



23. FORUM

# GEHEIMNISSE IM RODGAU-DUDENHOFENER WALD

## DIGITALE FAHRZEUGE UND PHYSISCHES TESTEN?

VORTRAG

»Fahrwerksent. im Wandel: Globale Herausforderungen lokal adaptiert im multifunkt. Testcenter«

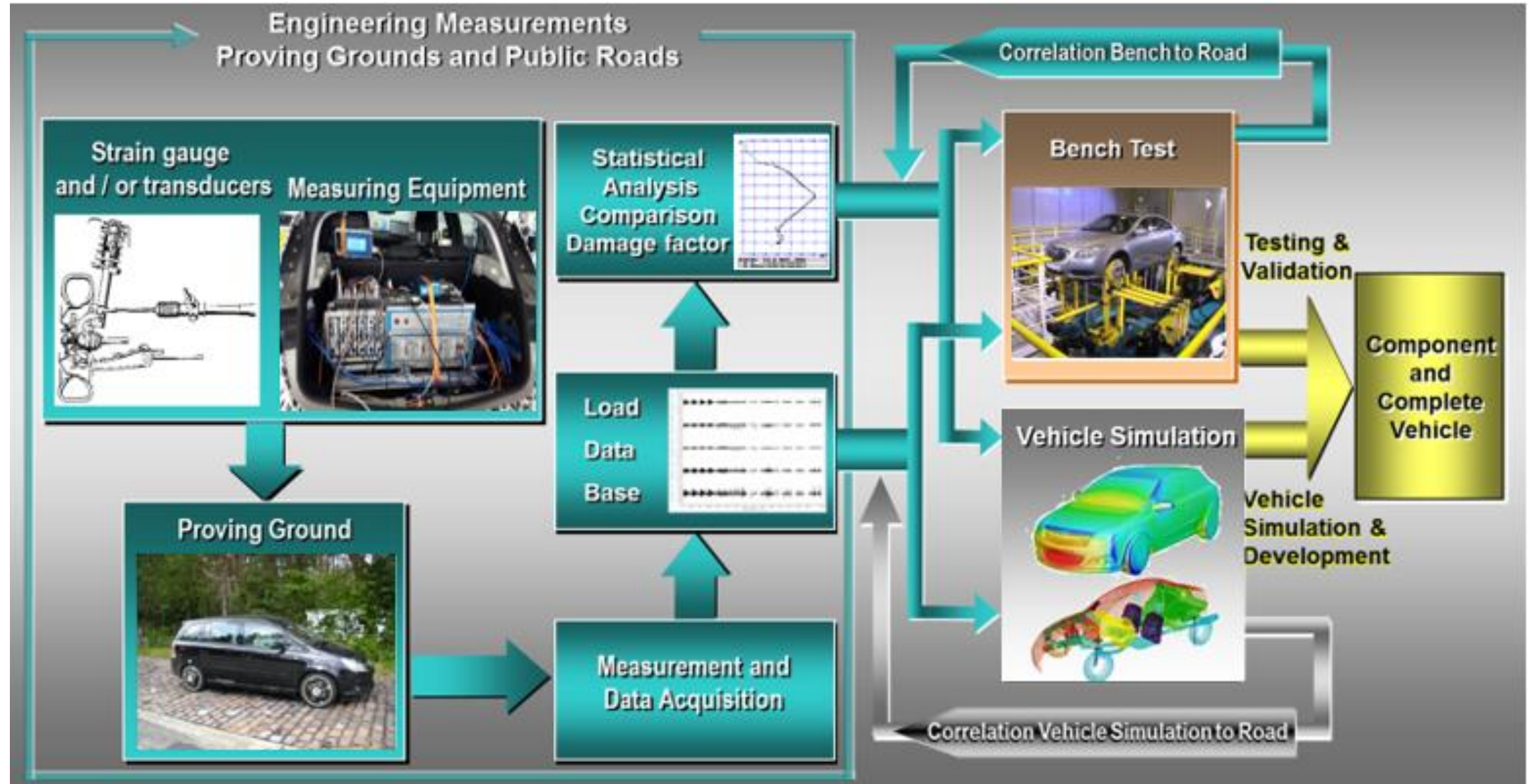
Frank Braunroth (SEGULA Technologies / Technical Lead CAE & Virtual Validation)

AUTOMOTIVE  
CLUSTER Rhein  
Main  
Neckar  
WIR BEWEGEN DEUTSCHLAND

 **SEGULA**  
TECHNOLOGIES

# TESTCENTER RODGAU-DUDENHOFEN

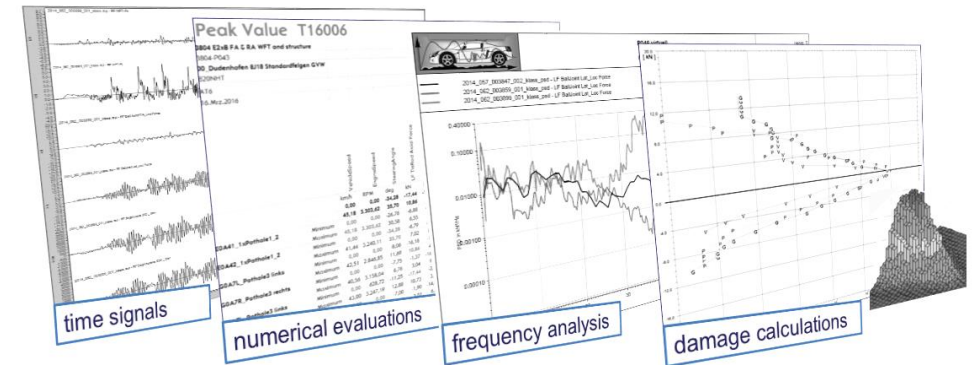
From ROAD to LAB to MATH, TRADITIONAL CONCEPT



# TESTCENTER RODGAU-DUDENHOFEN

From ROAD to LAB to MATH

- Vehicle Instrumentation and Calibration
- Durability Program RLDA & Analysis
- Correlation Activities Road to Lab to Math
- Virtual Product Development / CAE



### Road Load Data Acquisition

- Measurement of Data on Proving Grounds/ Public Roads
- Data Measurement for Vehicle Dimensioning and Testing
- Load Data for Simulation Models and their Validation
- Load Data for Failure Analysis, Stress Analysis
- Strain Gauge Applications (instrumentation & calibration)
- Instrumentation of serial or modified parts
- Specific Sensor Development & Vehicle Integration
- Sensor Calibration

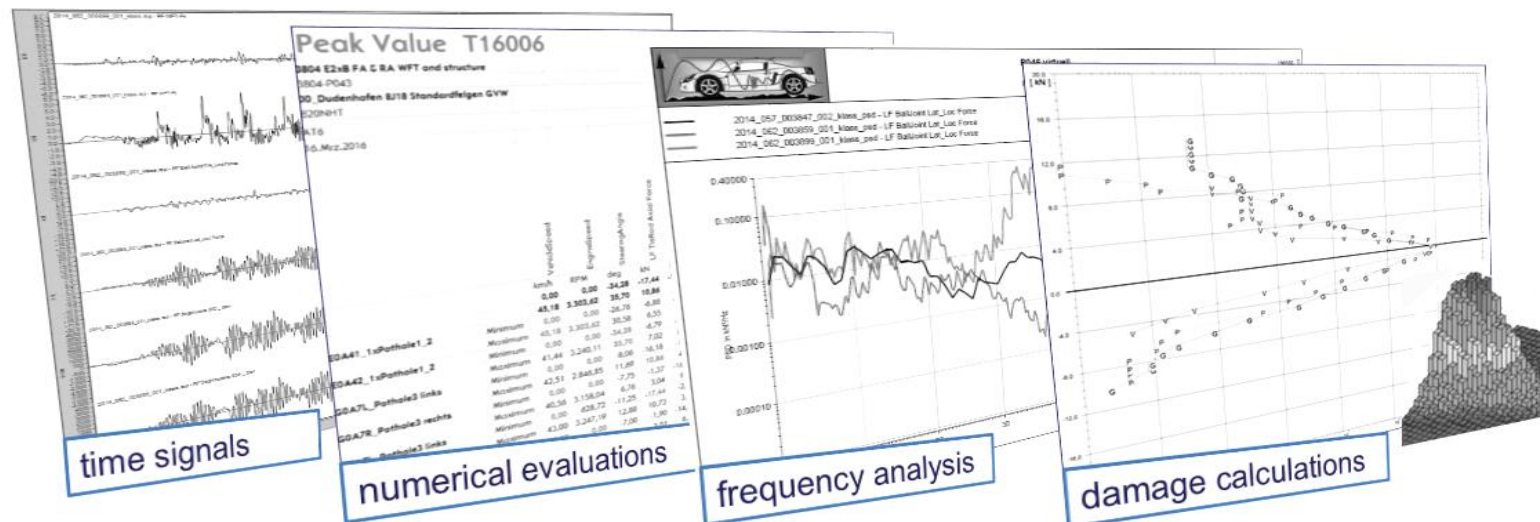
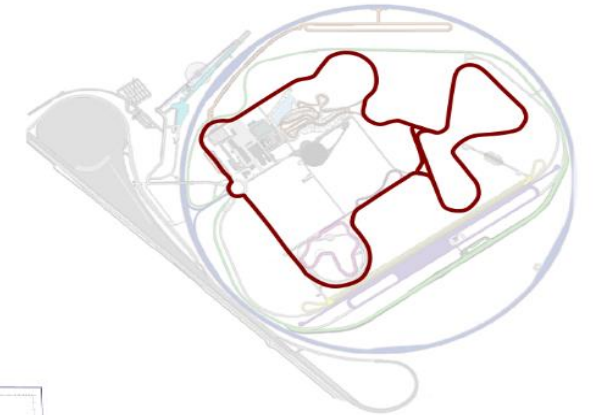
### Equipment

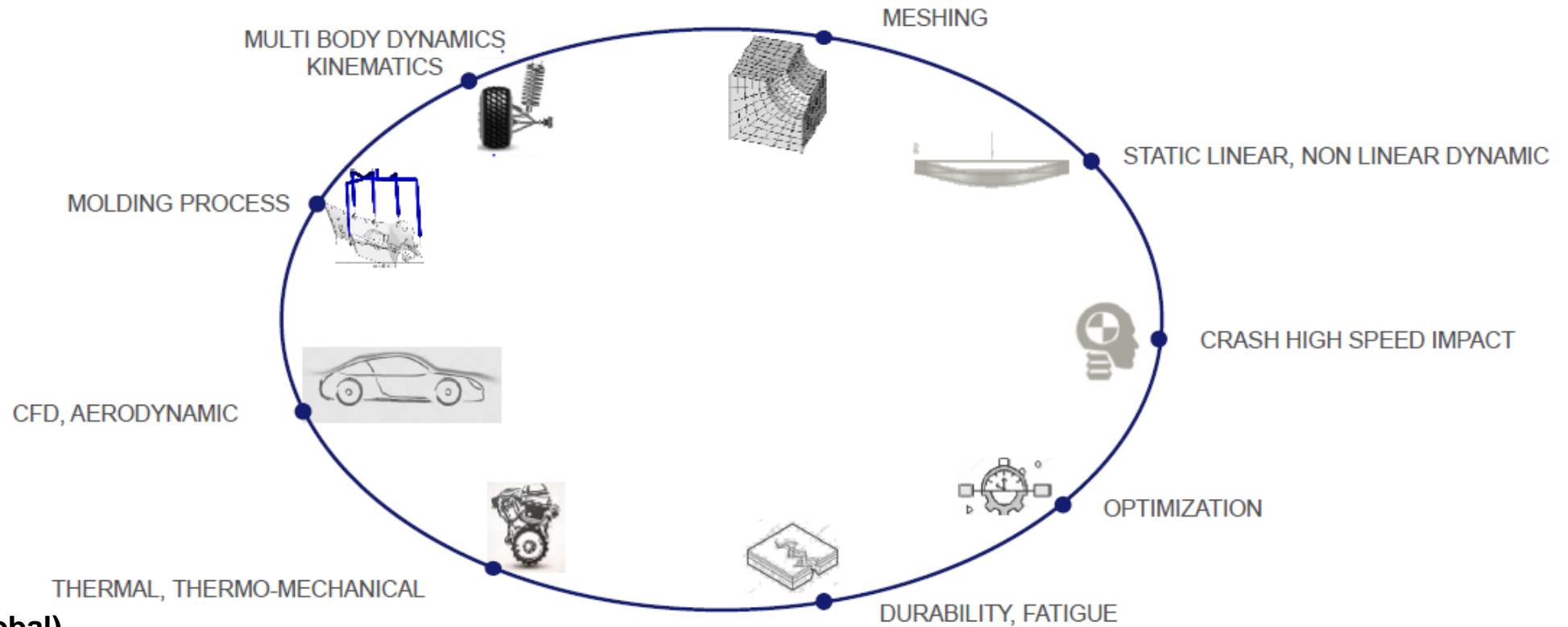
- Wheel Force Transducer, Accelerometers
- Displacement Sensors, Load Cells
- Telemetric Systems
- Thermocouples
- Angle Sensors
- GPS



### Durability Program Development

- Damage based Durability Program Calculation
- Measurements with Correlation Vehicles
- Correlation of different Proving Grounds
- Correlation of Customer Tracks
- Cooperation with other Proving Grounds



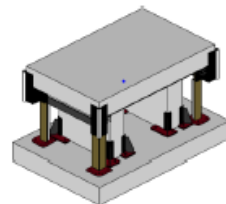


**Software (global)**

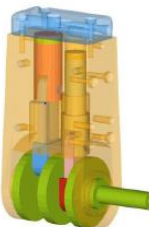
**Explicit**  
 PAMCRASH  
 Radioss  
 LS-Dyna  
 ABAQUS



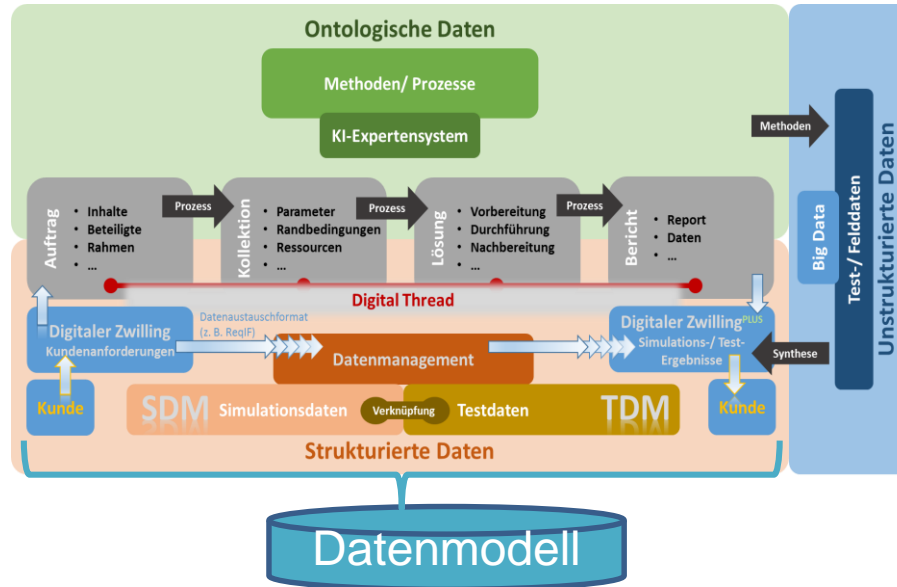
**Implicit**  
 ABAQUS  
 Nastran  
 Optistruct  
 ANSYS



**CFD**  
 Starccmp  
 Fluent  
 ACUSOLVE



### Eckdaten des Projekts



Entwicklungsplattform 4.0



### Projektlaufzeit:

01.06.2021 bis 31.05.2024

### Fördersumme:

2,42 Mio. €

### Ziel:

- Erschaffen einer Entwicklungsplattform, die virtuelle und physische Entwicklung als einen einheitlichen Gesamtprozess betrachtet mit gemeinsamer Methoden- Prozess- und Datenebene im SDM/TDM
- Einbindung von KI-Methoden anhand eines interdisziplinären Beispiels einer Temperatursensorentwicklung und Entwicklung eines Brennstoffzellenantriebs
- Behauptung im internationalen Wettbewerb, Effizienzsteigerung und Vertrauensbildung in Simulationsdaten

Gefördert durch:

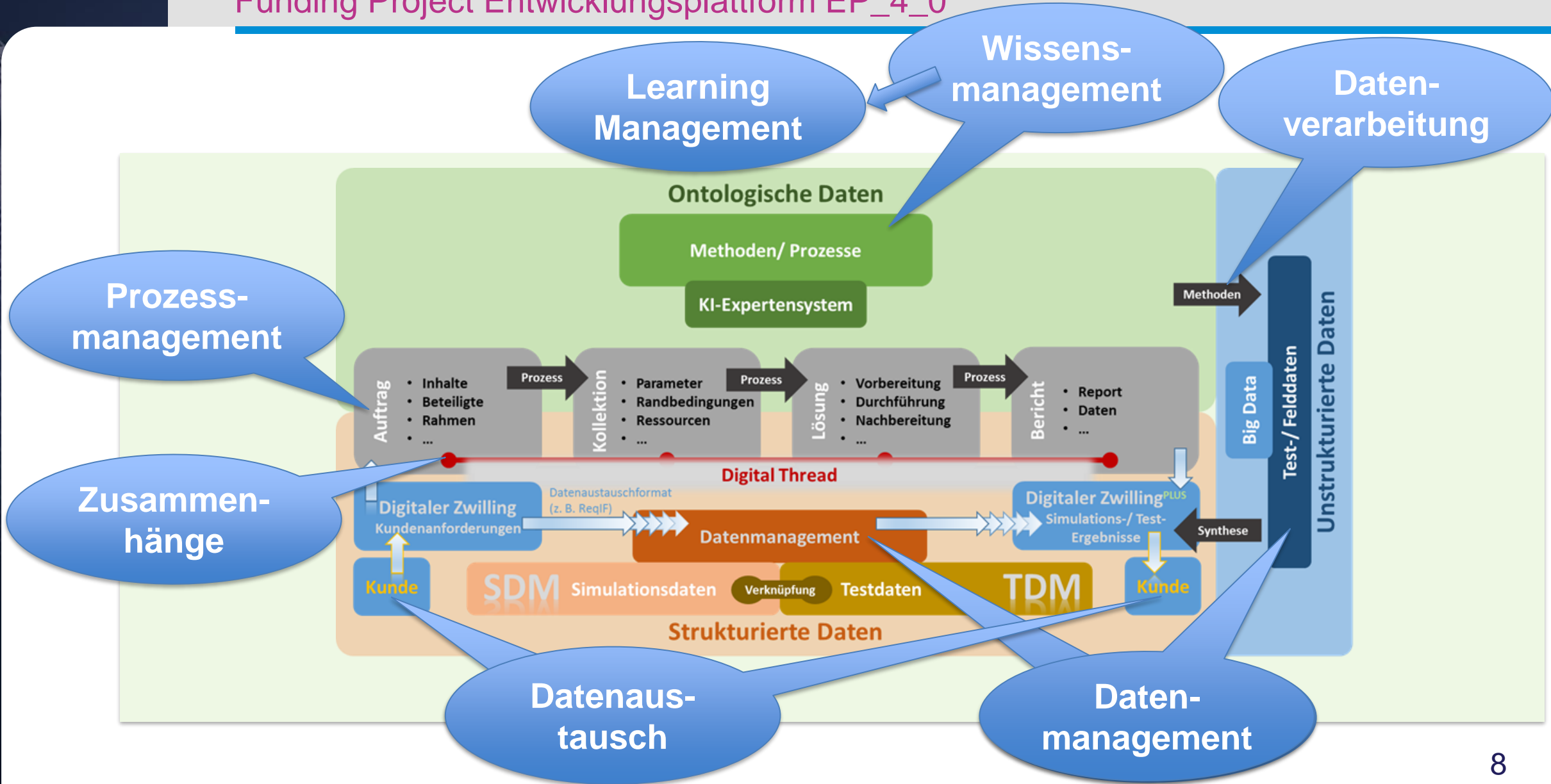


Bundesministerium für Wirtschaft und Energie

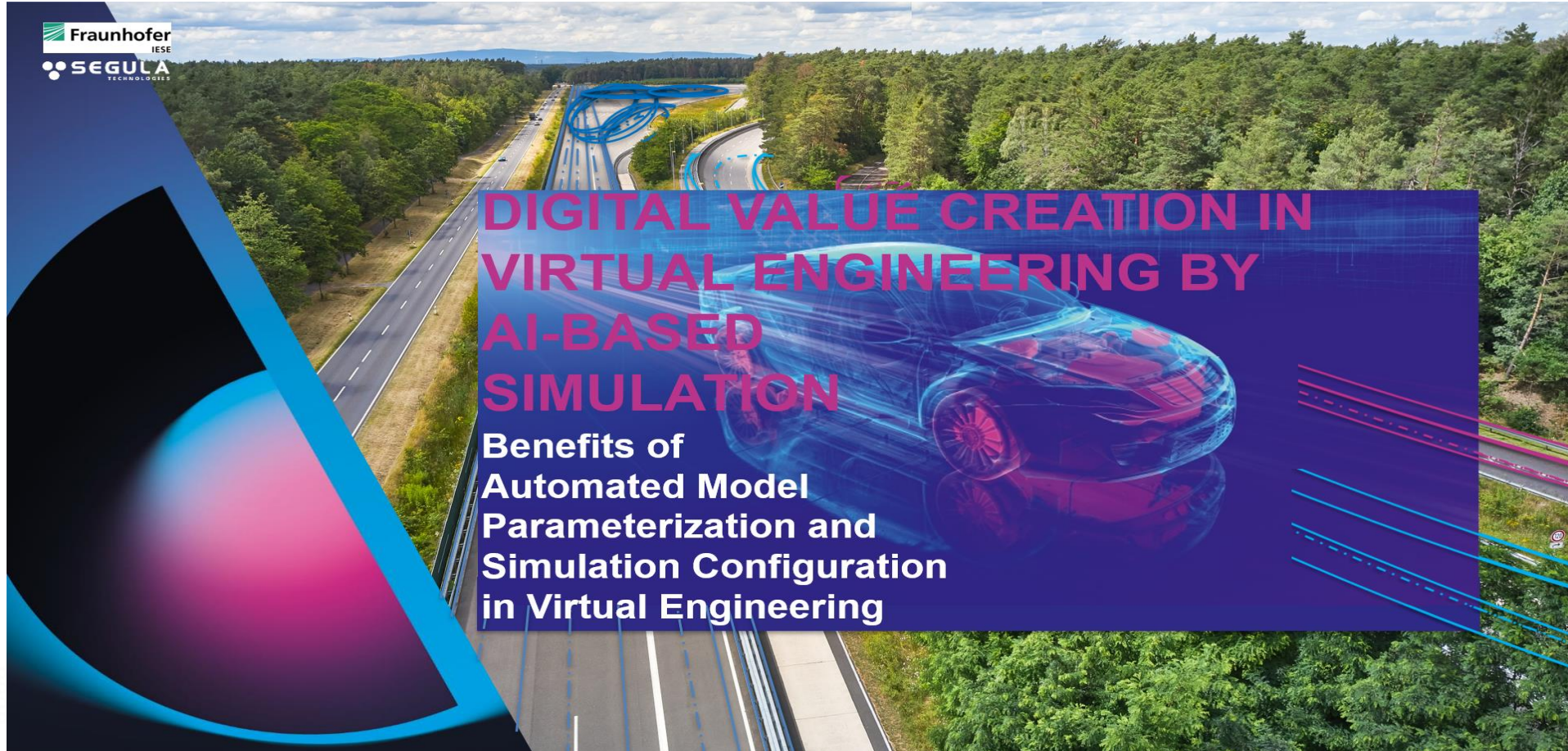
aufgrund eines Beschlusses des Deutschen Bundestages

# TESTCENTER RODGAU-DUDENHOFEN

Funding Project Entwicklungsplattform EP\_4\_0







Prostep ivip Symposium 2021 | May 05 - 06, 2021

### VIRTUAL TESTCENTER Rodgau/ Dudenhofen/ Digital Twin

#### 3-D Scanning on all relevant Testcenter Rodgau Tracks by

- Performing High Precision and High Resolution 3-D Scanning to provide Virtual Road Data
  - for Multibody & FEM Simulations
  - Driving Simulators
  - ADAS and Autonomous Driving



# TESTCENTER RODGAU-DUDENHOFEN

## ACCELERATED STRUCTURAL DURABILITY

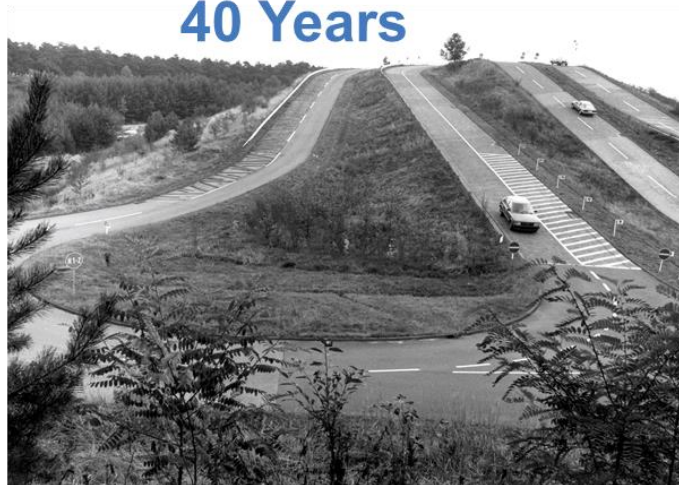
### DURABILITY PROGRAMM DEVELOPMENT

#### AUTOMOBILE CONCEPT - ACCELERATED STRUCTURAL DURABILITY

#### MANY YEARS EXPERIENCE

- Concept started in 1978
- Belgian Block Test established for Body-in-White and Chassis Components
- Continuously Improvements for more than

40 Years



### PURPOSE OF ACCELERATED DURABILITY TEST

- Accelerated Durability Test of the vehicle structure during development stage, delivering a rough durability result for body-in-white and chassis components in a very short time.
- Fast confirmation of the Virtual Development Process with the first running vehicle
- Possibility to run Test on Proving Ground or Multichannel Test Bench (6DOF)
- Test Mileage approx. 5000 km, 4- 5 Weeks Duration



### DURATION 4 TO 5 WEEKS

- Optimized Variety of Belgian Blocks, approx. 1700 km



### ■ Pothole Peak Loads



■ Body Twist (Ramp 16°, Twist Facility)



- Obstacles (Metall Barrieres, Speed Braker Variety)





### ■ Hill Route for lateral Loads

