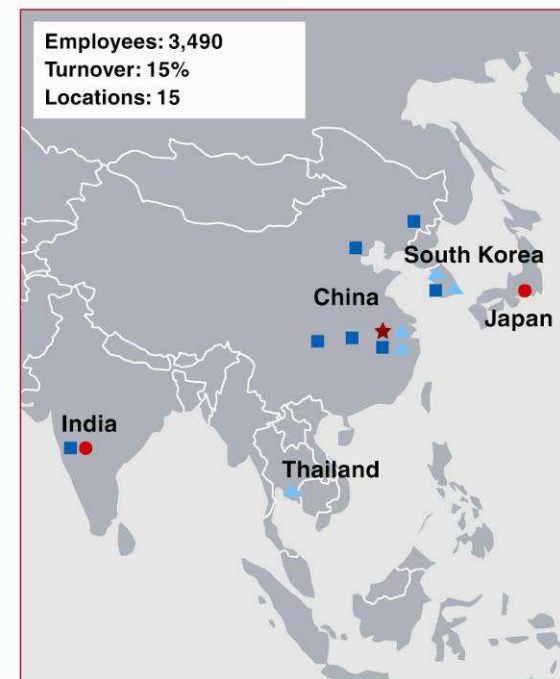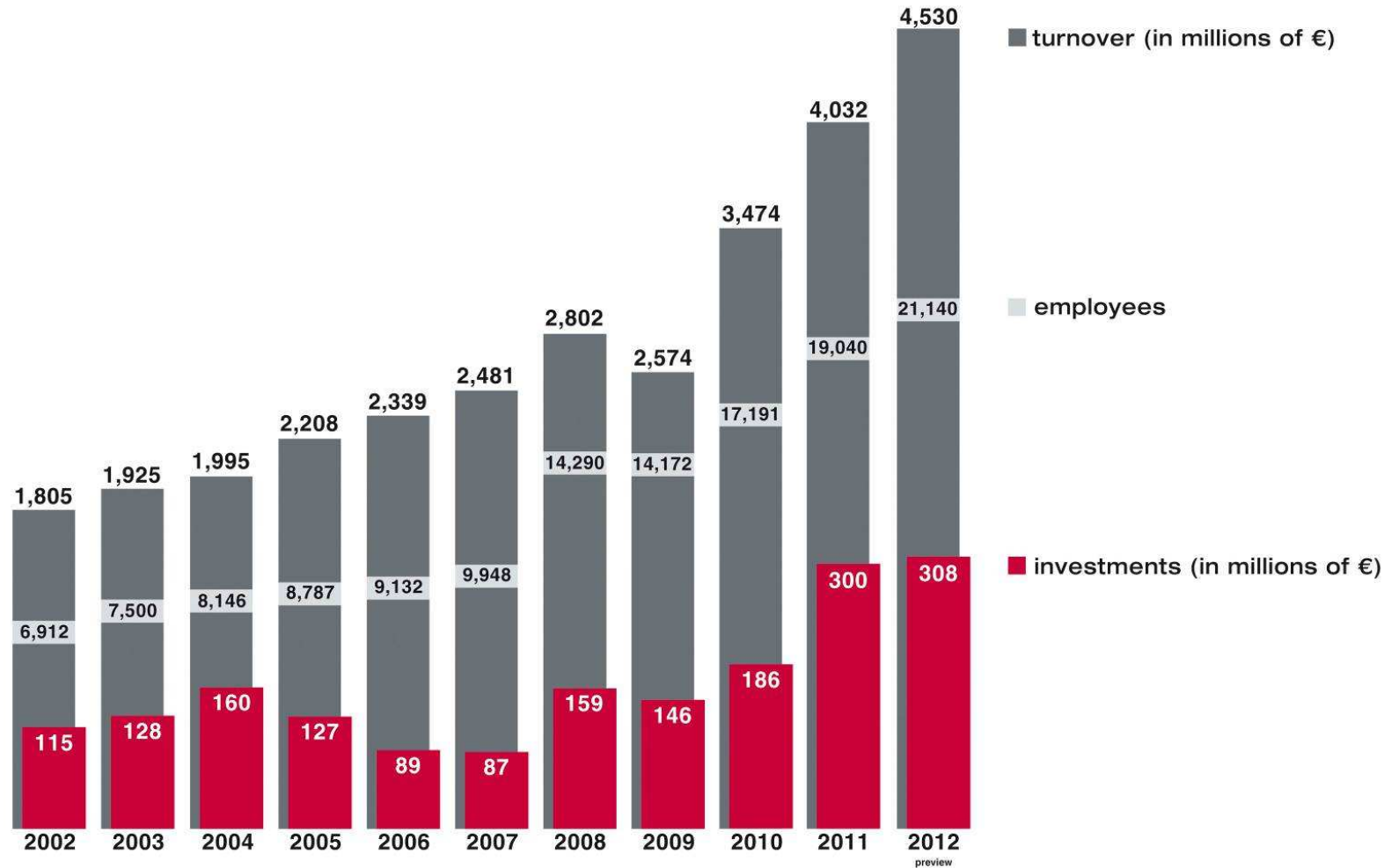★ Headquarters    ● Engineering/Sales    ■ Production/Plants    ■ Set-up/expansion stage    ▲ Joint venture/Affiliated company    *incl. South Africa

# Business development
## Continuous self-generated growth

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# Brose CAE - Teams and locations



America
- ● Detroit

Germany
- ★ Oldenburg
- ★ Wuppertal
- ★ Coburg
- ★ Hallstadt
- Würzburg ★

Asia
- ● Shanghai
- ● Pune

★ CAE - Team and center of competence "Crash"
★ CAE - Team and center of competence "FEA"
★ CAE - Team and center of competence "CFD"
★ CAE - Team and center of competence "MBS"
★ CAE - Team and center of competence "EMAG"
● CAE - Key User
● CAE - Team and simulation services
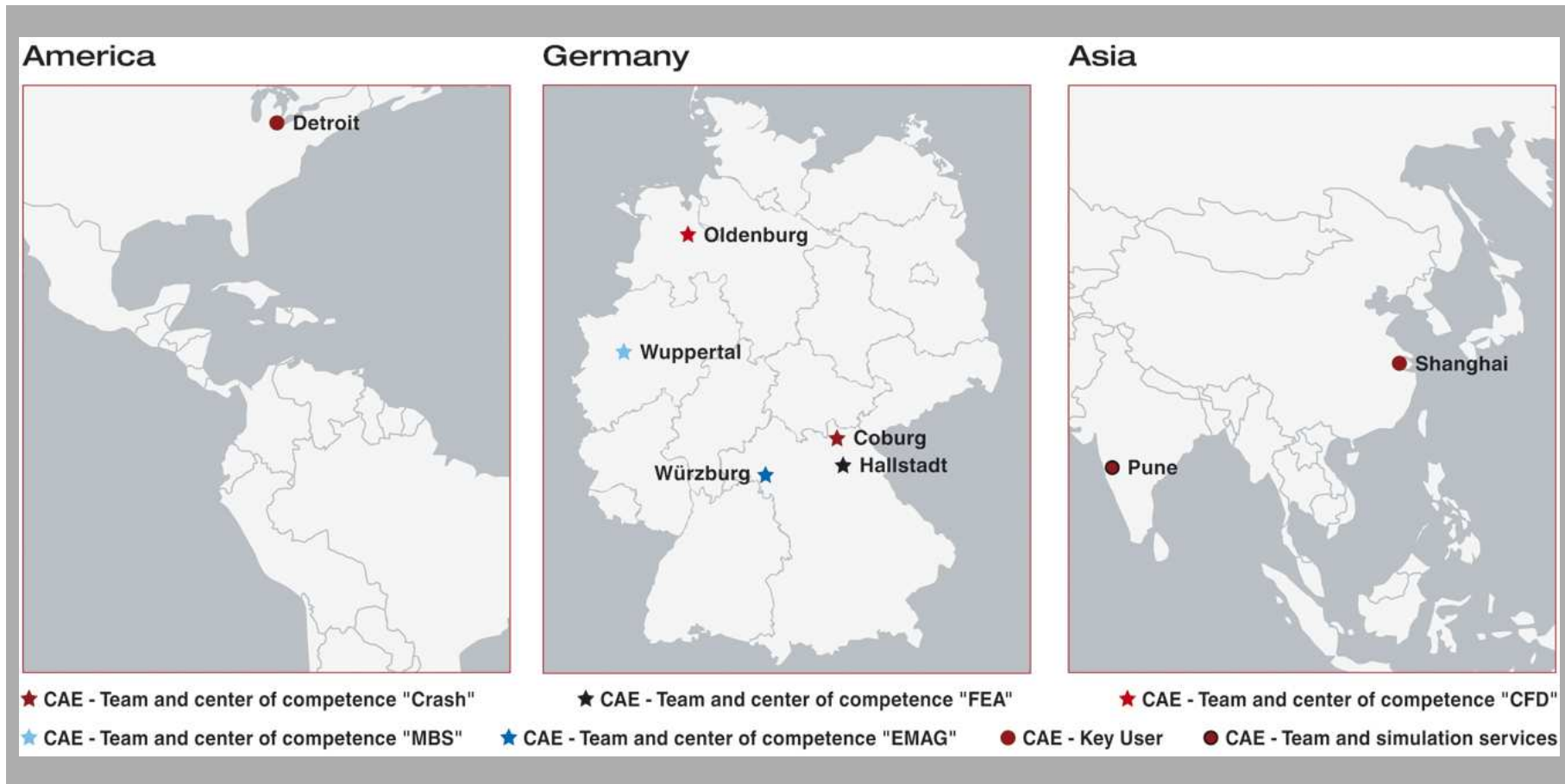
# Brose CAE – key methods

## Brose CAE key methods

| function-oriented simulation | design-oriented simulation | environment-oriented simulation | manufacturing-oriented simulation |
|---|---|---|---|
| - system simulation<br><br>- multybody simulation<br><br>- analytical methods | - structural and mechanical analysis<br><br>- crash simulation<br><br>- electromagnetics (3D) | - fluid dynamics<br><br>- airborne sound | - molding simulation<br><br>- forming simulation<br><br>- statistical tolerance analysis |

fluid – structure - coupling

multibody – hybrid simulation

integrative simulation

# Brose CAE – compute ressources
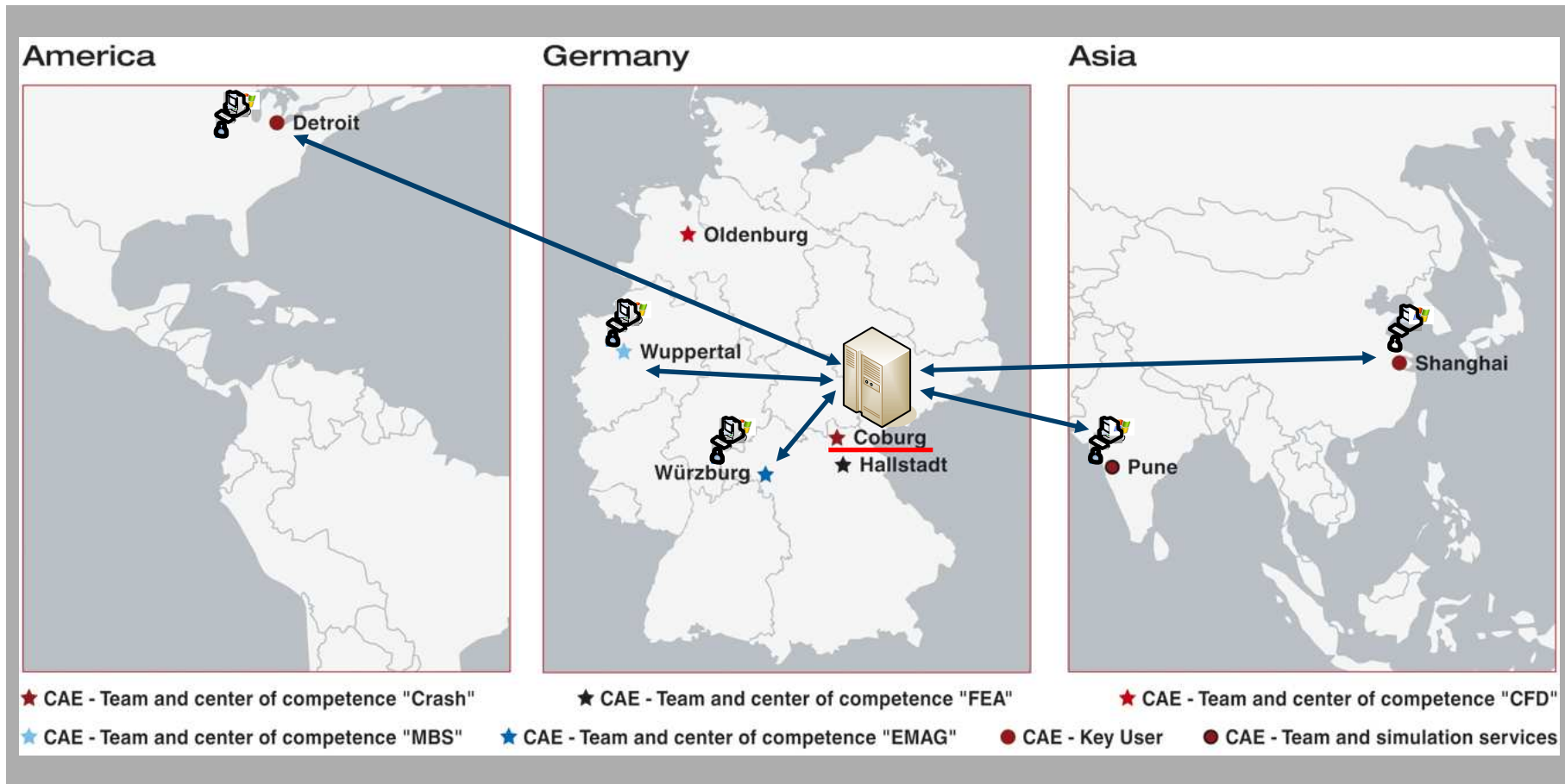
# Brose CAE – worldwide collaboration
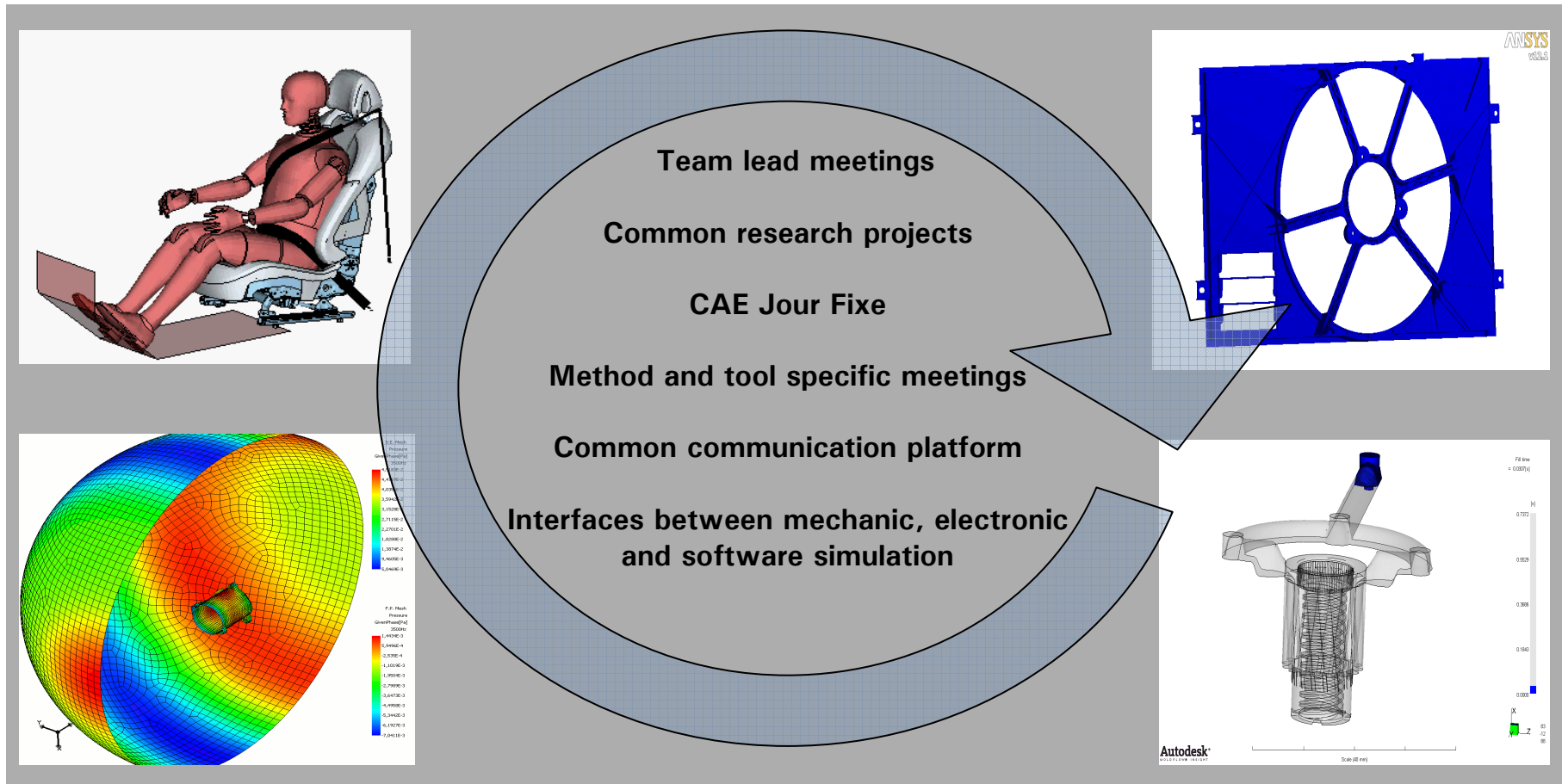
**Team lead meetings**

**Common research projects**

**CAE Jour Fixe**

**Method and tool specific meetings**

**Common communication platform**

**Interfaces between mechanic, electronic and software simulation**

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# Brose CAE – product development process



Release 0 | Release 1 | Release 2

Preparation → Acquisition → Concept-validation → Product- & Process-development → Product- & Process-realization → Ramp UP → Production → Service Parts

design / product development

virtual test / simulation

physical test
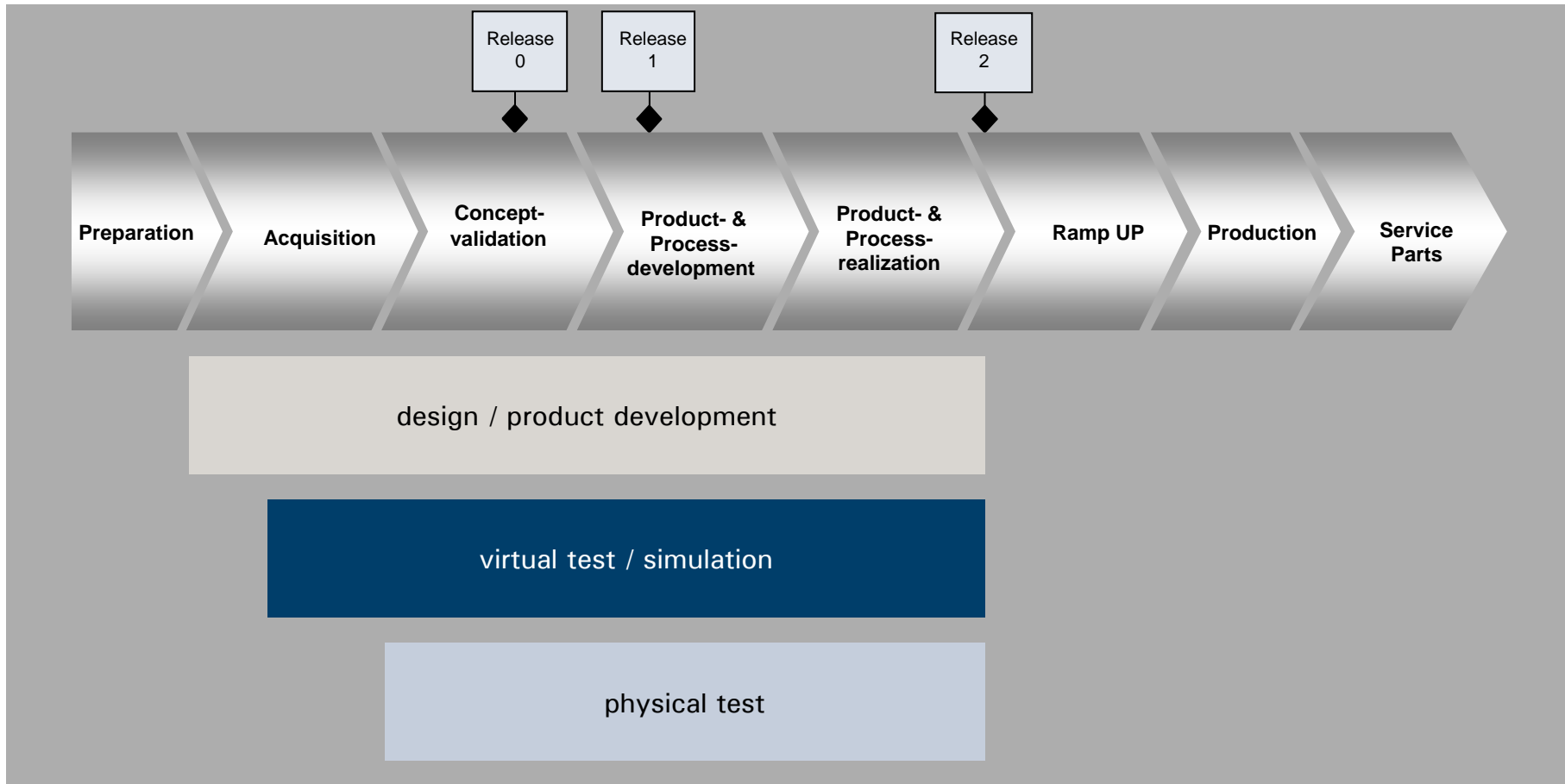
# Brose CAE – target product development process
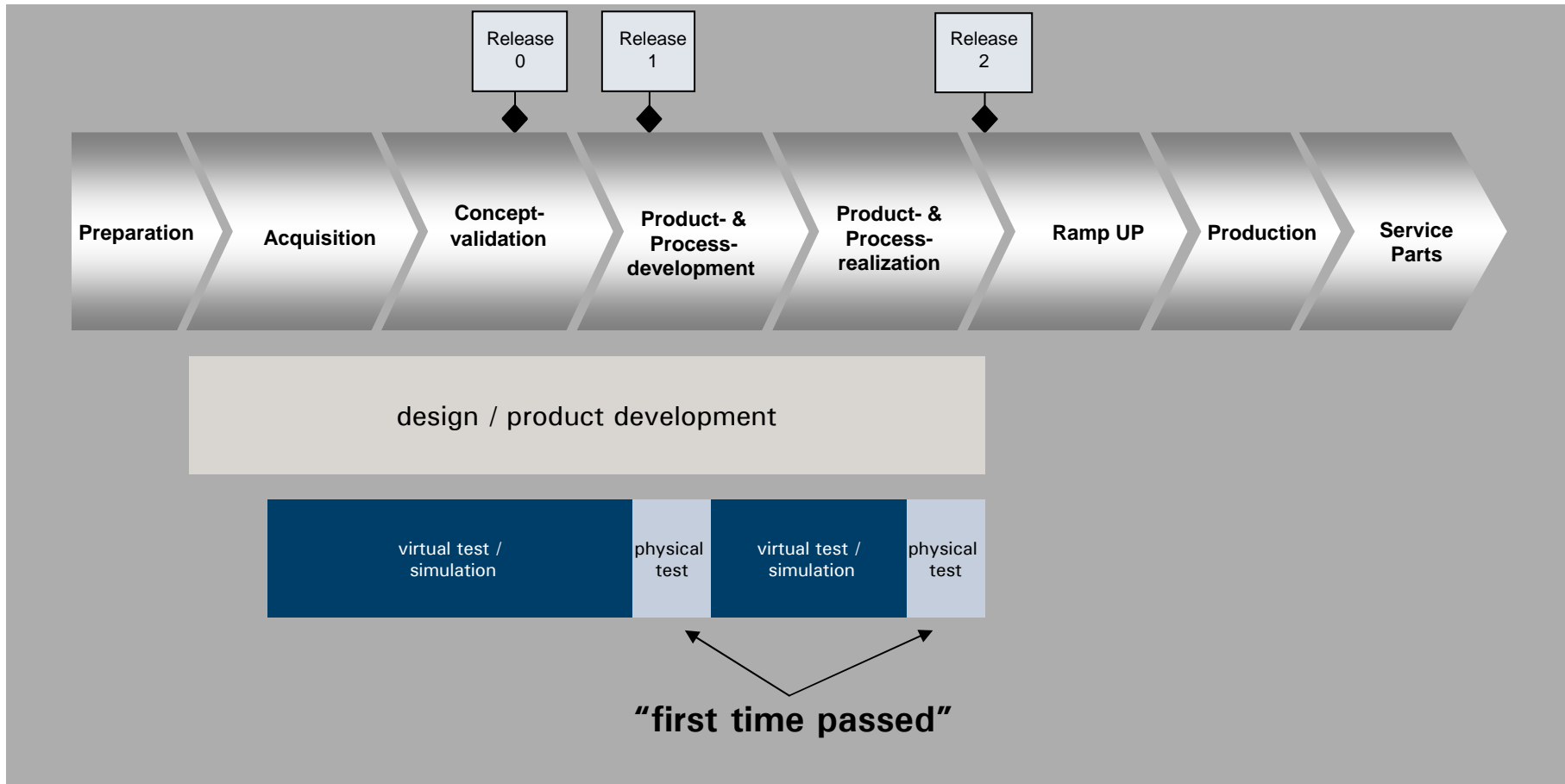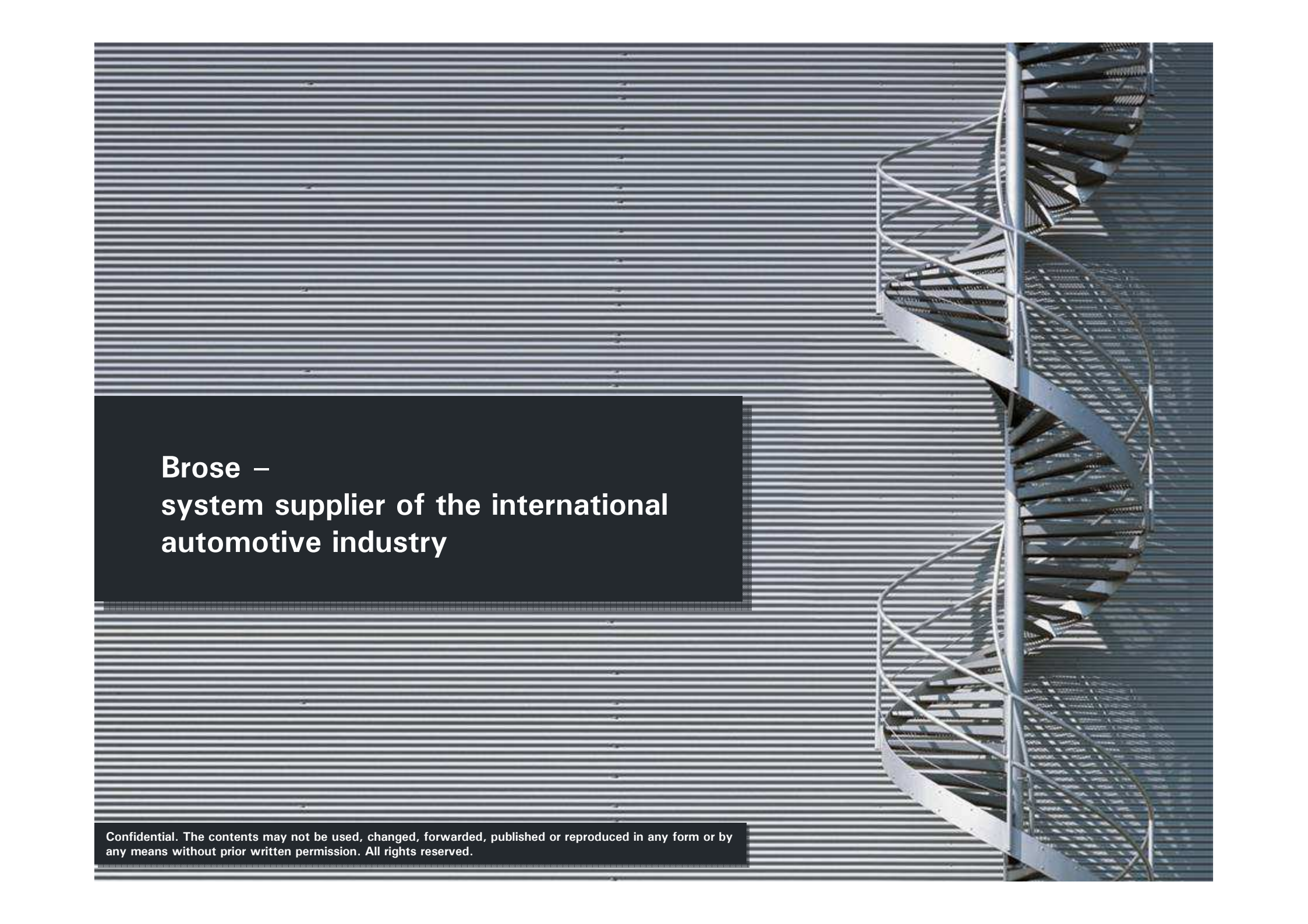


Release 0 | Release 1 | Release 2

Preparation | Acquisition | Concept-validation | Product- & Process-development | Product- & Process-realization | Ramp UP | Production | Service Parts

design / product development

virtual test / simulation | physical test | virtual test / simulation | physical test

"first time passed"

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# Brose CAE – Global Services India



**Global Services**

**Engineering Services**

| Design | Electronics | Simulation | Purchase | Information Technology | Corporate Strategy |
|---|---|---|---|---|---|
| • Design activities for Doors, Drives, Latches and Seats (CATIA)<br>• Tolerance Calculations (3DCS) | • Software Process<br>• Application Software<br>• Basic Software<br>• Hardware<br>• Testing<br>• Project Management | • Analysis activities for Doors, Drives (ANSYS) Latches and Seats (ANSA and LS-Dyna)<br>• Linear and Non-linear<br>• Static, Quasi-static and Dynamic<br>• Durability and Crash | • Purchase<br>• Global Sourcing<br>• Supplier Development | • IT support activities<br>• ABAP development<br>• SAP Support | • Market Research |

**supporting Development, Purchase, IT and Corporate strategy activities for global and local programs.**

# Brose CAE – process for LCC simulation request

**Brose - internal costumer**

Simulation request → 

Simulation results and recommendation ↑

**responsible German simulation team**

**Brose global services India**

Request, Project details, boundary condition, expected result and date of delivery

Proposal date of delivery

Approval

result delivery

quality release

feedback

# Brose –
# system supplier of the international automotive industry