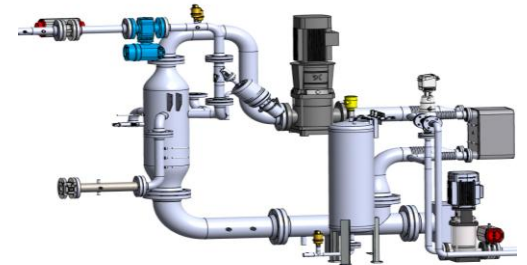# Modular E-pump testing solution

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     Dennewartstraße 25-27, 52068 Aachen, Germany   www.eutech-scientific.de   Phone:+49/241/963-2380   Fax:+49/241/963-2389

Model Based Design

Data management

Field Support

Calibration

Test benches

Optimizer

Thermal Management

Simulation

Virtual Sensors

HiL Testing

Powertrain Control

Simulation

Tools

Function Development

HVAC

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Modular E-pump testing solution

Motivation

- Rapidly increasing demand for electrical driven components
- On-demand supply of cooling for conventional, hybrid, fuel-cell, battery powertrains -> Large varity of applications
- Rigid conditions from -40 up to 150 $^{\circ}$C for coolant and ambient

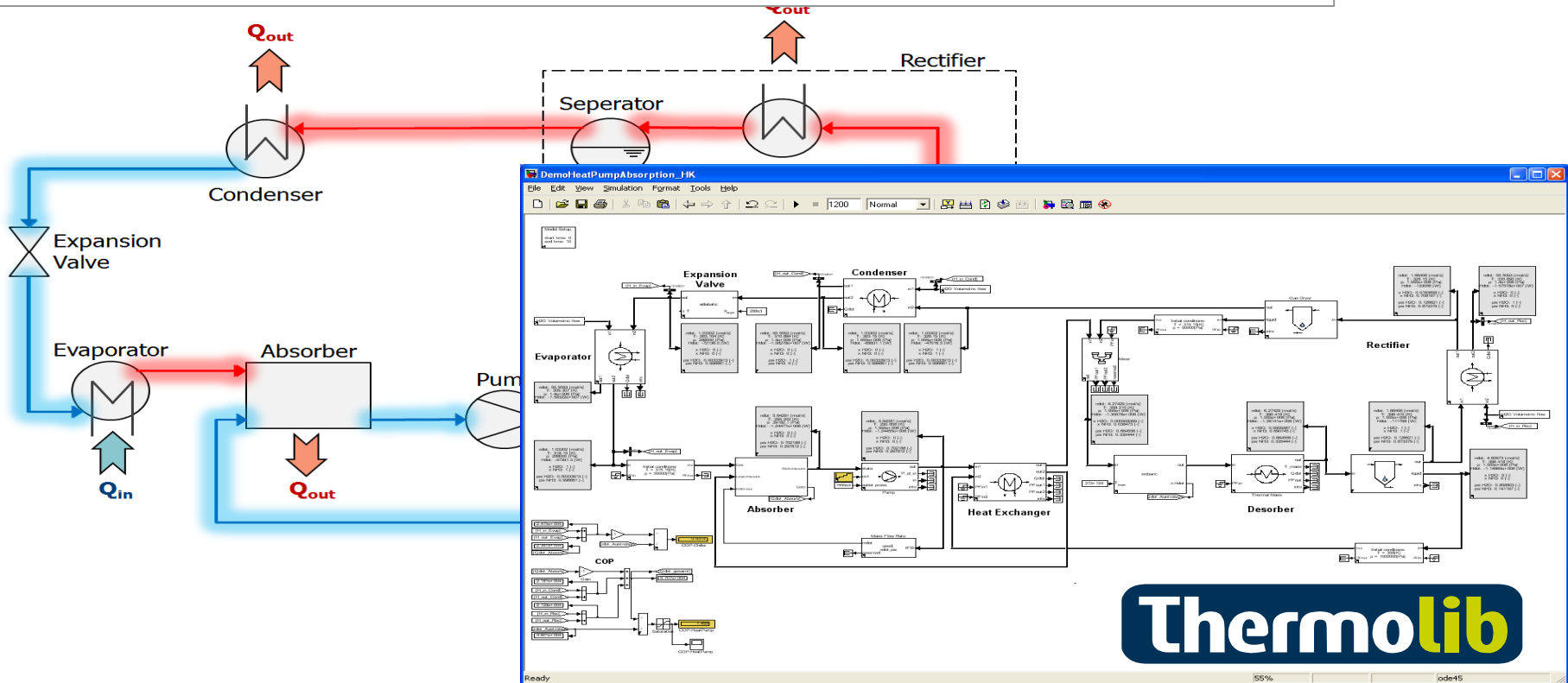# Modular E-pump testing solution

Request

- Easy and quick adaptation to specific customer needs
- Robust and highly reliable design
- Mechanical, electrical and digital competences
- Short delivery time and attractive price level

Our approach

- Fully digital development process
- Data driven development and analysis
- Modular, extendable and scalable design
- Easy adaptation to customer needs
- Approved technologies (hard- and software)
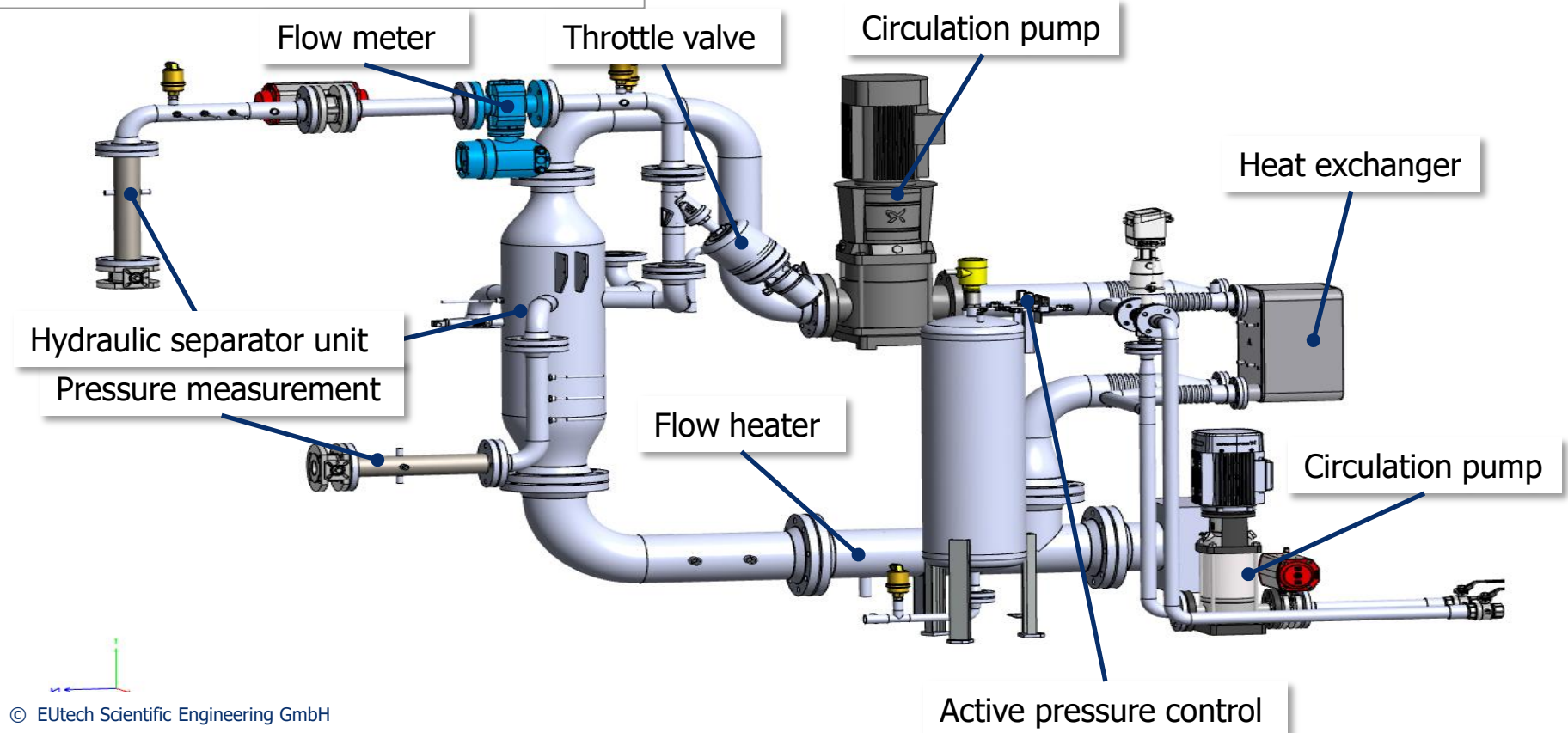- Quick assembly and installation

Modular E-pump testing solution

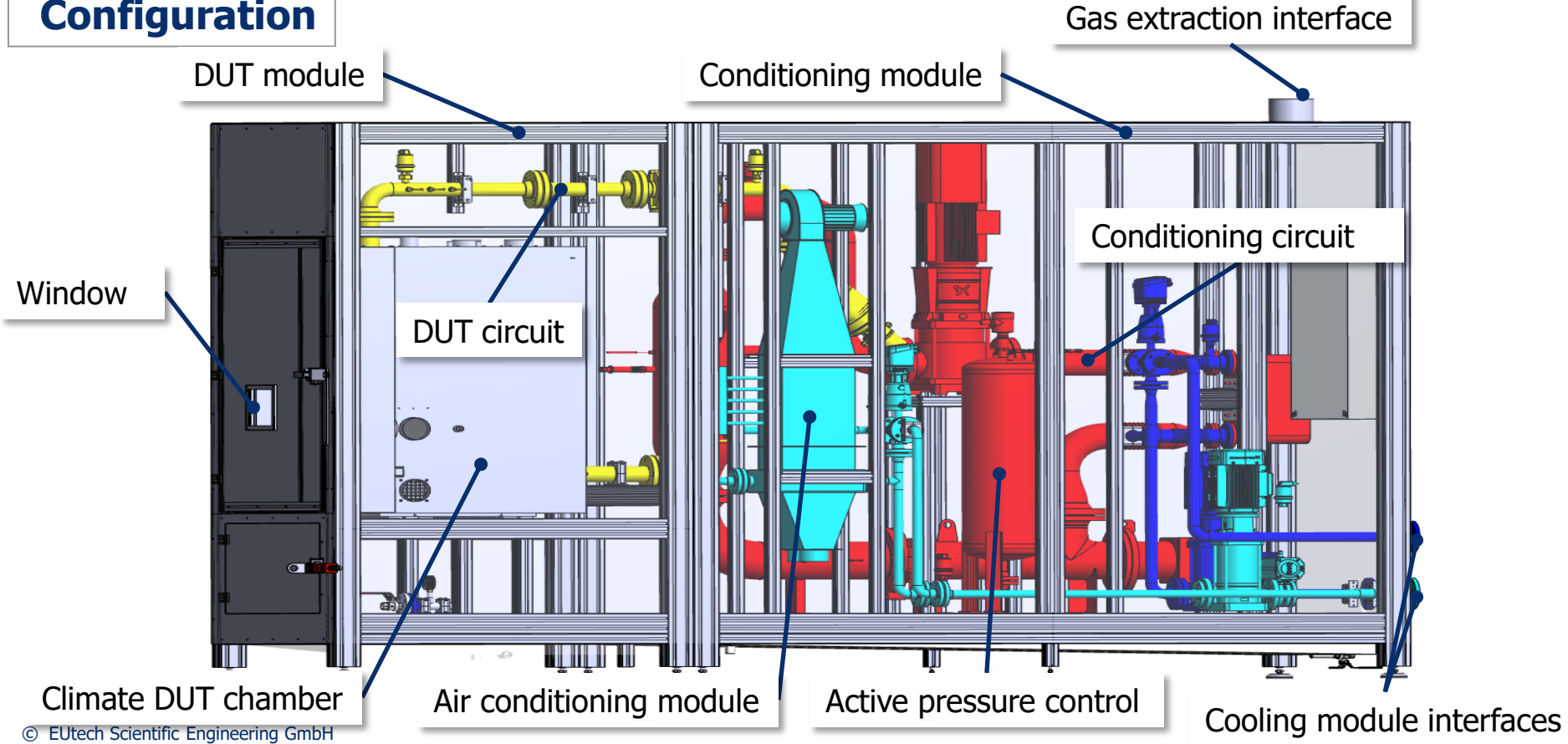## „Digital twin" - for development, analysis and lifetime service

Modular E-pump testing solution

Conditioning and DUT circuit

Flow meter

Throttle valve

Circulation pump

Heat exchanger

Hydraulic separator unit

Pressure measurement

Flow heater

Circulation pump

Active pressure control

Modular E-pump testing solution

Configuration

Gas extraction interface

DUT module

Conditioning module

Window

Conditioning circuit

DUT circuit

Climate DUT chamber

Air conditioning module

Active pressure control
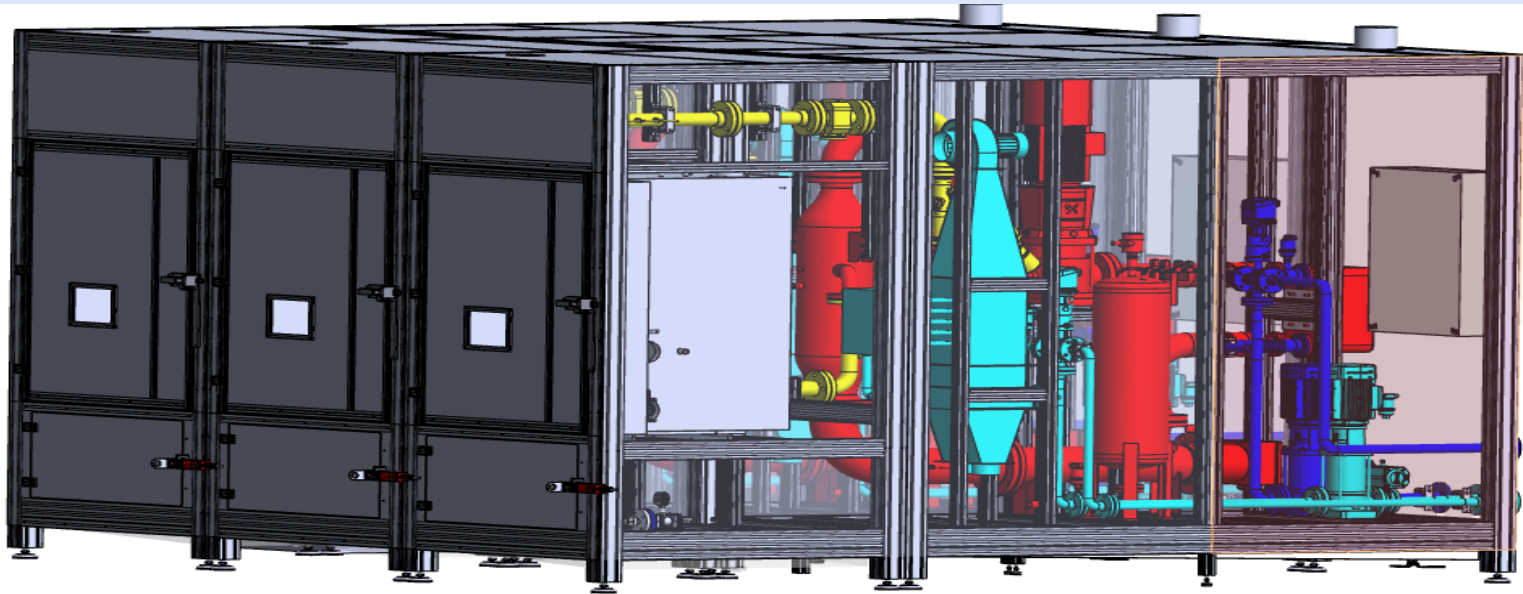
Cooling module interfaces

© EUtech Scientific Engineering GmbH

Modular E-pump testing solution

Extendable and scalable solution

- Combination of modules for small and large pumps or differing features is possbile

Modular E-pump testing solution

Customized and tailored to specific needs

| Functional test and hydraulic development | → | Control development | → | Endurance test |

Modular E-pump testing solution

Double-pump module

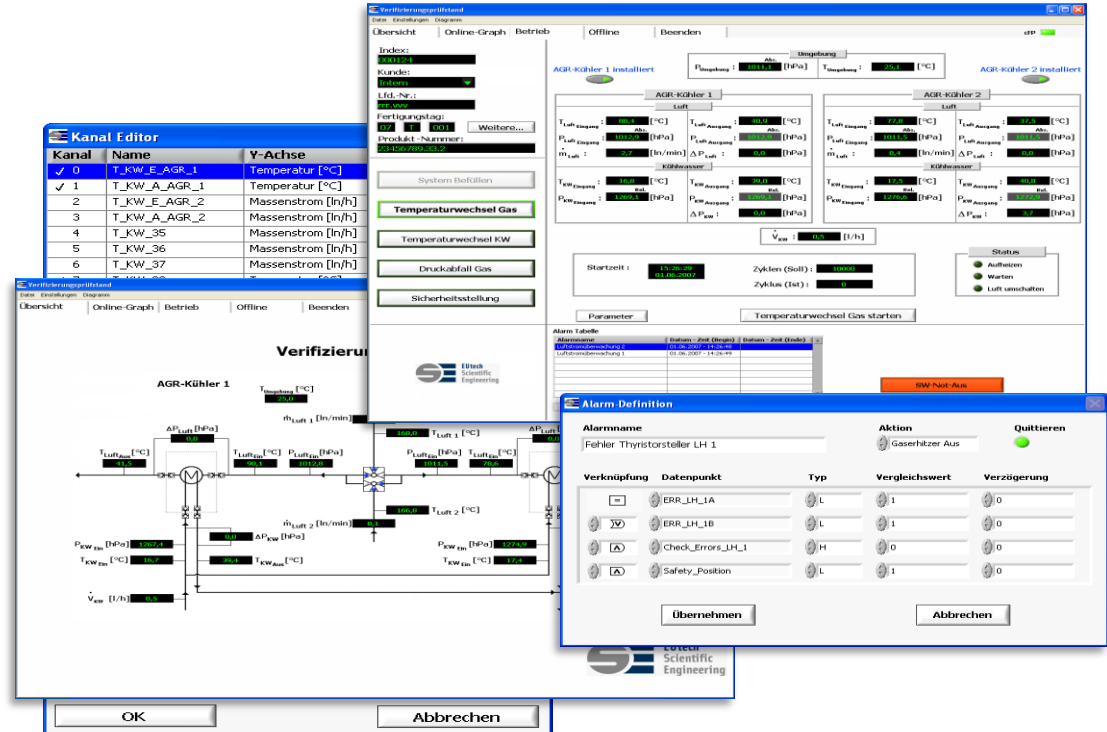# Modular E-pump testing solution

Pump testing unit

- Control soution is based on „all-inclusive" development tool
  - Test bench conditioning
  - Pump communication & control
  - Measurement and data acquisition

- PWM/LIN/CAN Communication module
  - Scalable up to eight pumps/module

Modular E-pump testing solution

EUtest Software - test bench automation

- Visualisation
- Manual and automatic operation
- Editable, automated processes
- Autonomous operation
  - Automatic characteristic diagram
  - Signal acquisition and management
  - Data analysis
- Test bench monitoring
  - Alarm definition
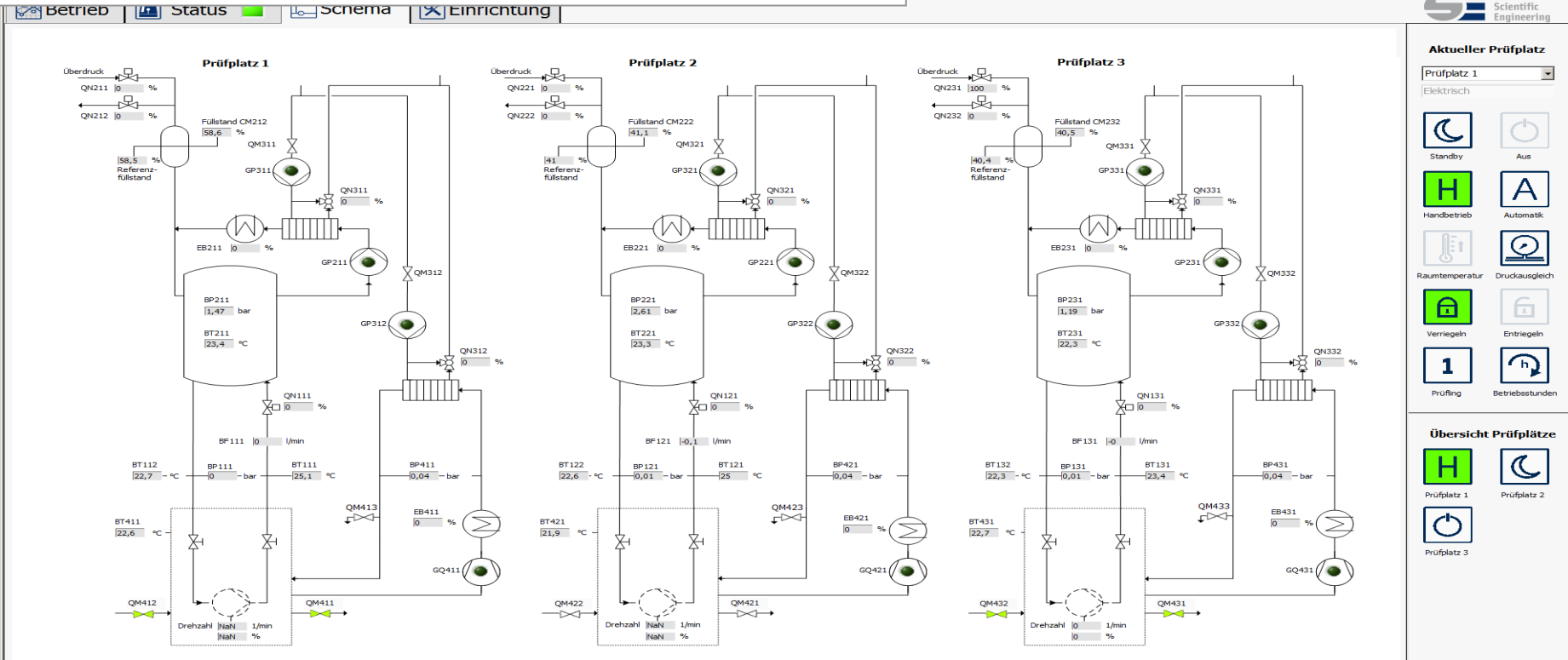 - Alarm handling
- Data management
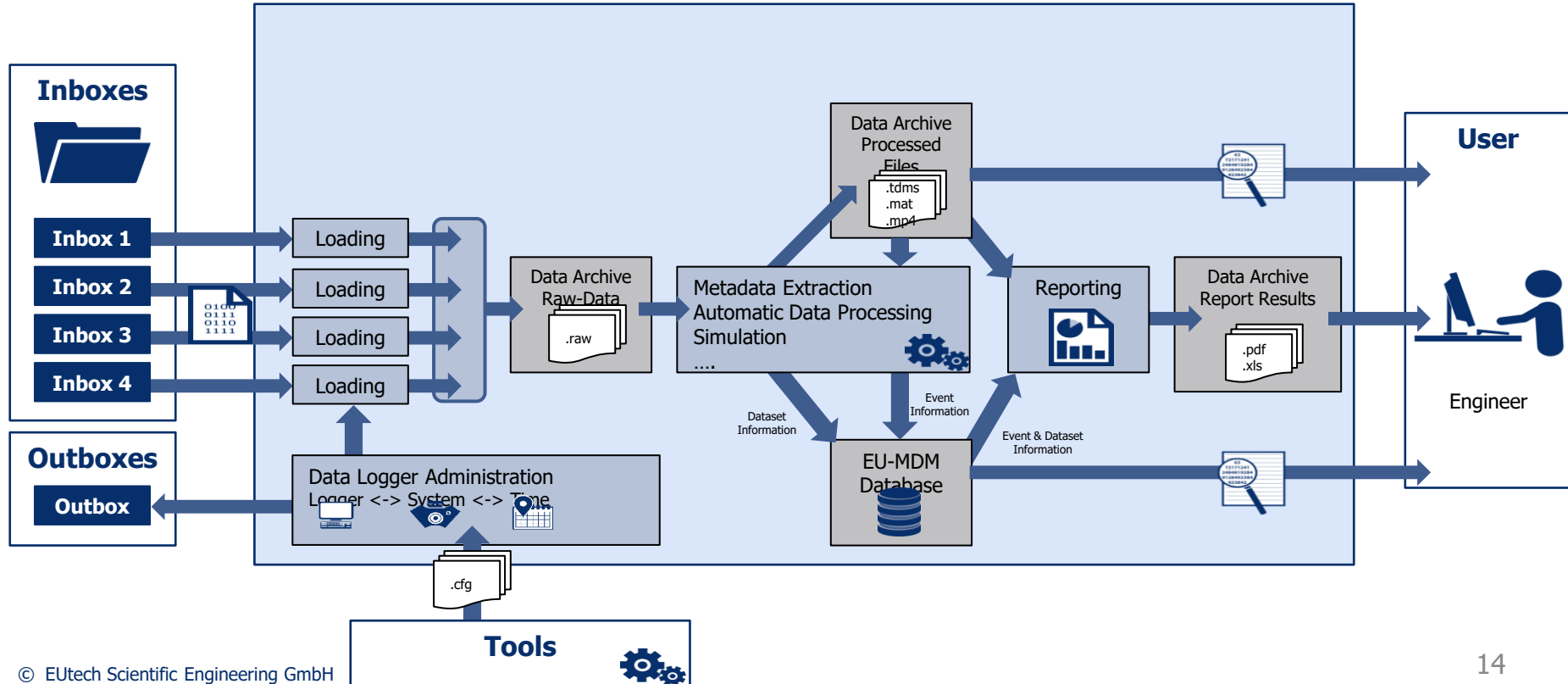- Remote-Service

Modular E-pump testing solution

EUtest Software - test bench automation

Data management and analysis (EU-MDM)

Thank you!
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