LIGHT FOR MEASUREMENT

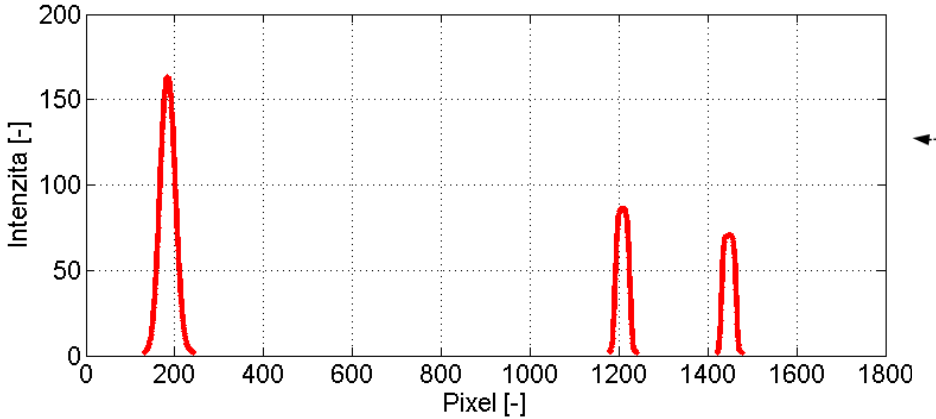
Laser Sensors for the Automotive Industry

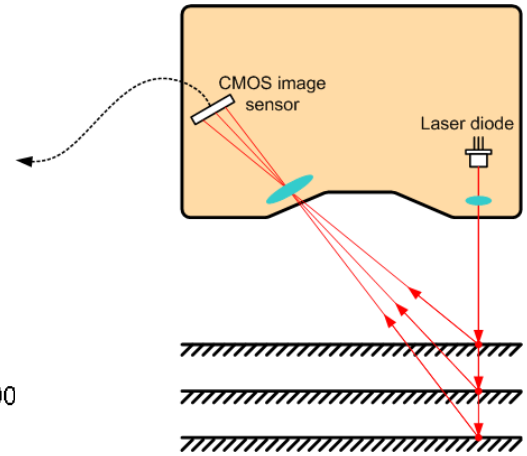
metralight

Index

- Two basic measuring methods
  - Thru-Beam
  - Reflective
- Most common sensor used is the point triangulation sensor
- Advantages of line triangulation
- Applications of line triangulation sensors
- Metralight TLE1 sensor

- Triangulation Sensors (distance measurement)
  - Scattered reflected laser light is focused back on the image sensor .
  - Peak position on the image sensor is directly related to the distance of an object in front of sensor
  - Linear image sensor used for point triangulation sensor
  - Area image sensor used for line triangulation sensor



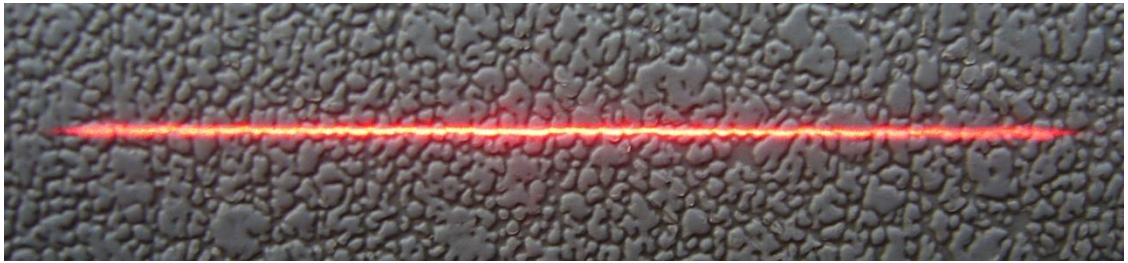


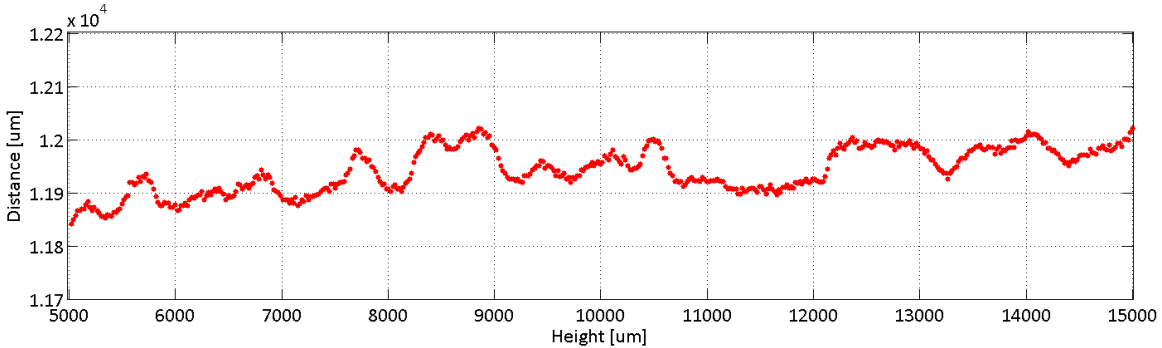
- **Point Triangulation sensor**
  - + High speed
  - + Low price
  - - Irregularity of the object surface will add significant errors

- **Line Triangulation sensor**
  - + Extra dimension (distance and height)
  - + 2D scanning of object surface/contour
  - + Irregularity of the object surface can be averaged out (more data points) .

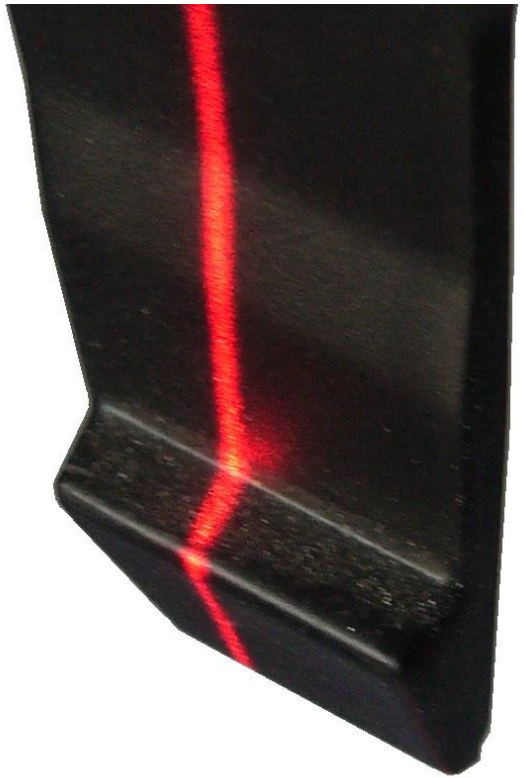
- **Applications for line triangulation**
  - plastic and metal parts inspection (replacement of digital dial)

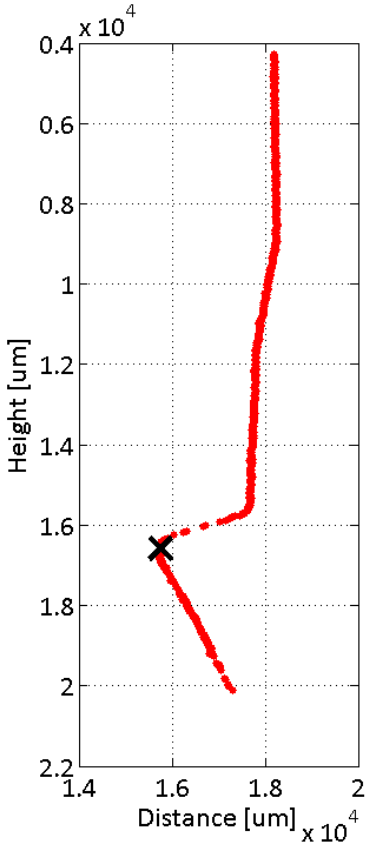
Figure: detail of dashboard texture



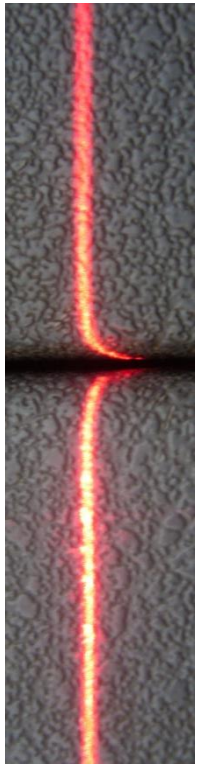


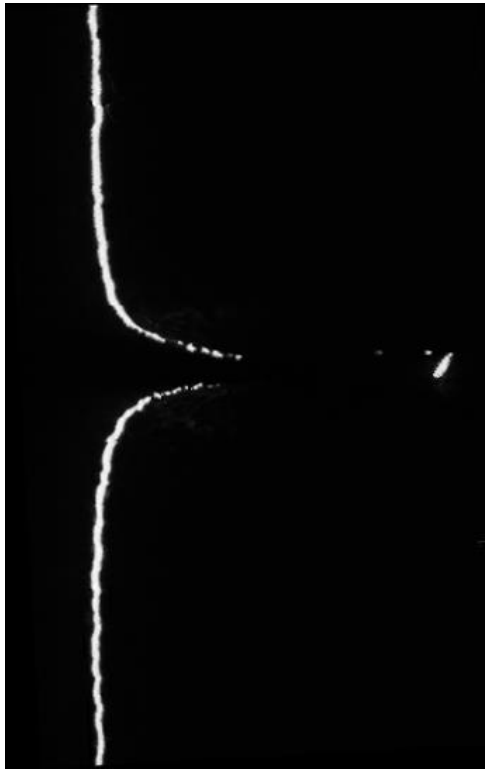
- **Applications for line triangulation**
  - 2D measurement of profile (distance and height)

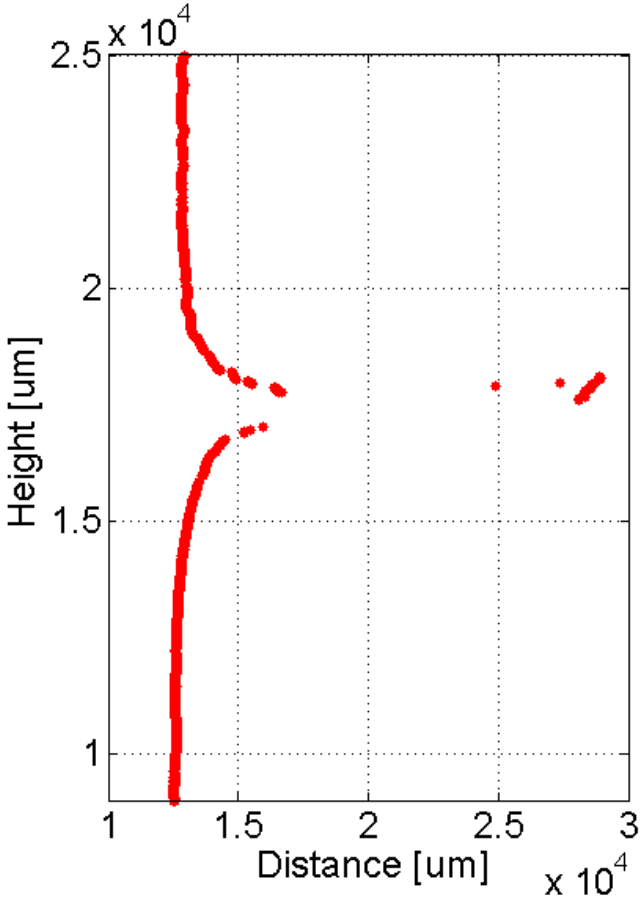




- **Applications for line triangulation**
  - **Gap size and position control**







- **Applications for line triangulation**
  - **Scanning application**
    - **Adding Robotic Movement to the MetraLight TLE1 Line Sensor or the measured object surface → adds the 3rd dimension**
    - **Parametric plain in 3D space**
    - **Welding joints inspection**
    - **Inspection of surface defects**
    - **And many more..**

Inspection of O-Rings

- Inspects the Diameter, Thickness and the Position of the O-Ring on the tube
- Embedded Linux controller for Profile processing

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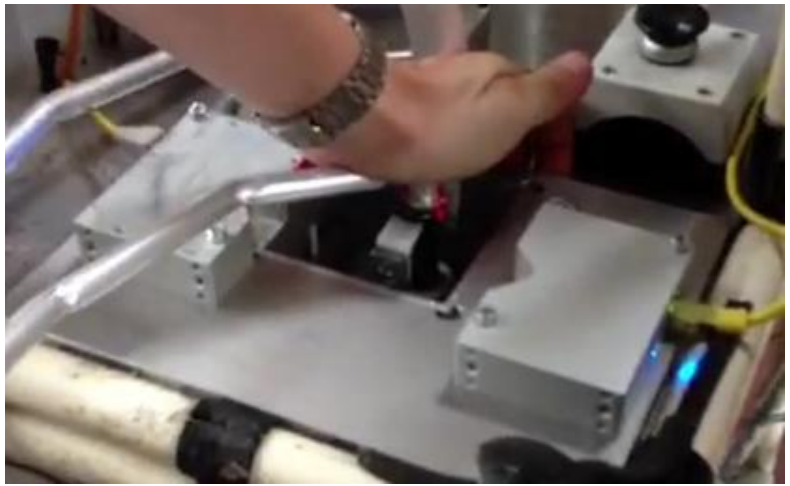
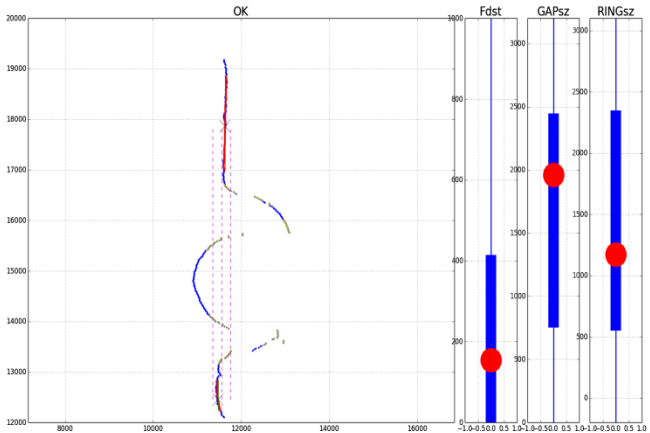
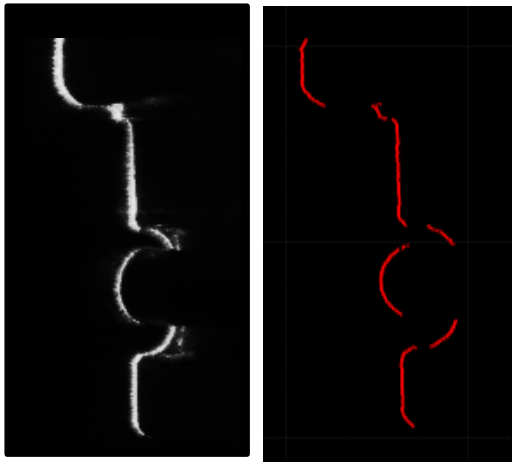
Inspection of O-rings







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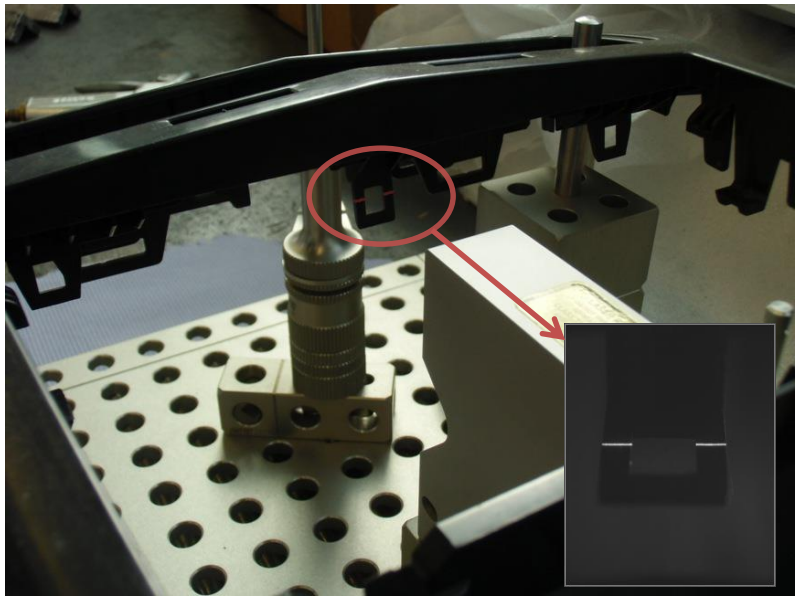
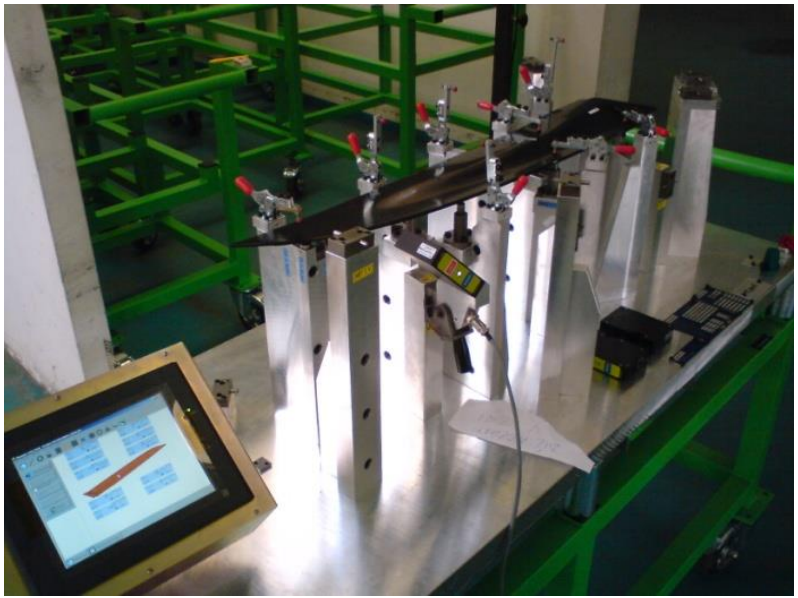
Dimension control of plastic and metal parts

- Magna
- Skoda Auto
- Benteler
- Faurecia





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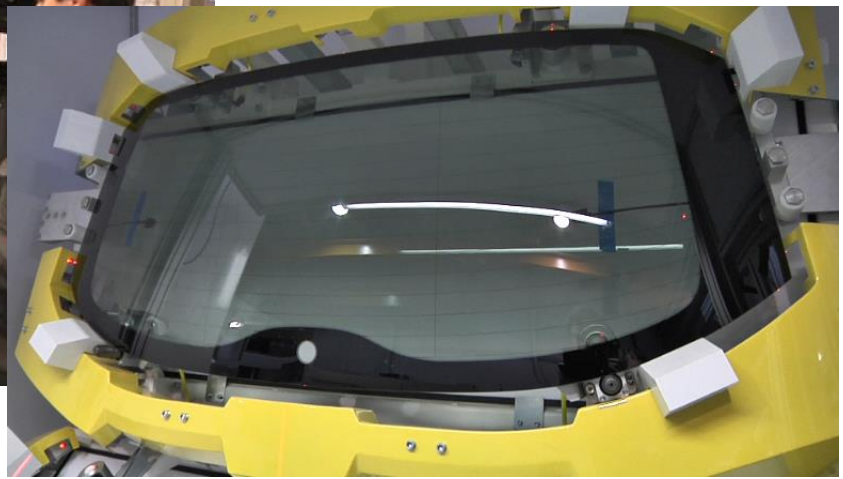
BMW i3 rear door assembly

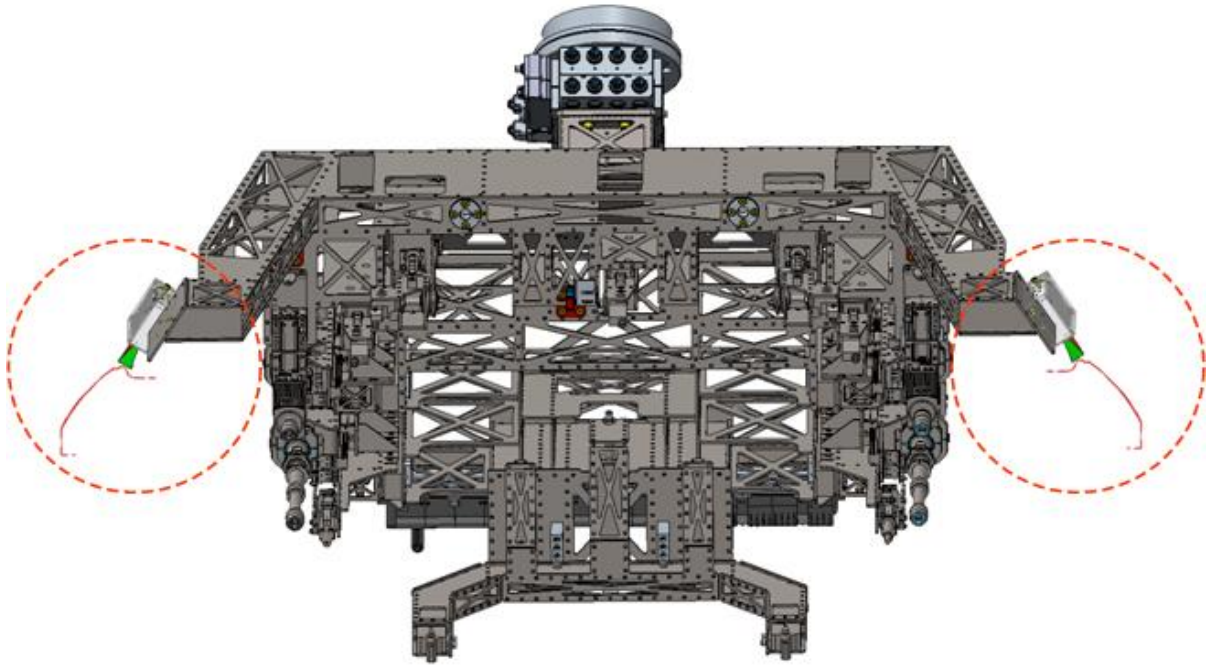
- Magna Bohemia
- 70 TLE1 sensors
- Parts dimension and assembly control
- Gaps size check



BMW i3 rear door assembly

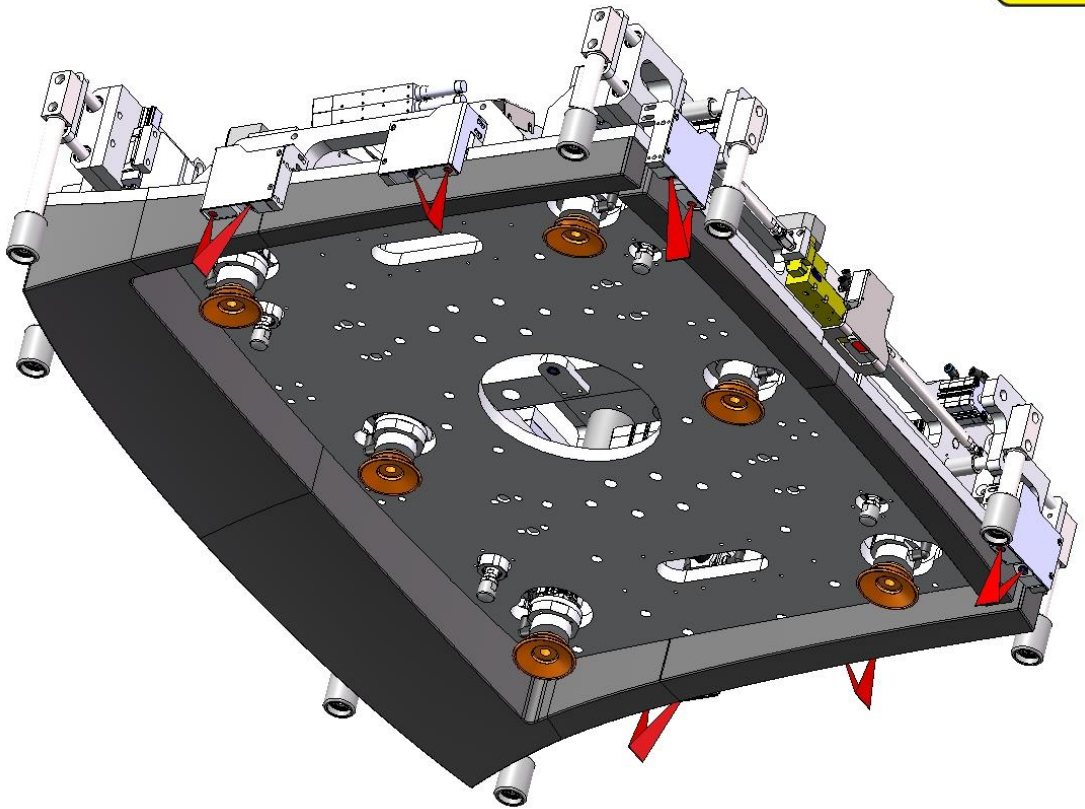
Front End Assembly Škoda Superb B8

- 2 MetraLight TLE sensors mounted on the robot gripper
- Robot trajectory based on actual car body positon



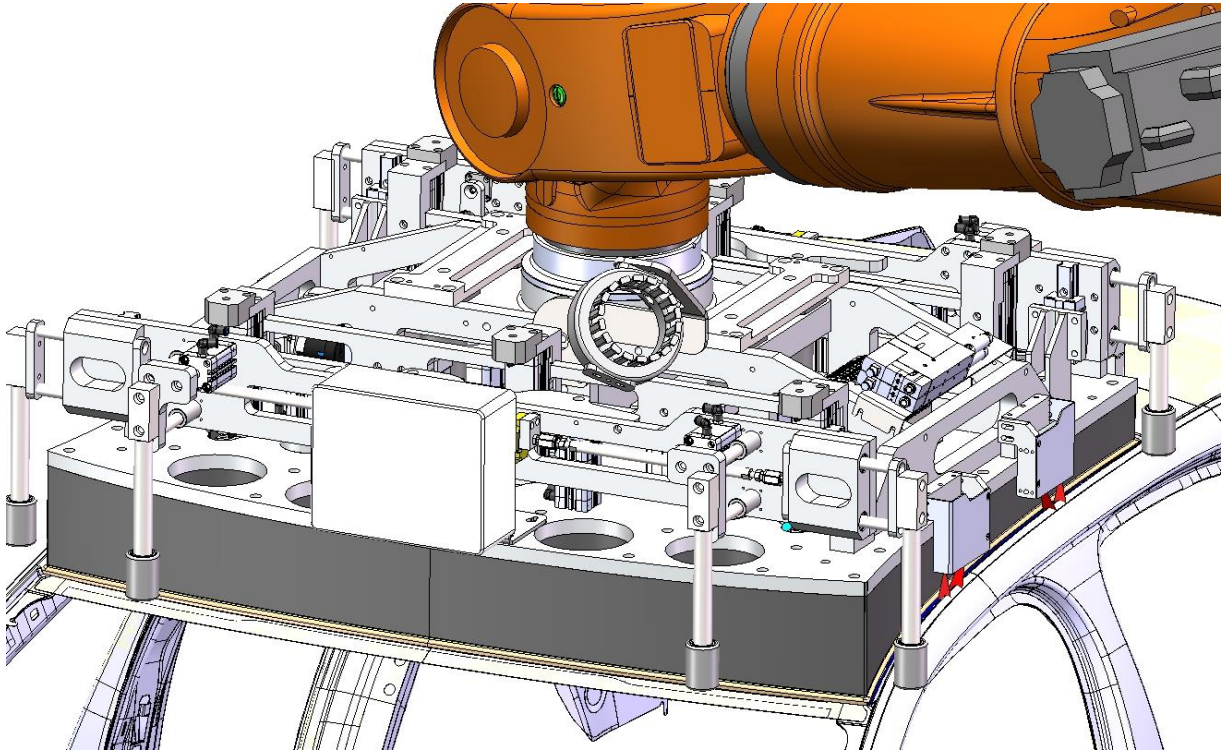
Panorama glass roof robot pick & place

- BK Technic s.r.o. → ŠKODA AUTO a.s.
- 6 MetraLight TLE1 sensors mounted on robot



Panorama glass roof robot pick & place

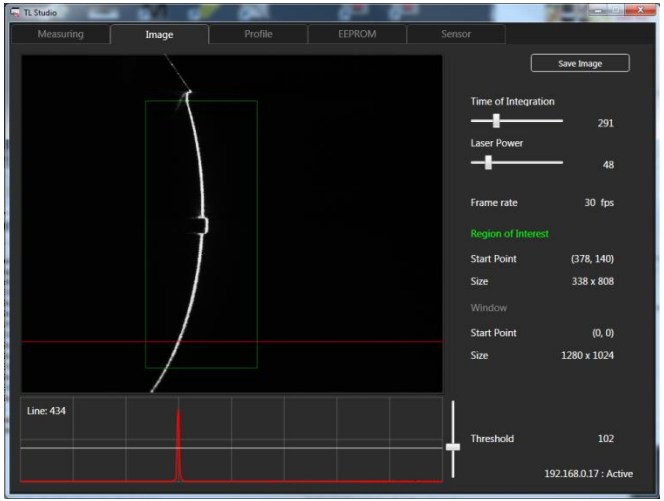
- BK Technic s.r.o. → ŠKODA AUTO a.s.
- Gap size control
- Robot control

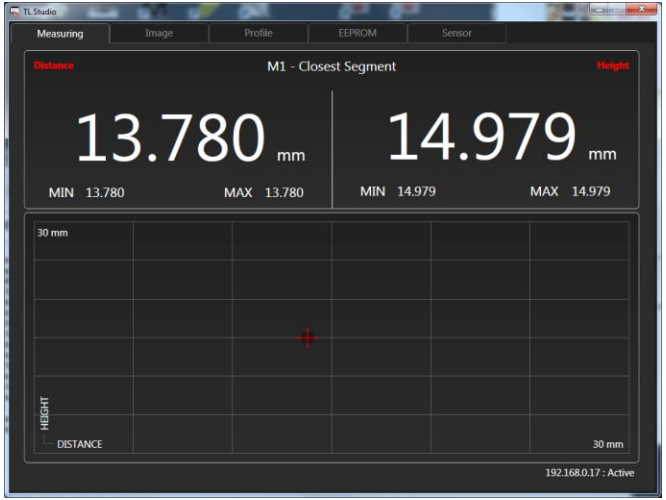


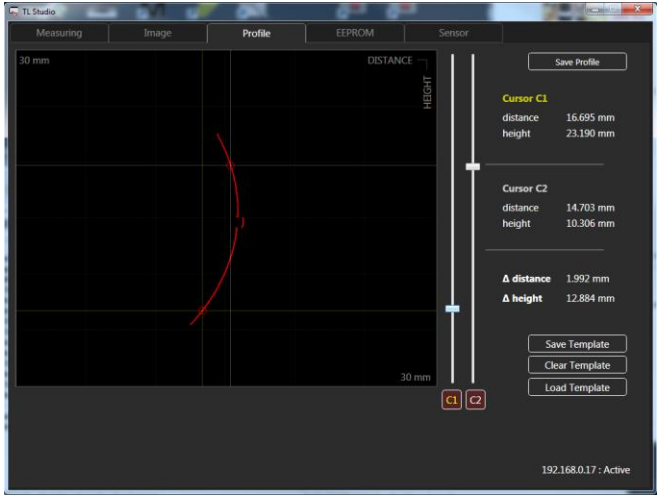
- **MetraLight TLE1 sensor (line triangulation)**
  - Simple and reliable interface, easy system integration
    - Ethernet TCP 10/100 Mbit, passive POE 12 V - 24 V
    - NO external controller
    - SW TLE Studio for sensor setting
    - Simple communication protocol
  - Advanced features
    - Remote firmware update
    - Macros
    - Automatic exposure
    - Windowing (30 Hz to 1.5 kHz)
    - Focus capability on the ROI (region of interest)

MetraLight TLE Studio

- Real time video of measured scene
- Sensors parameters setting
- Raw image and calculated profile
- Cursors for distance and height measurement
- Measured values (distance, height)







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