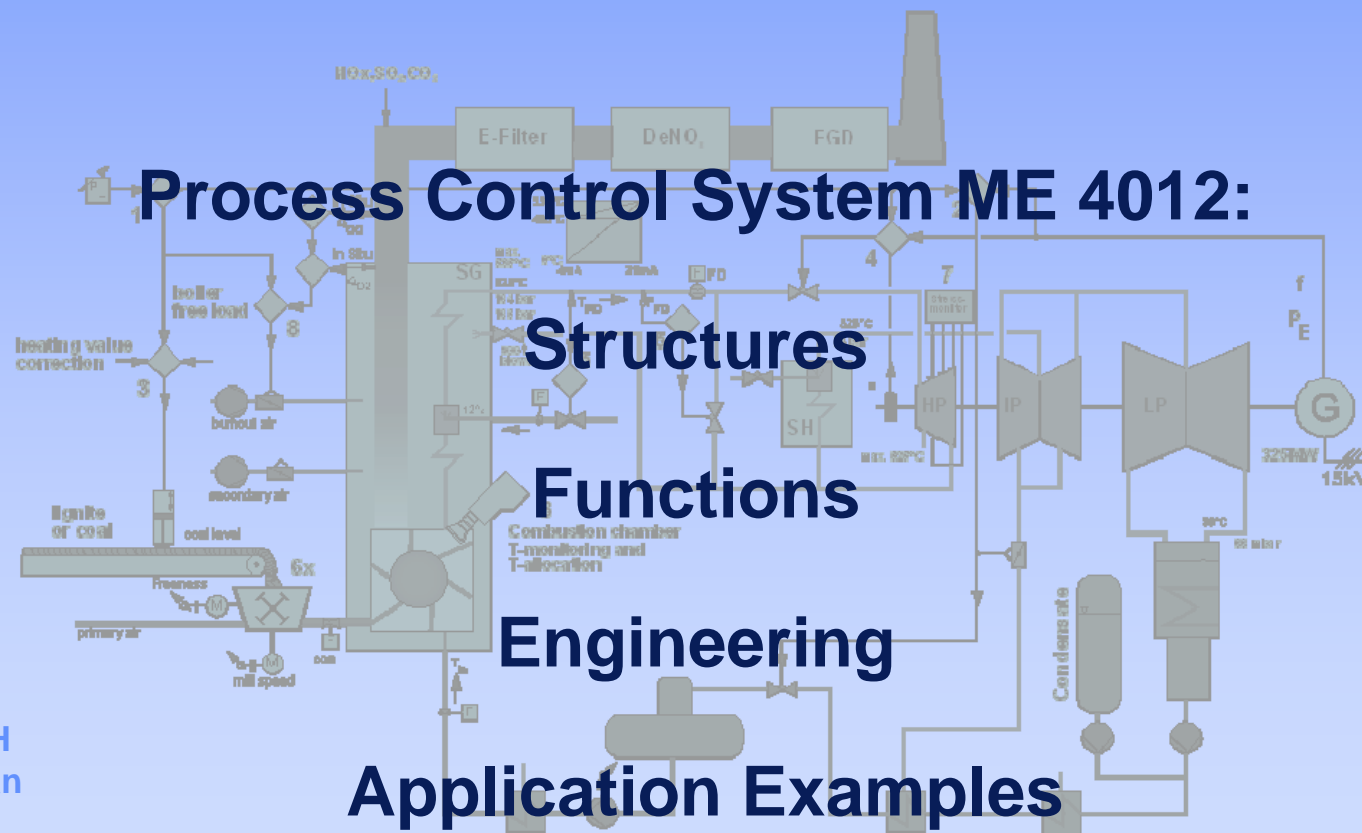


# Helmut Mauell GmbH Partner of Energy Suppliers



## Process Control System ME 4012

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# Power Station Control

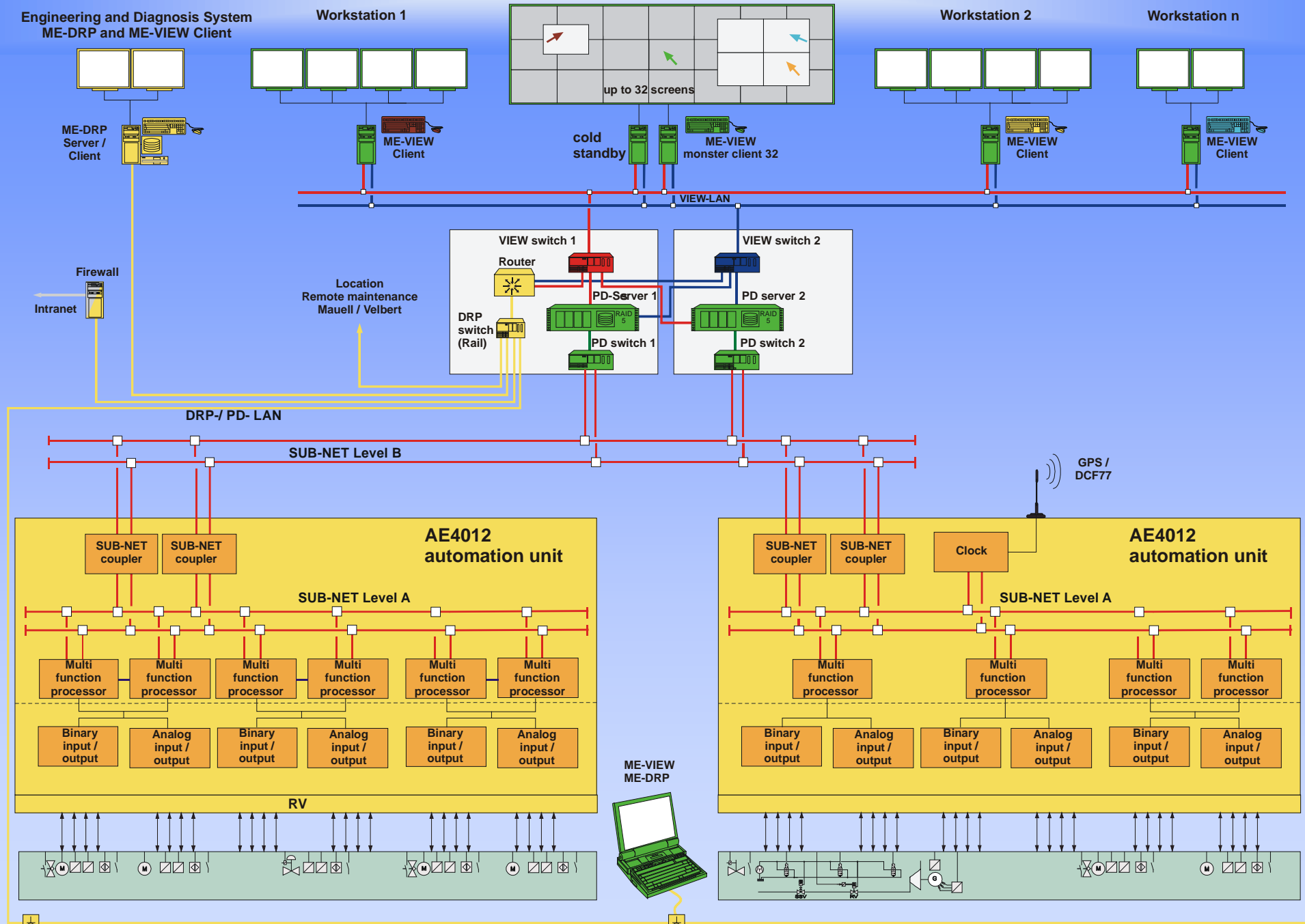
# Vertical Integration & Project Organisation

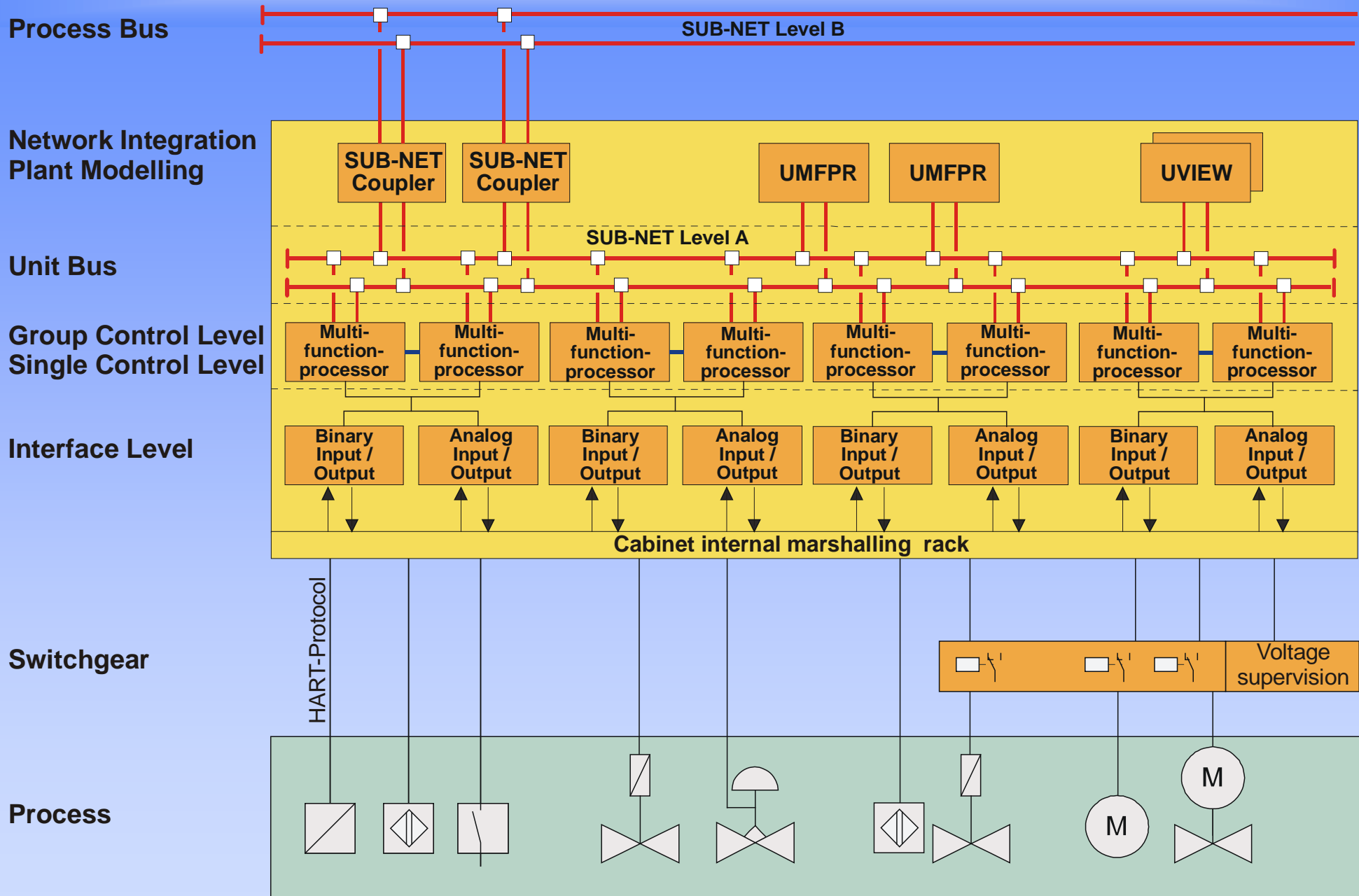


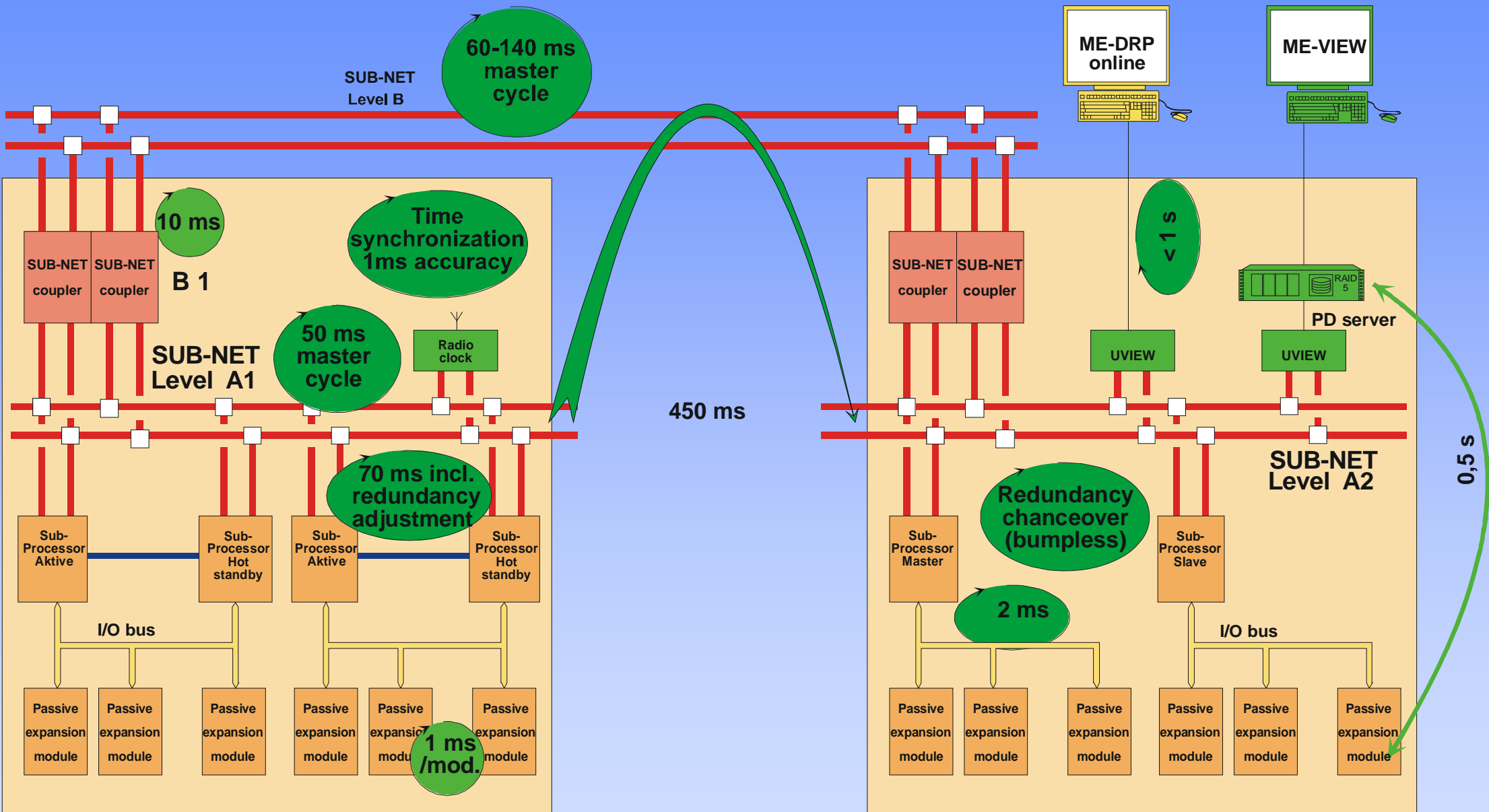
- Development
- Consulting
- Engineering
- Manufacture
- Installation
- Commissioning
- Training
- Product Maintenance
- Worldwide Service

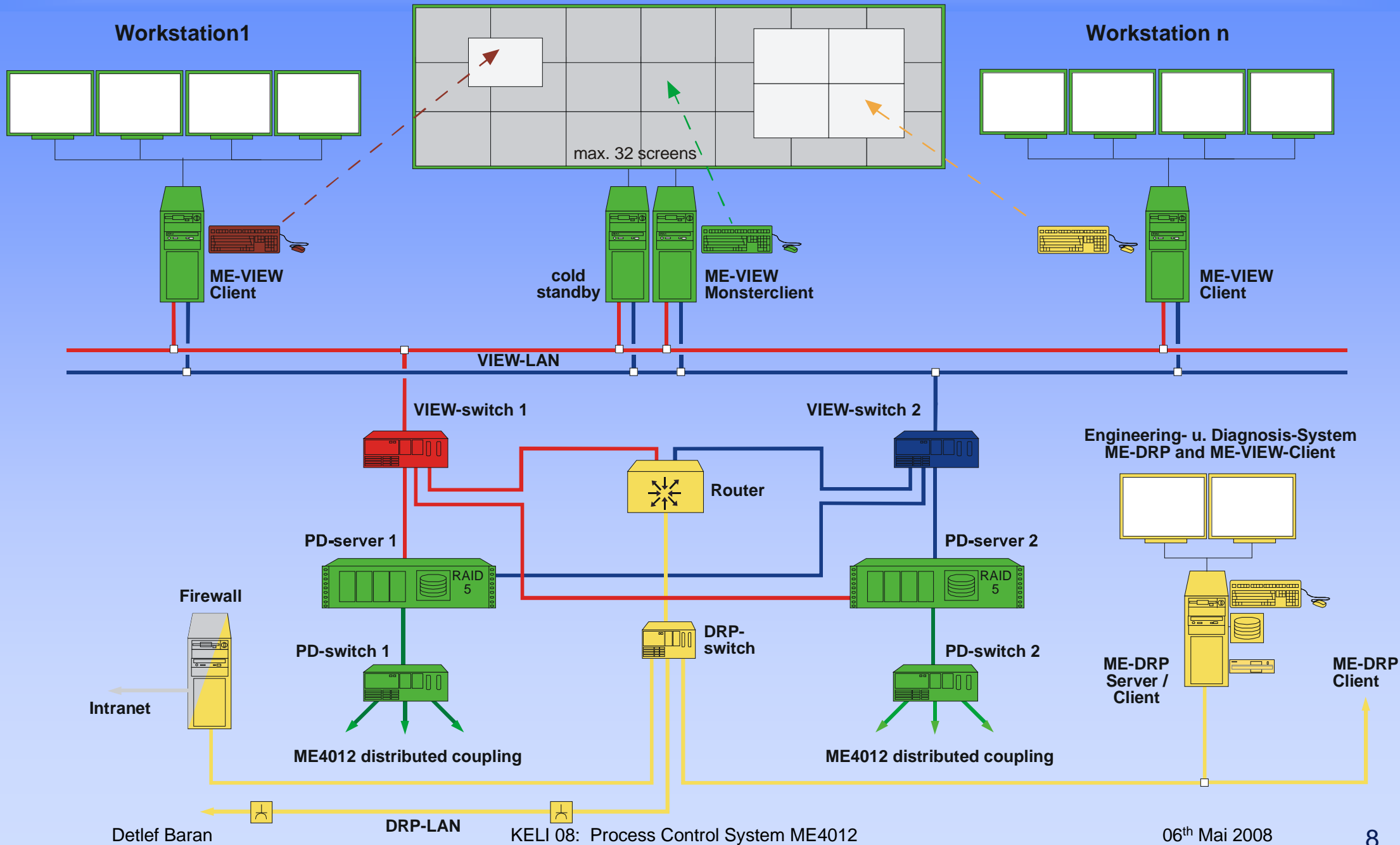


- **Unit Control**
- **Failsafe Burner Control**
- **Steam Turbine Control and Protection (incl. Turbine Hydraulic System)**
- **Gas Turbine Control and Protection**
- **Station Houseload and Dispatcher Control**
  
- **Power Station Auxillary Plants**
- **Waste Incineration Plants**
  
- **Pump Storage Power Plants**
- **River Power Plants**
  
- **Nuclear Power Plants:**
  - **Turbine Control and Turbine Protection**
  - **Turbine Hydraulic and Servo Motors**
  - **Signalling and Message System**
  - **Criteria Computer**
  - **Control Room Technology**
  - **Station Control Rooms**

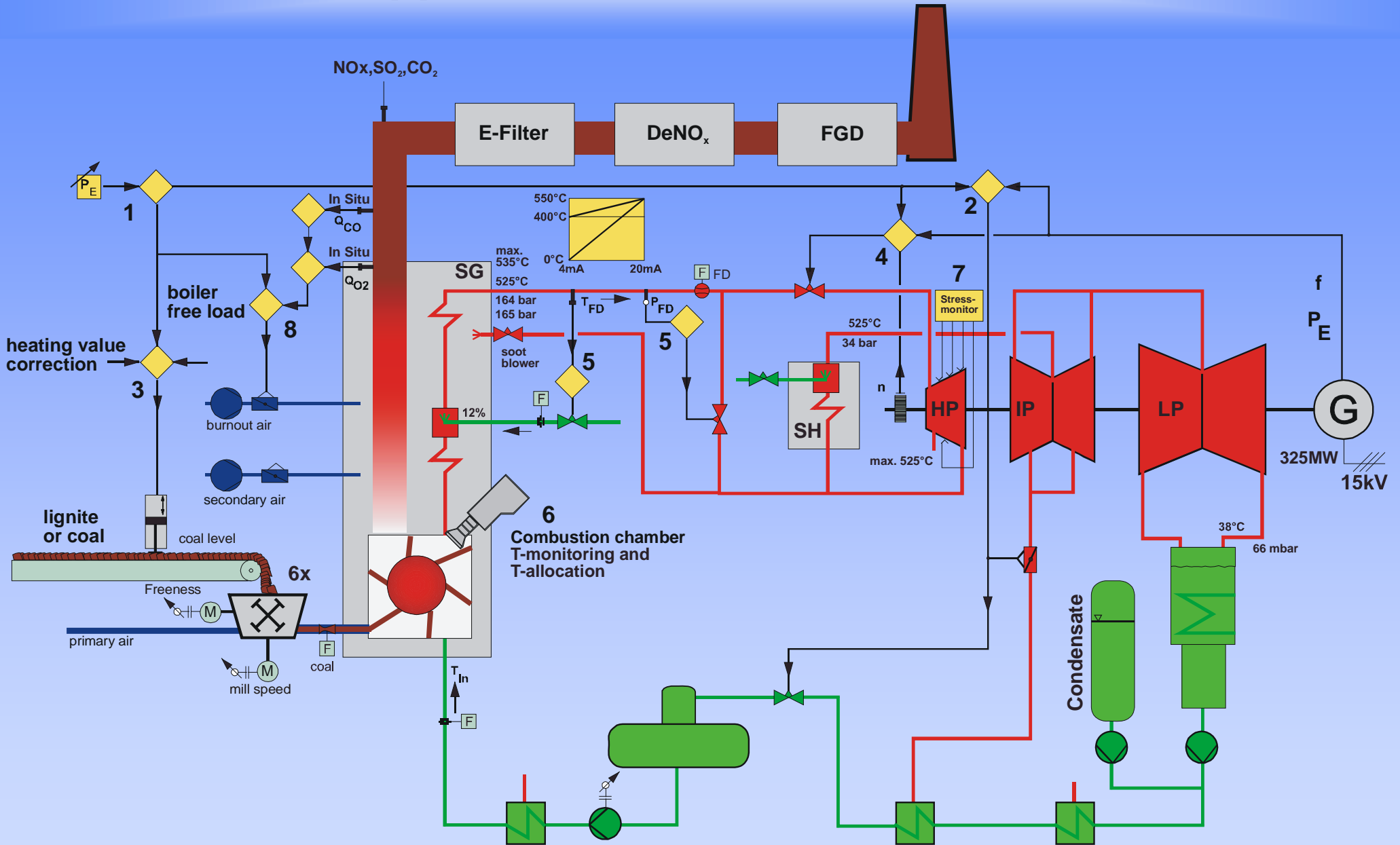












1. Unit model (smooth load control)  
2. Condensate stop control

3. Multi-variable Fuzzy control  
4. Turbine Speed- / Load Control

5. Calculation-guided control  
6. Combustion analyse control

7. Turbine Stress Monitor  
8. Boiler free load calculation

# Processinterface digital speed measurement :

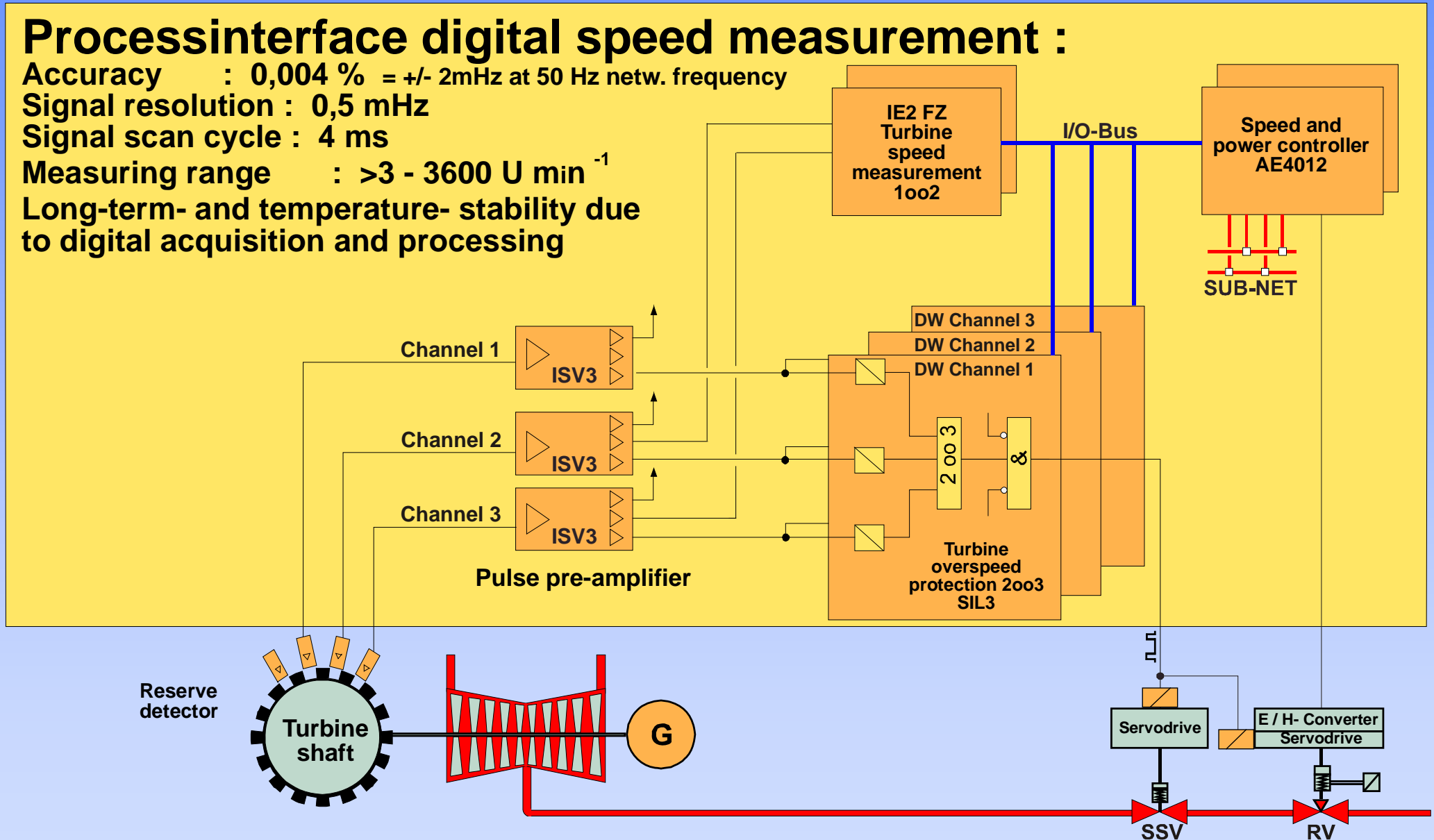
Accuracy : 0,004 % = +/- 2mHz at 50 Hz netw. frequency

Signal resolution : 0,5 mHz

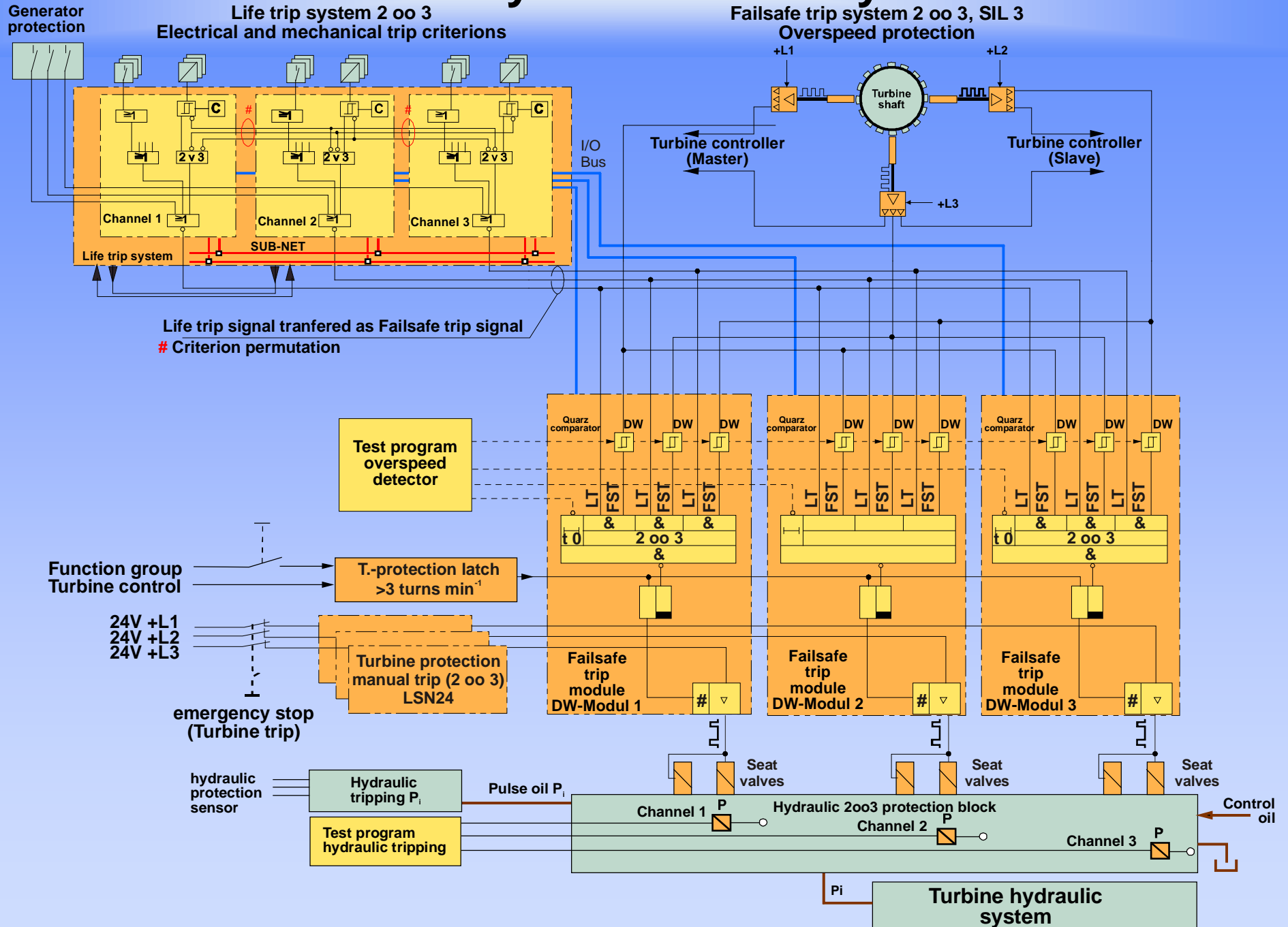
Signal scan cycle : 4 ms

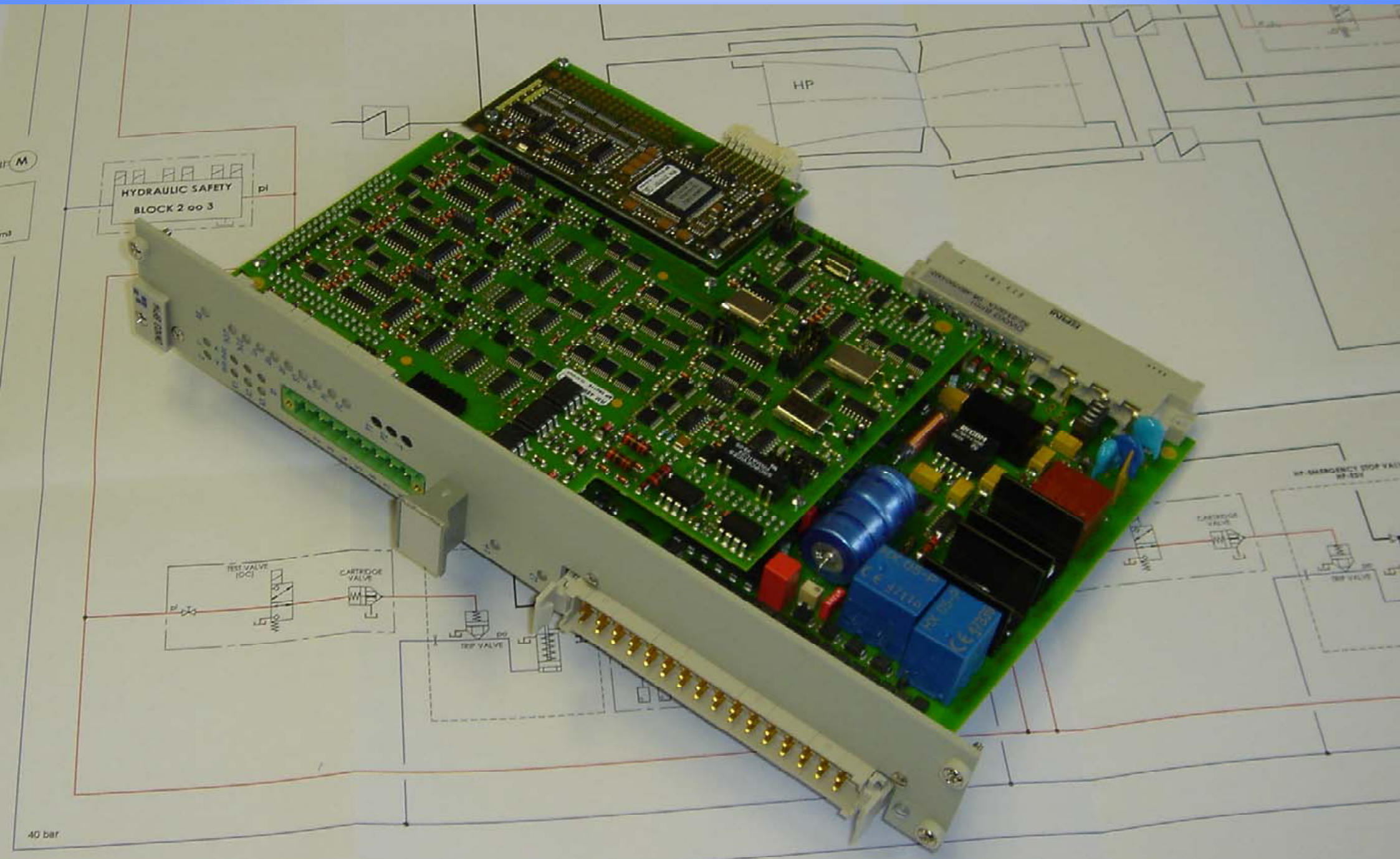
Measuring range : >3 - 3600 U min<sup>-1</sup>

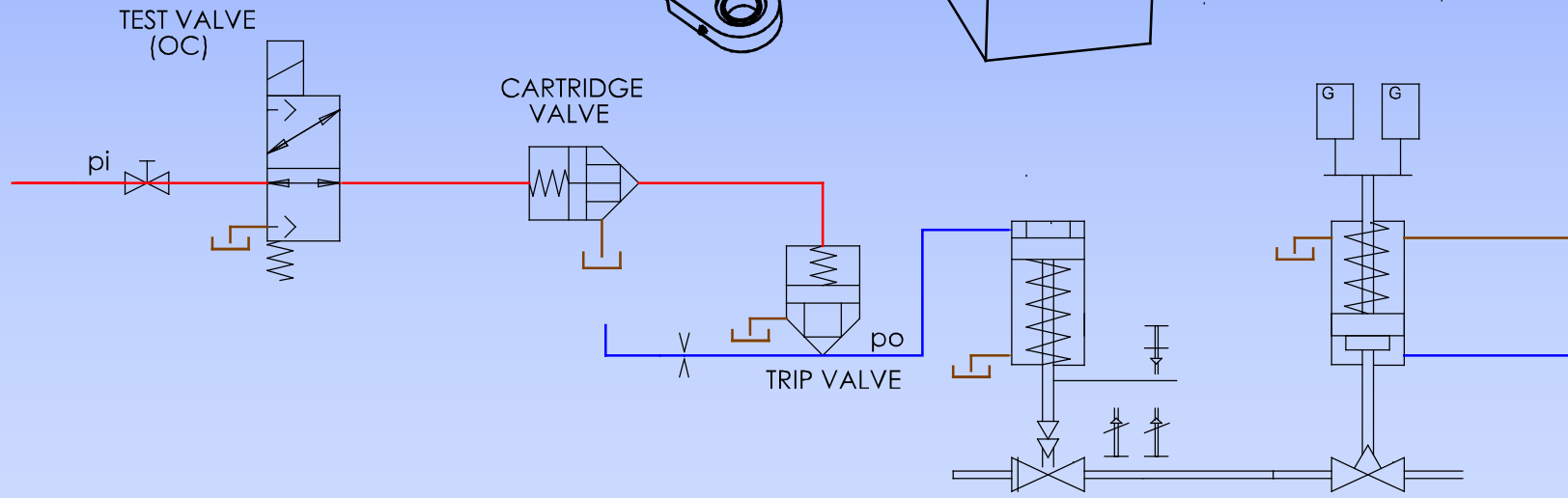
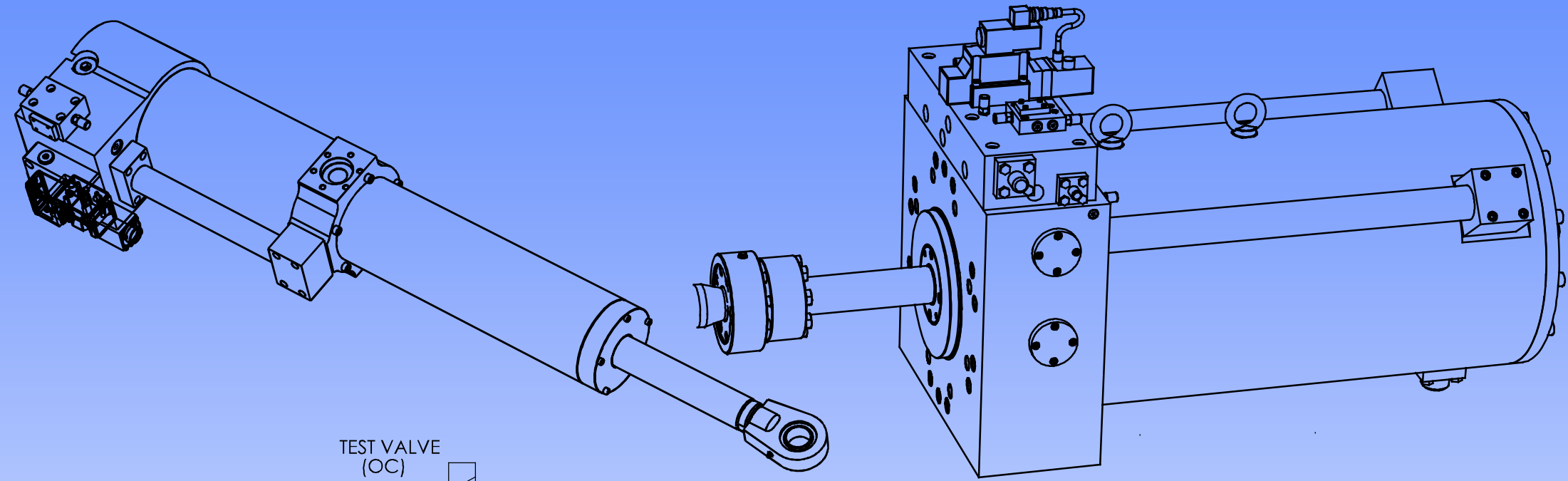
Long-term- and temperature- stability due to digital acquisition and processing

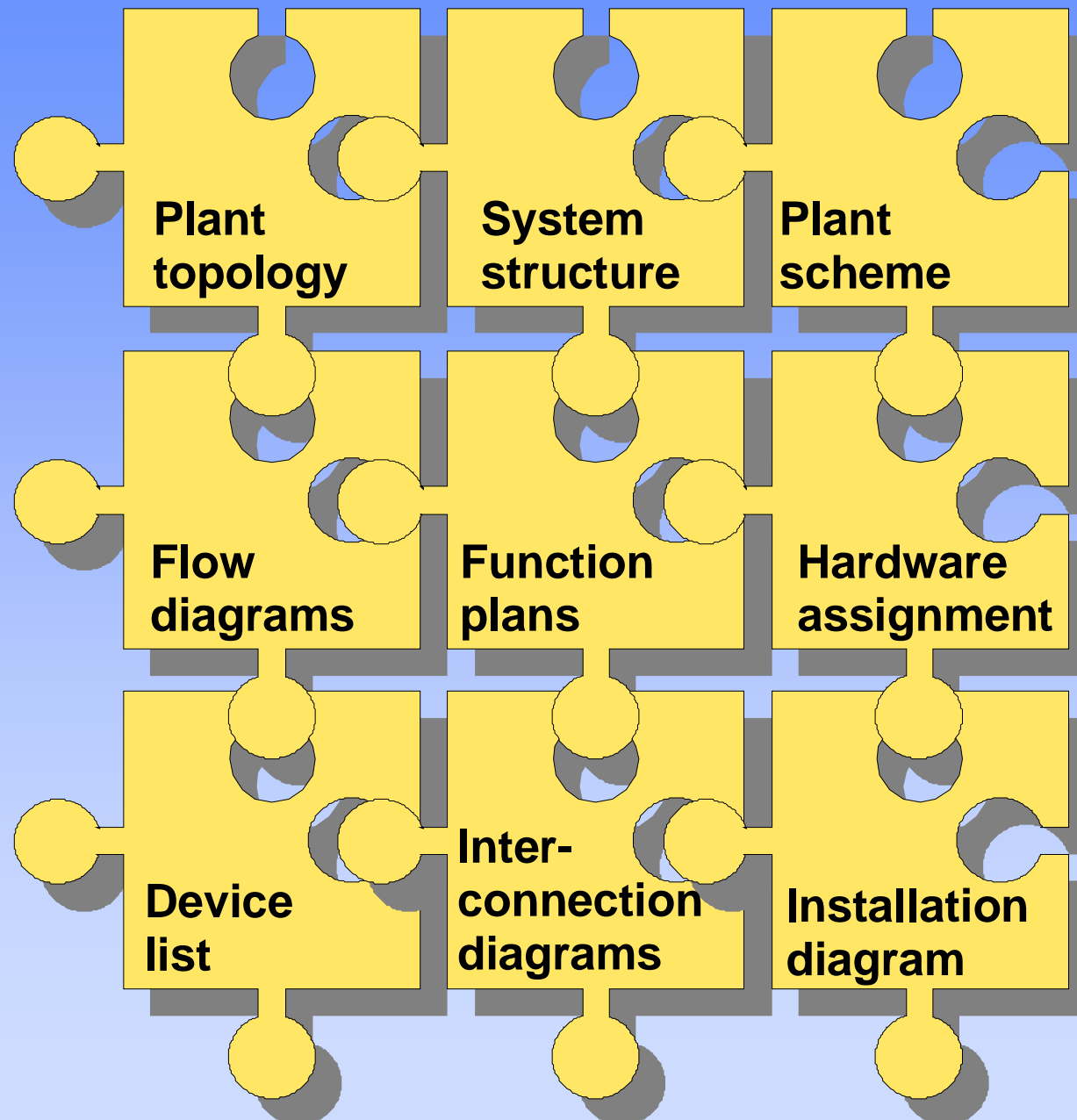


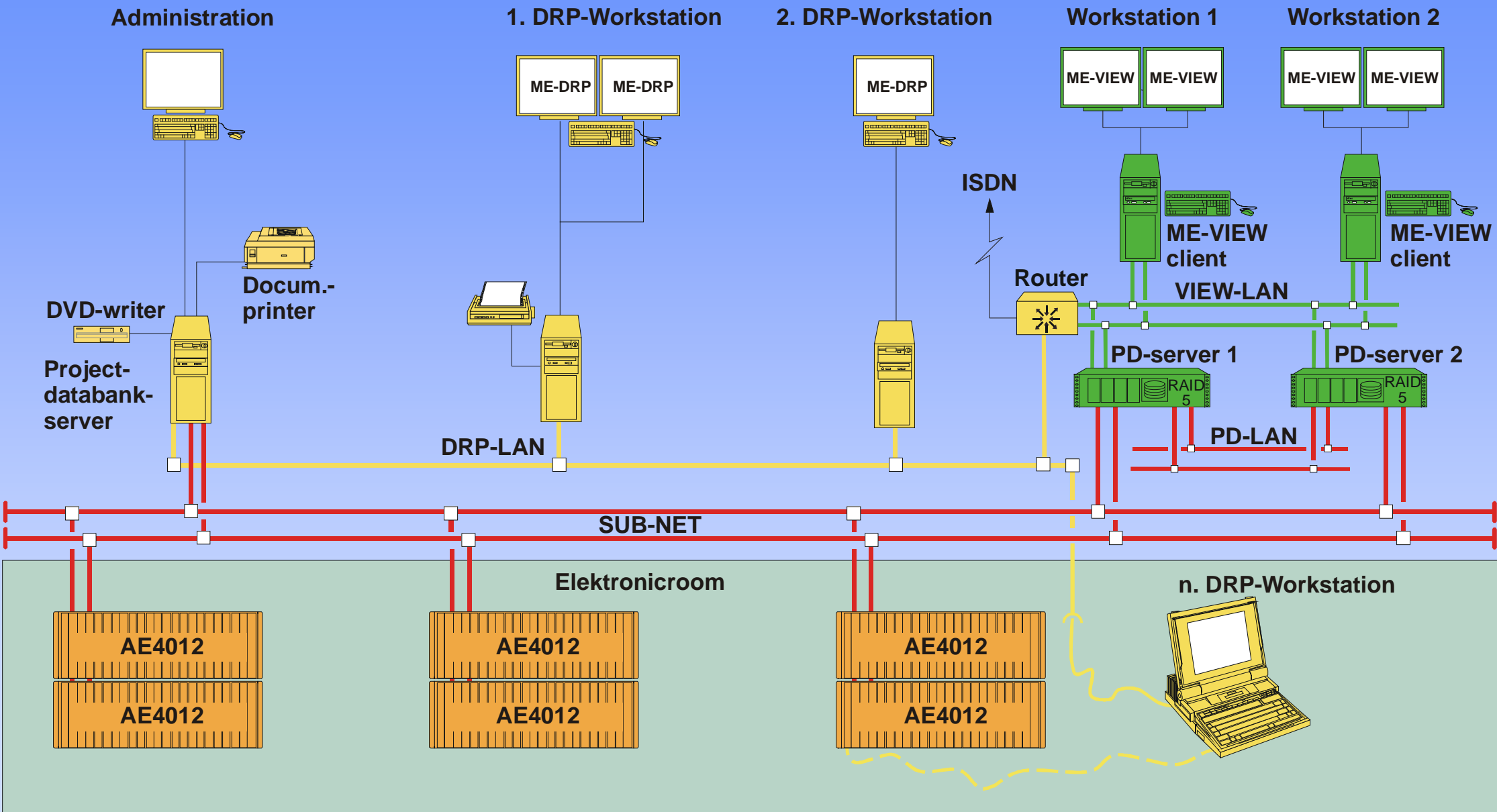
# Steam-Turbine Protection security and availability

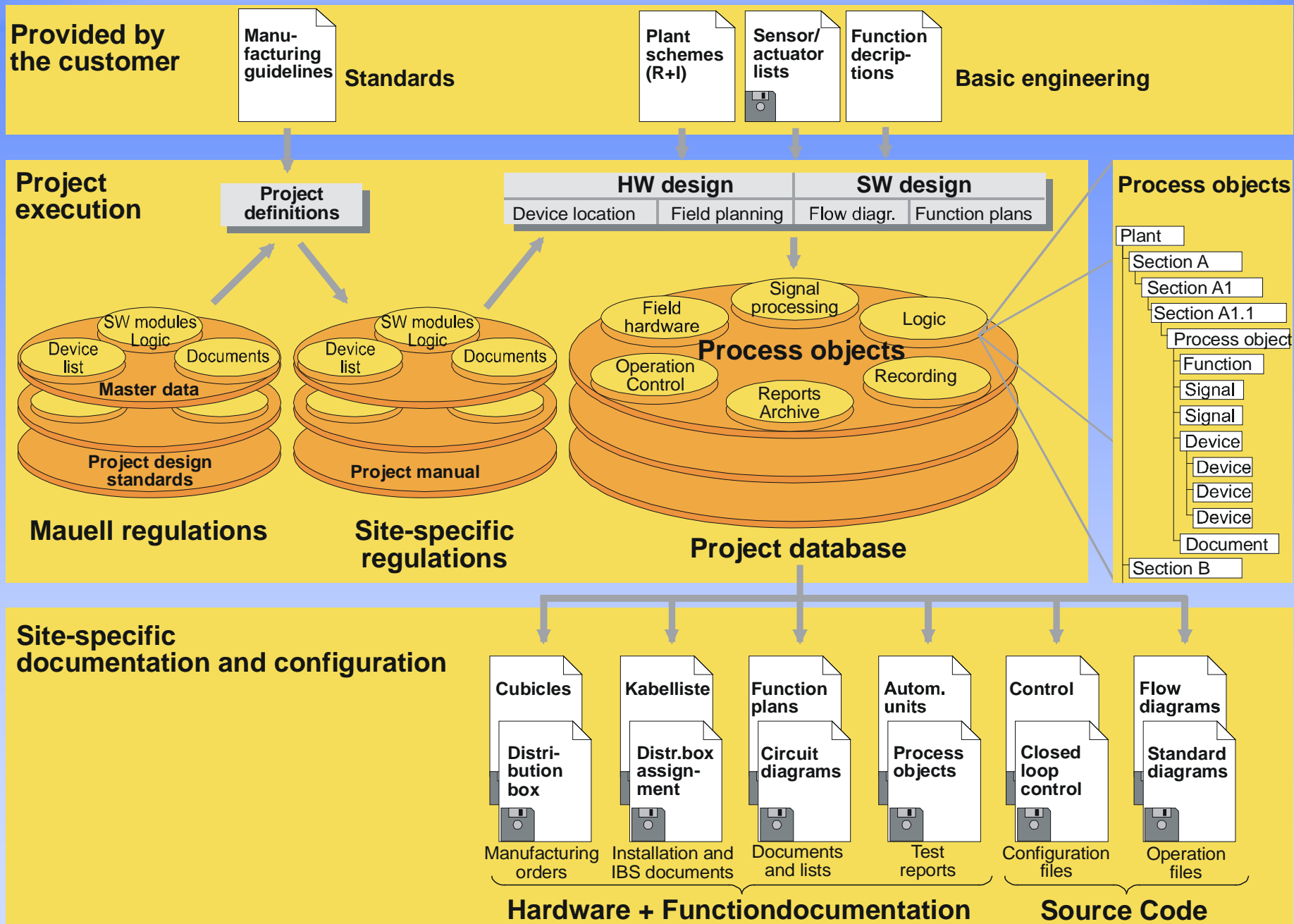


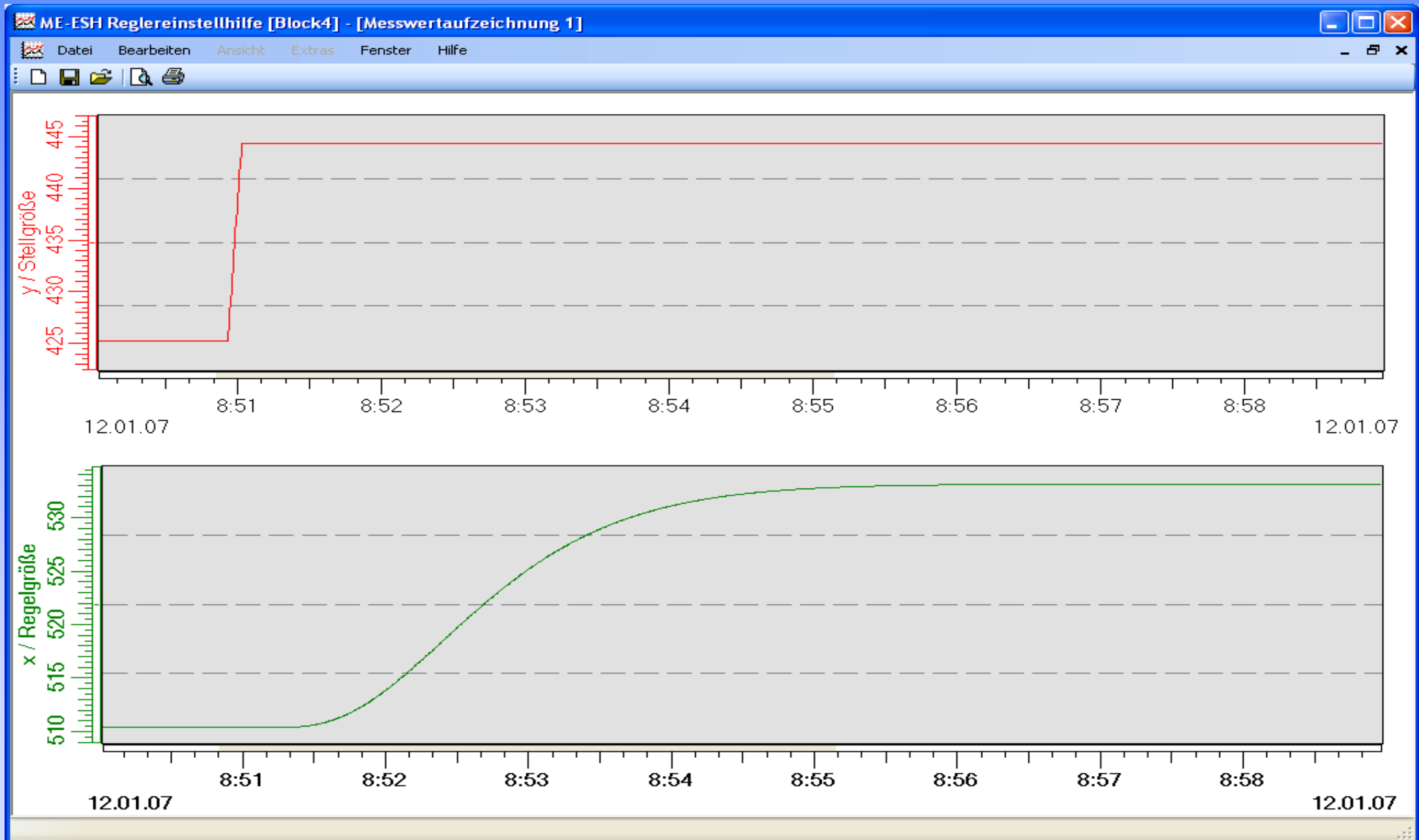


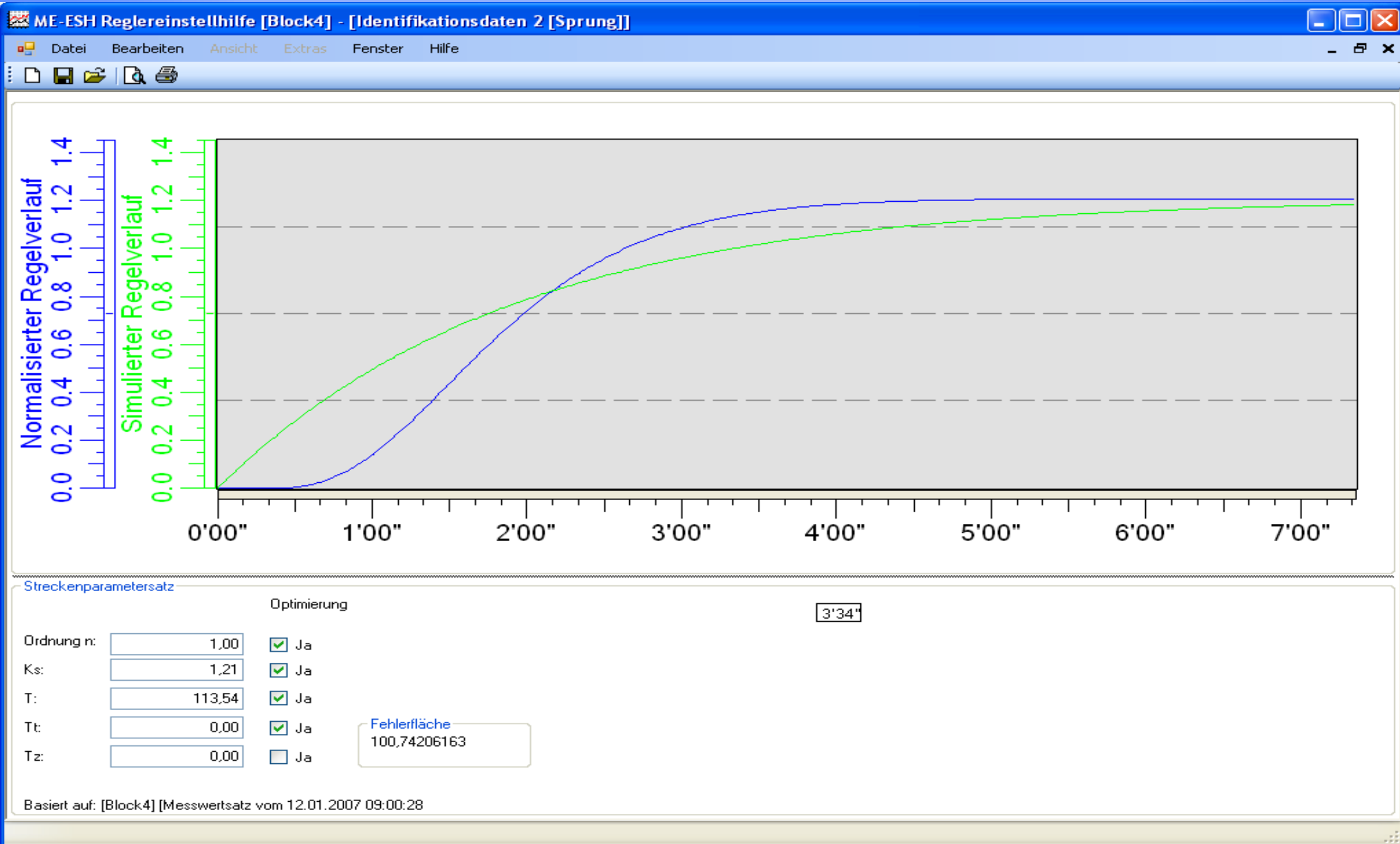






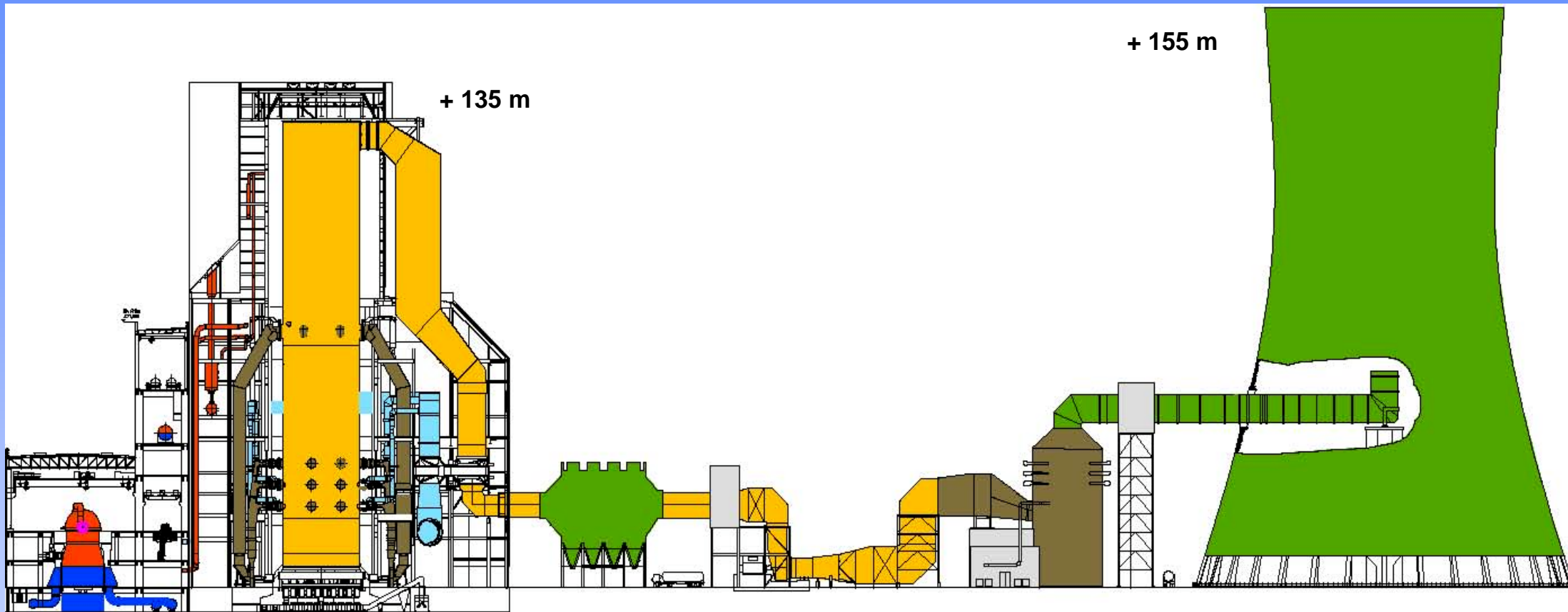








- Base load operation
- Availability > 91 %
- Unit guide control 50 % to 103 %
- High level of automation
- Fulfillment Transmission Code
- Net efficiency > **43,7 %** (main steam:  $T = 600 \text{ }^\circ\text{C}$ ;  $p = 285 \text{ bar}$ )
- Coal demand: 4,5 Mio. t/a
- Specific CO<sub>2</sub>-Emission: 924 g/kWh



Turbine building

Steam generator

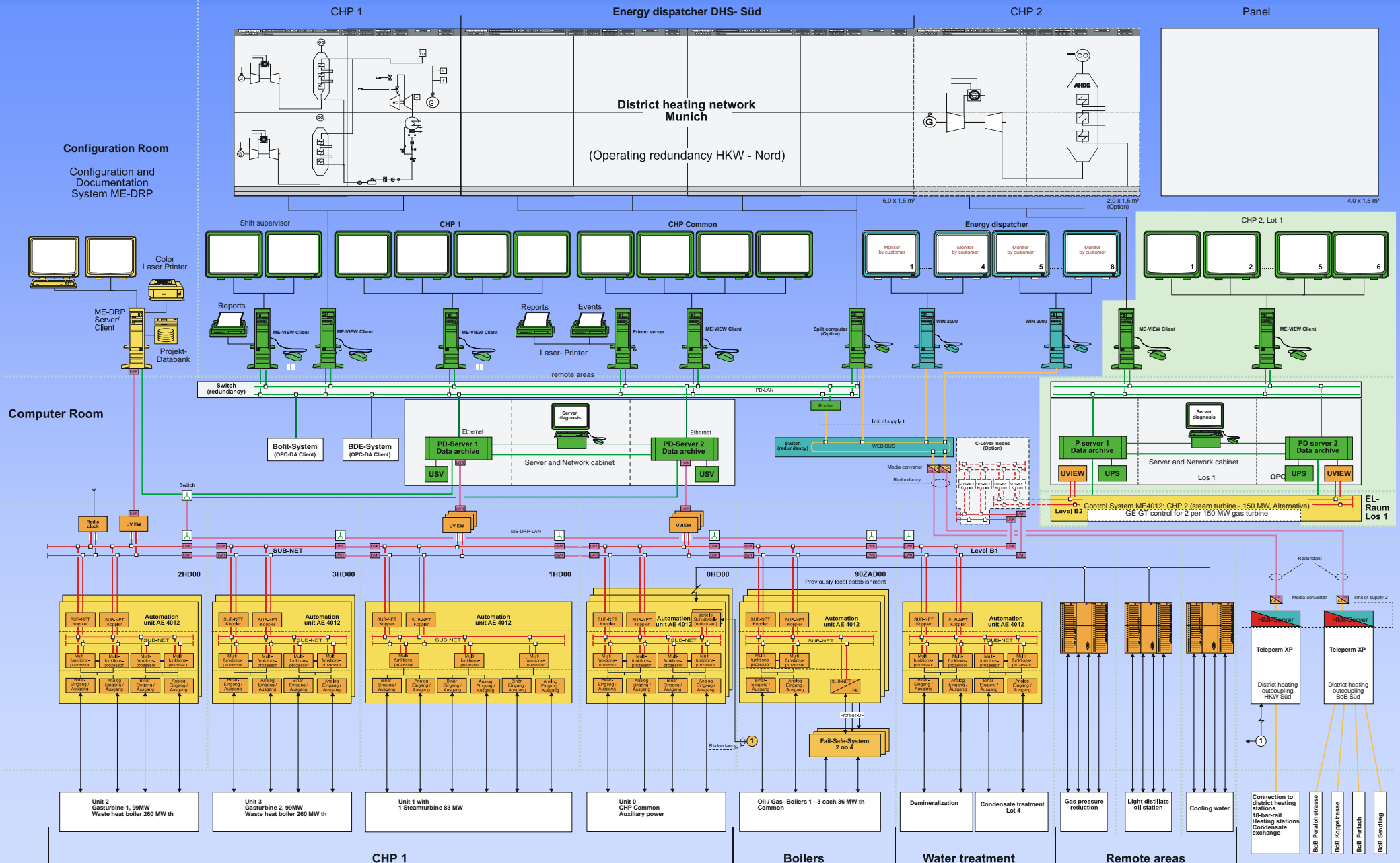
Electrical filters

Induced draft fan

Flue gas desulfurization plant

Cooling tower and flue-derivation





# ME 4012 ME-VIEW Control Room, Munich South combined heat and power station







## Partner for the energy supply industry

If you want to efficiently convert your energy into power . . .



  
*... your partner  
in automation*



### Power station control systems

Coal-fired and nuclear power plants, steam and gas turbines, gas and steam plants, incineration plants and hydroelectric power stations



### Power distribution control systems

Telecontrol systems, station control systems for power grids



### Control room technology

Power distribution and power plant control rooms, dispatch control rooms for gas, oil, water and district heat, traffic control centres and simulator control rooms

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