Vehicle Engineering

Styling
- Concept design development
- Surface & visualization
- Serial design development
- Hardware modelling
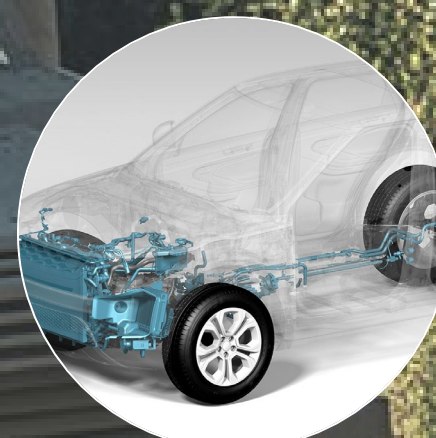
Chassis
- Chassis frame
- Axle / suspension system
- Steering system
- Powertrain integration

Cabin / Body
- Cabin concept
- Body in white development (BIW)
- Exterior development
- Interior development

System Engineering
- System architecture
- System requirements engineering
- Vehicle simulation
- Energy management

Prototyping & Testing
- Prototyping
- HIL test benches
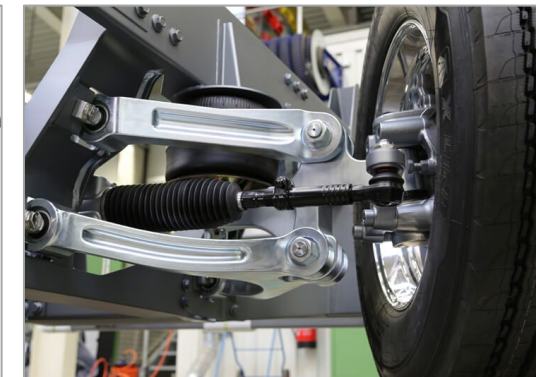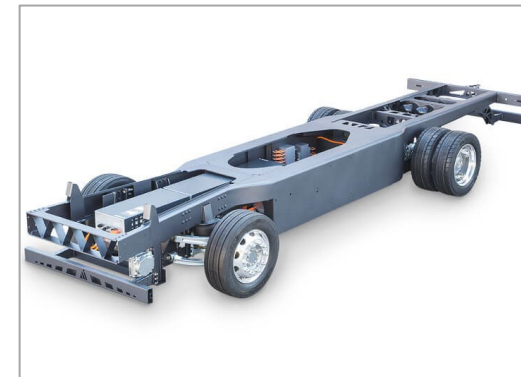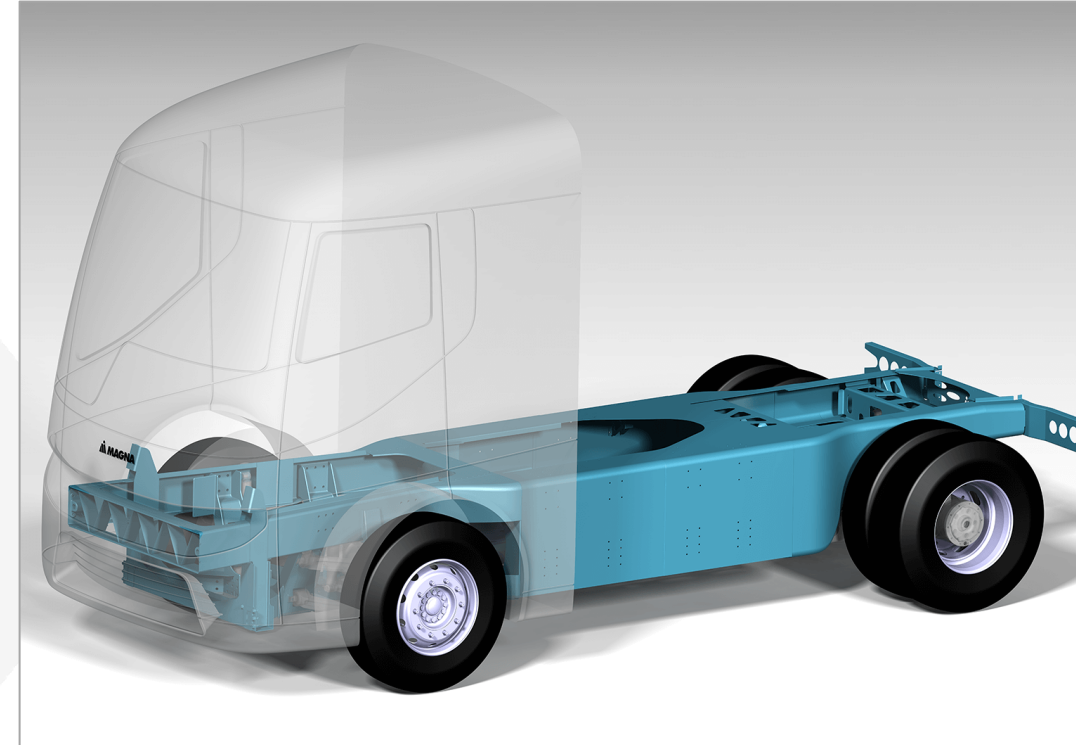- Vehicle testing
- Measurement services

Styling

- **Concept Design Development**
  - Trend research / styling benchmark
  - Orientation program / mood boards
  - Design strategy
  - Theme development exterior / interior

- **Surface & Visualization**
  - Fast modelling (polygon modelling)
  - CAS – 3D theme development
  - Class A surfacing
  - Powerwall visualization
  - Virtual reality design check

- **Serial Design Development**
  - Theme verification
  - Serial design support during realization
  - Styling – technical unification
  - Color & trim
  - Detail design

- **Hardware Modelling**
  - Design check model exterior
  - Design check model interior
  - Scale models
  - Clay models
  - Interior seating buck

Chassis

- ## Chassis frame
  - Ride & handling simulation and performance target setting
  - Frame for special vehicle application
  - Brake system simulation and integration
  - Lightweight solutions
  - Strength & fatigue simulation

- ## Axle / Suspension system
  - Rigid axle suspension
  - Independent suspension
  - Pusher- / trailing axles suspension
  - Spring types (air, steel, hydraulic)
  - Kinematics simulation and performance target setting

- ## Steering system
  - System design for standard rigid axle or independent suspension
  - Kinematics steering & suspension system development
  - Steering column kinematics
  - Steering ratios & forces
  - Steering system interface development

- ## Powertrain integration
  - Passenger cars to heavy duty trucks
  - Powertrain packaging
  - Interface system development
  - Cooling system
  - Air intake, fuel and after treatment system
  - Powertrain performance and energy demand optimization
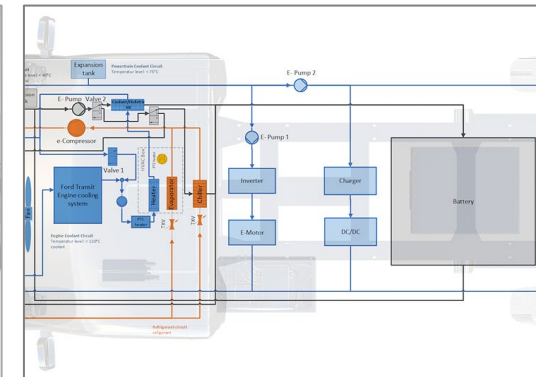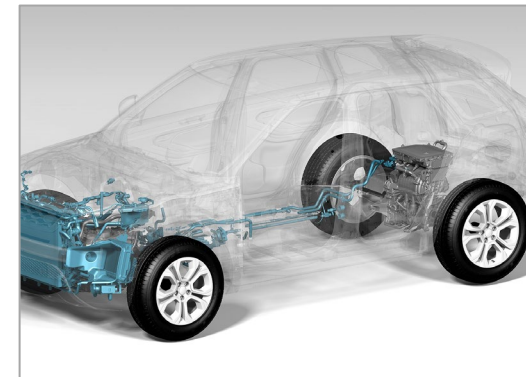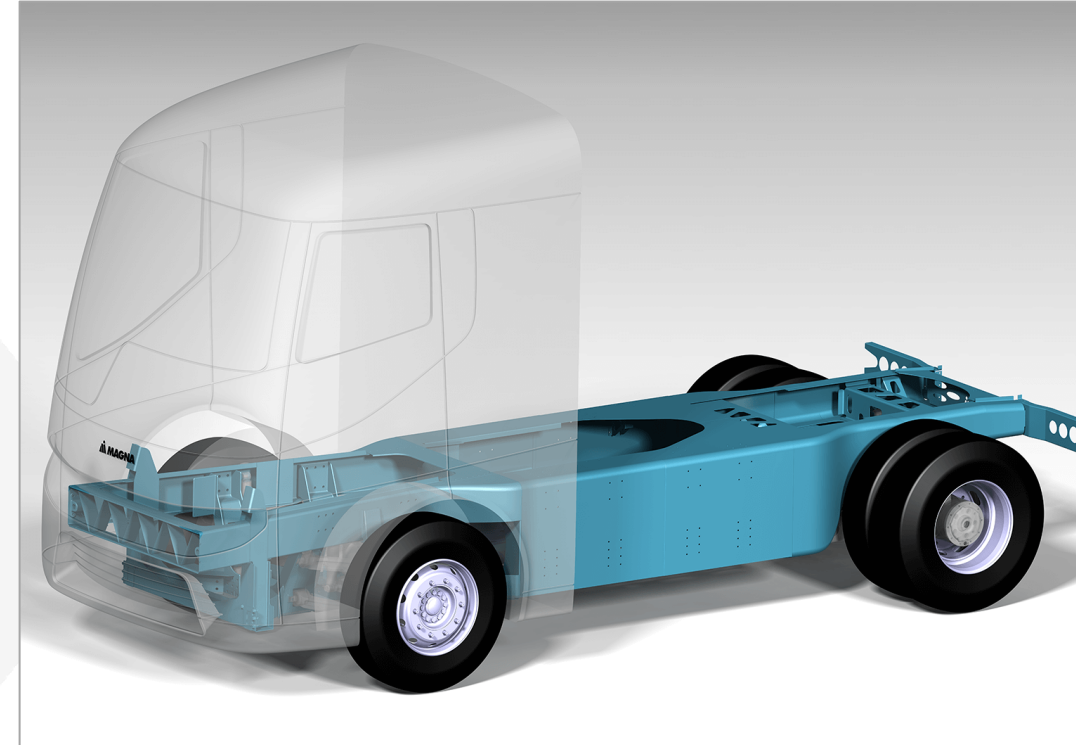
Cabin / Body

- **Cabin concept**
  - Line up & dimensions definition
  - Ergonomic & package layout
  - Modularity / assembly concepts
  - Legal requirements / regulations
  - Specification book
  - Chassis and E/E interface investigations

- **Body in White development (BIW)**
  - Function integration
  - BIW structure & door design
  - Performance & crash optimization
  - Light weight solutions
  - Modular assembly

- **Exterior development**
  - Interface integration (e.g. E / E, cameras, ADAS, ...)
  - Design for bumper, hood, steps, spoilers, ...
  - Aerodynamic & pollution optimization
  - Assembly and maintenance concepts
  - Manufacturing & material definition

- **Interior development**
  - Integration of interfaces
  - Modern living & equipment
  - Ergonomic driver´s place, HMI
  - Assembly and maintenance solutions
  - Design for dashboard, storages, trims, berth, ...
  - Manufacturing, splitting line & material definition
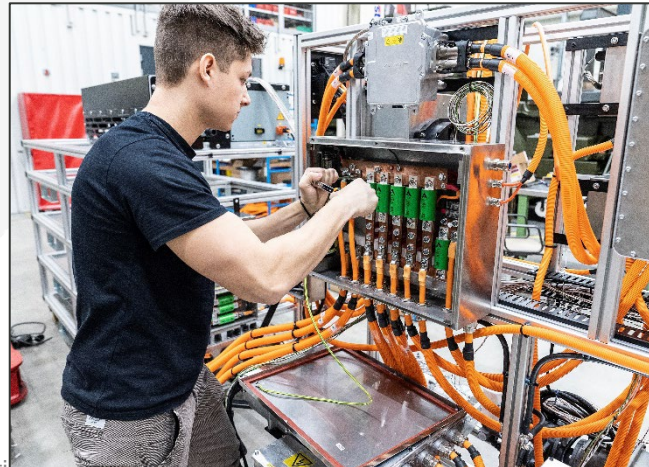
System Engineering

- **System architecture**
  - Development of vehicle systems
  - System specification
  - System benchmarking
  - System validation
  - HV / LV system design

- **System requirements engineering**
  - System requirements engineering
  - Function development
  - Vehicle system application

- **Vehicle simulation**
  - Vehicle performance analysis
  - Vehicle topology evaluation
  - Specification of powertrain components
  - Plant model build up for SiL analysis

- **Energy management**
  - Vehicle energy management concept investigation
  - VTM system architecture definition
  - Validation of VTM system

Vehicle Prototyping & Testing

- **Prototyping**
  - Prototype parts & sub systems
  - Demonstration vehicles
  - Mule vehicles
  - Full vehicles

- **HIL Test Benches**
  - Full vehicle disassembly
  - Reassemble of all components outside the chassis
  - Integration of new components
  - Measurement of signals and functions
  - Test of new components and gateways
  - Use of gateway tools to combine different systems and new components

Vehicle Prototyping & Testing

- **Vehicle Testing**
  - Subjective and objective vehicle evaluation
  - Vehicle tuning
  - Functional & durability testing
  - Testing resources

- **Measurement Services**
  - Vehicle dynamics / comfort
  - Vehicle durability / development tests
  - System / component measurement services
  - EE system analysis