Measurement technology for medical and environmental application

m-u-t GmbH – Your strong partner

Company presentation m-u-t GmbH
8 powerful brands within the nynomic group ensure successful solution development
Worldwide footprint of the nynomic group supporting our customers
The Nynomic group and its subsidiaries: Strong partners for solution development

Board of Directors: Fabian Peters, Maik Müller
Net Sales 2018: 67.1 Mio. EUR
Employees: > 425
Foundation: 1995
IPO: 2007, Stock Segment "Scale"
Stock code: A0MSN1
Further Information: www.nynomic.com

Group Nynomic / development of sales

Mio. EUR

17 26 24 32 40 38 41 50 52 55 61 67
History of the nynomic group

1995: Foundation as engineering company under the name m-u-t

2007: Compilation on the German stock exchange

2007: Integration of tec5 AG, Oberursel, GER

2008: Integration of Avantes B.V., Apeldoorn, NED

2014: Transformation of m-u-t AG into a pure strategic financial holding

2016: Integration of APOS GmbH, Wedel, GER

2017: Integration of LayTec AG, Berlin, GER

2018: Renaming to NYNOMIC AG

2018: Integration of Spectral Engines Oy, Helsinki, FIN

2019: Akquisition of Sensortherm GmbH, Sulzbach, GER

2019: Integration of LemnaTec GmbH, Aachen, GER
Together the Nynomic Group expands and complements their reach and portfolio

<table>
<thead>
<tr>
<th>Value Creation / Level of Integration</th>
<th>Industrial, low-volume</th>
<th>Industrial and pro handheld, mid-volume</th>
<th>Prosumer and consumer, high-volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solutions</td>
<td>m.u.t.</td>
<td>m.u.t.</td>
<td>SPECTRAL ENGINES</td>
</tr>
<tr>
<td>Systems</td>
<td>APOS</td>
<td>tec5</td>
<td>SPECTRAL ENGINES</td>
</tr>
<tr>
<td>Components</td>
<td>LAYTEC</td>
<td>SensorIHERM</td>
<td>SPECTRAL ENGINES</td>
</tr>
<tr>
<td></td>
<td>LemnaTec</td>
<td>AVANTES</td>
<td>SPECTRAL ENGINES</td>
</tr>
</tbody>
</table>

Each category (Solutions, Systems, Components) represents different levels of value creation and integration in the Nynomic Group's portfolio.
Eight Brands – one Product Portfolio

The whole spectrum of non-destructive optical measurement!
Brief overview of m-u-t GmbH

Management: Fabian Peters, Axel Witte
Net Sales: >20 Mio. EUR
Employees: approx. 120
Foundation: 1995
Location: Wedel (Hamburg-region)
Further Information: www.mut-group.com
our service as an OEM developer and manufacturer

Development
- Creative and Agile until the product concept
- Efficient until product launch
- Lifecycle Management
- Obsolescence Management

Production
- Well educated staff for short production times and a professional handling of mistakes
- Batch-controlled serial production based on LEAN and SIX-SiGMA principles
- Powerful Production Engineering for a fast and efficient serial transfer

Logistics
- All-inclusive service
- Fast order processing and optimal traceability with a modern ERP-system
- Warehousing
- Material management
- Supplier management and qualification
- Shipping and customs clearance

Quality
- State of the art quality system
- Own Quality Assurance People for Development, Production and Logistics
- ISO 13485
- ISO 9001

Regulatory
- Clear product compliance
- Product certification and documentation
- Medical devices
- In-Vitro Diagnostics
- Automotive
- Semiconductor
- Agricultural
- Railway
- VdS

Technology
- The full spectrum of photonic innovations
- Automation
- Control-Systems
- Software
- Component portfolio for laboratory automation
Growing markets within the m-u-t GmbH: Spectrometric measurement and automation technology

Clean Tech
- Transportation
- Fire Detection
- Industrial Sensing

Life Science
- Medical Technology
- Lab Automation

Green Tech
- Agricultural Technology
- Environmental Technology
Integrated product development process guarantees fast, safe and efficient results

1. **YOUR IDEA**
   - Technical support during concept phase

2. **CONCEPT**
   - Detailed concept-planning and development at fixed cost and time

3. **PRODUCT- & PROCESSDEVELOPMENT**
   - Series development certification and documentation

4. **DUPLICATE PART**
   - Cost efficient production
   - State-of-the-Art Quality Systems

5. **PRODUCTLIFECYCLE-SUPPORT**
   - Lifecycle Management
Application development from detector to mathematics

Example 1: Moisture and content detection in-line

- NIRS or NIR-Photometer technology
- Measurement of quality parameters during the harvesting process
- In-line dry mass detection on the field chopper for corn, grass, lucerne
- Optimization of the machine control

Example 2: Manure turnout & harvest control

- Contents analysis of manure in-line during turnout
- Directly in the goods flow
- Direct communication with central machine control
- Nutrient matter balancing and proof of turnouts
- Flexible use for different analysis methods through individual calibration
Spectrometer systems for control safeguarding your investment

Example 1: Multi Gas Sensor for oxygenated hydrocarbons

- Infrared Multi Gas Sensor using NDIR-Technology
- No chemical reaction inside Multi Gas Sensor, no calibration gases necessary – high long-term stability
- 8 gases in 1 Sensor - no interference between gases
- CO, CO₂, CH₄, C₂H₂, C₂H₄, C₂H₆, mm to be detected

Example 2: Early Fire Detection

- Integrated distance measurement
- Unique object detection: Detection of smallest hot spots surrounded by much larger "allowed" heat sources (e.g. trucks)
- Modularity
- 24/7 usability in rough environments
Medical technology and lab automation “one-stop-solution” to sort, identify and control quality

Example 1: Bulk-Input-Module for a Total Laboratory Automation (TLA) Solution

- Fast-track product development footing on the modular m-u-t concept for lab automation applications
- Bulk sample separation at input station
- Identification and quality control of the sample (barcode, geometry, cap color, mm.)
- Placing the sample tube in the rack of your TLA-System

Example 2: Sensors for quality control

- For instrument processing devices
- Identification of the instrument and of the personnel using smart RFID-Technology
- Process documentation of tightness and flow rate control of the instrument
Example laboratory automation
Bulkloader

m-u-t’s components

OEM-Solution
Example laboratory automation
Re- und Decapper

- Cap and Rotation Gripper
- Swivel and Lift Unit
- Camera-System
- Vial Gripper
- Drip Tray
Example Medical Devices
Components for Instrument reprocessing systems

1. Control System for Process Control and Traceability

- **Channel Check** (Sensors)
- **Leakage Test** (Sensors)
- **Control System** (integrated module and stand-alone, Software)
- **Identification of Instrument, Operator and Endoscope** (RFID-Antennas and Tags)
- **Traceability** (Printers, Labels, CanBus, Ethernet, etc)

2. Adapters for different types of flexible Endoscopes
Cloud possibilities of the m-u-t GmbH

Overview

- Industry 4.0
- High availability
- Easiest update and maintenance options
- Measured values can be stored and recalled in the cloud
- Maintenance and update of devices via remote access (internal or external)

Cloud-database

Upload of spectra and measurement data
Upload of warning and error messages
Download of firmware and model updates

Display of measured values and spectra
Remote maintenance of the sensor
Upload of new models and firmware
Access to measured values via app/web portal possible
Cloud possibilities of the m-u-t GmbH
Applications of various specifications and Business Cases

Process Communication

m-u-t or customer device

Data Network

Cloud

Functions/Scope

Status

Storage

Functions/Data Analysis/Calibration

Device Administration

Maintenance
Monitoring of system parameters and threshold values:
- Data recording through event logging
- Setting limits (e.g. for level warning and error)
- Feedback on border crossings
- Access to the log data
Cloud possibilities of the m-u-t GmbH
Exemplary concept

Customer

System device/environment

Data by sensors / control systems
- Currents
- Temperatures
- Cycles
- ...

Service

Nynomic Cloud

Web API

Application Logic

Database

Datalogging

Evaluation by neural network

Monitoring of Analysis values (e.g. threshold values)

Trend analysis and predictive maintenance

- ok
- nok

Service

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Service
Thank you for your attention!