



- Hybrid and adaptive Powertrain Technologies
- Alternative- and gaseous (mixed) fuels
- Exhaust after treatment
- Optimization of turbochargers and their parts



## Contact:

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# Powertrain

## 1. Testing Facilities



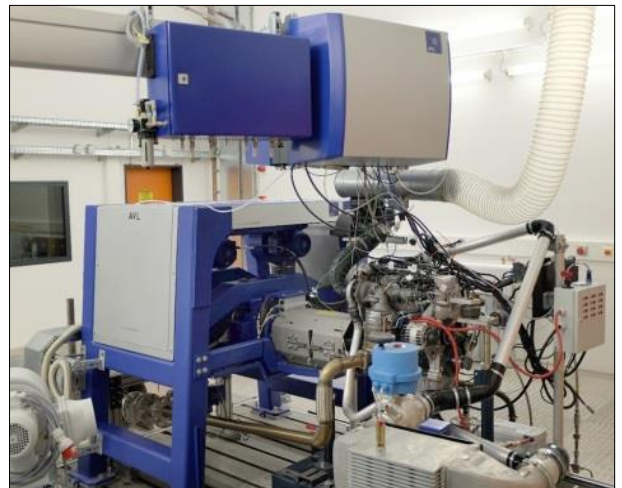
### Engine Test Bench

#### AVL Dynospirit 370/4,5-8

Modern high dynamic engine test bench for a wide range of modern engines.

##### Specification:

- Torque: MD=785 Nm
- Power: P=370 kW
- Rotational Speed: n=8000 1/min
- Inertia:  $\Theta=0,273 \text{ kg m}^2$
- Measured Values: p,T,P,M
- Indexing: AVL Indimodul
- Exhaust Measuring: Gaseous Emissions  
AVL SESAM i60 FT
- Fuels: Gasoline, Diesel



### Hot gas Test Benches

Hot gas test benches for turbocharger mapping, thermomechanical investigations and other several, possible investigations including components underlying a gaseous fluid flow.

##### Specification Test Bench 1:

- Power: P=400 kW
- Massflow: m= 1500 kg/h
- Temp-Range: T=150-1100 °C
- Special: Capable of tThermoshocks

##### Specification Test Bench 2:

- Power: P=200 kW
- Massflow: m=1000 kg/h
- Temp-Range: T=150-1100 °C
- Special: Capable of ClosedLoop



# Powertrain

## 2. Measurement Systems



### Measurement and Analysis Systems

#### Stationary Exhaust Measurement Device (AVL) SESAM i60 FT

Multi component exhaust gas measurement system for detailed determination of every single exhaust gas component.

#### Specification:

- Principle: Infrared spectroscopy  
After treatment over Fourier Analysis
- Sampling rate: 1Hz
- Reactional speed: 1Sek ( $t_{10}$  to  $t_{90}$ )
- Measurable gases:  
nitric oxide, alcohols, aldehyde,  
ammoniac, CO, CO<sub>2</sub>, CH<sub>4</sub>, SO<sub>2</sub>,  
formaldehyde, aromatic hydrocarbon,  
pentane, octane



### High-dynamic DC-Voltage source VES2 (Vehicle Energy System, Kratzer Automation)

DC Source for static and dynamic loading of electric engines and DC Drain for investigating battery like component behaving.

#### Specification:

- Power:  $P = 250 \text{ kW (340PS)}$
- Voltage Output:  $U = 40 - 800 \text{ V}$
- Current Output:  $I = +/- 0 - 700 \text{ A}$
- Voltage reactional speed:  $< 400\mu\text{s}$
- Current reaction speed:  $< 400\mu\text{s}$



# Powertrain

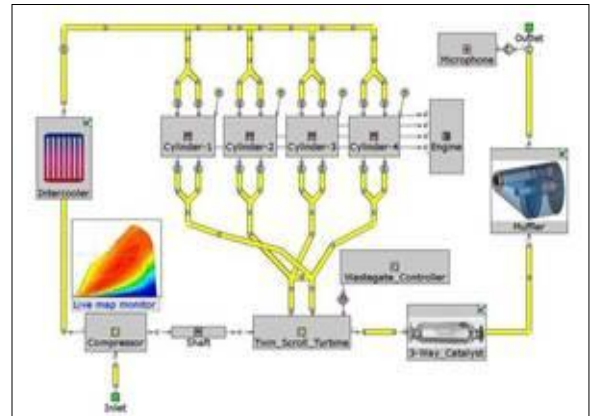
## 2. Measurement Systems



### Numerical Simulation

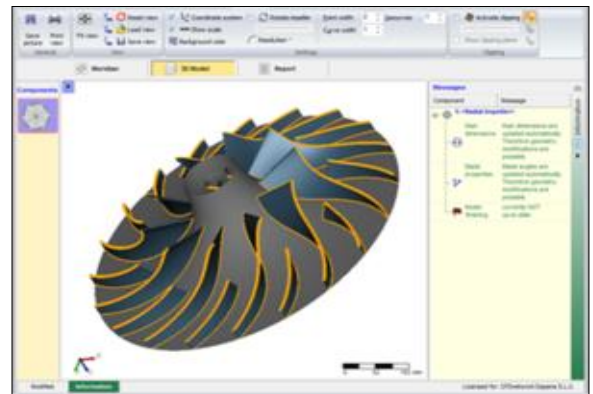
#### Engine Simulation

Over an 1-D engine simulation tool (GT Power) for science and teaching.



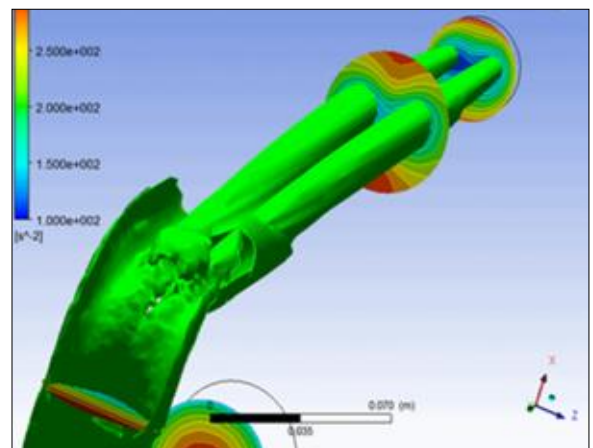
#### Turbocharger Dimensioning

CFTurbo is used to construct and shape turbochargers as needed for scientific investigations and also for teaching students.



#### Computational Fluid Dynamics

With ANSYS CFX and FLUENT, our staff has the possibilities to investigate fluid streams in three dimensions.





# Powertrain

## 2. Measurement Systems



### Variable gas composition unit

- engine test bench supply with gaseous fuels
- gas mixtures generation with any composition

#### Specifications:

- gas components & maximum mass flow rate
  - methane (60 kg/h)
  - carbon dioxide (15 kg/h)
  - nitrogen (11 kg/h)
  - hydrogen (7 kg/h)
  - compressed natural gas (80 kg/h)
- gas pressure variable up to 16 bar
- 500 litres buffer tank for dynamic engine operation

