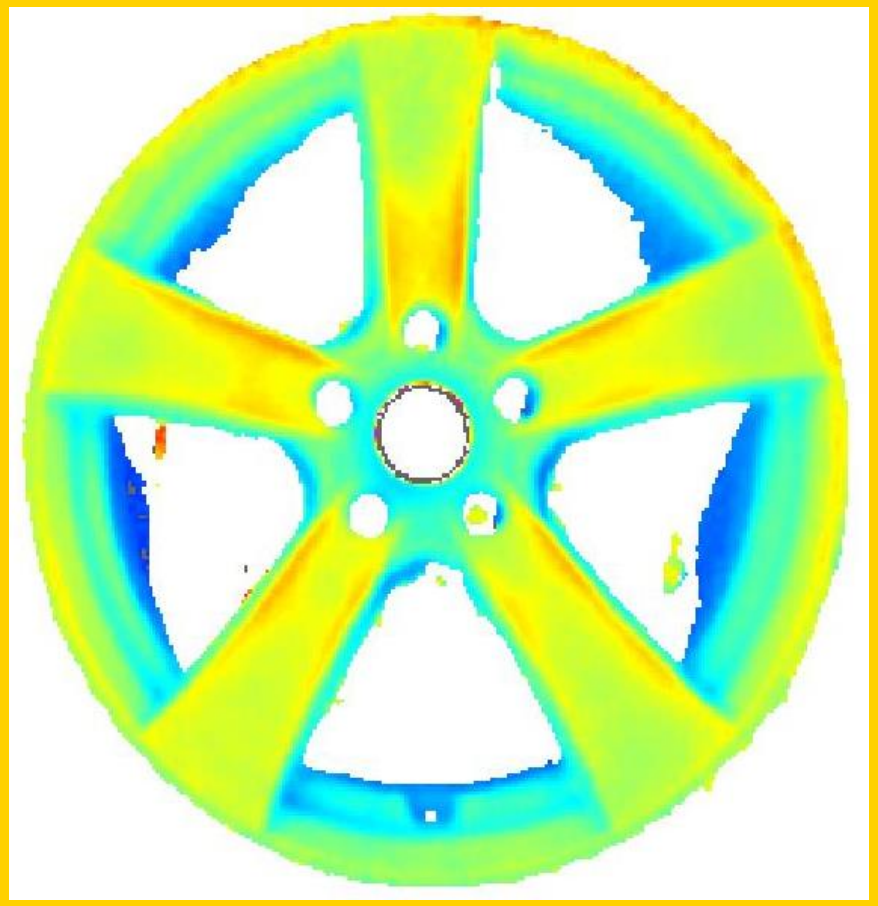
coatmaster

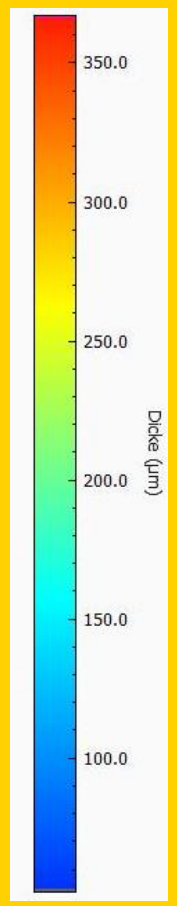
# Imaging measurement of coating thickness on wheels

# Application examples

1. Three-layer cured (3 layers)
2. Bicolor, high gloss (5 layers)
3. Polish turned and Deburred (3 layers)
4. Vibratory finished (5 layers transparent)
5. Bicolor, high gloss
6. Wet paint
7. Powder paint

# 3 layers (color) – Imaging coating thickness measurement





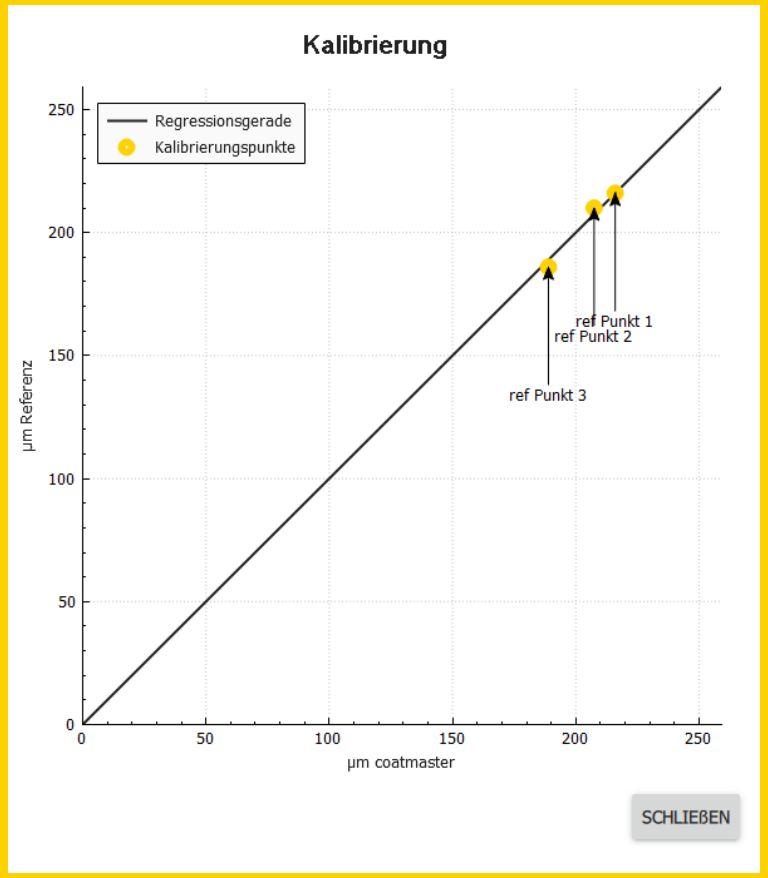

**Benefits**

- Objective, uncompromising and repeatable coating thickness measurement at more than 100,000 measuring points
- 100% quality assurance
- 100% documentation and warranty protection
- Automated measurement on moving objectManual testing also possible

**Technical specifications**

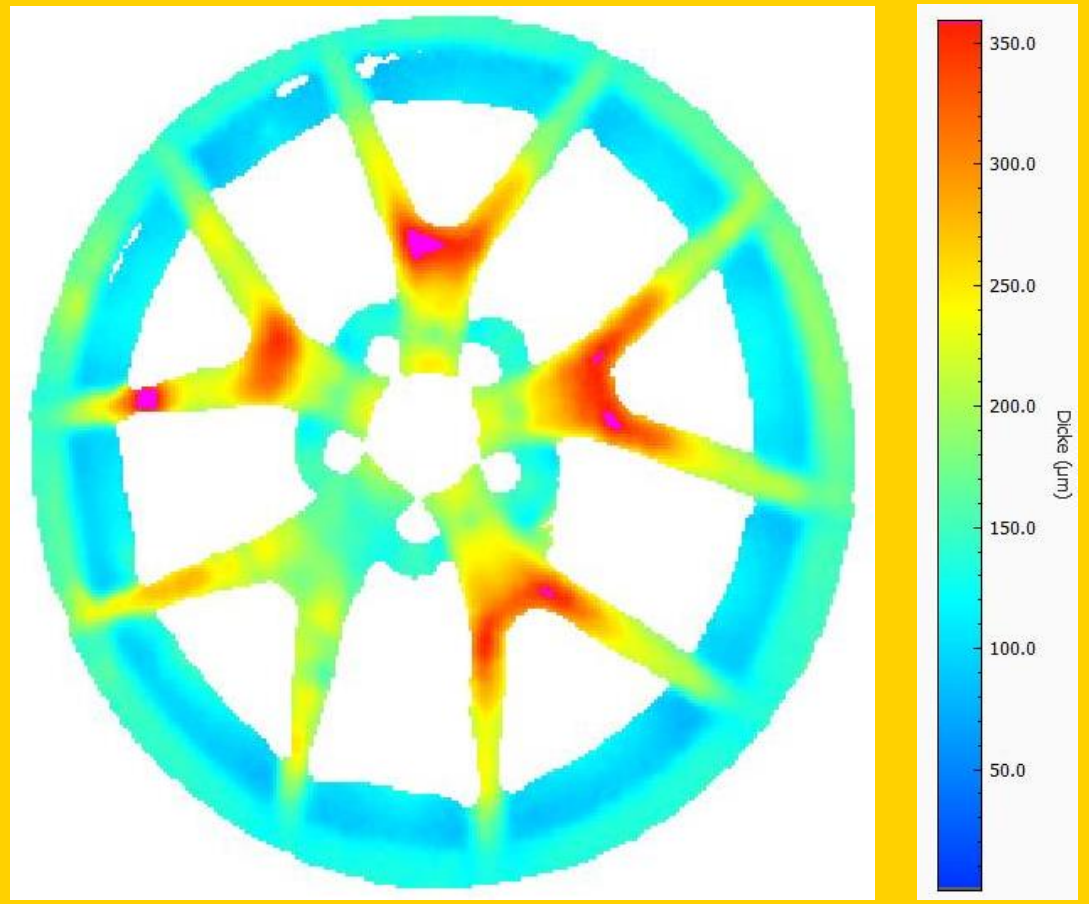
- Spatial resolution ca. 2mm
- Measurement of more than 100,000 measuring points in less than 1s measuring time

# 3 layers (color) – Calibration & Traceability




- Easy calibration via coatmaster Flex or tactile coating thickness gauge
- Good agreement with tactile measurement
- Linear coating thickness curve over large coating thickness range (up to 600µm)

# 5 layers (color, gloss) – Imaging coating thickness measurement

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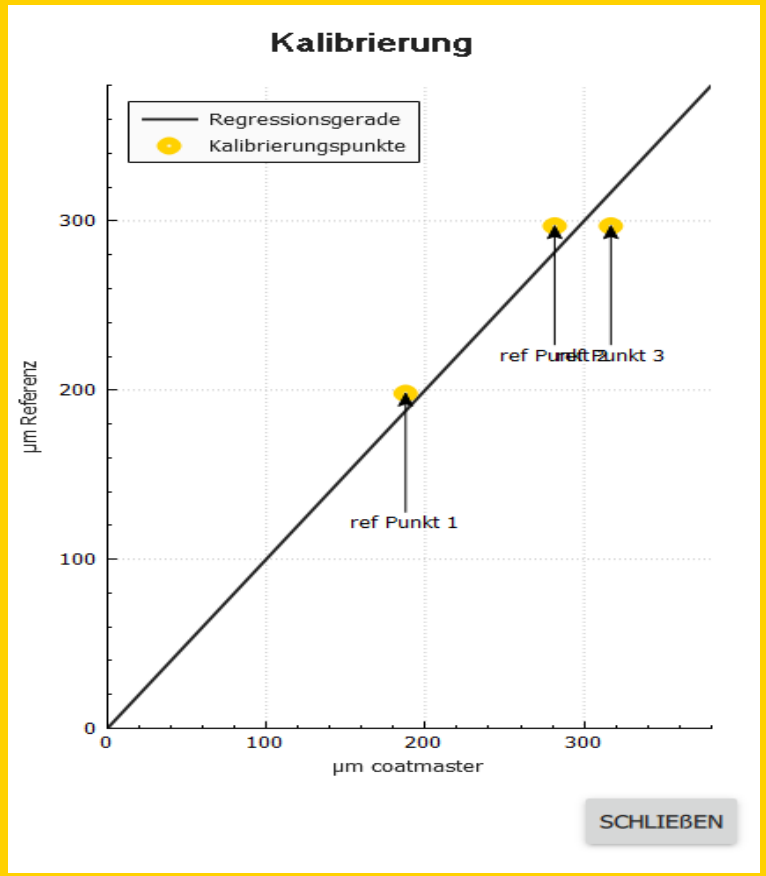


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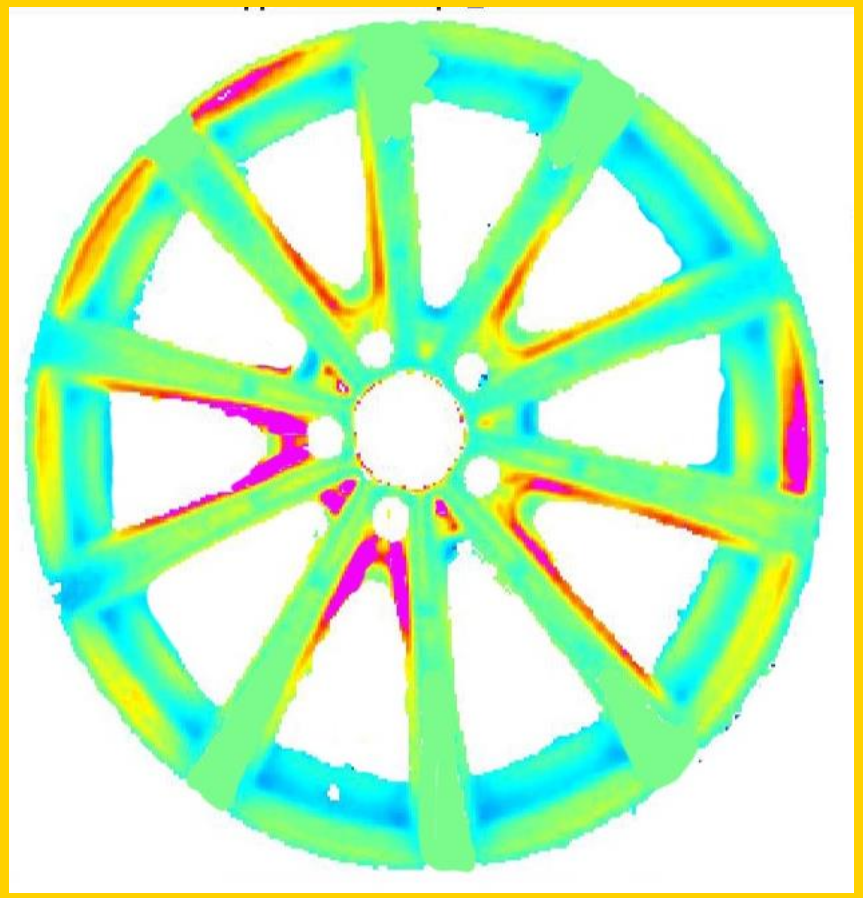
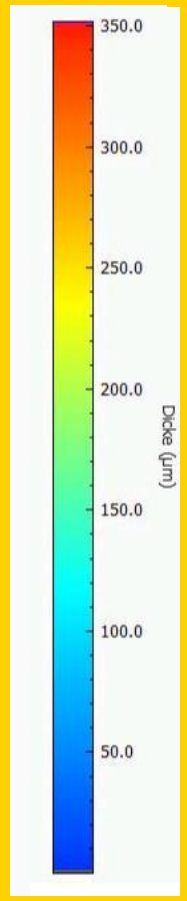
# Clear coat– Imaging coating thickness measurement



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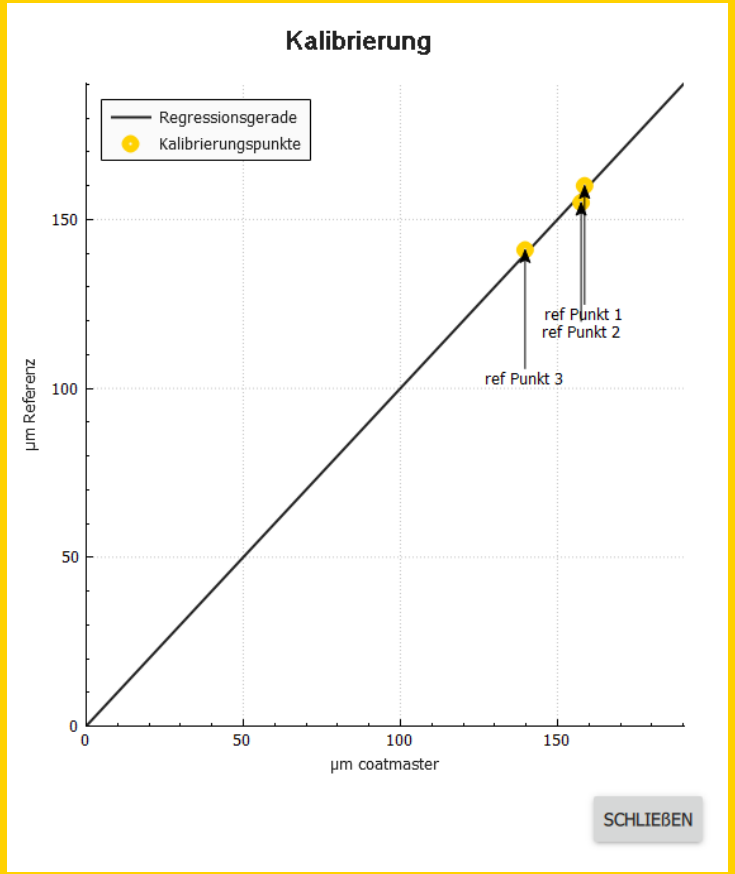


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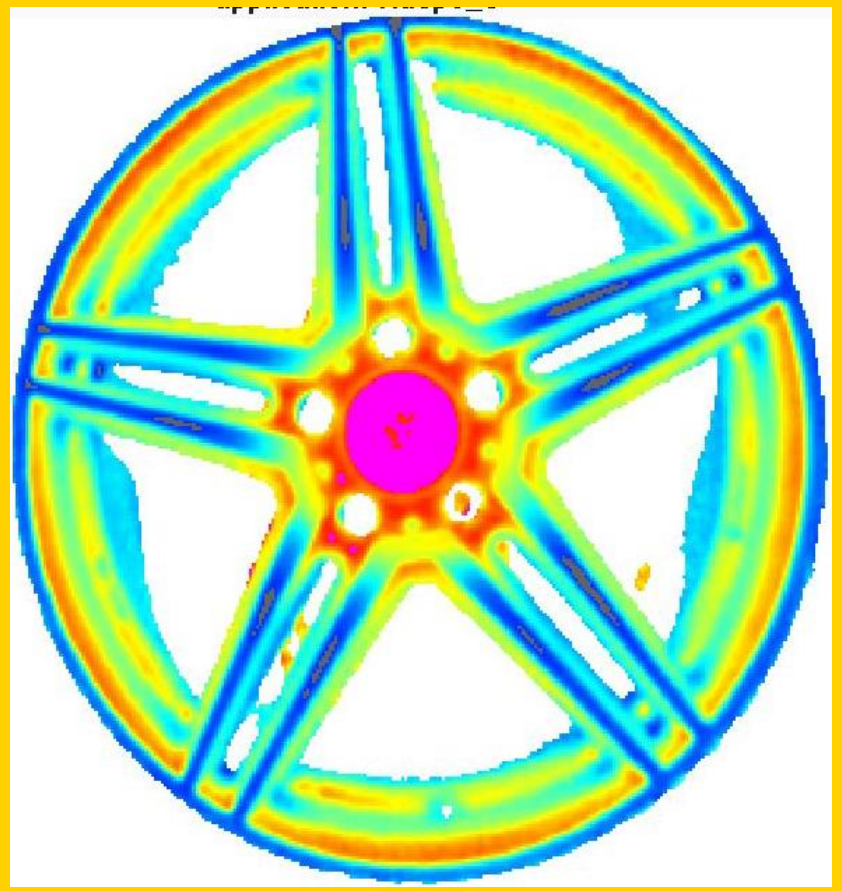
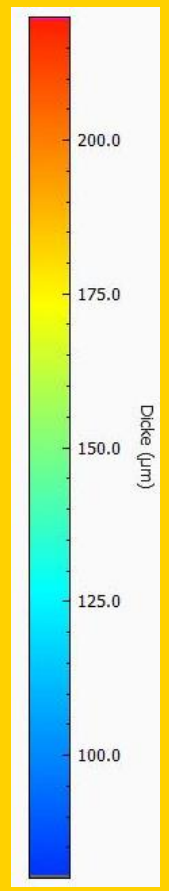
# 5 layers (color, matte) – Imaging coating thickness measurement



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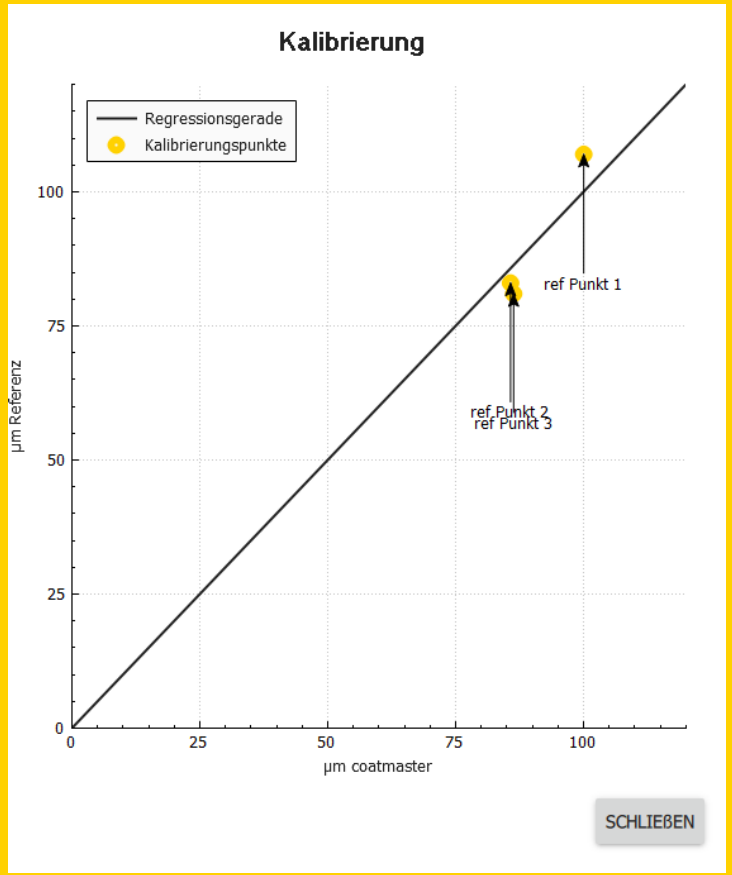


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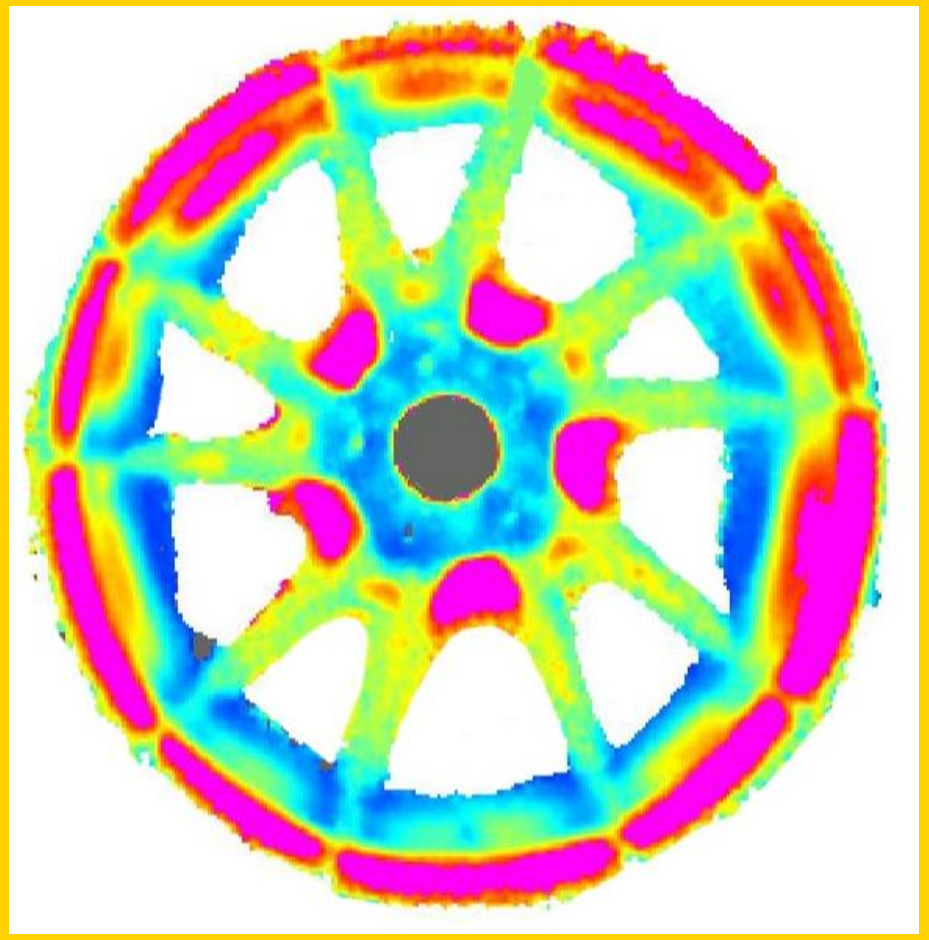
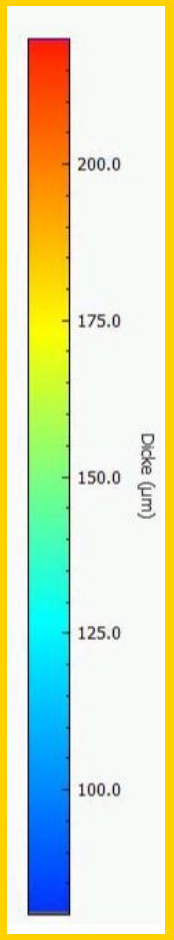
# Polish turned / Clear-Coat – Imaging coating thickness measurement



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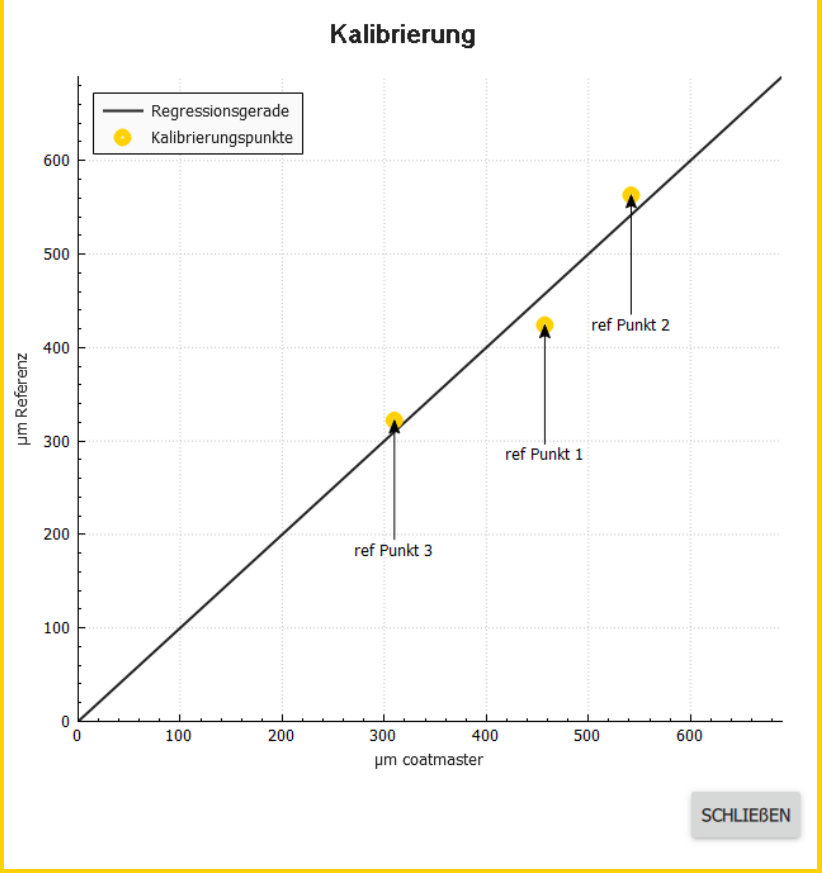


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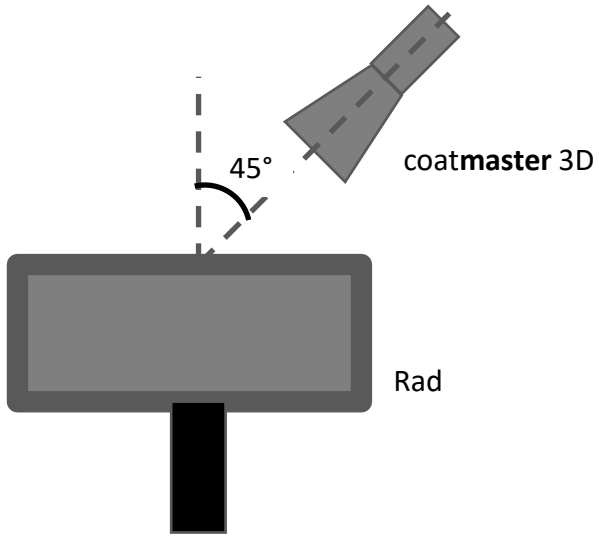
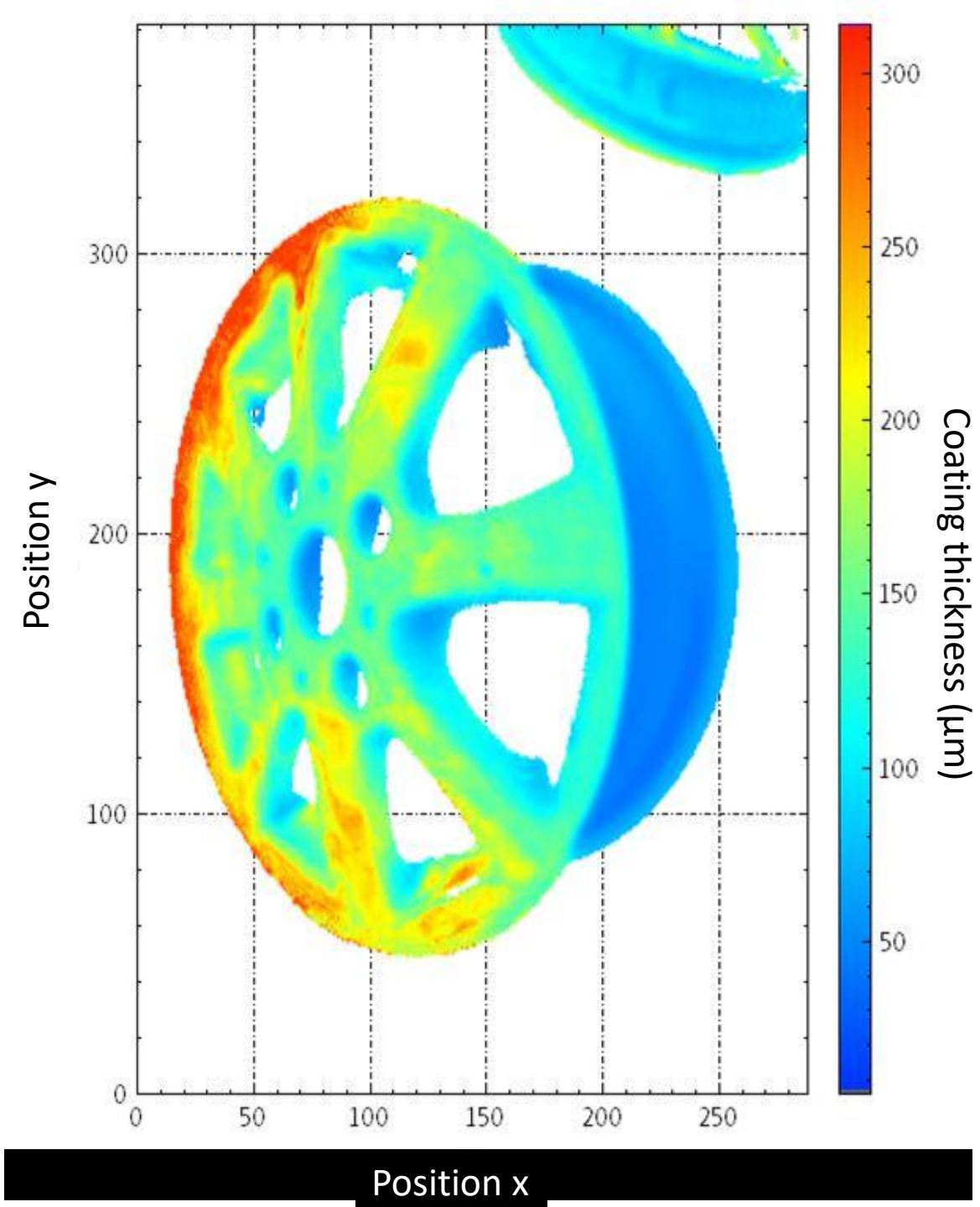
# Example

Setup



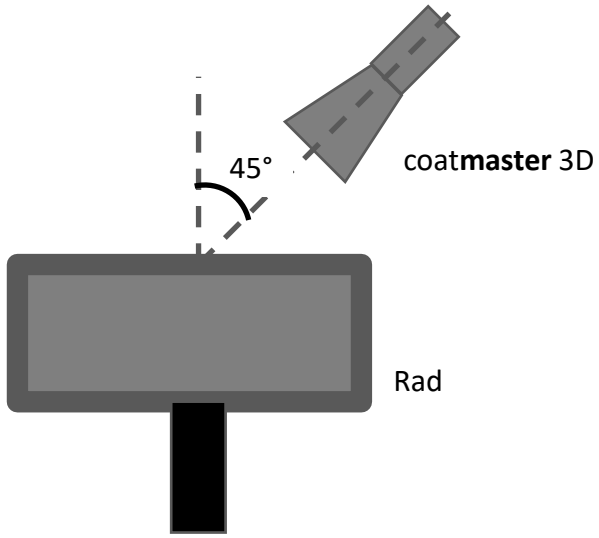



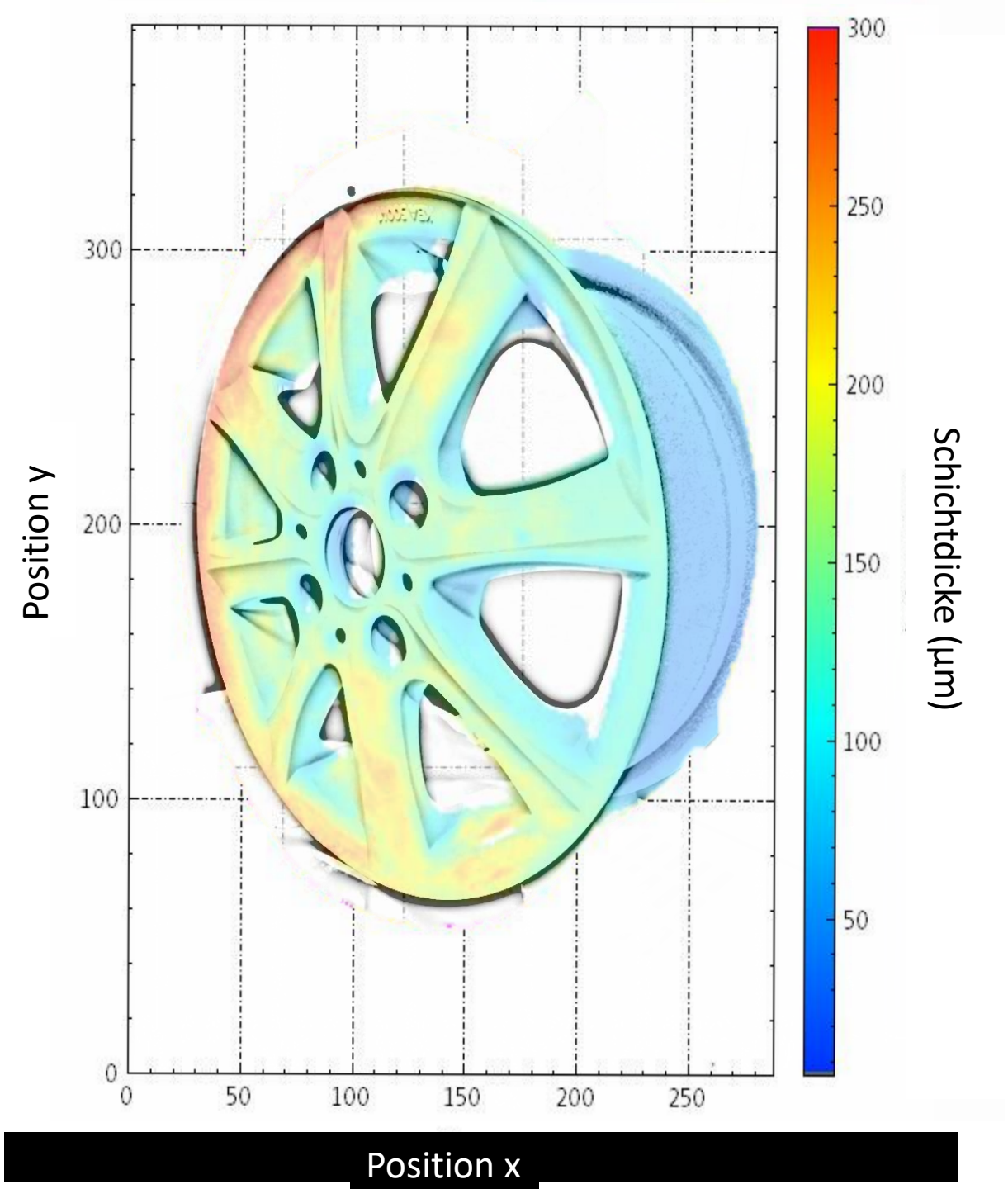

**Details**

- Measurement of powder layer thickness before curing with a standard deviation of 2%-5% per measuring point.
- Fast measurement process in about 1.5s with proven and robust coatmaster technology.
- Measurement also possible on moving object directly in the line.
- Acquisition of more than 100,000 coating thicknesses in a single measuring process.
- Coating thicknesses on the front side, the edge area, as well as flanks on spokes can be recorded with one measurement.

# Example
# (incl. edge filter)

Setup



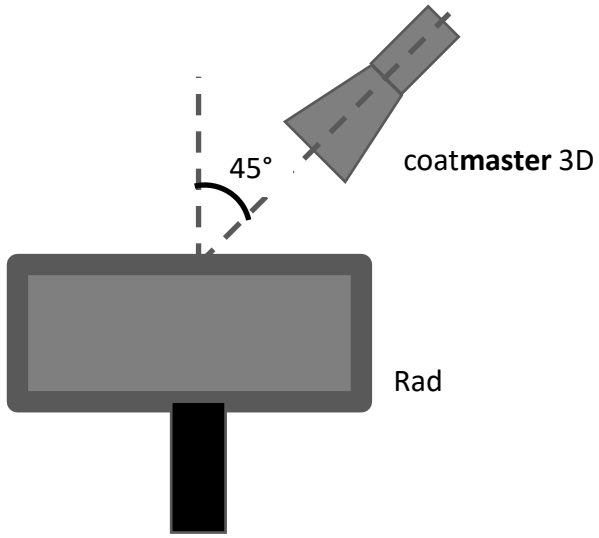



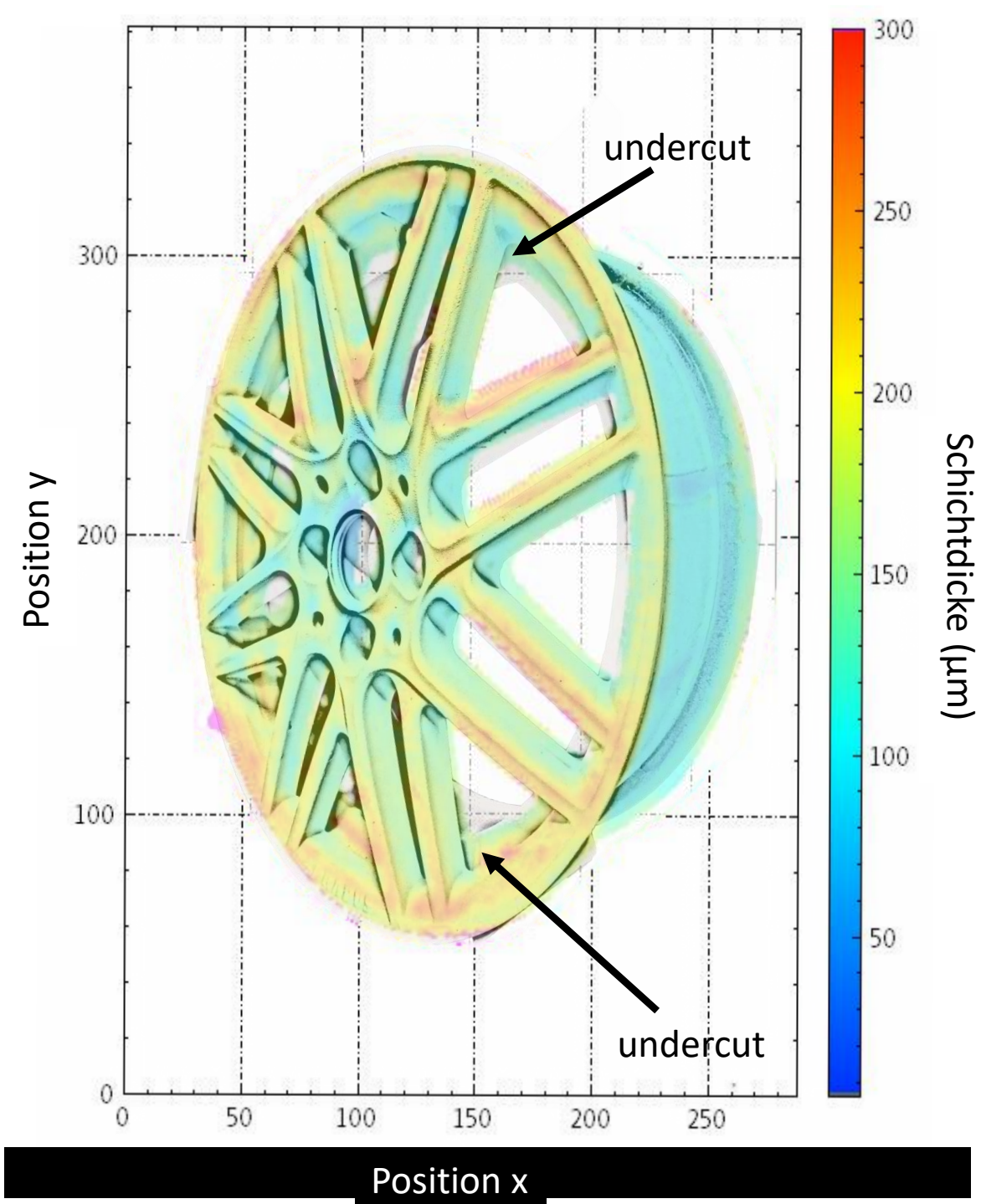

**Details**

- Guide for the eye on the wheel by overlaying with edge-filtered visible image
- Layer thicknesses on the front side, the edge area, as well as flanks on spokes can be recorded with one measurement.

# Example (incl. edge filter)

Setup

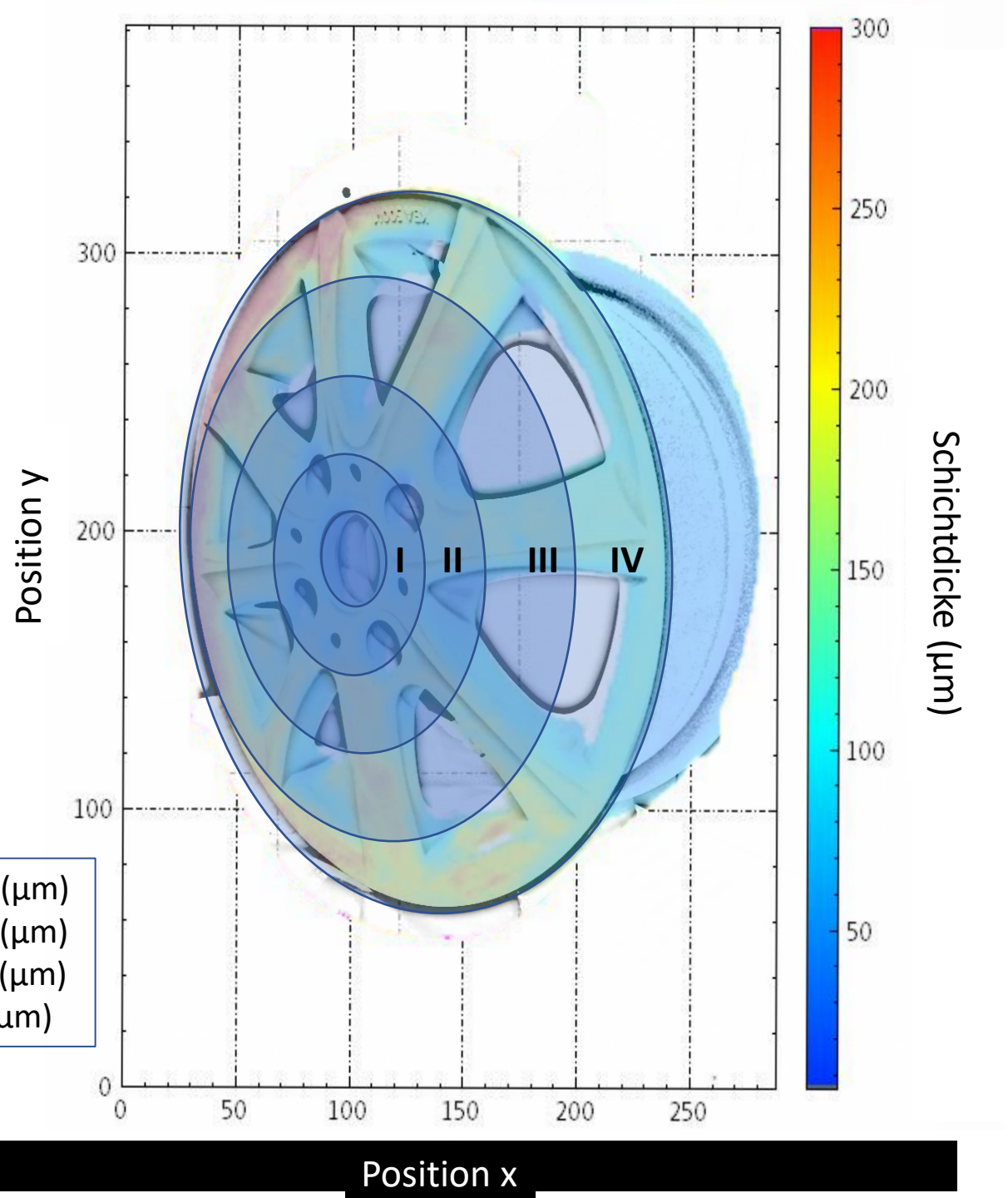



**Details**

- Measurement also possible on complicated wheel geometries without problems and without integration effort
- Layer thicknesses in undercuts can be made visible
- The following applies: The larger the measuring angle, the deeper the measurement in undercuts.
- Synchronization with the system via standard protocol or proximity sensor
- Storage of measurement data on measuring computer

# Post-Processing




IV: **AVG** 200 **STD** 31 **MIN** 150 **MAX** 302 (µm)
III: **AVG** 154 **STD** 21 **MIN** 131 **MAX** 212 (µm)
II: **AVG** 130 **STD** 20 **MIN** 108 **MAX** 165 (µm)
I: **AVG** 98 **STD** 17 **MIN** 45 **MAX** 83 (µm)

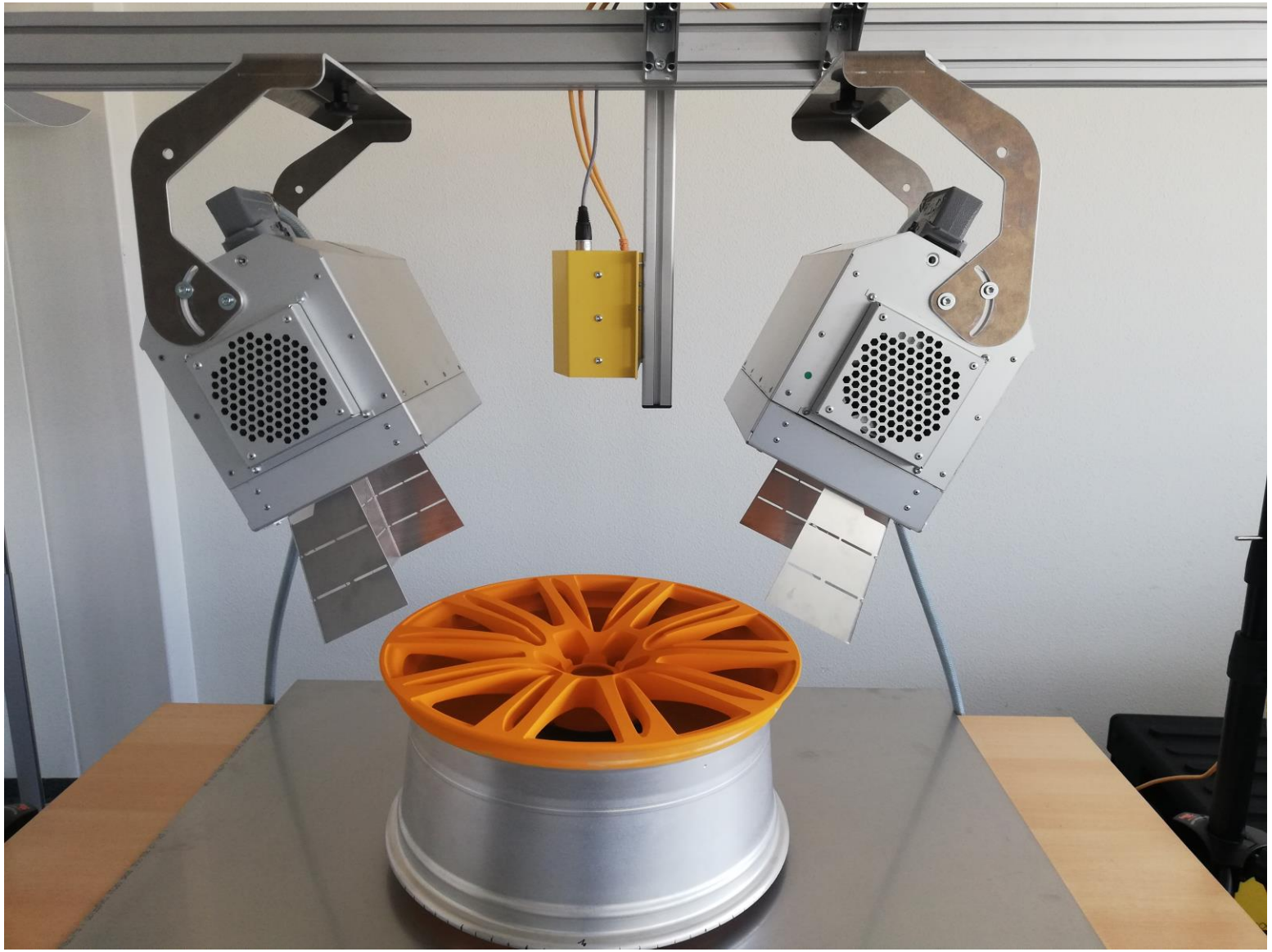
**Details**

- Automated position recognition of the wheel
- Automated evaluation via standard geometries (here elliptical rings)
- Automated output of control variables such as mean value, standard deviation, minimum & maximum value
- Local storage of data (stand-alone solution) or transfer of control variables to system (integrated solution)

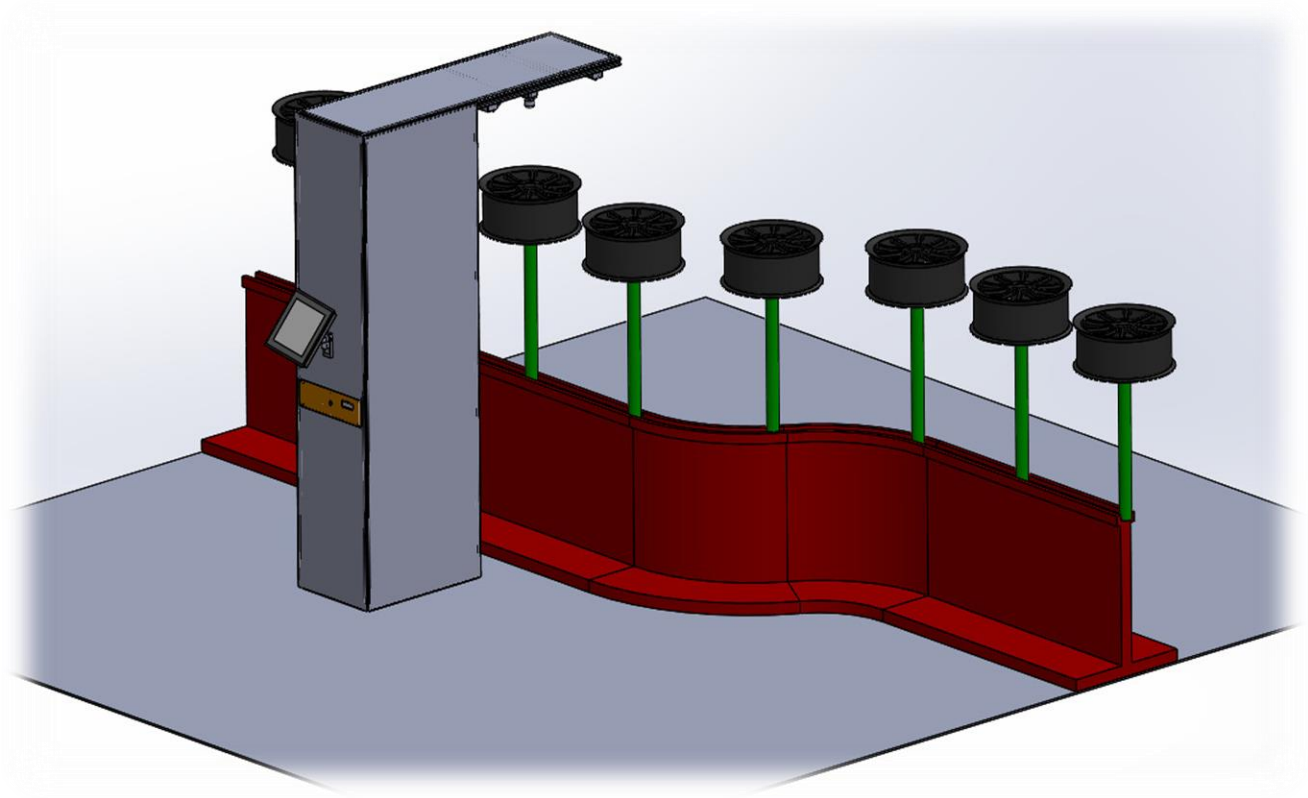
# Integration locations in the coating line

- Powder coating Primer
- KSP coating
- Clear coat powder
- Clear coat wet
- Final inspection outgoing goods / QA

# Stand-alone measuring station for random samples



# Integration example – Station for Inline Measurement

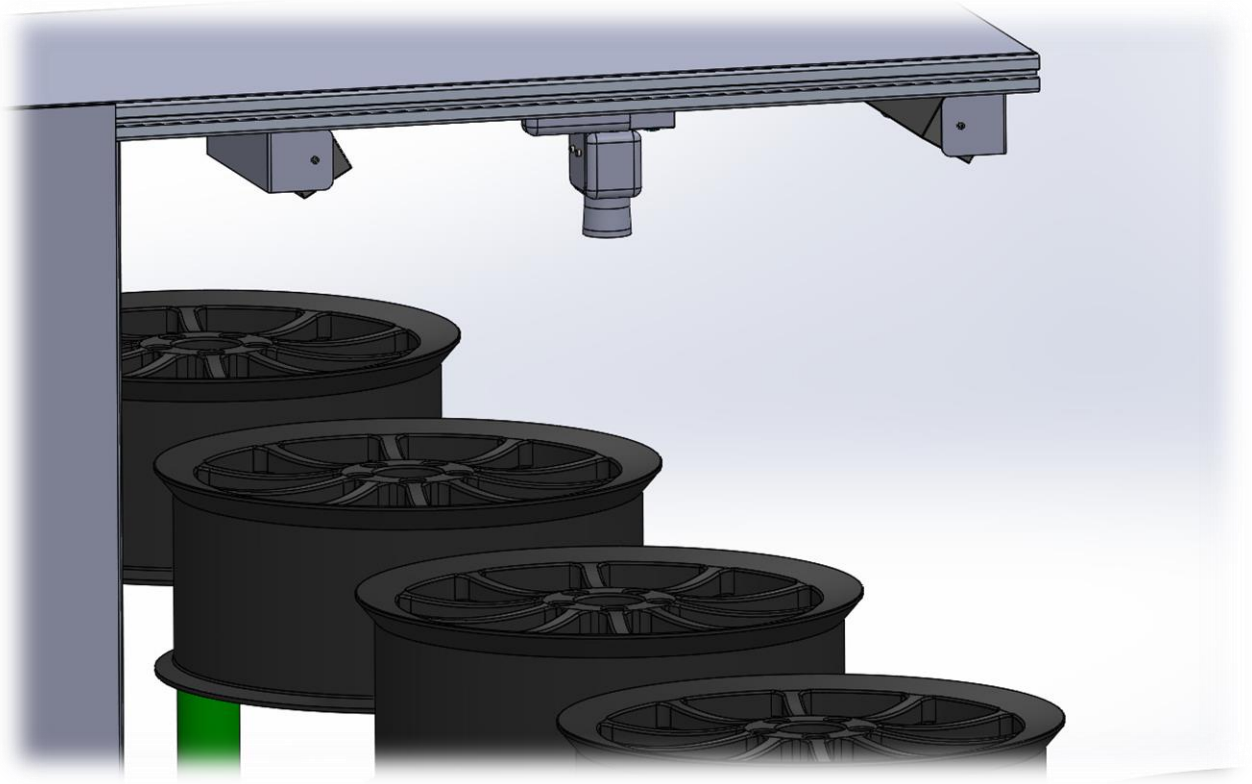


**Technical description**

- Formwork of the superstructure with sheet metal elements and integration of all system components
- Profile construction for mounting camera (with 10 cm linear axis and light sources)
- Synchronization of the measurement setup via optical proximity sensor
- Display of data on monitor
- Opt. 2nd monitor directly at the system controller
- Local storage of data (stand-alone solution) or transfer of control variables to plant (integrated solution)

Figures are for illustration purposes only

# Integration example –
# Station for Inline Measurement



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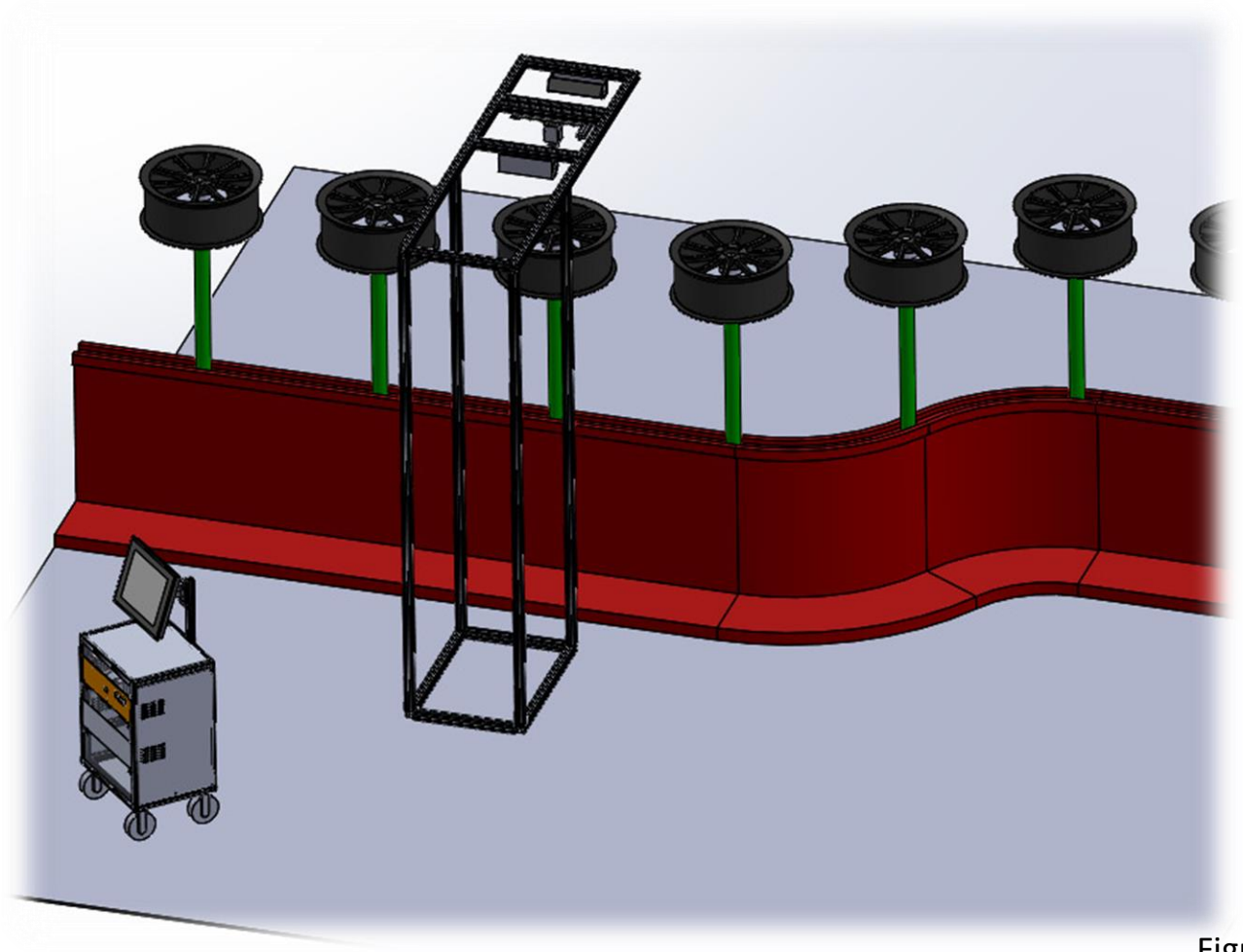
# Integration example –
# Mobile Station for Inline Measurement



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# Return-of-invest example

- Savings - Reduced scrap: **1,000,000 € / year**

  Assumptions:

  - Scrap rate current: 5%
  - Scrap rate new: 0%
  - Production volume: 1 million wheels / year
  - Rework costs: 20€ / wheel

- Savings - powder saving primer: **50.000 € / year**

  Assumptions

  - Powder consumption 50t / year
  - Powder price 10€ / kg
  - Savings potential 10%

- Savings - powder savings Clear-Coat: **50,000 € / year**

  Assumptions

  - Powder consumption 10t / year
  - Powder price 50€ / kg
  - Savings potential 10%

# Benefits summary

- Avoid of scrap & rework
- Reduction of powder consumption (primer & clear coat)
- Automated quality assurance & documentation
- Protection against liability claims
- Quality certificate towards OEMs
- Efficient training of personnel
- Outlook: Fully automated layer thickness control