

An aerial photograph of a lush green forest. A winding road curves through the trees on the left side. In the center, there is a large industrial or commercial building complex with several white roofs. To the right, a multi-lane highway runs parallel to the forest. The overall scene is a mix of nature and infrastructure.

23. FORUM

GEHEIMNISSE IM RODGAU-DUDENHOFENER WALD

DIGITALE FAHRZEUGE UND PHYSISCHES TESTEN?

VORSTELLUNG SEGULA TECHNOLOGIES GERMANY

Henning Fischer (Senior Manager Business Development / SEGULA Technologies)

AUTOMOTIVE
CLUSTER Rhein
Main
Neckar
WIR BEWEGEN DEUTSCHLAND

 **SEGULA**
TECHNOLOGIES

GLOBAL ENGINEERING GROUP

- 1985 FOUNDATION IN FRANCE
- 2011 START IN GERMANY
- 2019 CARVE OUT OF ITDC RÜSSELSHEIM
- 2019 OPERATION OF PROVING GROUND

GLOBAL

12 000
EMPLOYEES

30+
COUNTRIES

140+
BRANCHES

300+
CUSTOMERS

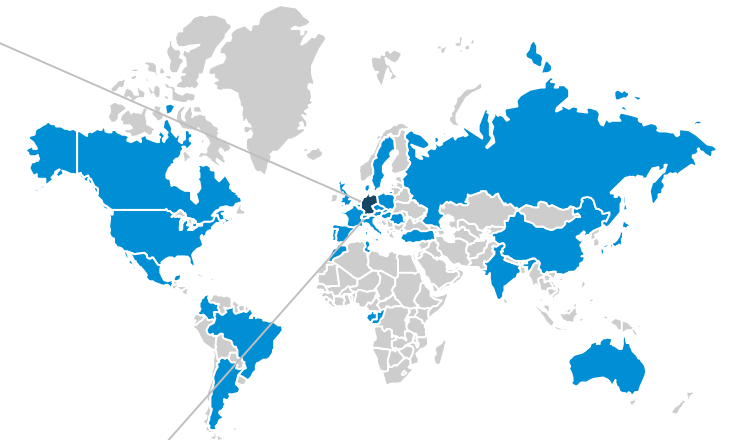
GERMANY

700
EMPLOYEES

8
BRANCHES

ENGINEERING & TESTING SERVICES

PROVING GROUND



ENVIRONMENT & ENERGY

- DIN EN ISO 14001:2015

INFORMATION SECURITY

TISAX
RESULT AVAILABLE

HEALTH & SAFETY

- DIN EN ISO 45001:2018
- CHAS (Contractors Health & Safety Assessment Scheme)

QUALITY

- DIN EN ISO 9001:2015
- Internal project, maturity, and risk management



WE THINK LIKE AN OEM AND ACT LIKE AN ESP

> 70%

Of our employees have decades of experience from globally operating automotive OEM's



Development, testing, validation, application experience in all global markets

100%

Independent player of the automotive industry

360°

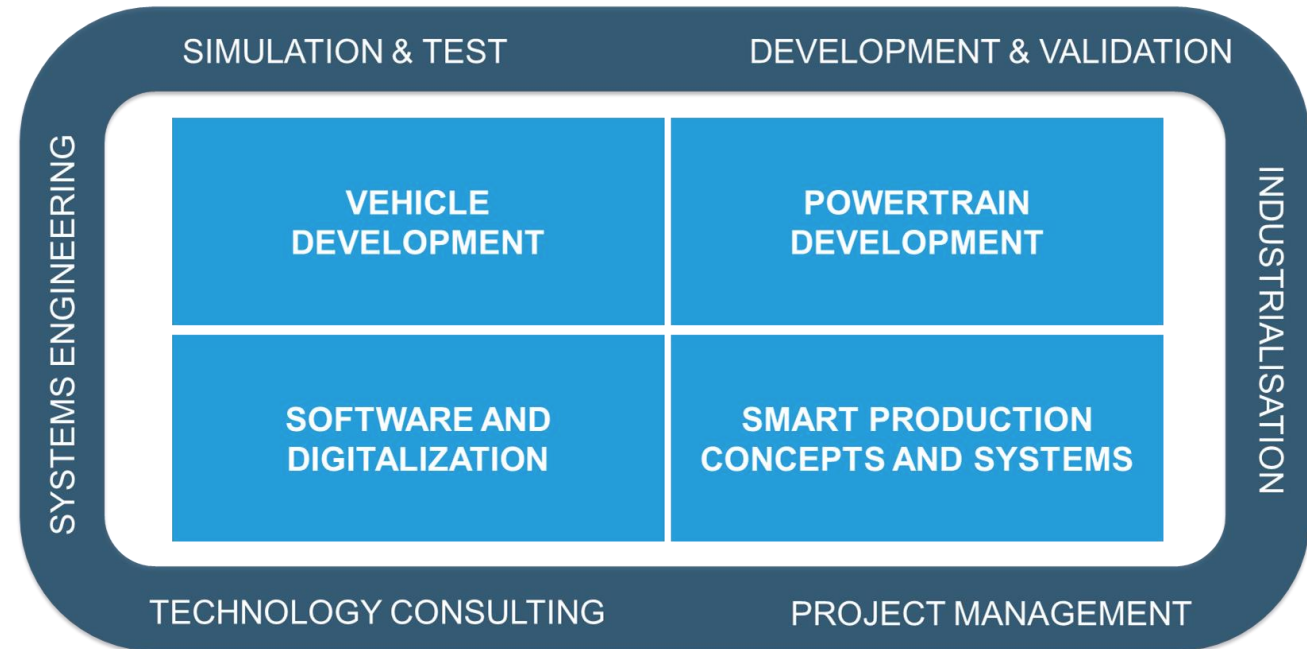
Competence portfolio:
Development, testing, validation, application under one roof



Cooperation with TÜV SÜD
One Stop Shop

**State-of the art
Facilities**

At OEM level
with OEM equipment



LOCATIONS

SEGULA Technologies
Major-Hirst-Straße 11
38442 Wolfsburg

SEGULA Technologies
Robert-Perthel Straße 77a
50739 Köln

ENGINEERING & TESTING
Rüsselsheim am Main



SEGULA Technologies
Zum Übergang 4
79312 Emmendingen

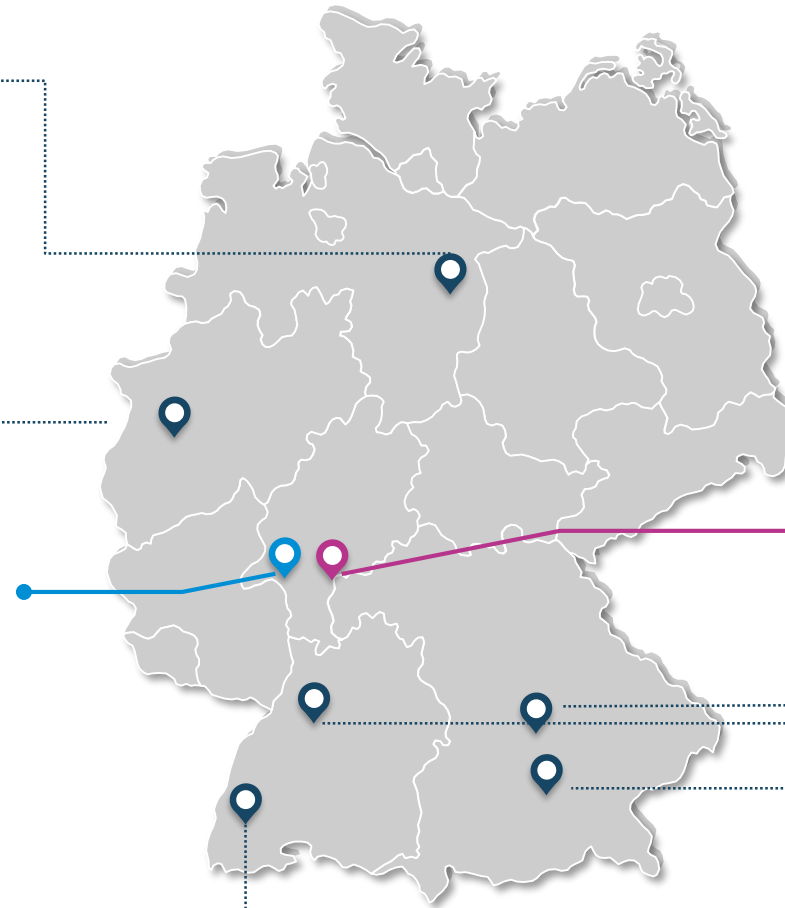
SEGULA Technologies
Alemannenstraße 9
71296 Heimsheim

SEGULA Technologies
Kopernikusstrasse 17a
85092 Kösching

SEGULA Technologies
Frankfurter Ring 129
80807 München



PROVING GROUND
Rodgau-Dudenhofen



RUESSELSHEIM SITE

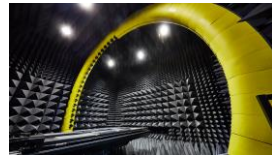
INSIGHTS INTO ENGINEERING & TESTING FACILITIES



NVH testing



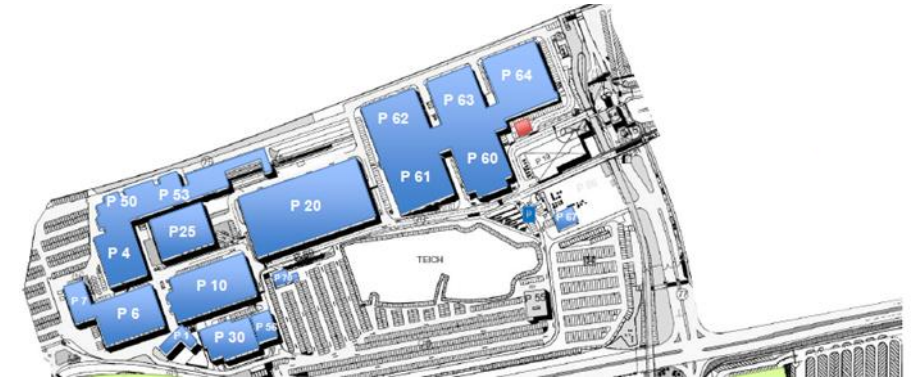
AUDIO testing



ANTENNA testing



EMC testing



CRASH testing



SLED testing



DUMMY lab



OCCUPANT SAFETY (FMH) testing



VEHICLE STRUCTURE (26ch) testing



KINEMATIC & COMPLIANCE testing



SEAT & COMPONENT testing



PEDESTRIAN PROTEC. testing



MULTI AXIAL SHAKER TABLES (MAST) testing



PWT DYNOS with CLIMATE chambers



VEHICLE CLIMATE chambers



Main ENGINEERING building

HIGHLIGHTS

Ca. 500

Employees for vehicle & powertrain development and testing

PWT development

Engine, transmission and fuel cell test benches for durability and performance testing

7500 m²

Prototyping, small series build & logistics

Vehicle testing facilities (excerpt):

- CRASH
- SLED
- PEDPRO
- OCCUPANT SAFETY
- COMPONENT

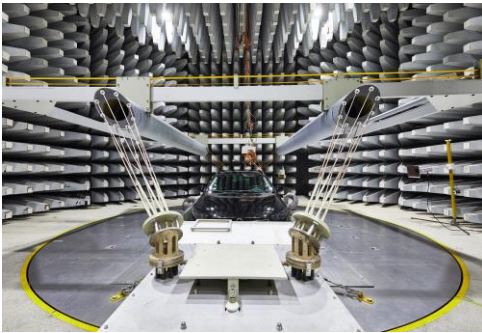
- DURABILITY
- KINEMATC

- NVH
- AUDIO / Handsfree

- EMC
- ANTENNA

Electromagnetic Compatibility (EMC)

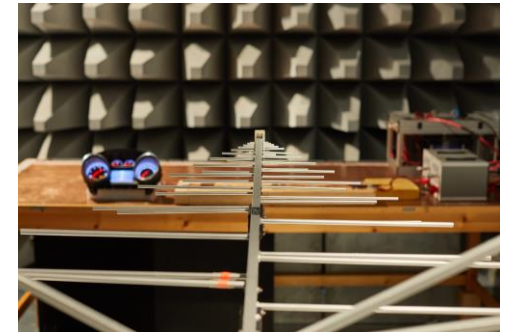
OVERVIEW



Semi anechoic chamber with vehicle turn table
Emission and immunity in 10 m distance



Semi anechoic chamber for vehicles
Emission received by onboard antennas



Semi anechoic chamber
Component and IEC



Transient test site
Power line disturbances in charging mode / ESD testing



EM-Field screened tent
Customer specific tests

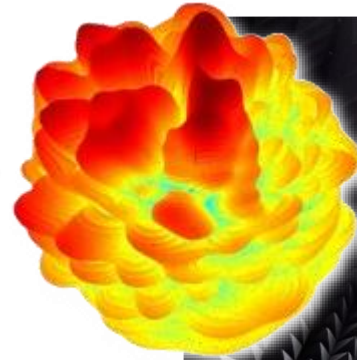


Control room

VEHICLE MEASUREMENTS PASSIVE – SEND AND RECEIVE

PERFORMANCE TESTING

- Antenna pattern & gain direction
Receiving & transmitting

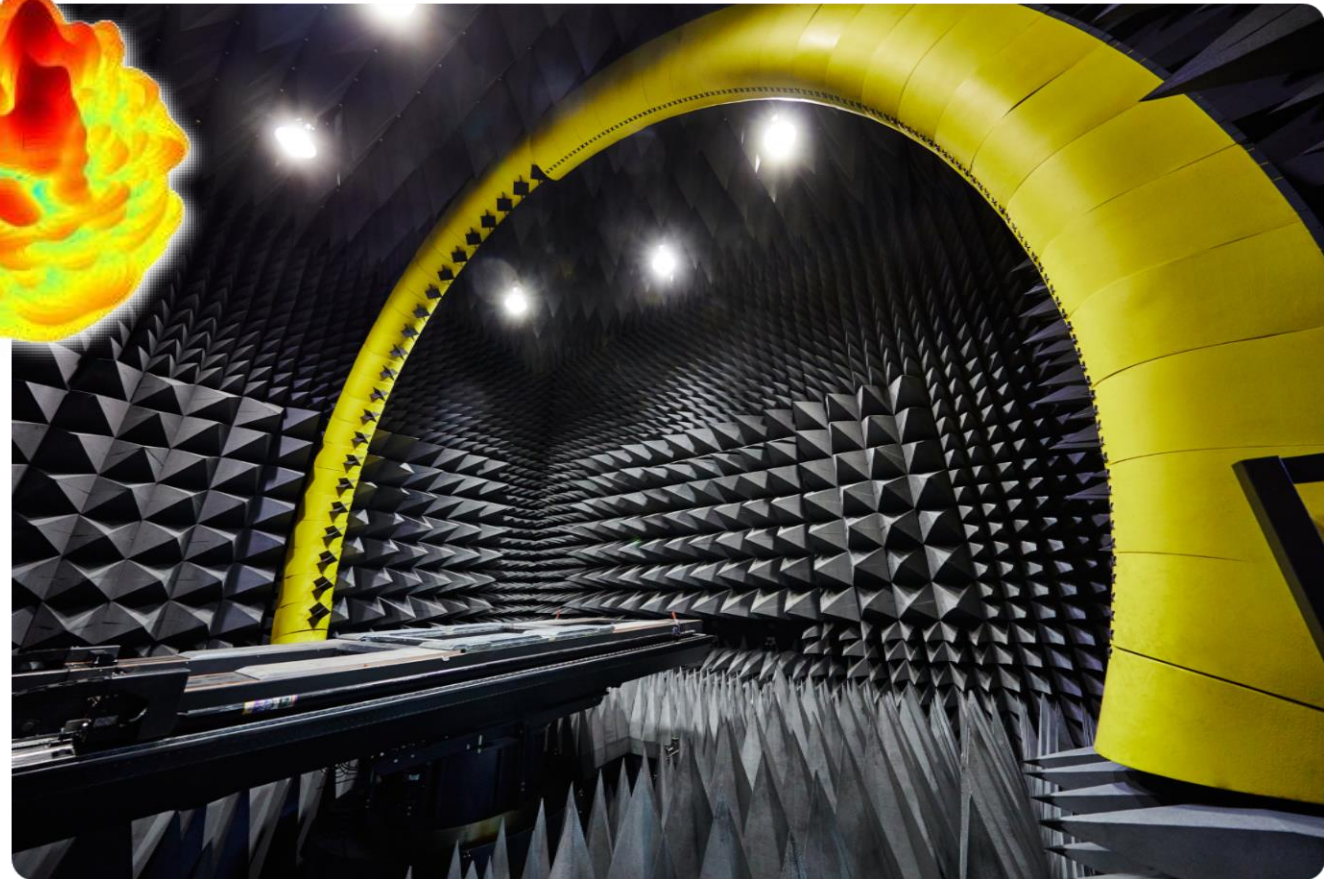


MEASUREMENT CAPABILITIES

- Antenna efficiency & diversity
- 2D & 3D radiation (linear & circular)
- FM, DAB, LTE, 5G, CAR TO X, etc
- GPS, Era-Glonass, Galileo & Baidu

FREQUENCY RANGE

- 70MHz to 6GHz



EXPERIENCE: APPLE, GOOGLE, QUALCOMM, SIERRA WIRELESS // CERTIFICATIONS: TISAX, ISO 9001, ISO 17025 (Q3/2023)

TELECOMMUNICATION

- Handsfree and e-Call
- Concept Studies & Validation
- Tuning of system parameters
- Bluetooth, Wired and Wi-Fi connections
- Apple CarPlay & Google Android
- Wakeup-Word and Speech Recognition
- 2G up to 5G network simulators
- Component testing

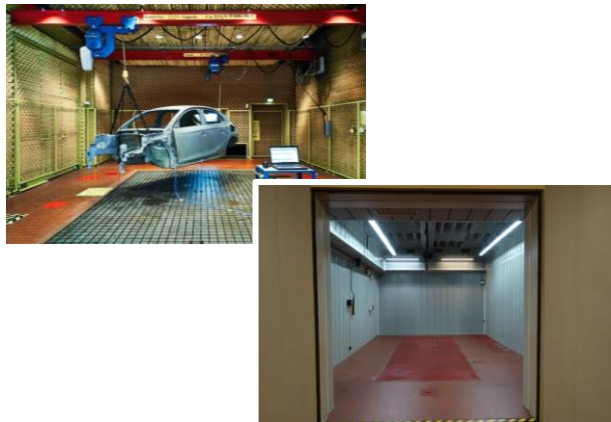
AUDIO HIFI

- Tuning of system parameters
- Speaker and Microphone testing
- Speaker vibration analysis in vehicle
- Audio listening calibration
- Full anechoic test chamber for components



CONSULTING, SIMULATION, TESTING, DEVELOPMENT, HOMOLOGATION

COMPONENTS



Structural, Mechanical, Electrical

Body in white

Component development

POWERTRAINS

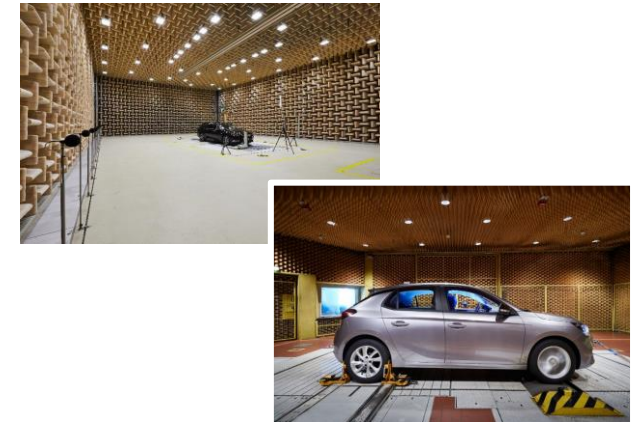


Engine & Transmission

ICE, 48V Hybrids, 48V E-Motors, F-Cell

Transmissions (MT, AT, CVT, reduction gears), electrified 48V

VEHICLE



Full vehicle

Overall vehicle test

On – Road & On - Chassis dyno

Vehicle Performance – Passive Safety

OVERVIEW – LARGE TEST STANDS

VEHICLE CRASH

- All global NCAPs & regulation & OEM inhouse requirements
- Front, side, rear impacts & rollover



OCCUPANT SAFETY

- Advanced development of occupant restraint systems in simulation and sled test system
- MVSS 201u (FMH) & MVSS 226 (ejection mitigation)
- Static component tests for global regulation



PEDESTRIAN PROTECTION

- All global regulatory and NCAP tests
- Active hood sensing tests in different temperature ranges



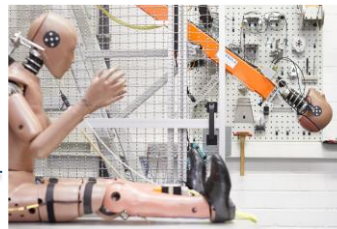
HIGH G - SLED TEST SYSTEM

- Development of front & side restraint systems
- All dynamic component testing regarding regulation & inhouse requirements
- EuroNCAP requirement for far side testing
- Pitching device available



CALIBRATION & SPECIFIC EQUIPMENT

- Dummy & Sensor calibration and certification
- High speed cameras
- 2D, 3D film analysis and more



4 POST TEST FACILITY

- Structure durability
- Z-direction only (real time or synthetic)
- BEV & PHEV capable



DETERIORATION

- Infrared sunning simulation (heat)
- Range: -40 to +80 °C
- Rel. Humidity: up to 95 %



26 CHANNEL FULL VEHICLE

- Structure durability
- 26 channels (real time or synthetic)
- 3 forces & 3 torques per wheel
- Longitudinal restraints front & back



SEAT DEVELOPMENT

- Egress/Ingress
- Seat comfort
- Seat cushion & backrest
- Seat heating



KINEMATIC & COMPLIANCE

- CoG, Inertia Measurement
- Steering geometry
- Chassis set up measure & alignment
- Measurements w/ tires & hard fixtures



MULTIAXIAL SHAKER TABLES

- Half bodies, components, etc
- Engine Mounts (heated)
- Size: 2209 x 2173 mm
- Load: 680 kg / up to 150Hz



Vehicle & Powertrain Development

ENGINEERING SERVICE PORTFOLIO

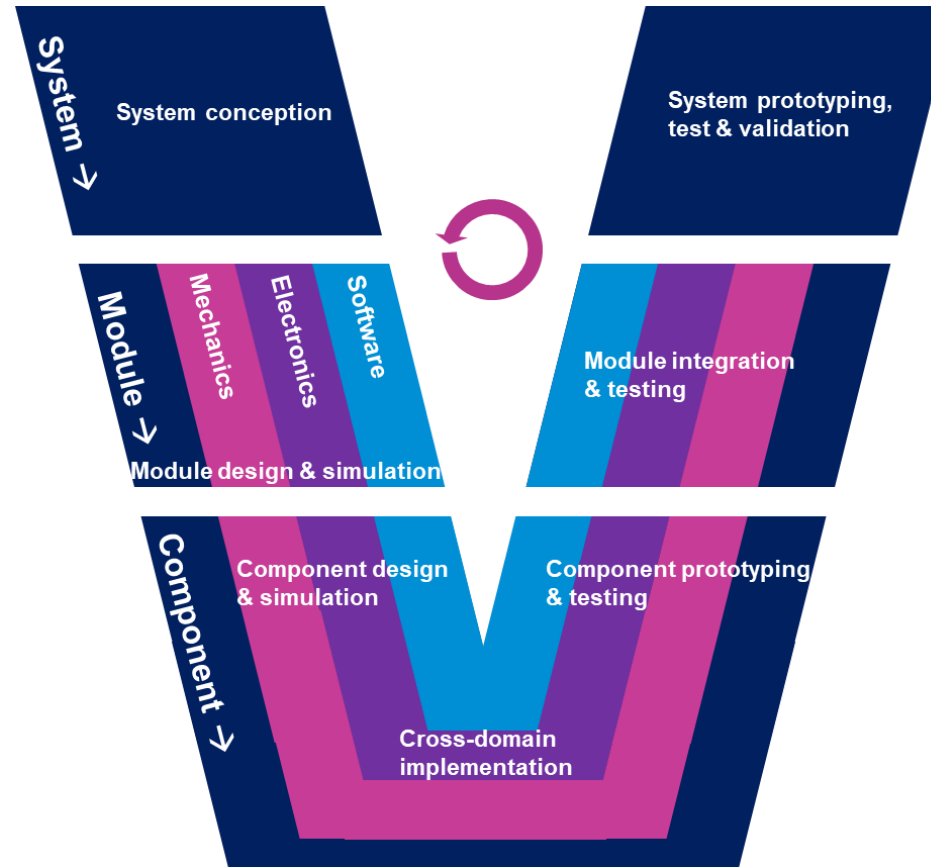


CONCEPT & LAYOUT/DESIGN

- Specification
- Styling
- Functional Layout and Design
- Benchmark Analysis

COMPONENTS / SYSTEMS

- Powertrain
- Body incl. Exterior and Lightning
- Interieur
- Chassis
- Electric / Electronic



VEHICLE INTEGRATION

- EMC, ANTENNA, NVH, AUDIO
- Vehicle Safety & Structure
- Road to Lab to Math
- Driving Dynamic & -Comfort
- CO2- / Milage- / Aging- Optimization

LIFE-CYCLE MANAGEMENT

- Production Launch Support & Serial Life
- Cost- & Quality Engineering
- Project Management
- Homologation Support
- Conformity of Production

COOPERATION SEGULA & TÜV SÜD

ROADMAP FROM REGULATORY SUPPORT TO CERTIFICATION

