



# DYNAmore GmbH LS-DYNA

Informationstag: Menschmodelle – Überblick und  
Erweiterungsmöglichkeiten

Stuttgart, 8. März 2013

# DYNAmore - The Company

## ■ Countries and Main Offices

- Germany - headquarters in Stuttgart
- Sweden – headquarters in Linköping
- Switzerland – headquarters in Zurich

## ■ Further Offices

- Ingolstadt
- Dresden
- Langlingen (Wolfsburg)
- Berlin
- Gothenburg

## ■ On-site Offices

- Sindelfingen
- Untertürkheim
- Weissach
- Ingolstadt
- Gothenburg



Stuttgart [Headquarters]

# DYNAmore – The People

## ■ Who we are

- In total 80 people
- Civil and mechanical engineers, mathematicians, computer scientists,...
- The employees are from 13 different countries
- The percentage of female staff is above 25 %
- The fluctuation of employees is below 2%
- The company is financially stable since its foundation



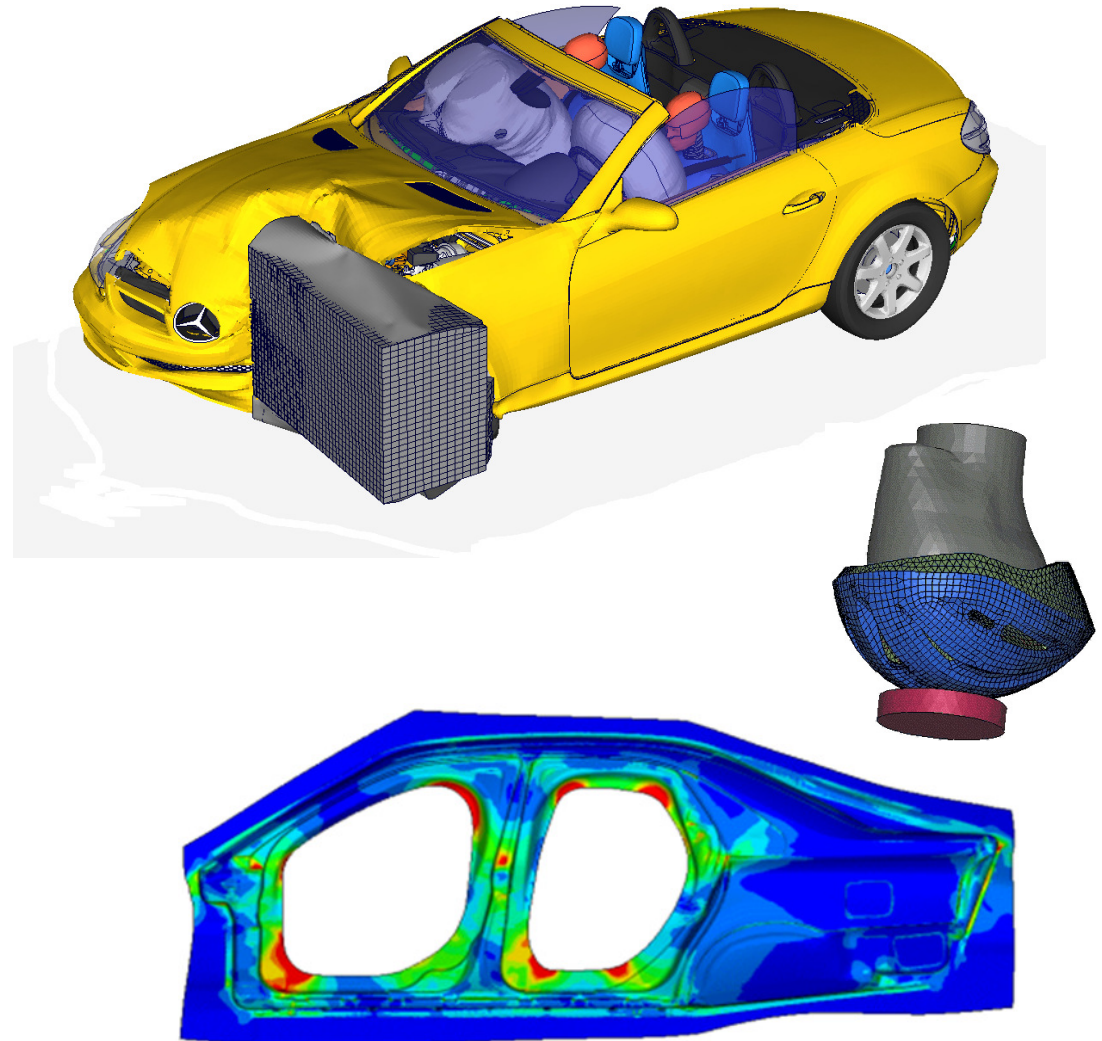
# DYNAmore - The Products

## ■ Software

- LS-DYNA
- LS-OPT und LS-TASC
- LS-PrePost
- eta/DYNAFORM
- FEMZIP
- Digimat

## ■ Models

- FAT/PDB dummy models
- Humanetics dummy models
- THUMS human model
- Arup barrier and impactor models
- Daimler/Porsche impactor models
- LSTC models



# DYNAmore - The Services

## ■ Software

- European master distributor for LSTC (w/o UK and France)
- about 10000 maintained LS-DYNA licenses

## ■ Engineering

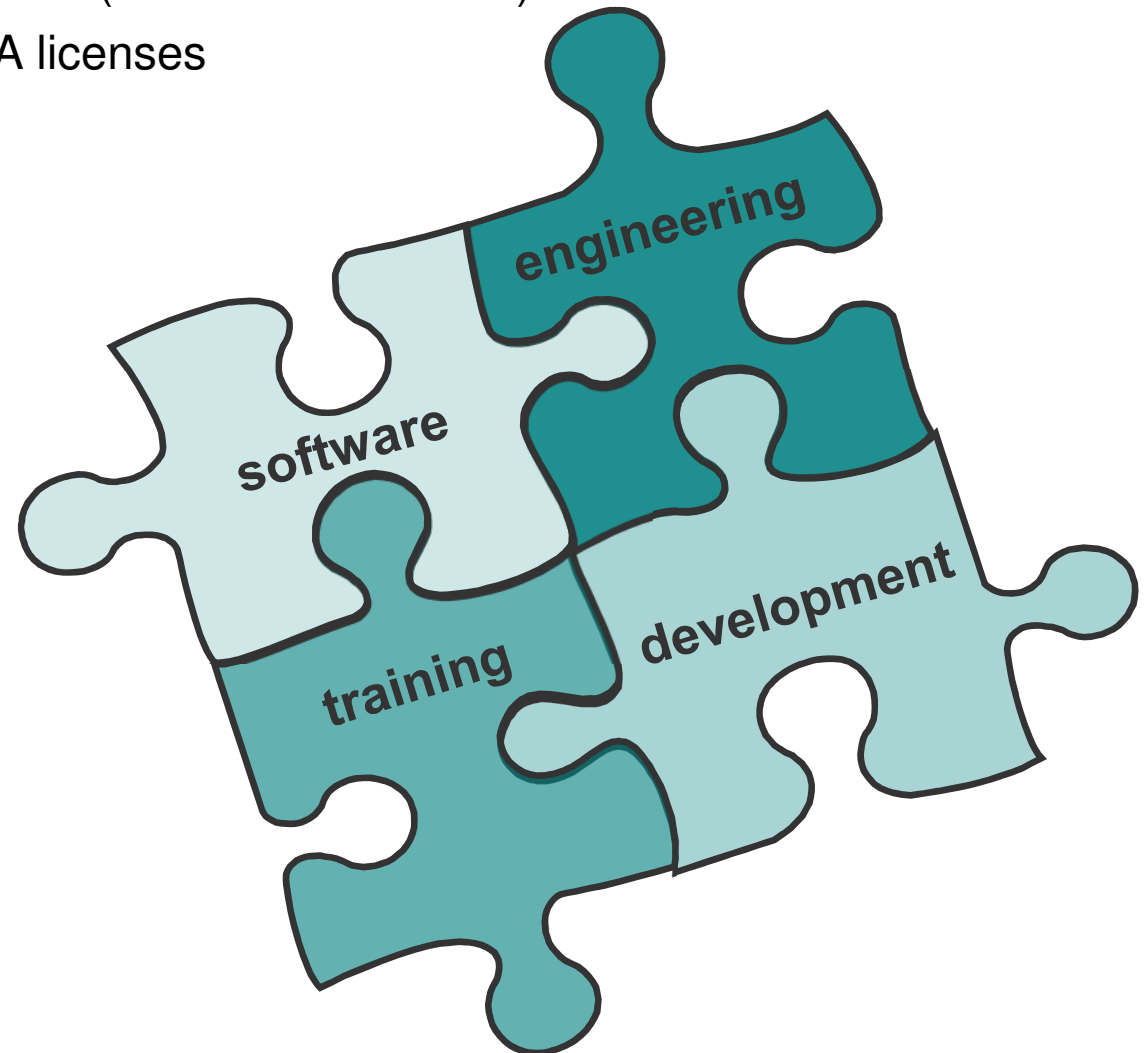
- Benchmarking
- Pilot projects
- On-site engineering
- Consulting

## ■ Development

- Dummy models
- Material models
- Method development

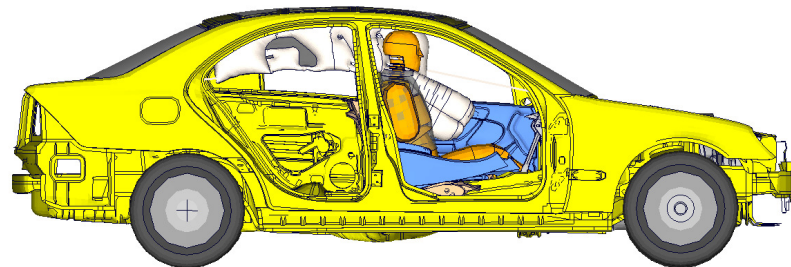
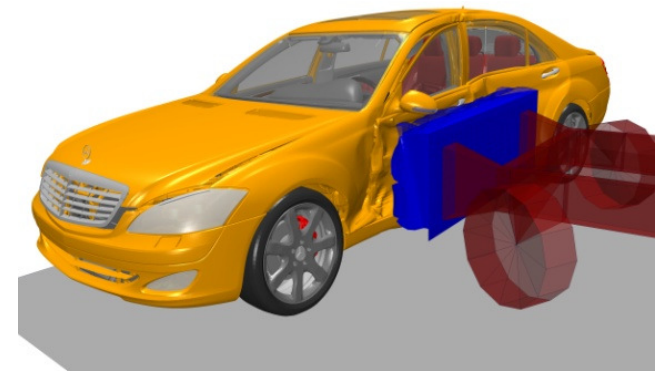
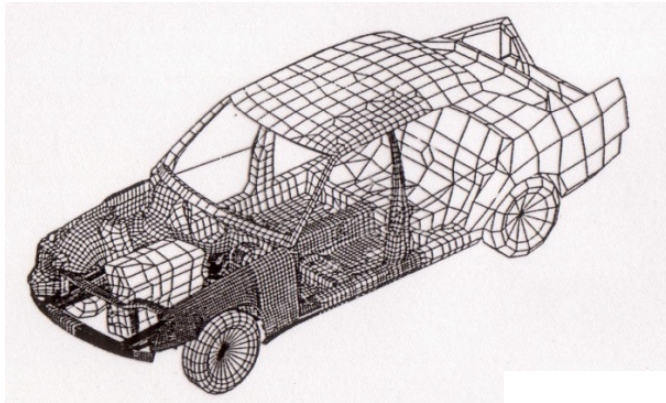
## ■ Training

- Seminars
- Conferences
- Coaching on site



# History of LS-DYNA and DYNAmore

- 1976: John Hallquist develops DYNA3D at Livermore Laboratories
- 1988: John Hallquist founds LSTC, DYNA3D becomes LS-DYNA3D
- 1988: Prof. Schweizerhof + co-workers start with crash simulations in Germany
- 2001: DYNAmore is founded
- 2011: DYNAmore acquires ERAB Nordic,
- 2011: DYNAmore assigned as master distributor



# Human Models

## ■ Based on Multi-Body Systems

- Easy to set up
- Numerically cheap
- No field functions (stress, strain, etc.)
- Usually no failure prediction possible



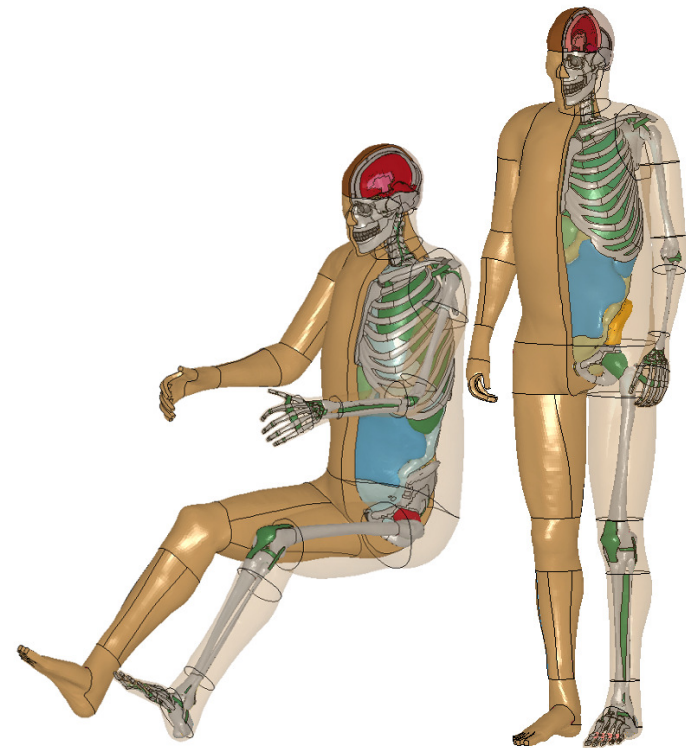
[[www.tass-safe.com](http://www.tass-safe.com)]



[[www.anybody.com](http://www.anybody.com)]

## ■ Based on Finite-Element Systems

- Difficult to set up
- Numerically expensive
- Includes field functions
- Failure prediction under research



[THUMS® [www.dynamore.de](http://www.dynamore.de)]

# Include Skeletal Muscles

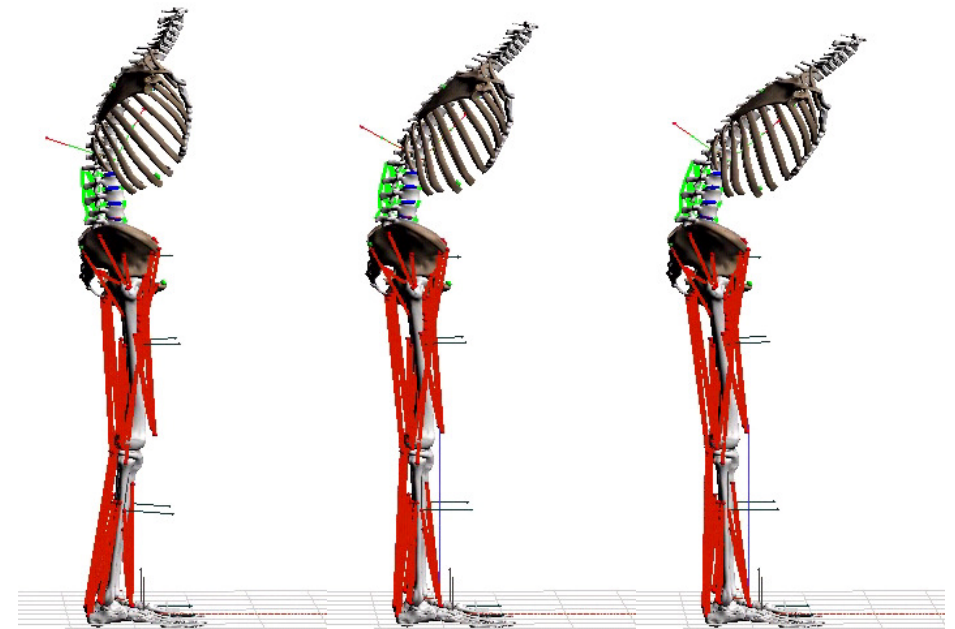
## ■ Possibility to Impose Movement

- Inverse kinematics
  - motion is captured and prescribed
  - muscle forces are computed as a reaction due to the imposed movement



- Forward kinematics
  - muscle forces are measured and prescribed
  - motion is computed

- Posture and motion prediction
  - forces and motion are unknown
  - control theory used to predict muscle forces
  - motion is computed



[ Courtesy Prof. Syn Schmitt]



# Overview of Today's Talks

- THUMS and its Current Applications
  - Vorstellung der THUMS Menschmodelle
    - D. Fressmann (DYNAmore)
  - Anwendung des FE-Menschmodells THUMS-D im automobilen Umfeld
    - A. Öztürk (Daimler AG)
  - Passive Muskeleigenschaften für Menschmodelle in der Crashsimulation
    - K. Zhou (LMU München), S. Peldschus (Campus Tuttlingen/ HS Furtwangen)
- Extension Possibilities for Muscle Activation
  - Aktive Muskelansteuerung des THUMS mit dem Co-Simulationstool ICOS
    - T. Steidl (Kompetenzzentrum Das virtuelle Fahrzeug Forschungsges. mbH)
  - Aktive Muskelmodellierung an der Schnittstelle von Mehrkörper- und Kontinuumsmechanik
    - O. Röhrle, S. Schmitt (Exzellenzcluster SimTech, Universität Stuttgart)