We solve your challenge in the field measurement, control and automation technology

m-u-t GmbH – a strong partner for your project

m·u·t

MEMBER OF THE NYNOMIC GROUP

m-u-t GmbH in figures

Managing directors: Fabian Peters, Axel Witte

Sales volume: > 25 Mio. EUR

Number of employees: abt. 120

Founding: 1995
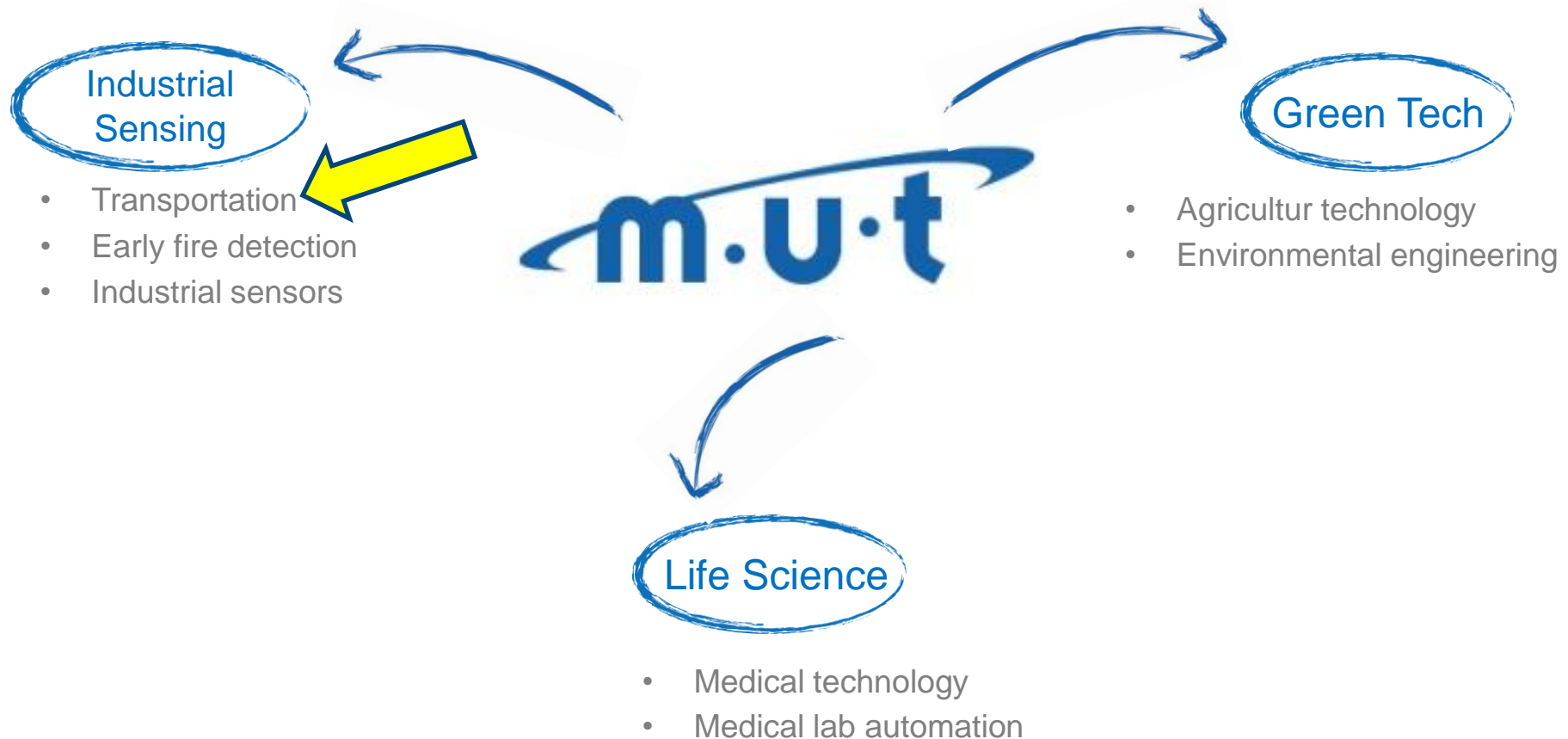
Location: Wedel (bei Hamburg)

Further information: www.mut-group.com

Growth markets in the focus of spectrometric measurement technology and automation technology

Industrial Sensing

- Transportation
- Early fire detection
- Industrial sensors

Green Tech

- Agricultur technology
- Environmental engineering

Life Science

- Medical technology
- Medical lab automation

Our performance as an OEM partner Not just development and production

Technology
- The entire spectrum of photonic innovations
- Robotics, automation, control, software
- Component portfolio for laboratory automation

Development
- Creative and agile in concept development
- Efficient in product development
- Life cycle management
- Osolescence management

Producion
- Flexible batch-controlled series production based on LEAN and SIX SIGMA principles
- Short production times
- Fast and efficient series transition

Logistics
- modern ERP system for fast order processing and complete traceability
- warehousing and materials management
- Supplier management and qualification

Regulatory Affairs
- Clear product conformity
- Medical devices, in vitro diagnostics
- Automobile, Semiconductor
- Agriculture, Railway, VdS

Service
- In-house and on-site
- Remote maintenance and telephone support
- All service levels possible
- ESD and separate disinfection area

Quality
- State-of-the-art quality assurance system
- Separate quality assurance for development, production and logistics
- ISO13485, ISO9001

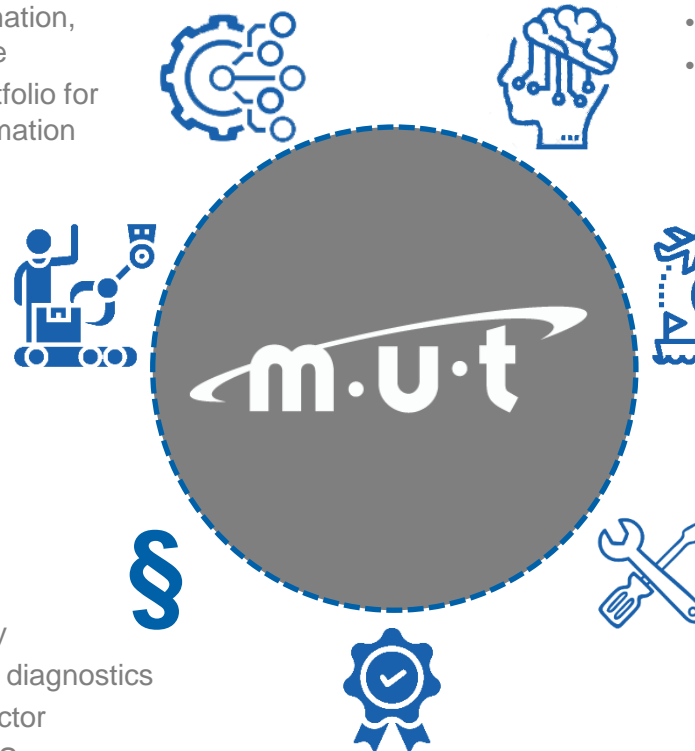The Transportation division specializes in
measurement and **control** technology,
as well as **control elements** and **sensors**
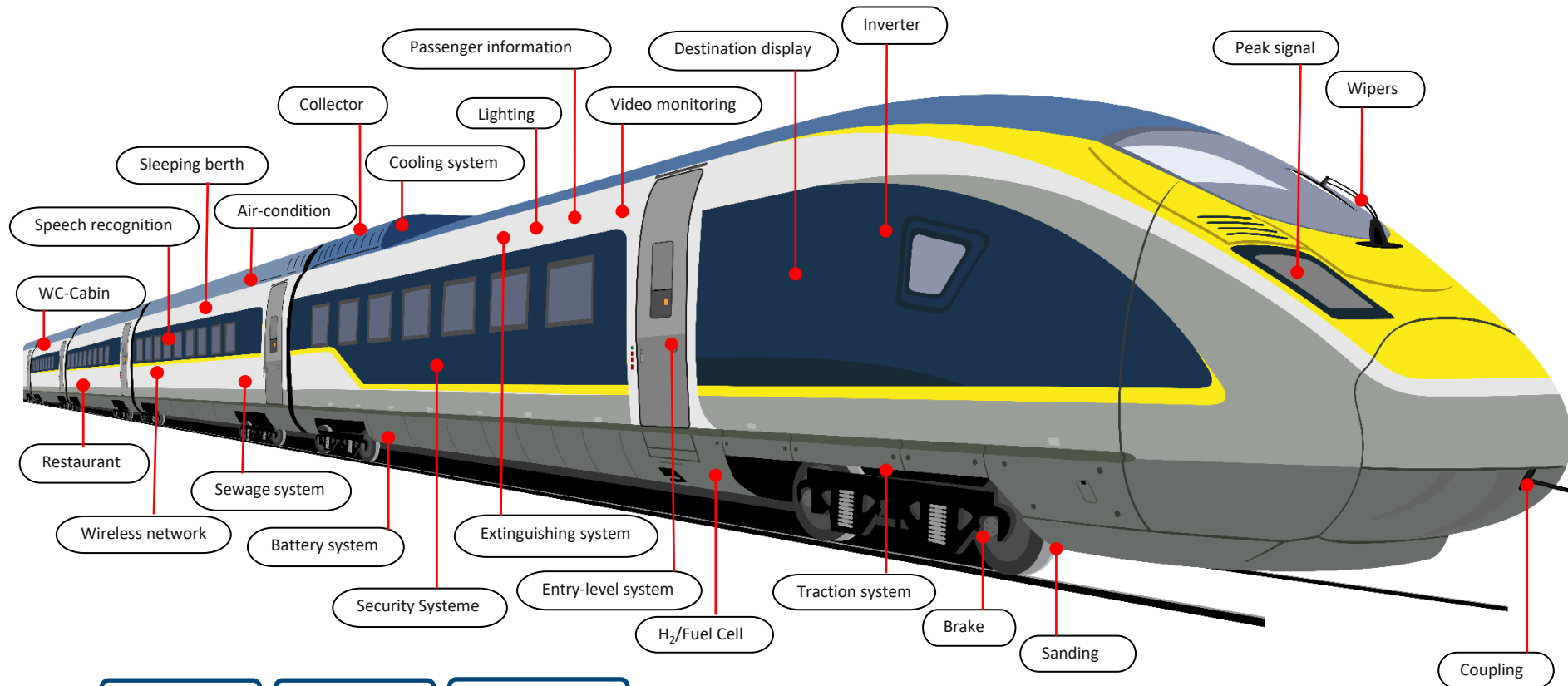for use in rail vehicles.

Four good reasons...

1. Our products are not developed for industrial or commercial applications and then adopted for the railways, **we develop for the railways from the beginning!**

2. **25 years of experience** form the basis for our competence in the planning, development and manufacture of products for use in rail transport.

3. Due to our medium-sized structures, we can respond to **individual customer requests** quickly and flexibly.

4. **Railway-compliant quality at fair prices....**

Our scope of services

- Products and product development according to regulatory requirements for rail traffic e.g.
  EN50155   Electronic equipment on rail vehicles
  EN45545   Fire protection
  EN50121-3-2   EMC Electromagnetic compatibility (+ radio communication)
  EN50128   Software

- Long-term **lifecycle management** (typically 30 years)

- **Develop and manufacture** customer-specific products and systems

- Innovations through **photonics integration** (sensors)

- **Innovations for control boards** using printed circuit boards (PCB) + controls

- All products as OEM goods with **customer branding**

Custom-fit electronics for your subsystems

- Inverter
- Passenger information
- Destination display
- Peak signal
- Wipers
- Collector
- Lighting
- Video monitoring
- Sleeping berth
- Cooling system
- Air-condition
- Speech recognition
- WC-Cabin
- Restaurant
- Sewage system
- Wireless network
- Battery system
- Security Systeme
- Extinguishing system
- Entry-level system
- H_2/Fuel Cell
- Traction system
- Brake
- Sanding
- Coupling

Controls   Control   Control Panl.

Indicators   Sensors   Gateways   R+D Products

Controls

- Force-based, non-contact or combination buttons
- proximity sensors
- touch screen
- ## NEW ## Gesture Recognition
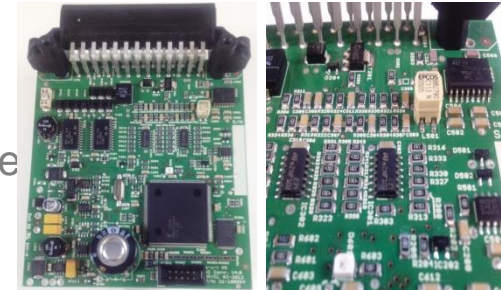- ## NEW ## Voice Recognition

Displays & Indicators

- LED displays with fixed symbols / opt. vanishing effect
- LCD displays / opt. with touch panel
- VFD displays
- Symbolism, graphic or alphanumeric
- Remote HMI for service personnel
- Optional integrated interfaces RS232, RS485, CAN, Ethernet
- Optional integrated inputs and outputs, digital and analog

Embedded Controller

- Custom-fit compact controllers with/without housing
- EMC-protected inputs and outputs, digital and analogue
- Process interfaces RS232, RS485, CAN, Ethernet etc.
- Real Time Operating System (RTOS)
- Software solutions according to EN 50128

PLC: programmable logic controllers

- Custom-fit compact controllers with/without housing
- EMC-protected inputs and outputs, digital and analogue
- Process interfaces CAN, Ethernet etc.
- Membrane keyboard or touch screen
- Linux operating system
- IEC 61131 programming
- Software solutions according to EN 50128
- Integrated in control panel

Liquid Level Sensors:

- Liquid Level Control
- Leakage Detection
- Air Bubble Detection
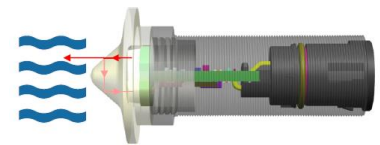
Concentration measurement:

- antifreeze content in water
- AdBlue content
- Fuel type detection
- Oil in water detection

Hygienic touchless control

- Proximity sensor,
- Gesture sensor,
- Voice recognition & control
- Optical, electrical and acoustic measuring methods

Liquid Level Sensor
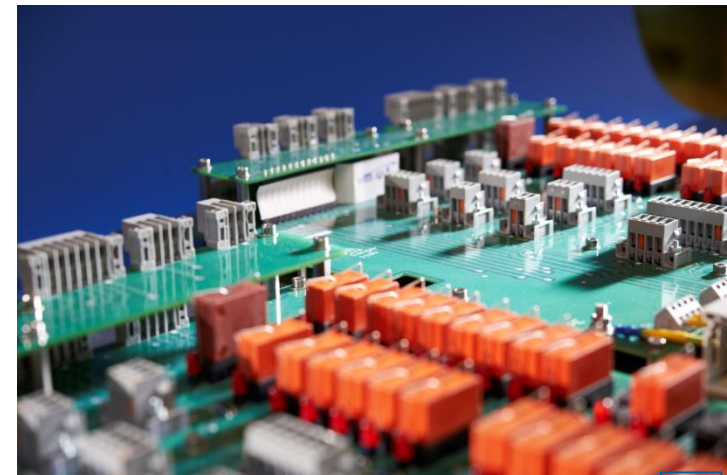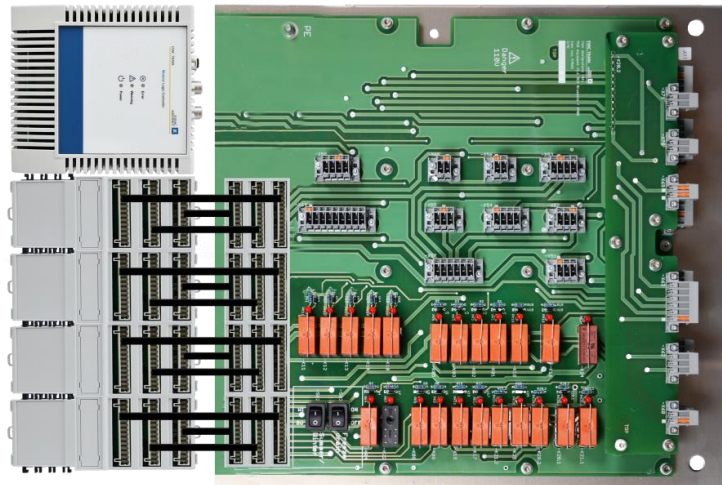

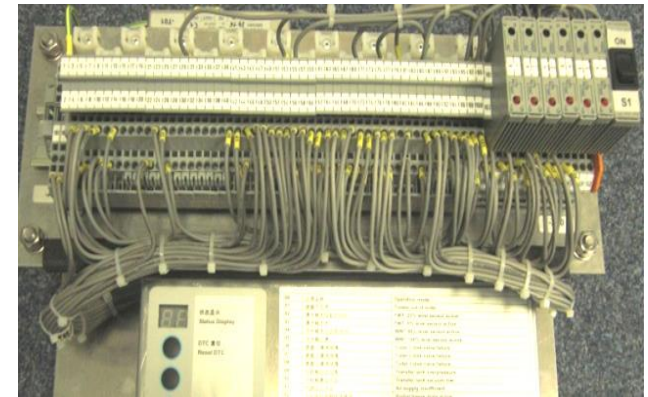Smart universal sensor

Proximity sensor

PLC controls optimized with PCB control panels

- Virtually wiring-free
- Expansion reserve already integrated, e.g. reserve terminals
- Modular & service-friendly hardware concept
- Standardized user software
- Space and weight-optimized installation
- Manufacturing error rate virtually zero (no individual wiring)

Control panels

Control panel optimized in
Printed circuit board technology (PCB)

- Error-free assembly
- No troubleshooting
- No rework
- Short production cycles, fast deliveries
- High production capacities (>15,000 pieces p.a.)
- Optimized for lean manufacturing
- High quality

control panel in stranded wiring,
approx. **15h** production time.

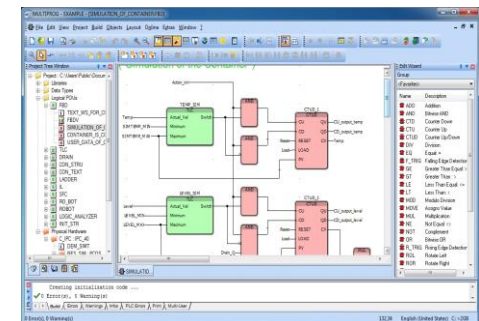control panel in PCB technology,
approx**. 2h** production time

We implement the different network protocols for your controls. In addition, we offer you railway-compliant hardware with protocol translators. All railway-compliant according to EN 50155 and EN 50128.

Examples of implemented protocols:

- IPTCom (Bombardier IPTCom)
- Simple IPTCom (PD data only)
- TComm (Siemens protocol)
- TRDP (Based on TCNopen)
- Hitachi TRDP (Based TCNopen)
- Expert 2 (Siemens protocol)
- UDP
- CANopen
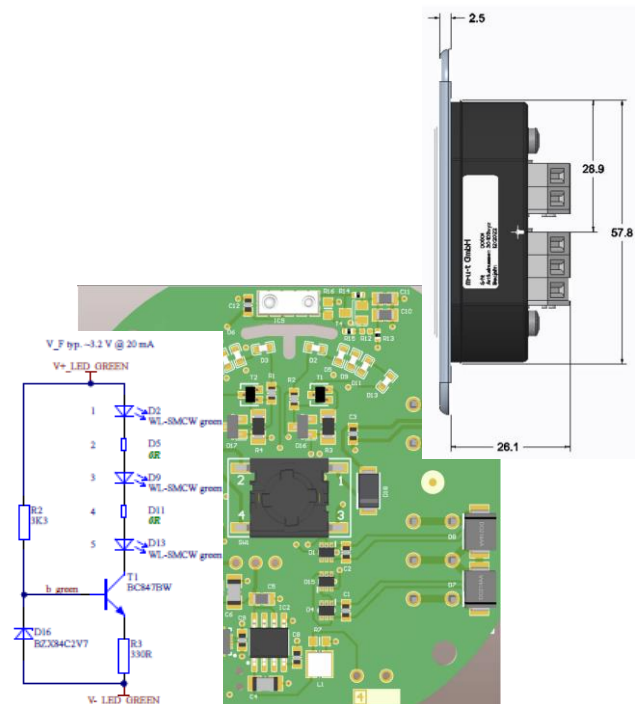- SCN Smart Cabin Network
- Other: On request

No compromises:
OEM products made to measure

Do you need a tailor-made electronic solution for your systems?

- We develop and manufacture **tailor-made solutions** for your systems
- Professional **requirements** and **project management** at medical technology level
- Railway compliant from the start: **EN 50155, EN 45545, EN 50128** etc.
- All disciplines by professionals for professionals:
  project management, regulatory requirements,
  hardware design,
  software design,
  mechanical design,
  validation and verification,
  certification, testing, testing equipment
- Series production including **life cycle management**
- Preventive **obsolescence management**
- Sophisticated **change management**
- High quality standards

Everything from a single source:
That's why our products work right away.

References

Electronic components were supplied for the following projects:

- Alstom RGV 2N2
- Ansaldo Breda / Hitachi ETR 1000
- Bombardier Talent 2
- CRRC CHR 3
- Kawasaki M-8
- Siemens Velaro RUS
- Siemens Desiro ML
- Siemens Desiro RUS
- Siemens Velaro CN
- Stadler KISS
- Stadler FLIRT
- and much more

Thank you for your attention!

MEMBER OF THE NYNOMIC GROUP