HOLOLENS UND SMARTE 3D SENSORIK

SICK
Sensor Intelligence.

Uwe Hahne
GBC09 BU05 3D Compact Systems
VAR² 2017 - Realität erweitern

MOTIVATION
VON DER 3D APPLIKATION ZUR 3D INBETRIEBNAHME

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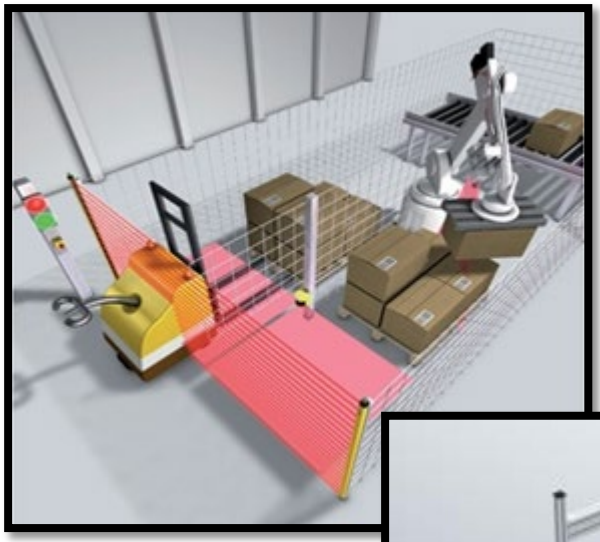
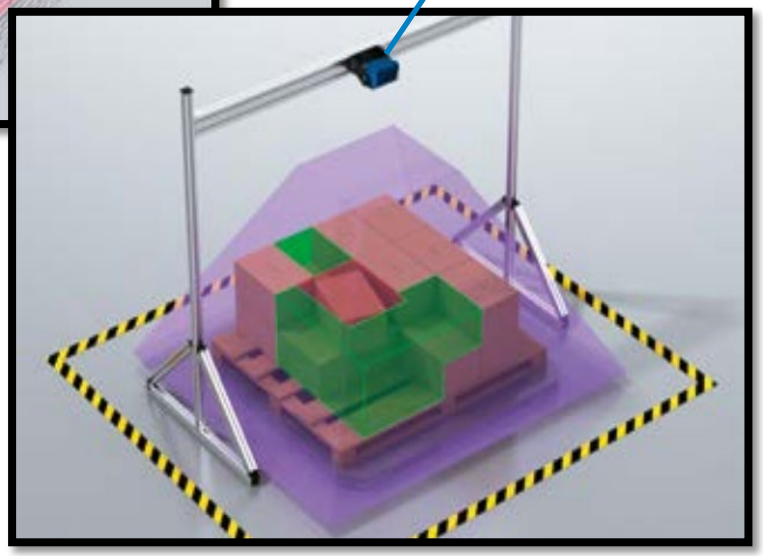
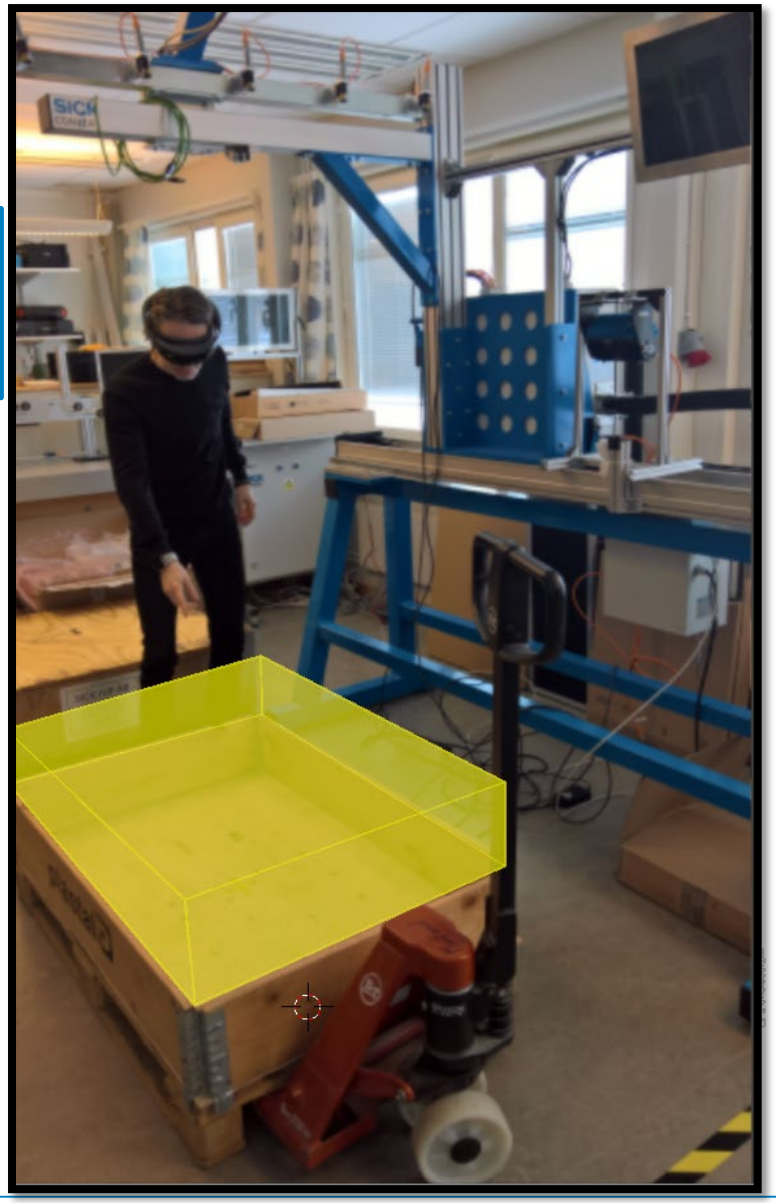




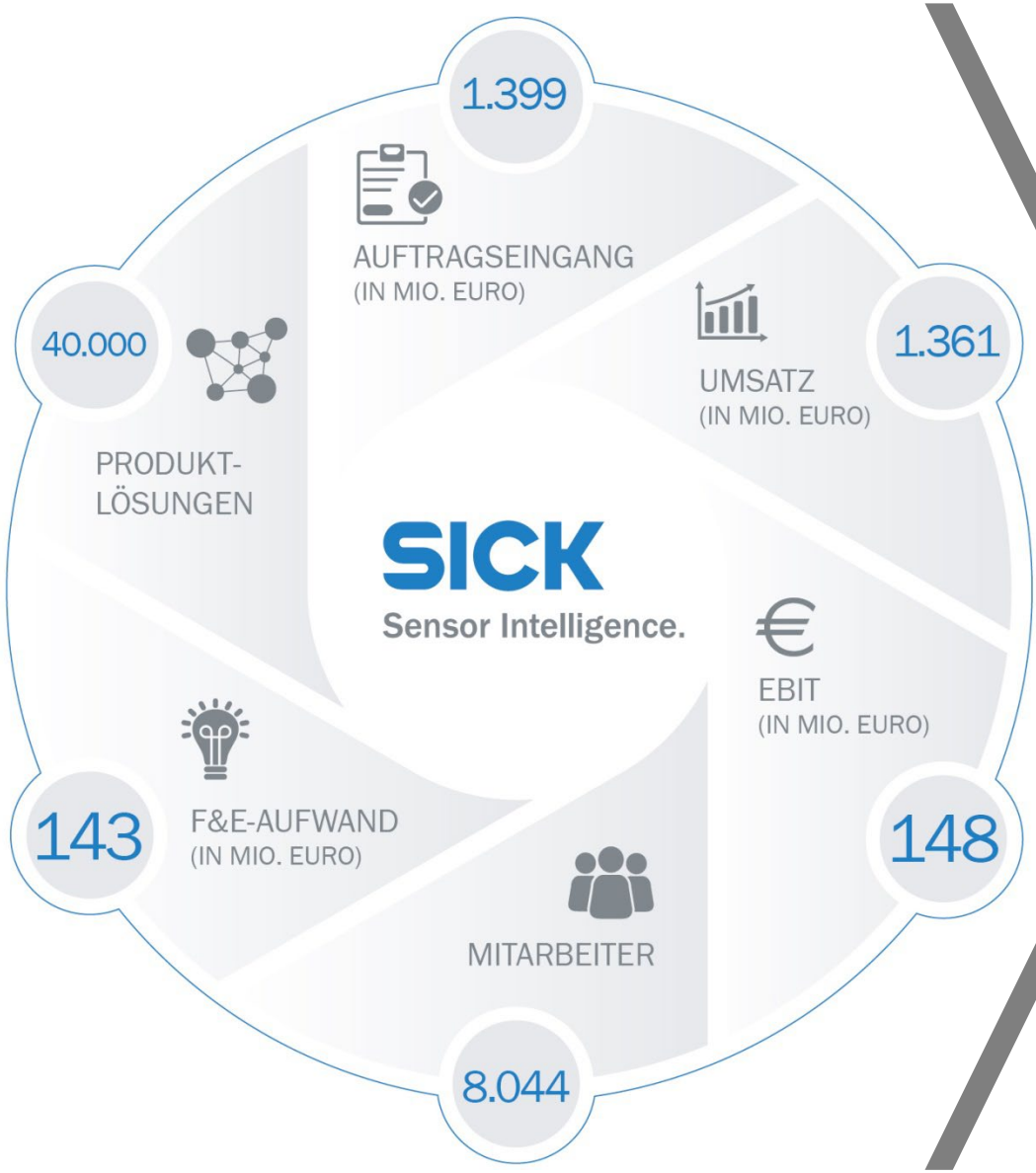


3D APPLIKATIONEN UND 3D SENSOREN

SICK
Sensor Intelligence.

SICK AUF EINEN BLICK
GEGRÜNDET 1947

SICK
Sensor Intelligence.



SICK – weltweit einer der führenden Hersteller von Sensoren und Sensorlösungen für industrielle Anwendungen

BREITES PRODUKTSPEKTRUM + ERFAHRUNG + EXPERTISE
= EFFIZIENTE LÖSUNGEN FÜR SIE

SICK
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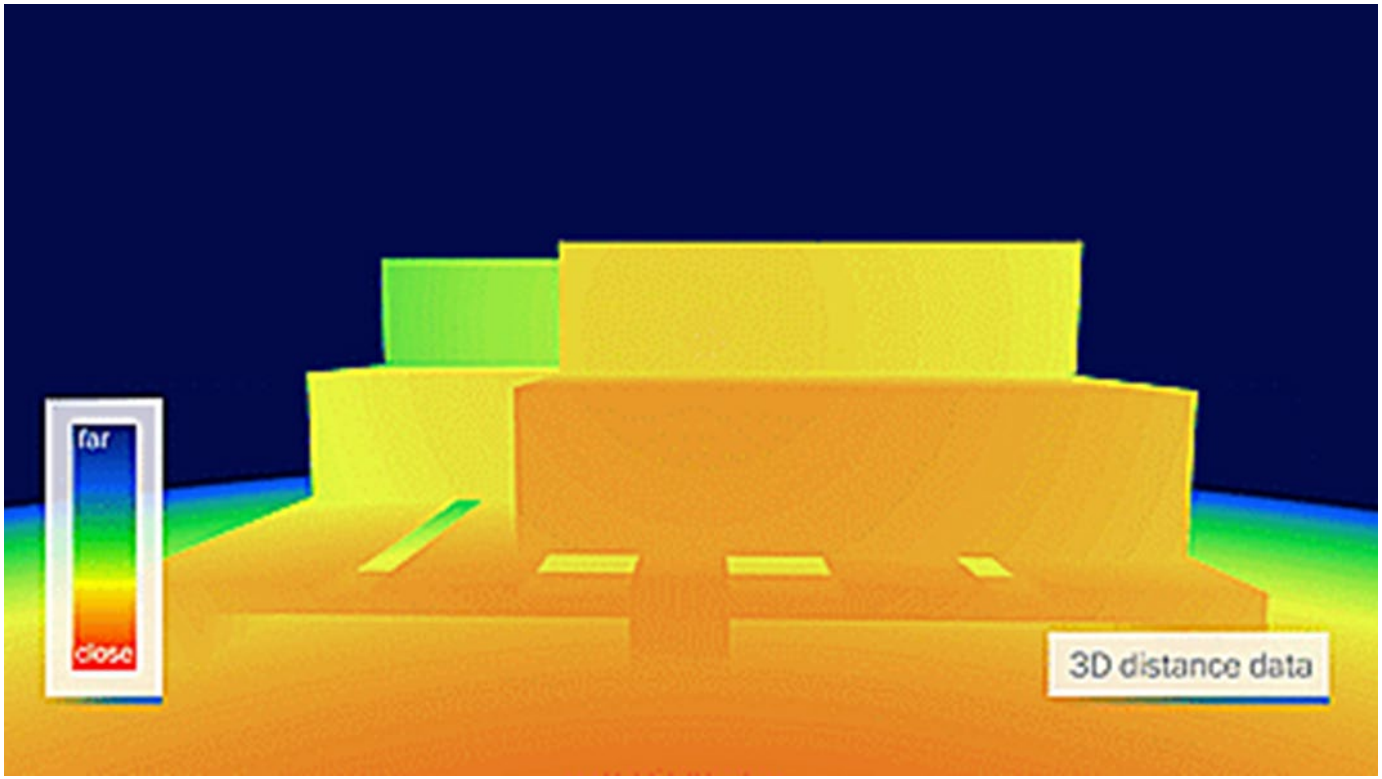
- Analysenlösungen
- Automatisierungs-Lichtgitter
- Distanzsensoren
- Encoder
- Fluidsensorik
- Gasanalysatoren
- Identifikationslösungen
- Lichttaster und Lichtschranken
- Magnetische Zylindersensoren
- Mess- und Detektionslösungen
- Motor-Feedback-Systeme
- Näherungssensoren
- Optoelektronische Schutzeinrichtungen
- Registration Sensors
- sens:Control – sichere Steuerungslösungen
- Sicherheitsschalter
- Sicherheits-Software
- Staubmessgeräte
- Systemlösungen
- Ultraschall-Gasdurchflussmessgeräte
- Verkehrssensoren
- Vision

- Grundprinzip: “3D Time-of-Flight” bedeutet, dass die Lichtlaufzeit eines Signals von der Kamera in die Szene ermittelt wird um daraus für jedes Pixel einen Distanzwert zu berechnen.



APPLIKATIONSBEISPIEL
SELF BAG DROP (ANWESENHEITSKONTROLLE, KLASSIFIZIERUNG)

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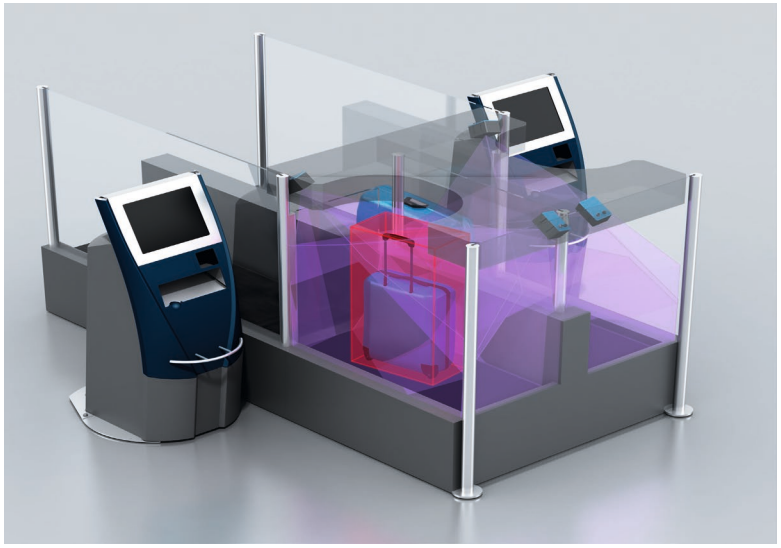

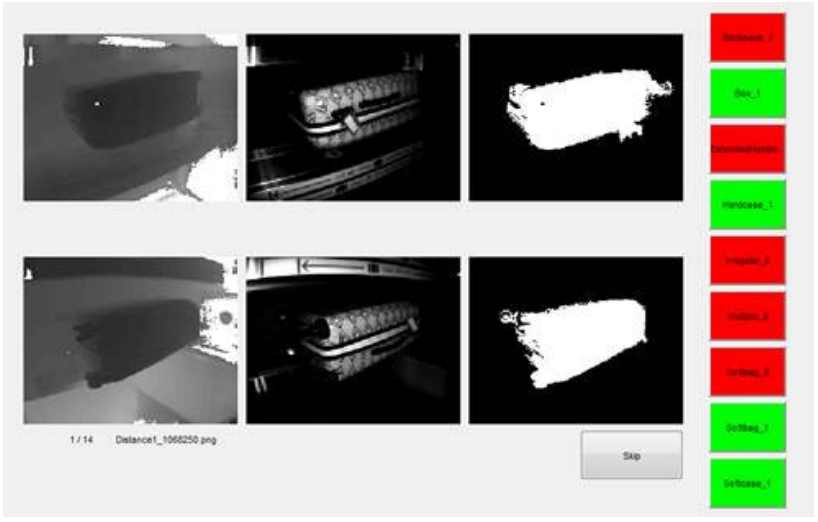

APPLIKATIONSBEISPIEL
SERVICEROBOTIK IN DER PFLEGE (ZUKUNFTSKONZEPT)

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Source: www.care-o-bot-4.de

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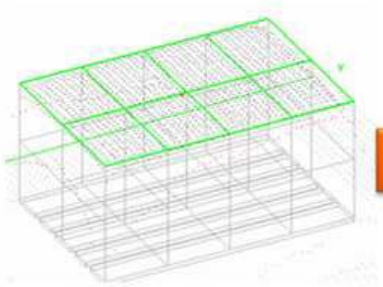
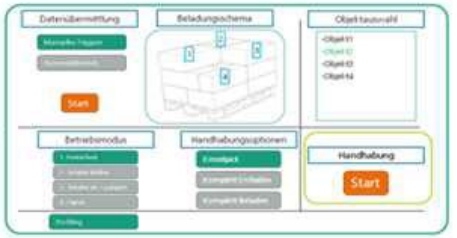
Use of 3D-Sensors for the automatic de-palletize
Basic idea of 3D- Contour check

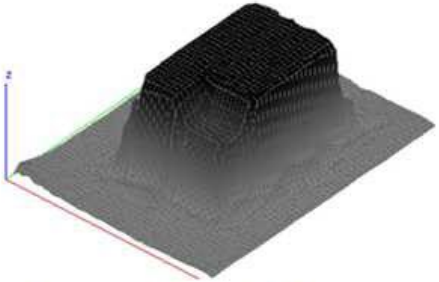
Pallet for de-palletizing



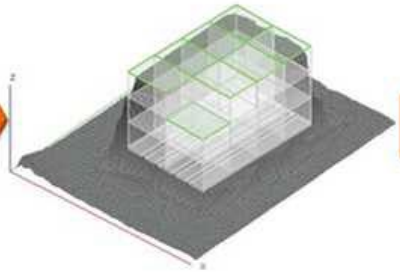
Read out of the loading position



Selection of the gripping technology



Acquisition of the point cloud



Comparison/ Fitting of the point cloud

Quick grab of the desired objects

SICK Fraunhofer IML

Fraunhofer IML

KONFIGURATION IN 2D

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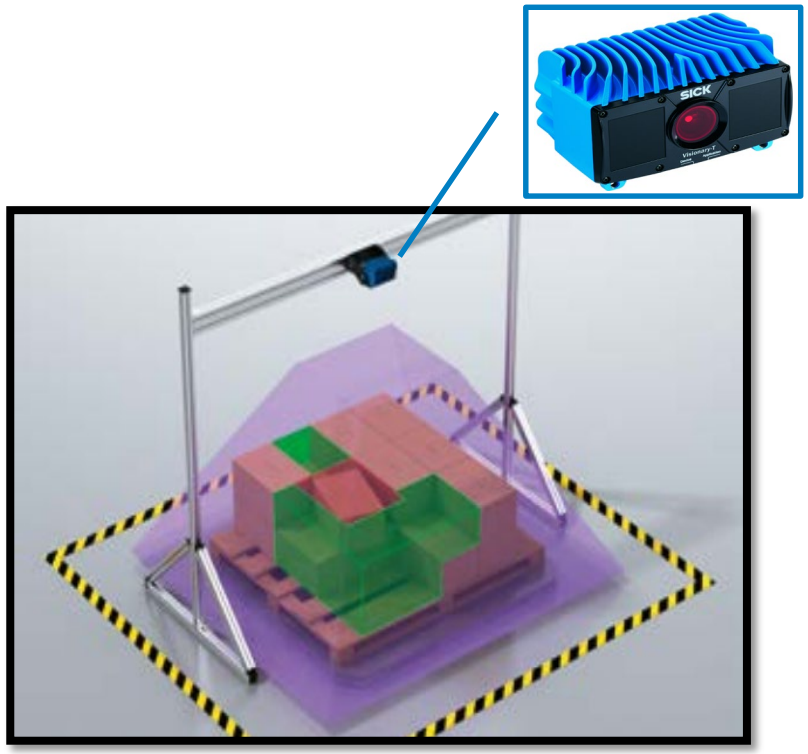
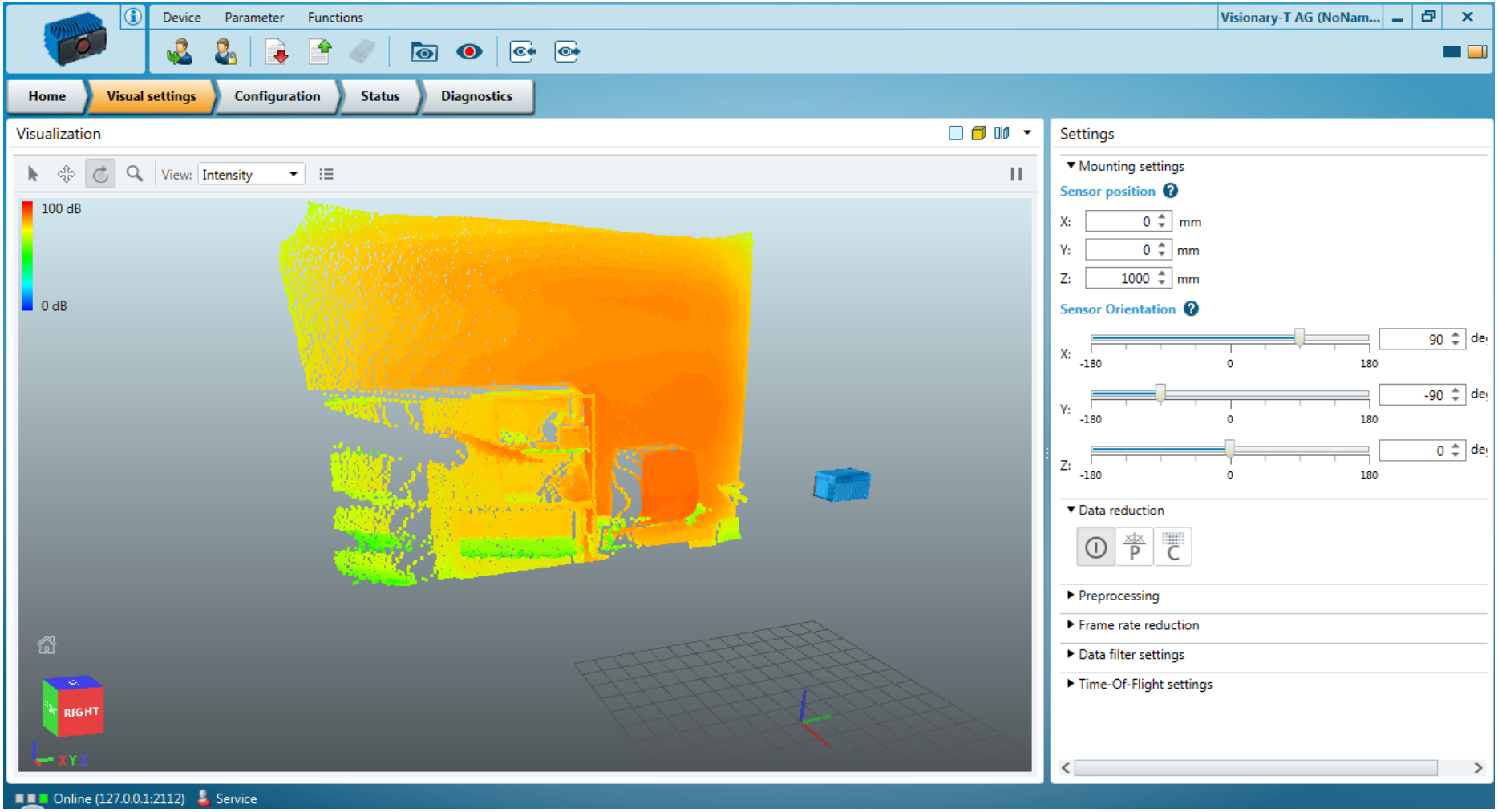
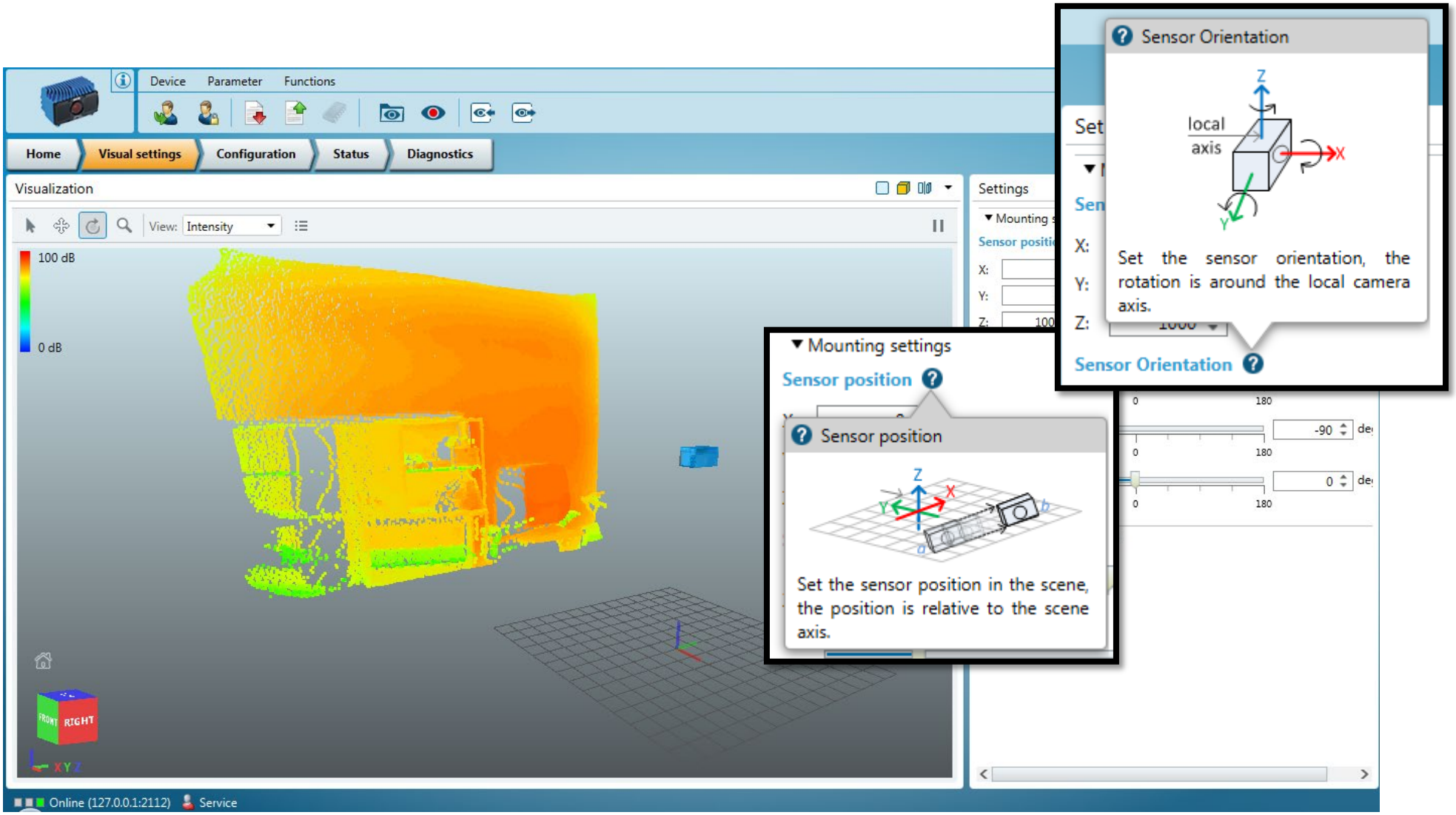
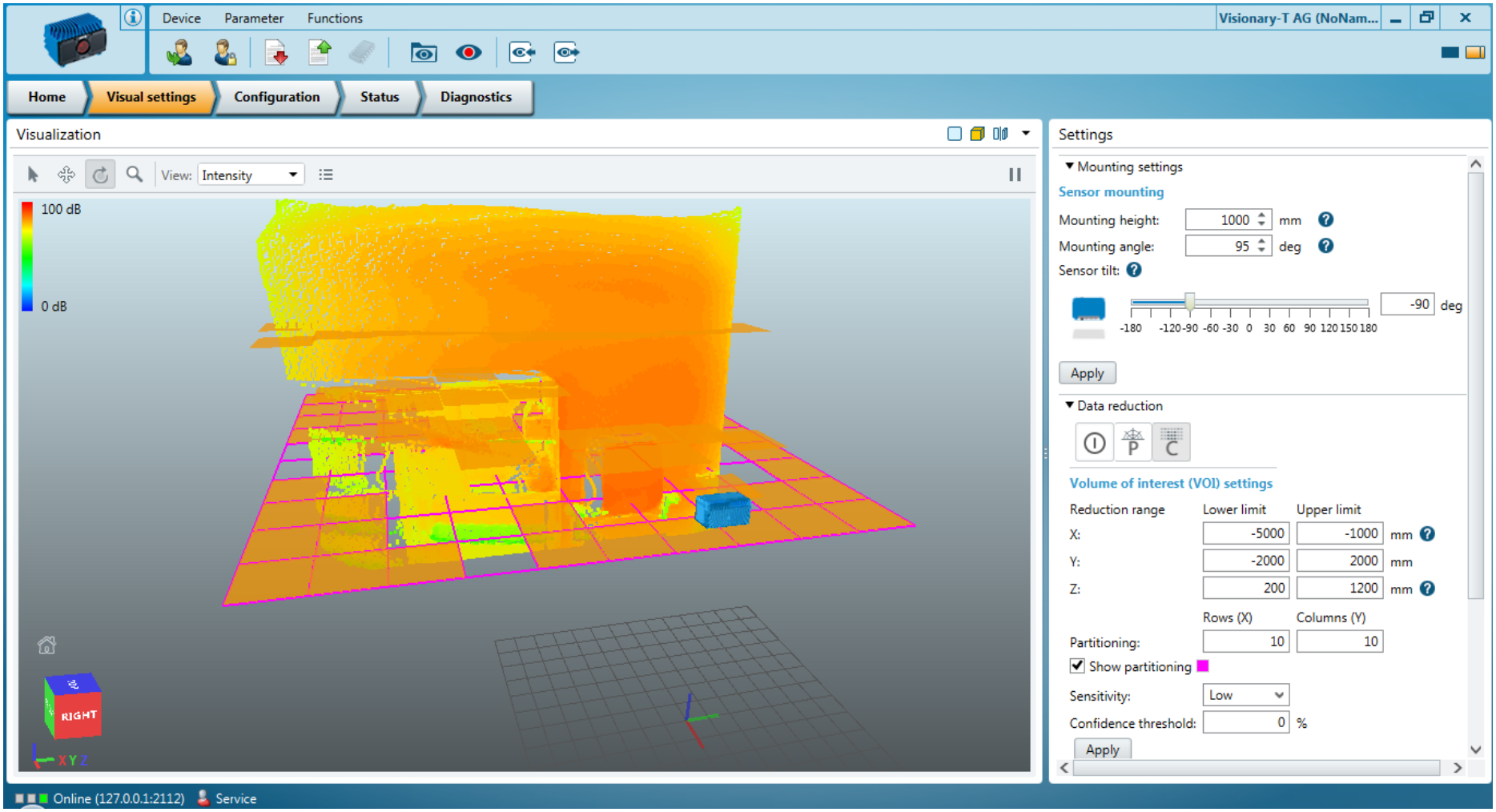
MONTAGE UND KONFIGURATION

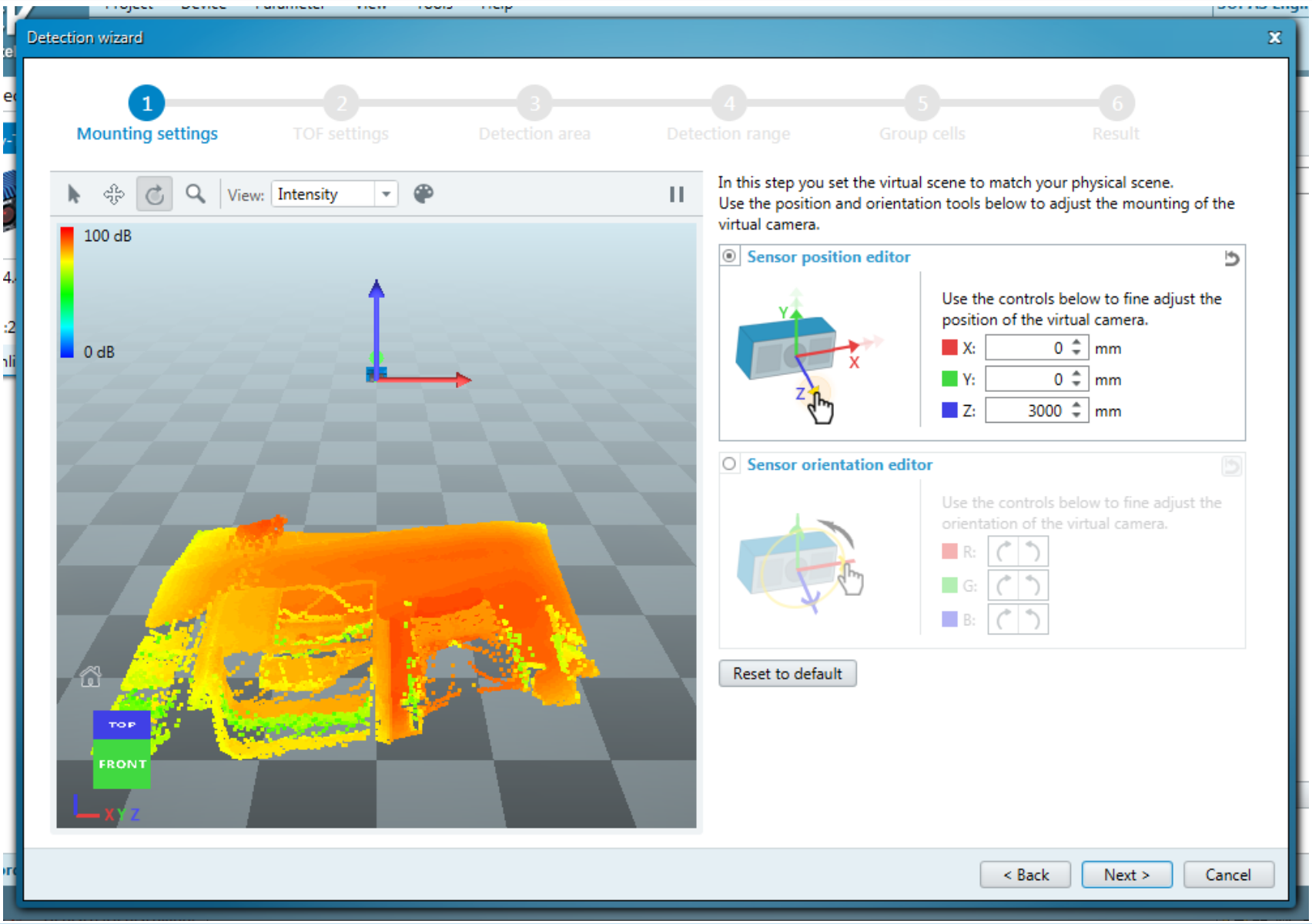


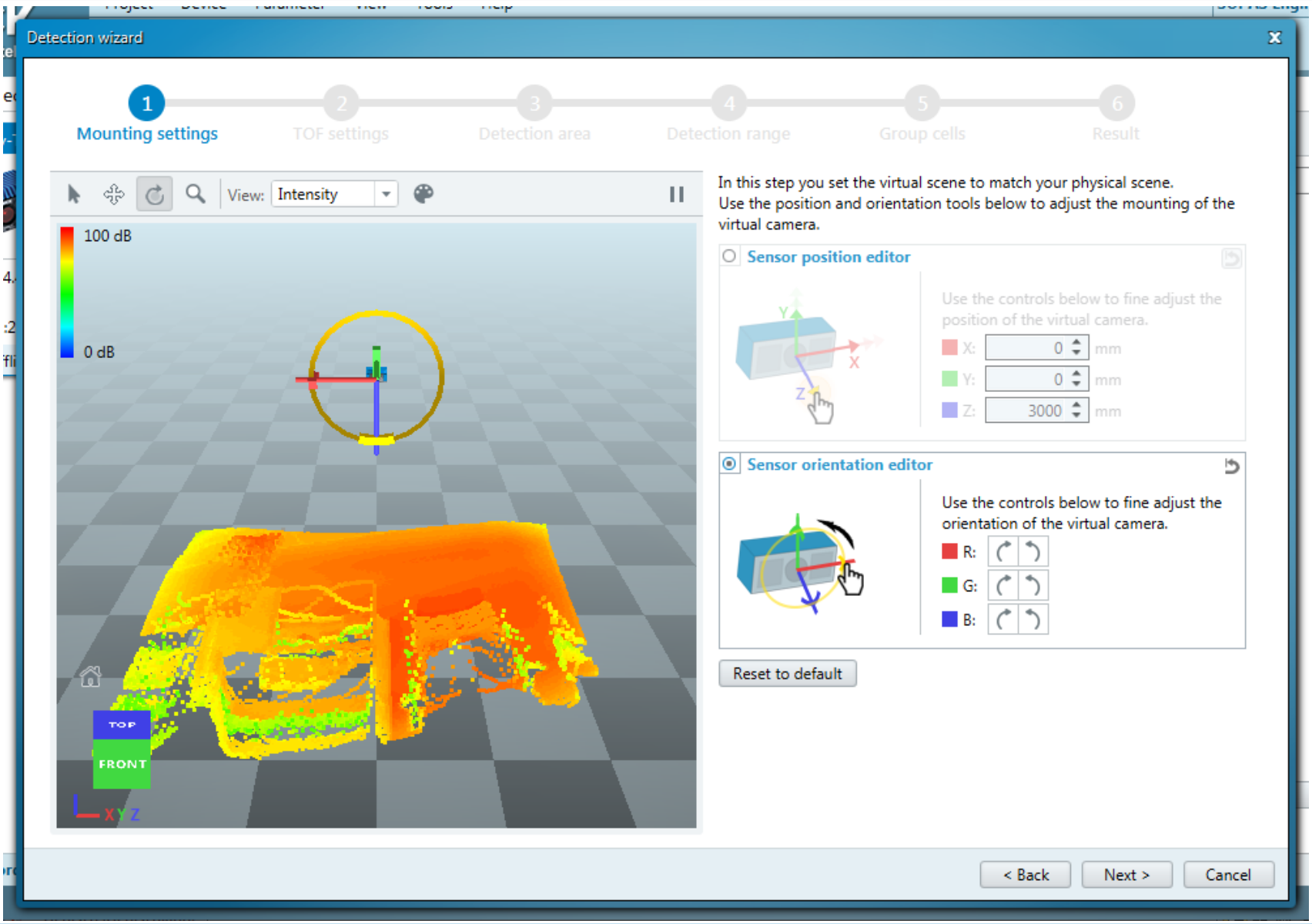

Device
Parameter
Functions
Visionary-T AG (NoNam...
Home
Visual settings
Configuration
Status
Diagnostics
Visualization
View: Intensity
100 dB
0 dB
RIGHT
Settings
Mounting settings
Sensor position
X: 0 mm
Y: 0 mm
Z: 1000 mm
Sensor Orientation
X: 90
Y: -90
Z: 0
-180
0
180
Data reduction
Preprocessing
Frame rate reduction
Data filter settings
Time-Of-Flight settings
Online (127.0.0.1:2112)
Service

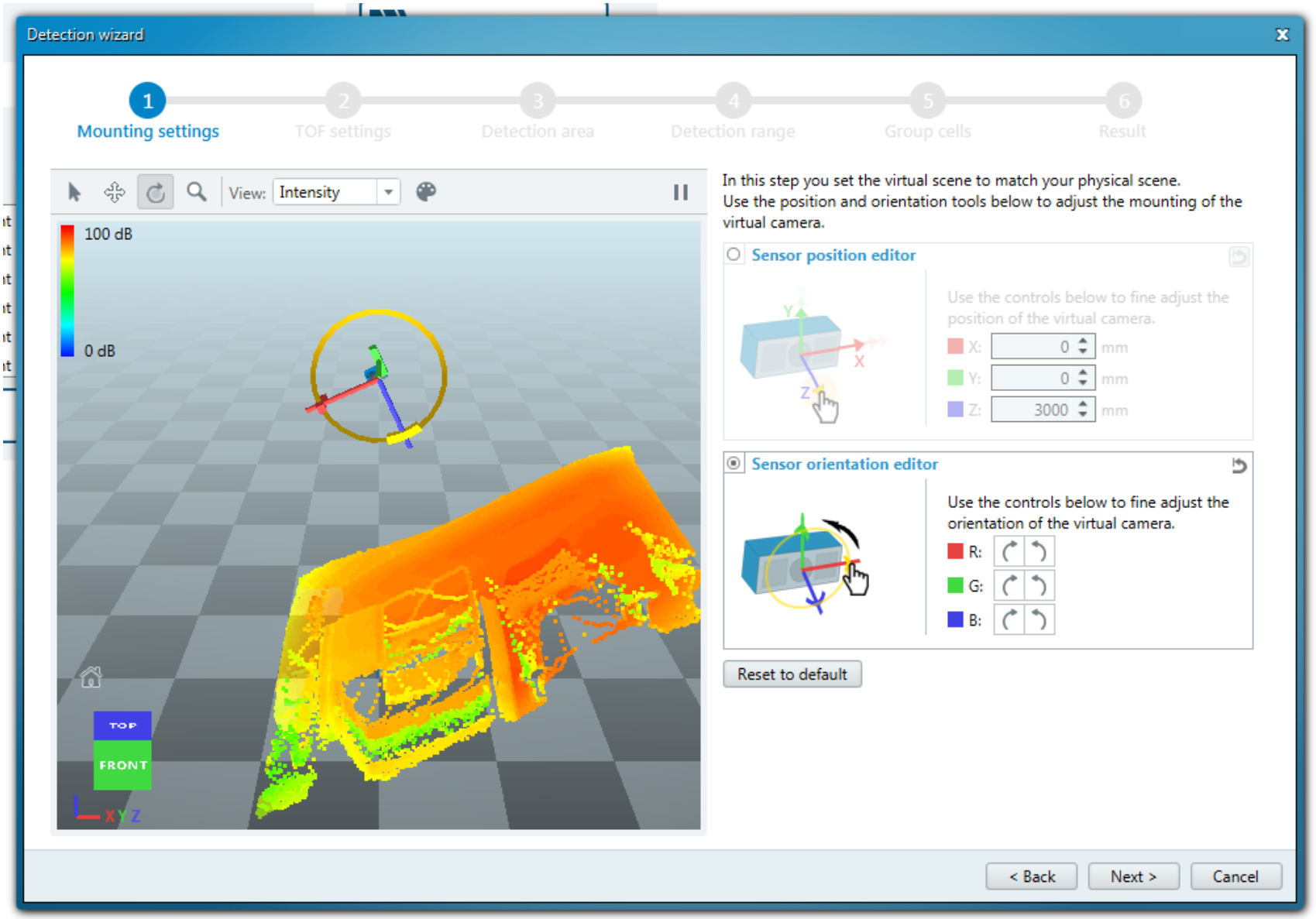

Device
Parameter
Functions
Home
Visual settings
Configuration
Status
Diagnostics
Visualization
View: Intensity
100 dB
0 dB
Settings
Mounting settings
Sensor position
Sensor position
Set the sensor position in the scene, the position is relative to the scene axis.
Sensor Orientation
local axis
Set the sensor orientation, the rotation is around the local camera axis.
Sensor Orientation
Online (127.0.0.1:2112)
Service

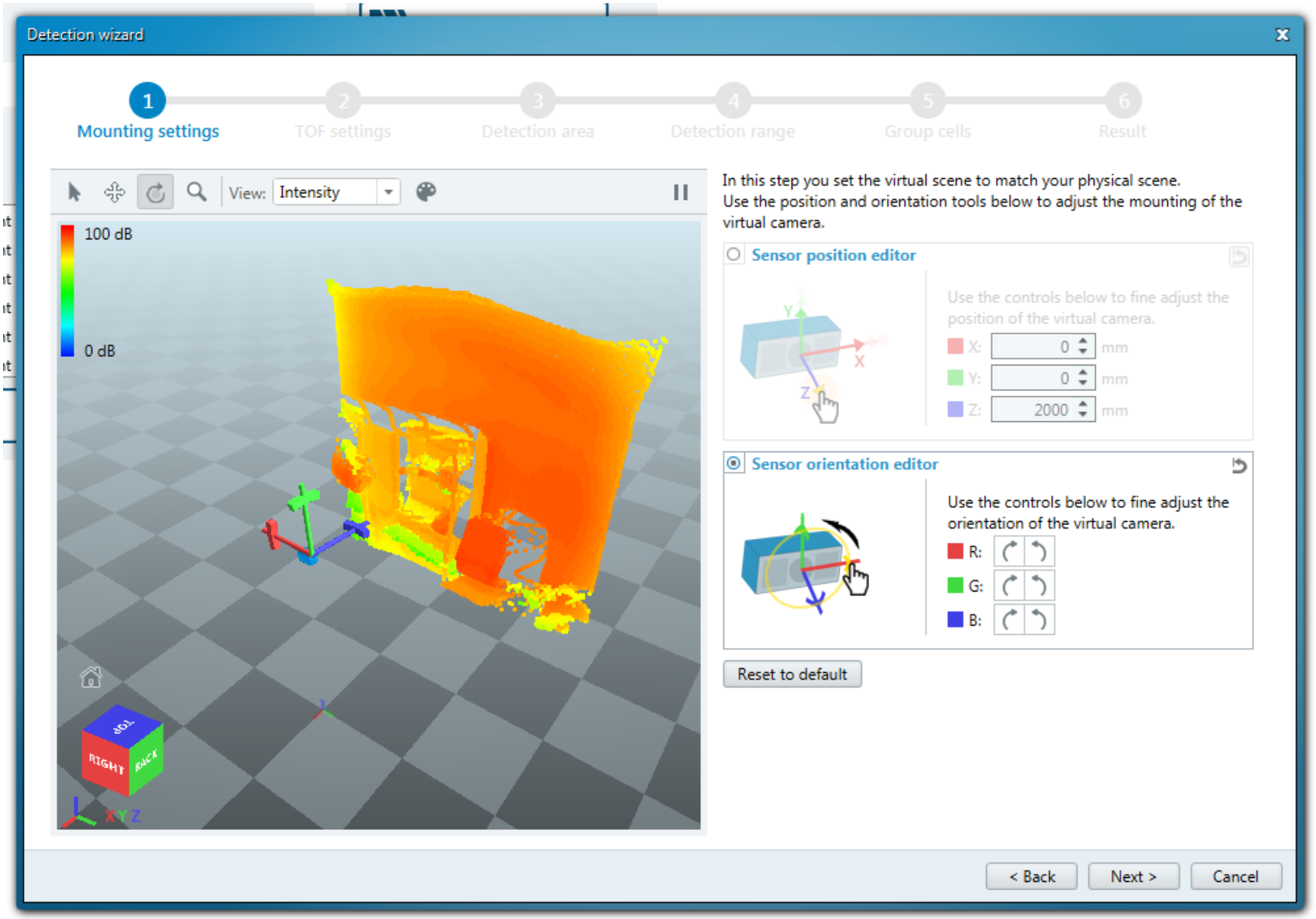
VEREINFACHUNG DURCH REDUKTION

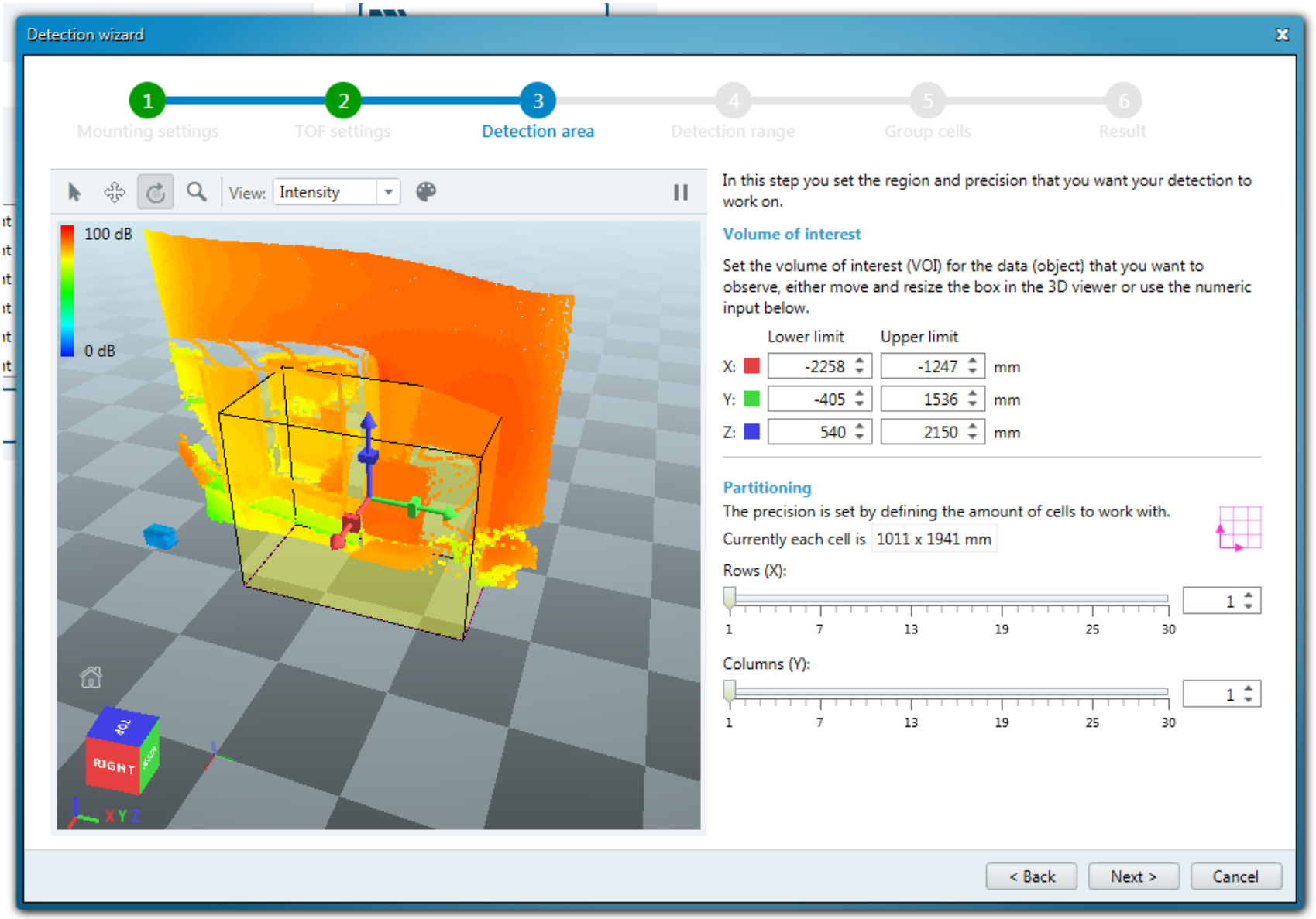



Detection wizard
1 Mounting settings
2 TOF settings
3 Detection area
4 Detection range
5 Group cells
6 Result
View: Intensity
100 dB
0 dB
TOP
FRONT
XYZ
In this step you set the virtual scene to match your physical scene.
Use the position and orientation tools below to adjust the mounting of the virtual camera.
Sensor position editor
Use the controls below to fine adjust the position of the virtual camera.
X: 0 mm
Y: 0 mm
Z: 3000 mm
Sensor orientation editor
Use the controls below to fine adjust the orientation of the virtual camera.
R:
G:
B:
Reset to default
< Back
Next >
Cancel


Detection wizard
1 Mounting settings
2 TOF settings
3 Detection area
4 Detection range
5 Group cells
6 Result
View: Intensity
100 dB
0 dB
TOP
FRONT
X Y Z
In this step you set the virtual scene to match your physical scene.
Use the position and orientation tools below to adjust the mounting of the virtual camera.
Sensor position editor
Use the controls below to fine adjust the position of the virtual camera.
X: 0 mm
Y: 0 mm
Z: 3000 mm
Sensor orientation editor
Use the controls below to fine adjust the orientation of the virtual camera.
R:
G:
B:
Reset to default
< Back
Next >
Cancel


Detection wizard
1 Mounting settings
2 TOF settings
3 Detection area
4 Detection range
5 Group cells
6 Result
View: Intensity
100 dB
0 dB
TOP
FRONT
XYZ
In this step you set the virtual scene to match your physical scene.
Use the position and orientation tools below to adjust the mounting of the virtual camera.
Sensor position editor
Use the controls below to fine adjust the position of the virtual camera.
X: 0 mm
Y: 0 mm
Z: 3000 mm
Sensor orientation editor
Use the controls below to fine adjust the orientation of the virtual camera.
R:
G:
B:
Reset to default
< Back
Next >
Cancel


Detection wizard
1 Mounting settings
2 TOF settings
3 Detection area
4 Detection range
5 Group cells
6 Result
View: Intensity
100 dB
0 dB
In this step you set the virtual scene to match your physical scene.
Use the position and orientation tools below to adjust the mounting of the virtual camera.
Sensor position editor
Use the controls below to fine adjust the position of the virtual camera.
X: 0 mm
Y: 0 mm
Z: 2000 mm
Sensor orientation editor
Use the controls below to fine adjust the orientation of the virtual camera.
R:
G:
B:
Reset to default
< Back
Next >
Cancel


Detection wizard
1 Mounting settings
2 TOF settings
3 Detection area
4 Detection range
5 Group cells
6 Result
View: Intensity
100 dB
0 dB
RIGHT
TOP
XYZ
In this step you set the region and precision that you want your detection to work on.
Volume of interest
Set the volume of interest (VOI) for the data (object) that you want to observe, either move and resize the box in the 3D viewer or use the numeric input below.
Lower limit
Upper limit
X: -2258 -1247 mm
Y: -405 1536 mm
Z: 540 2150 mm
Partitioning
The precision is set by defining the amount of cells to work with.
Currently each cell is 1011 x 1941 mm
Rows (X):
1
1 7 13 19 25 30
Columns (Y):
1
1 7 13 19 25 30
< Back
Next >
Cancel

DIE ZUKUNFT IN 3D

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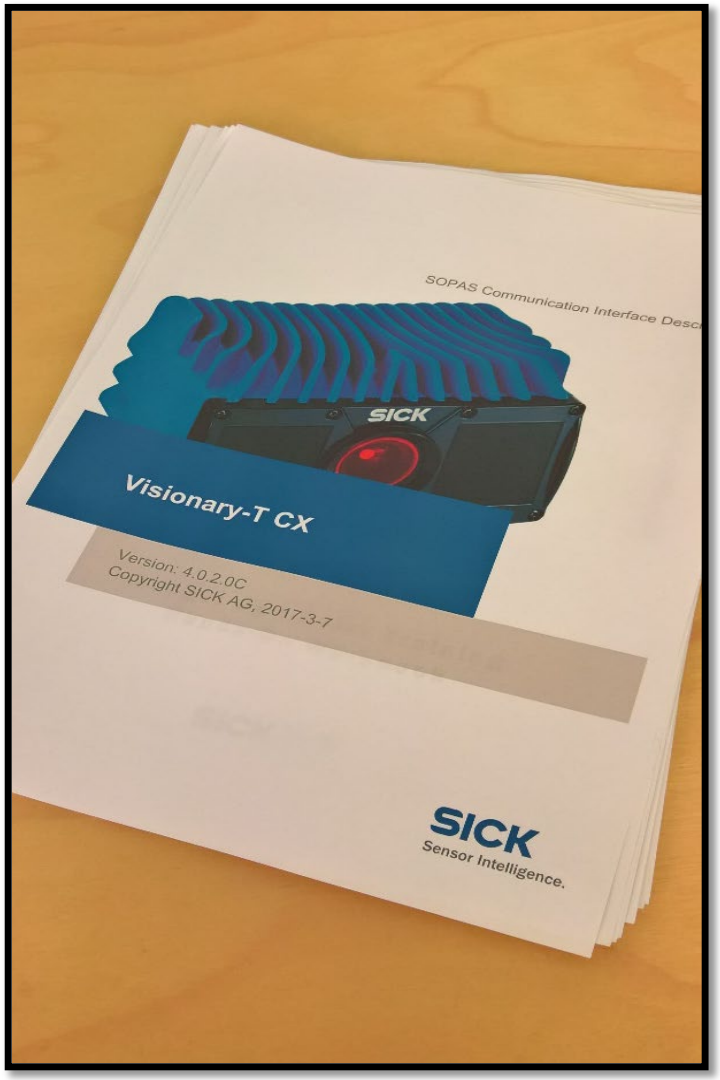
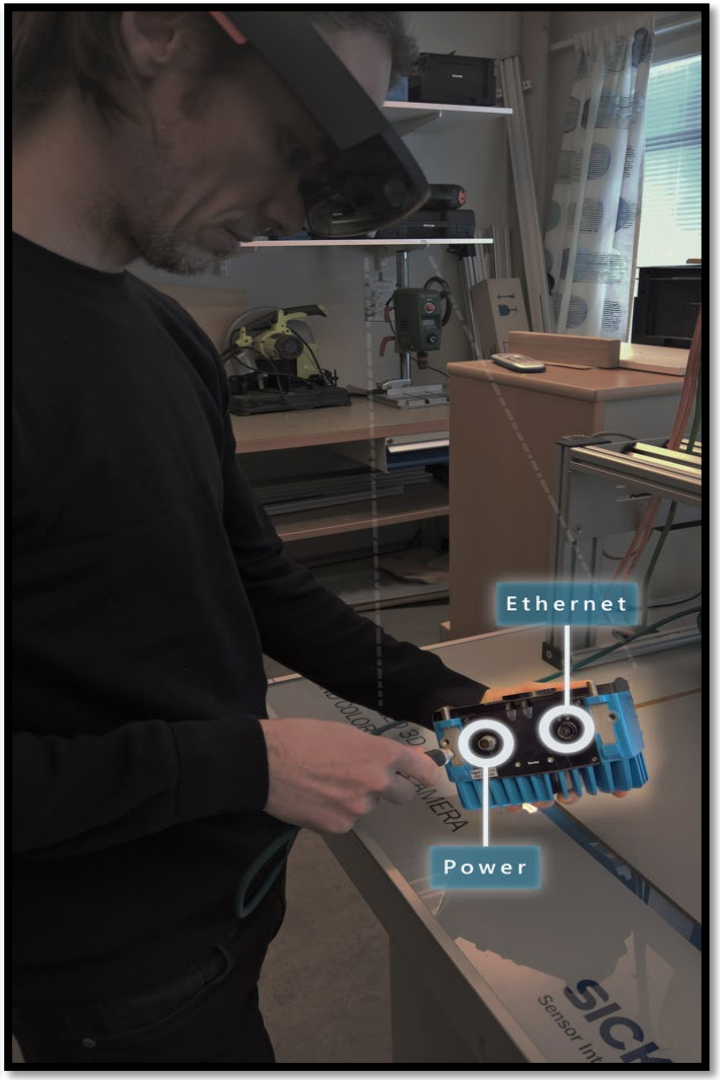
Herkömmliches Handbuch:



HoloLens:



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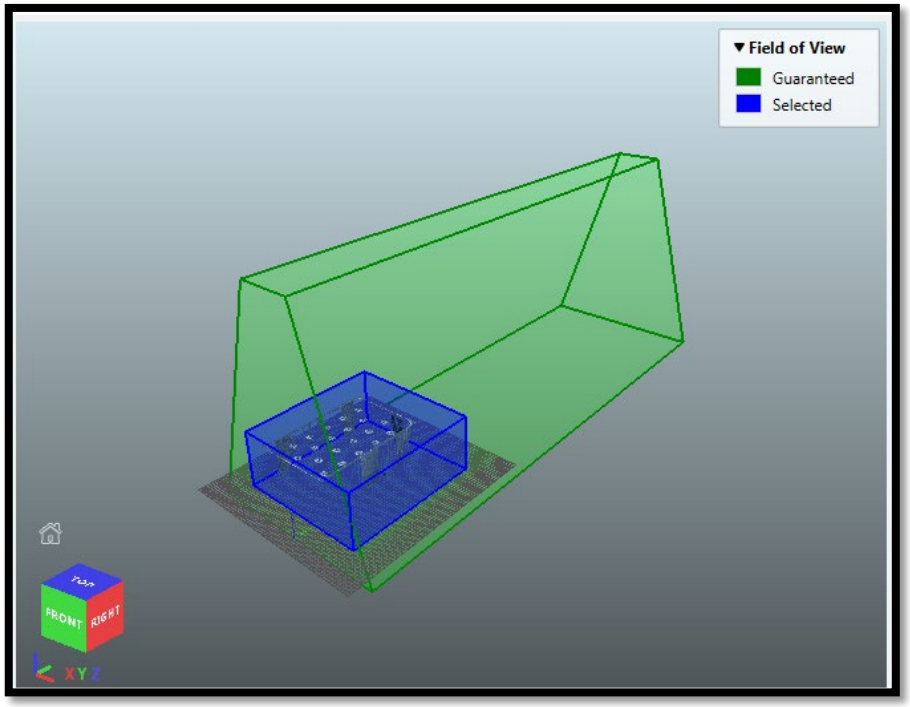
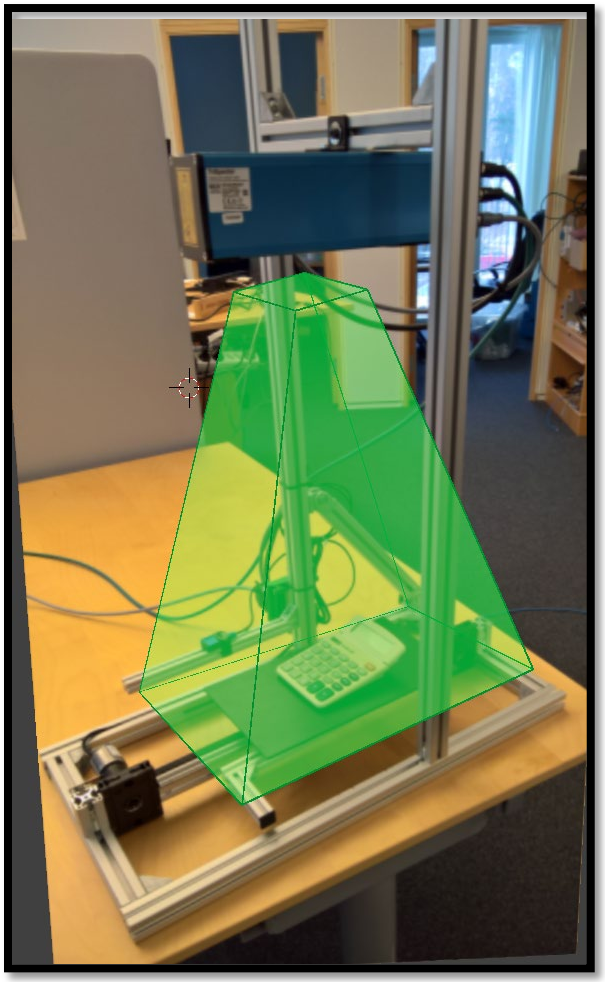
Herkömmliche Visualisierung



HoloLens:



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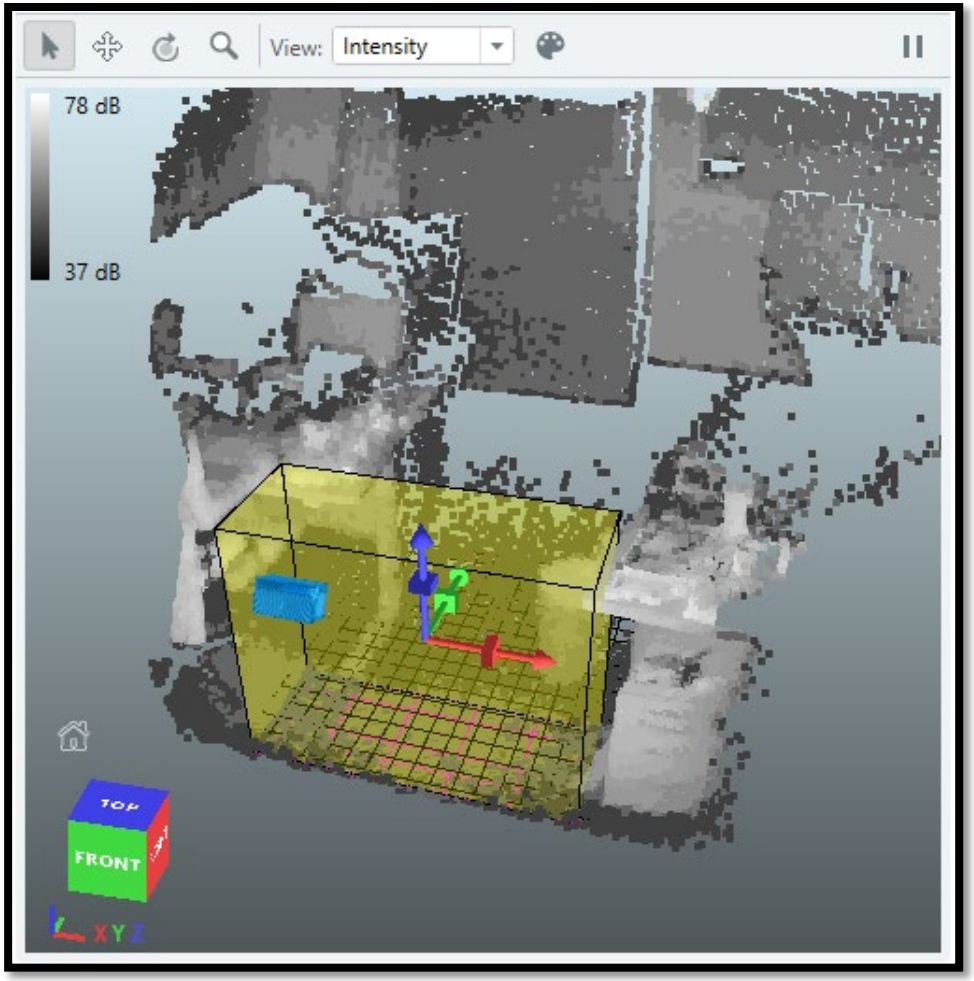
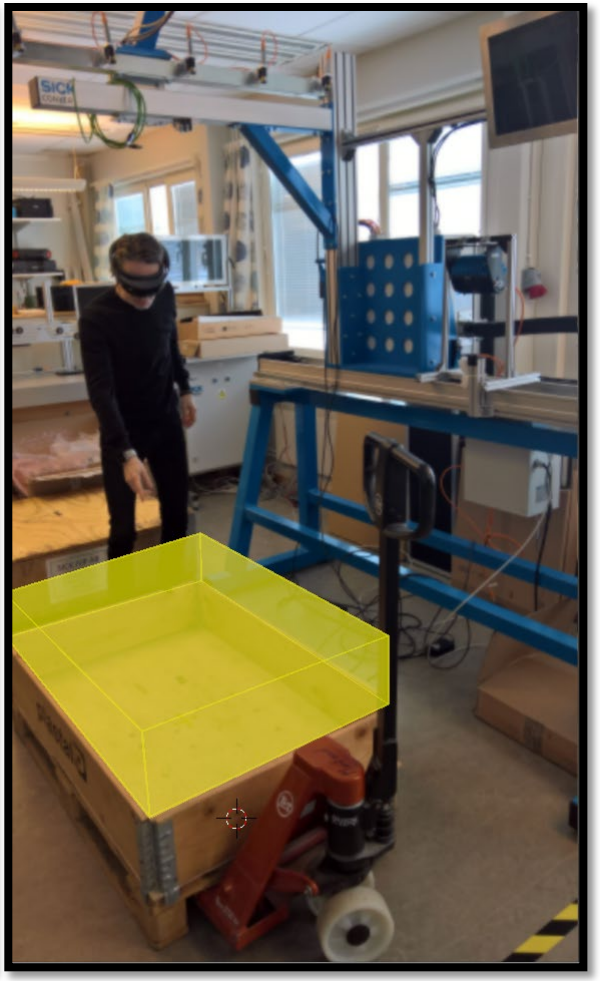
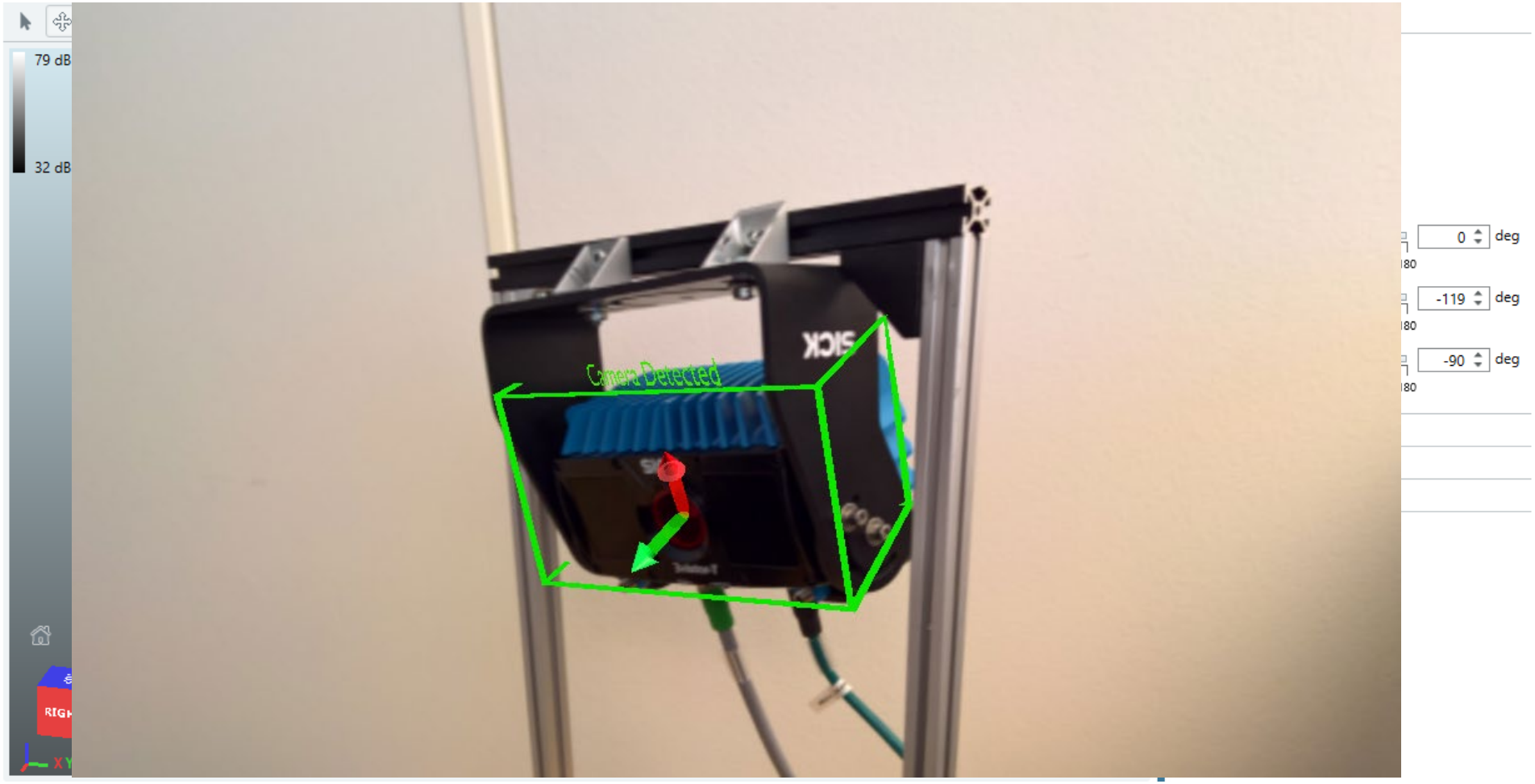
Herkömmliche Visualisierung

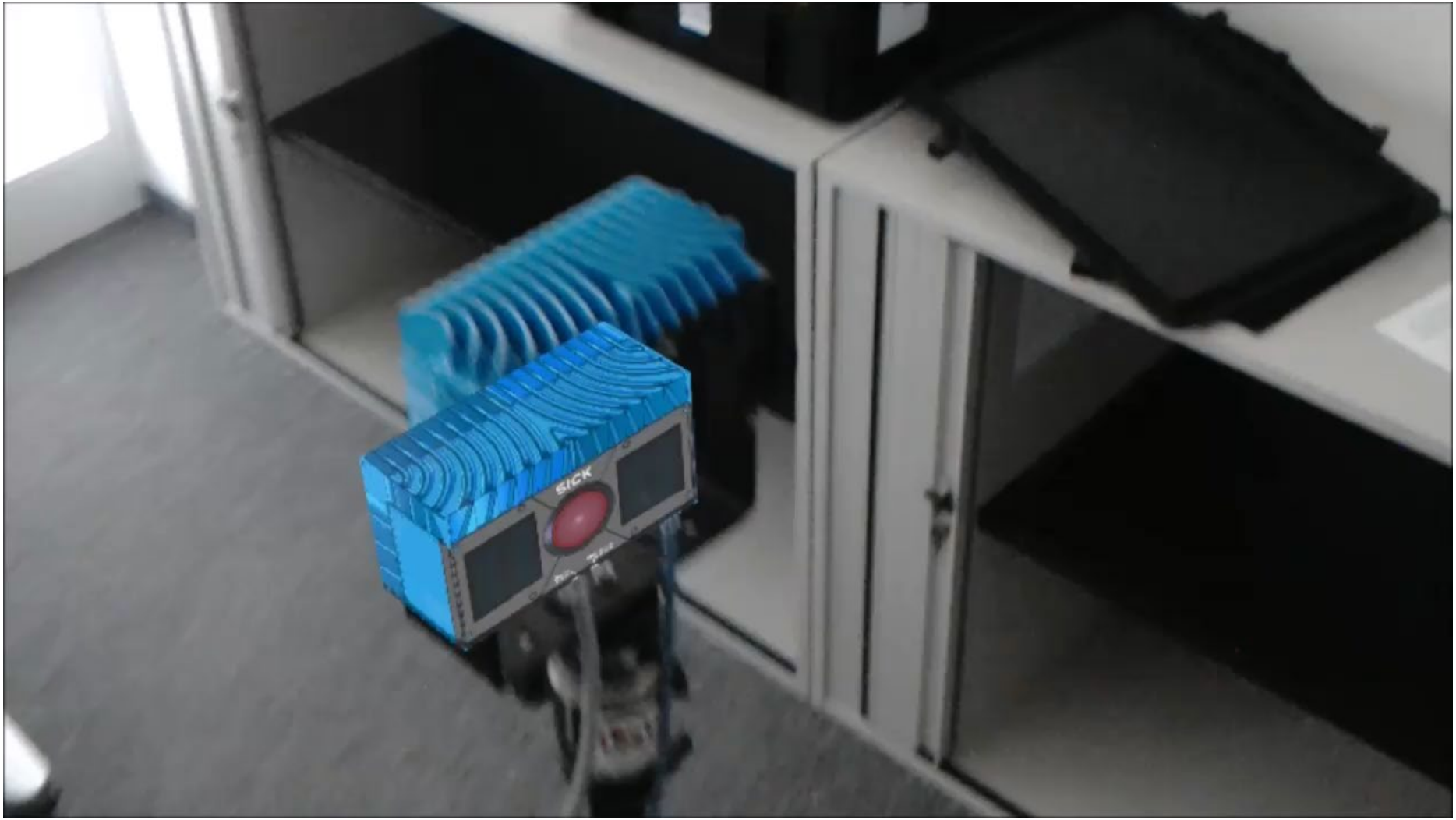


HoloLens:



Herausforderung: Abgleich zwischen virtueller Szene und der Realität




SICK

BEISPIEL AUTOMATISCHE MONTAGEERKENNUNG

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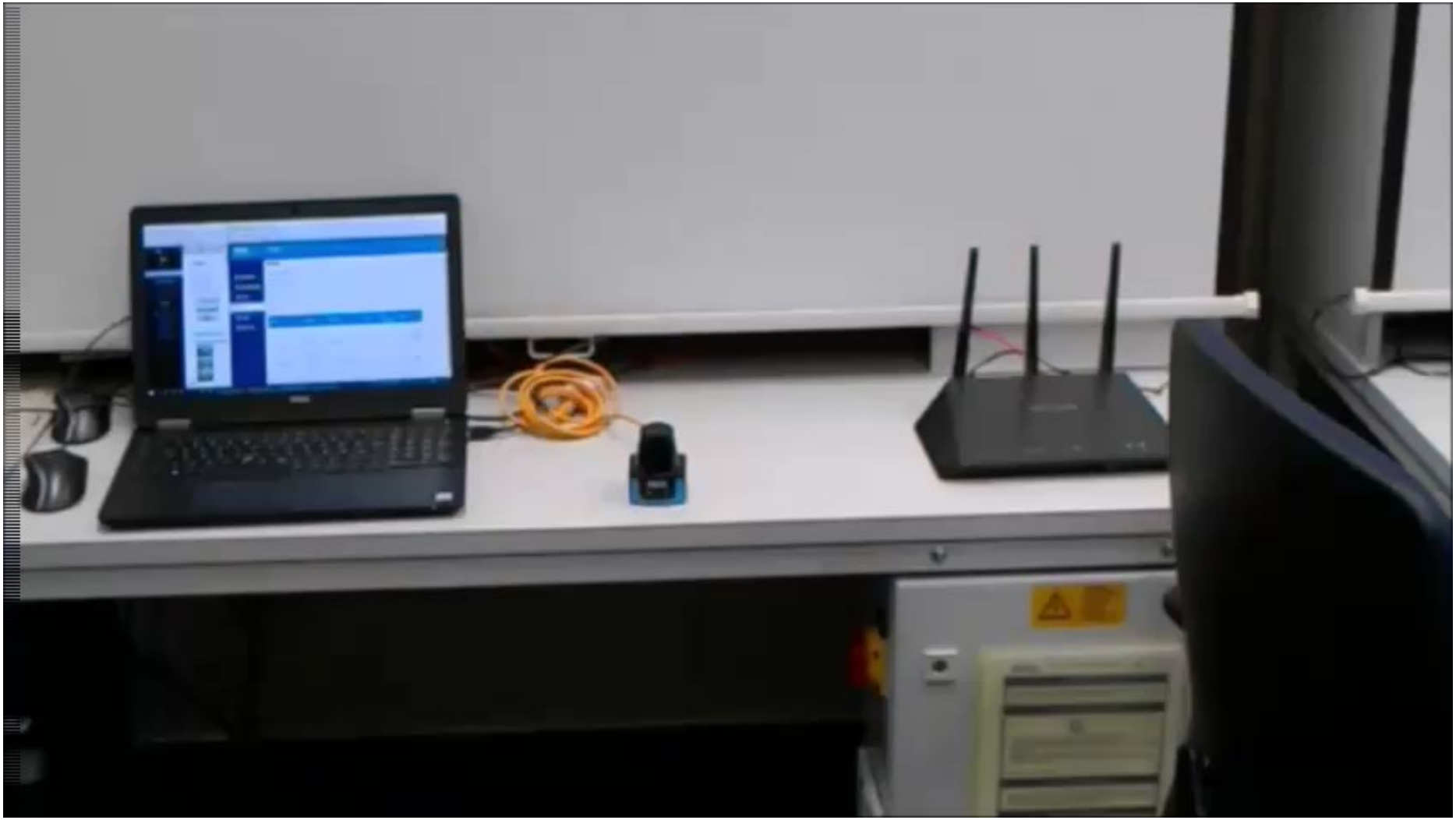

HOLOLENS ALS EINGABEGERÄT
POSITIONIERUNG DES ARBEITSBEREICHS

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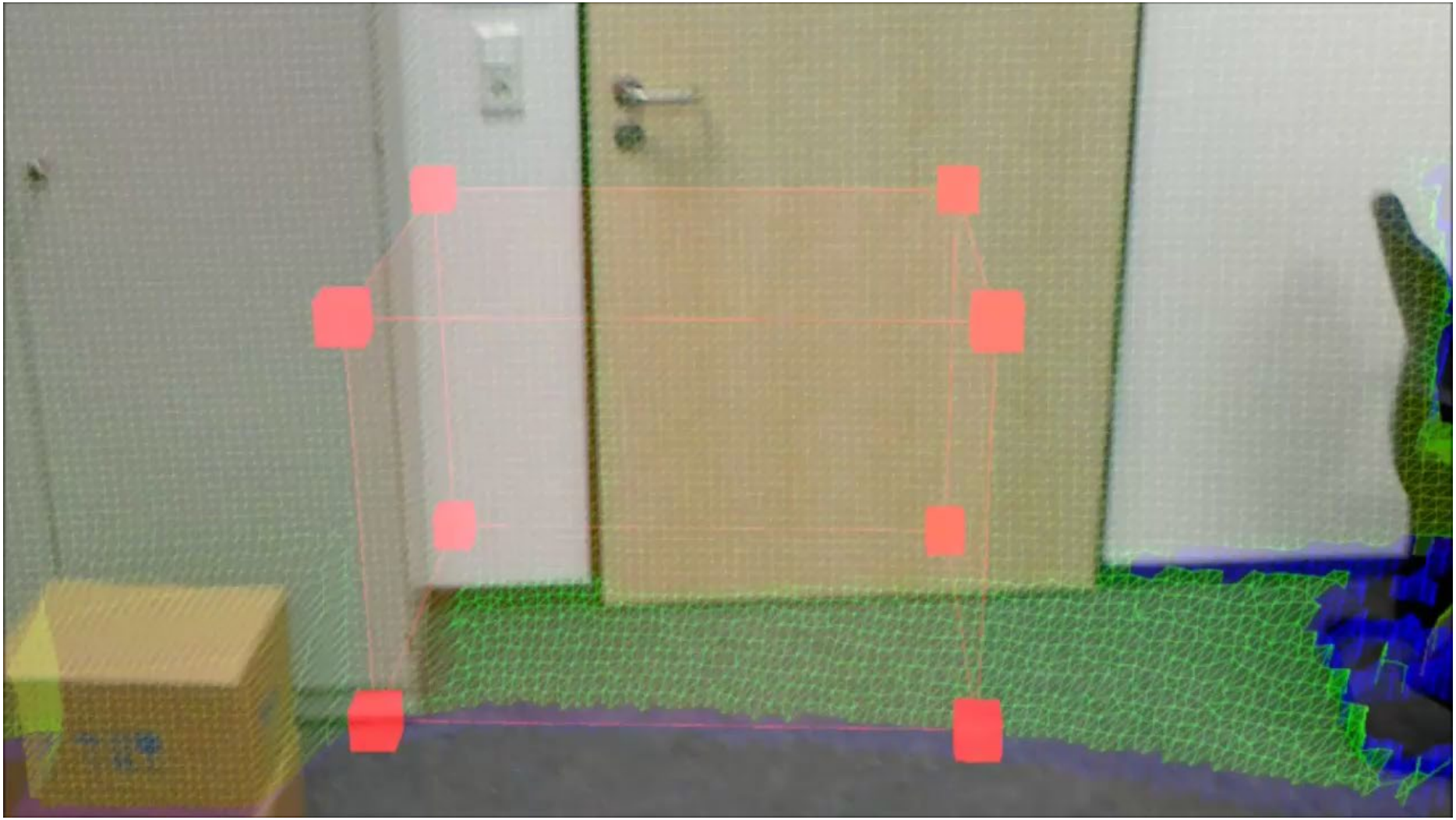

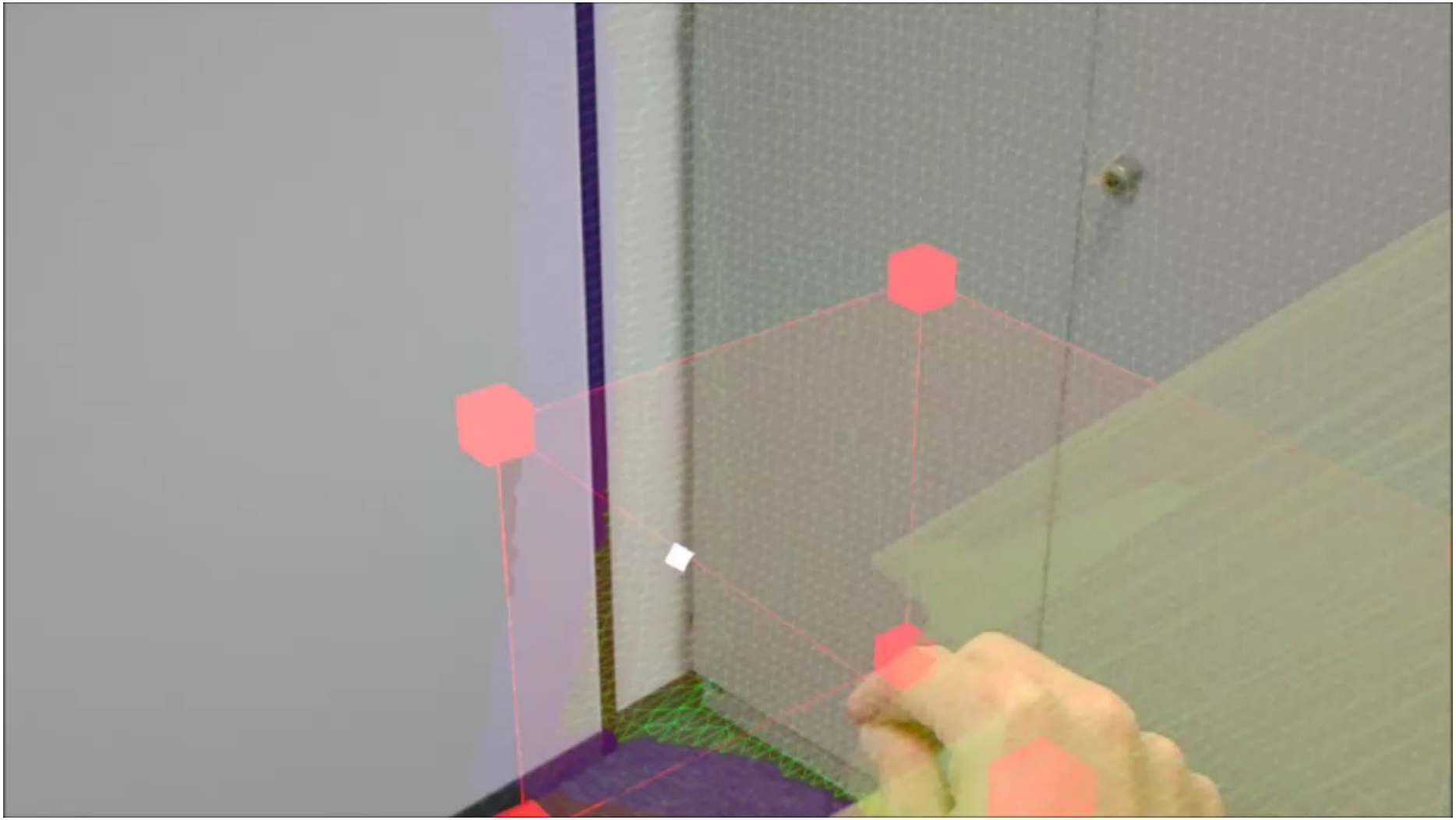

HOLOLENS ALS AUSGABEGERÄT
TESTEN DER KONFIGURATION

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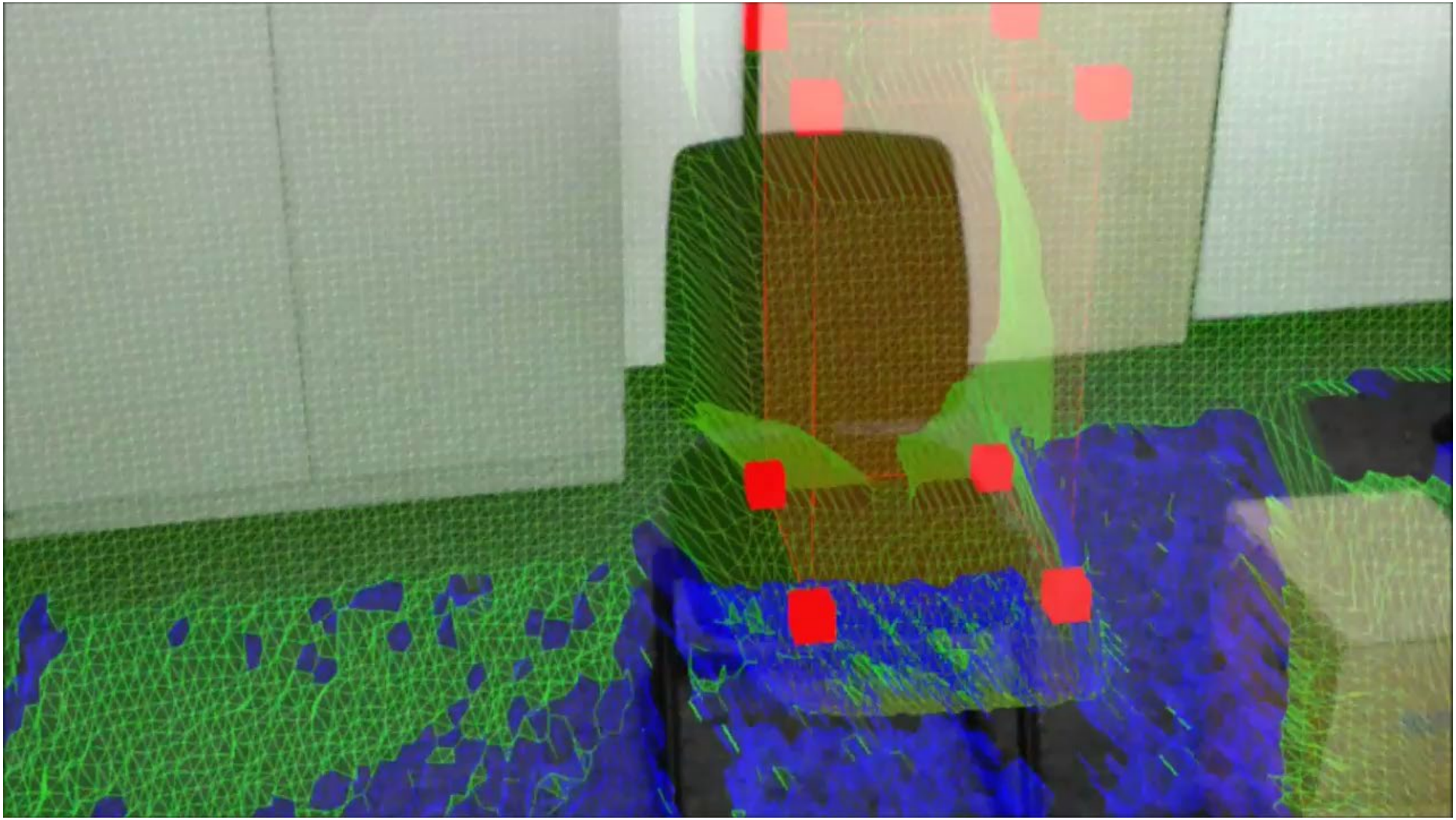

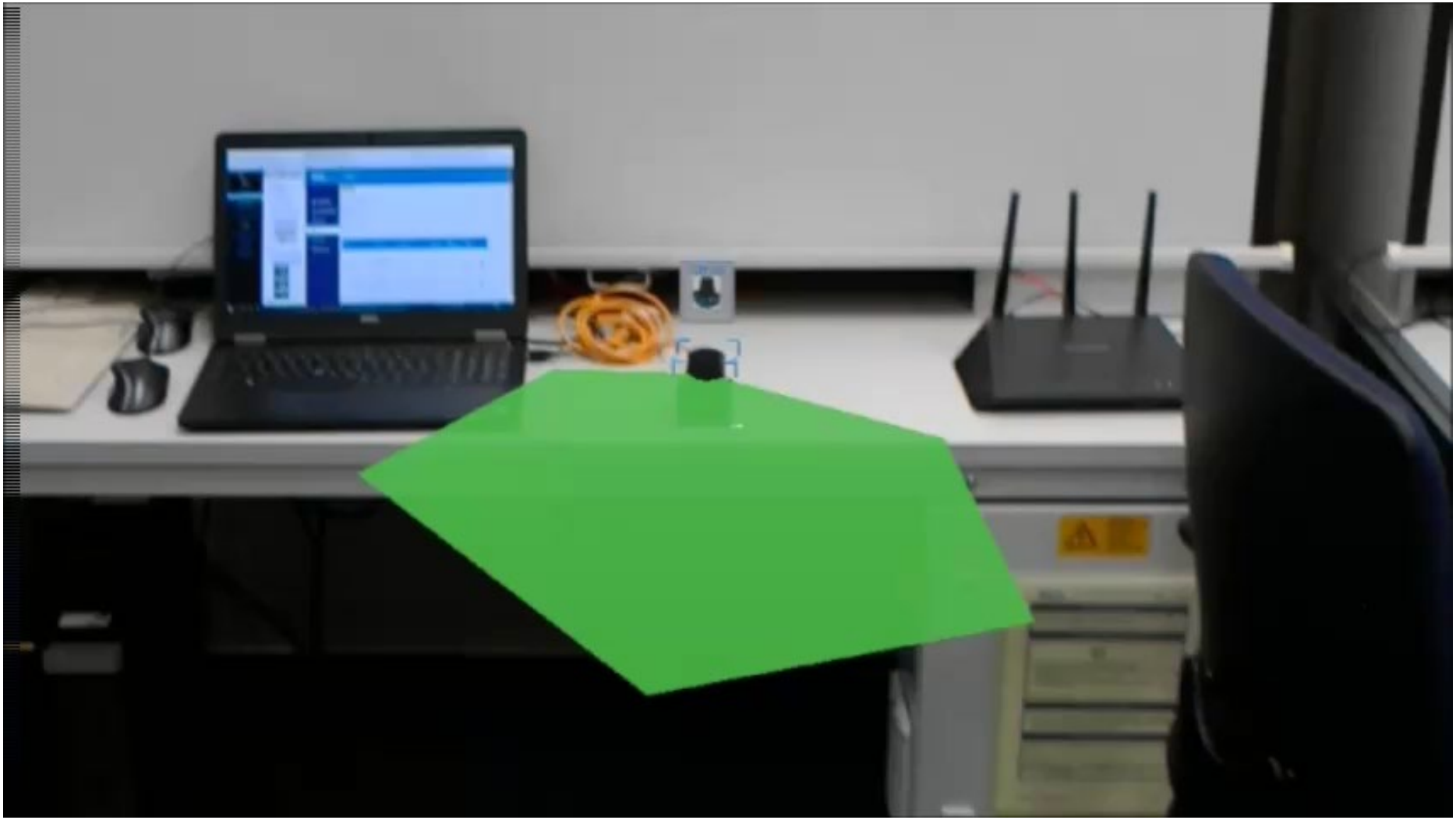

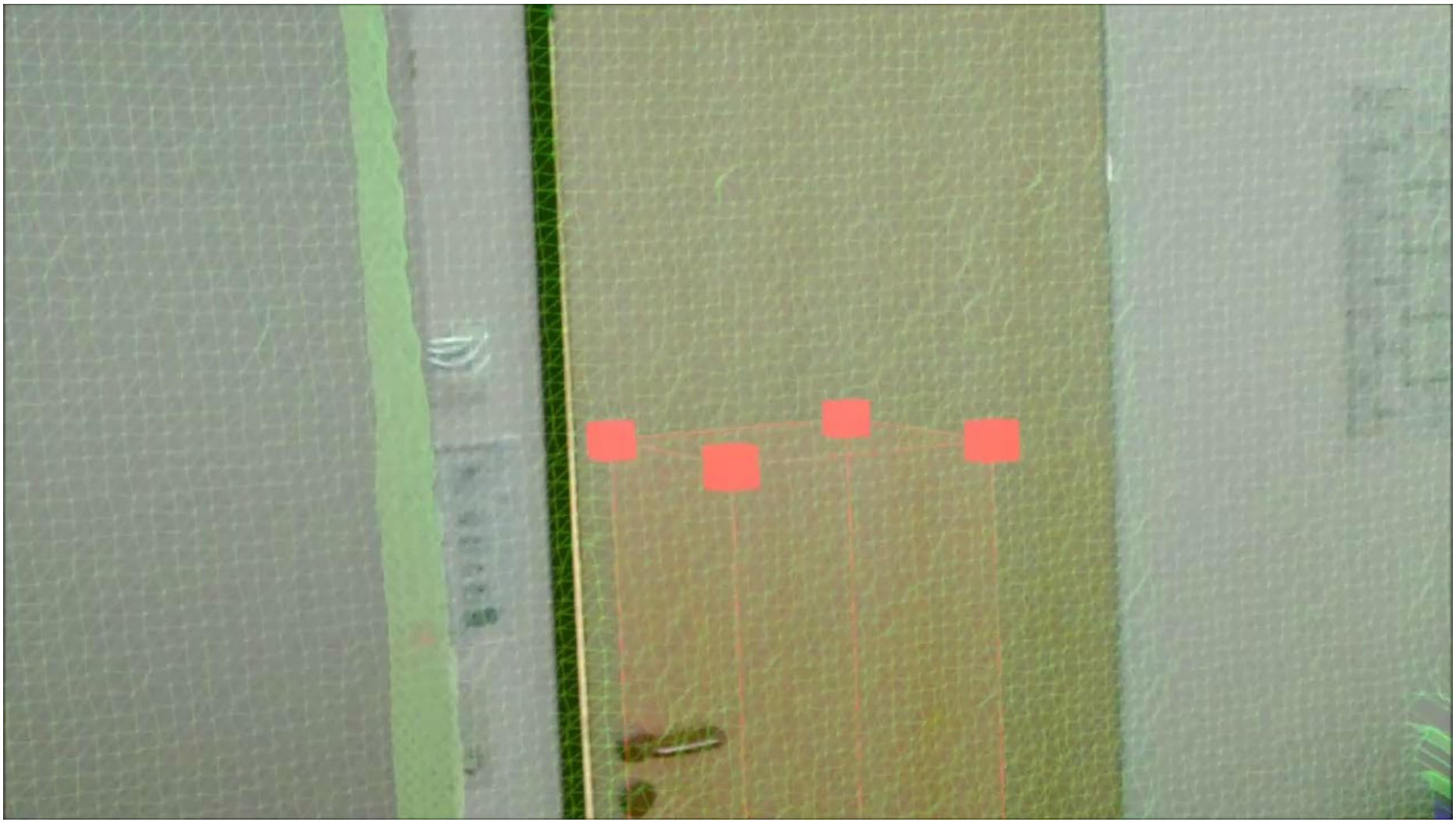

HERAUSFORDERUNGEN

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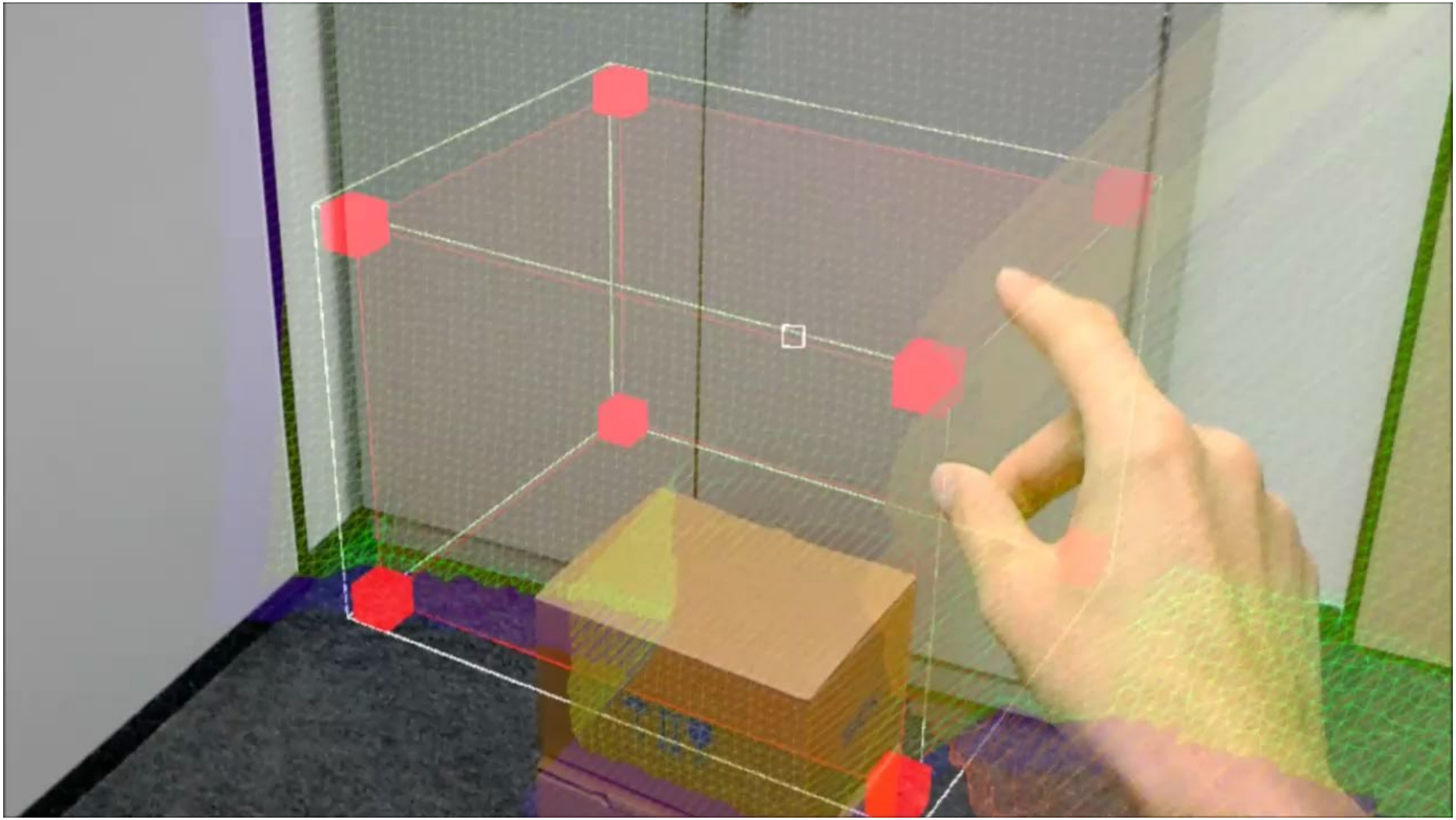
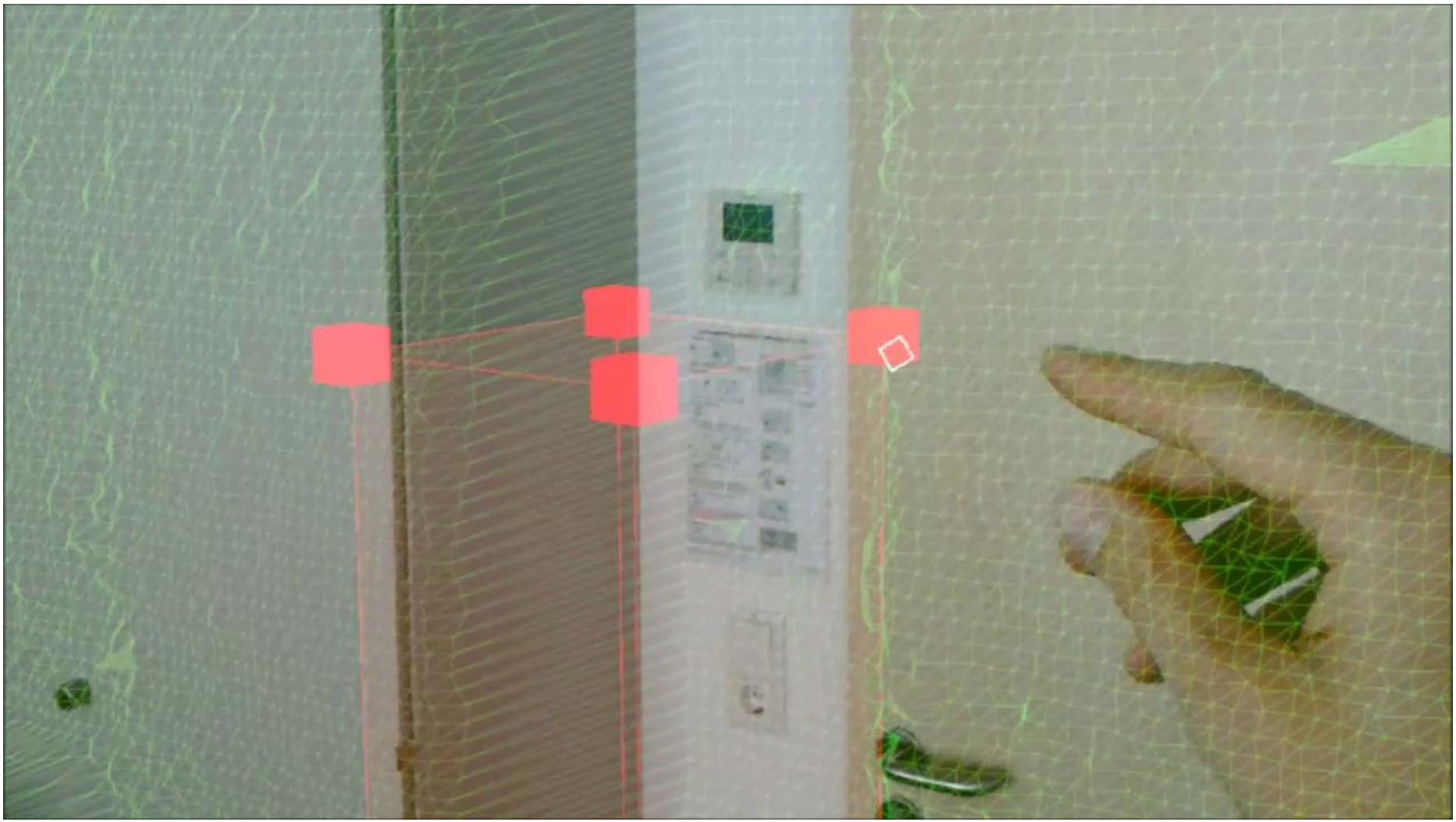
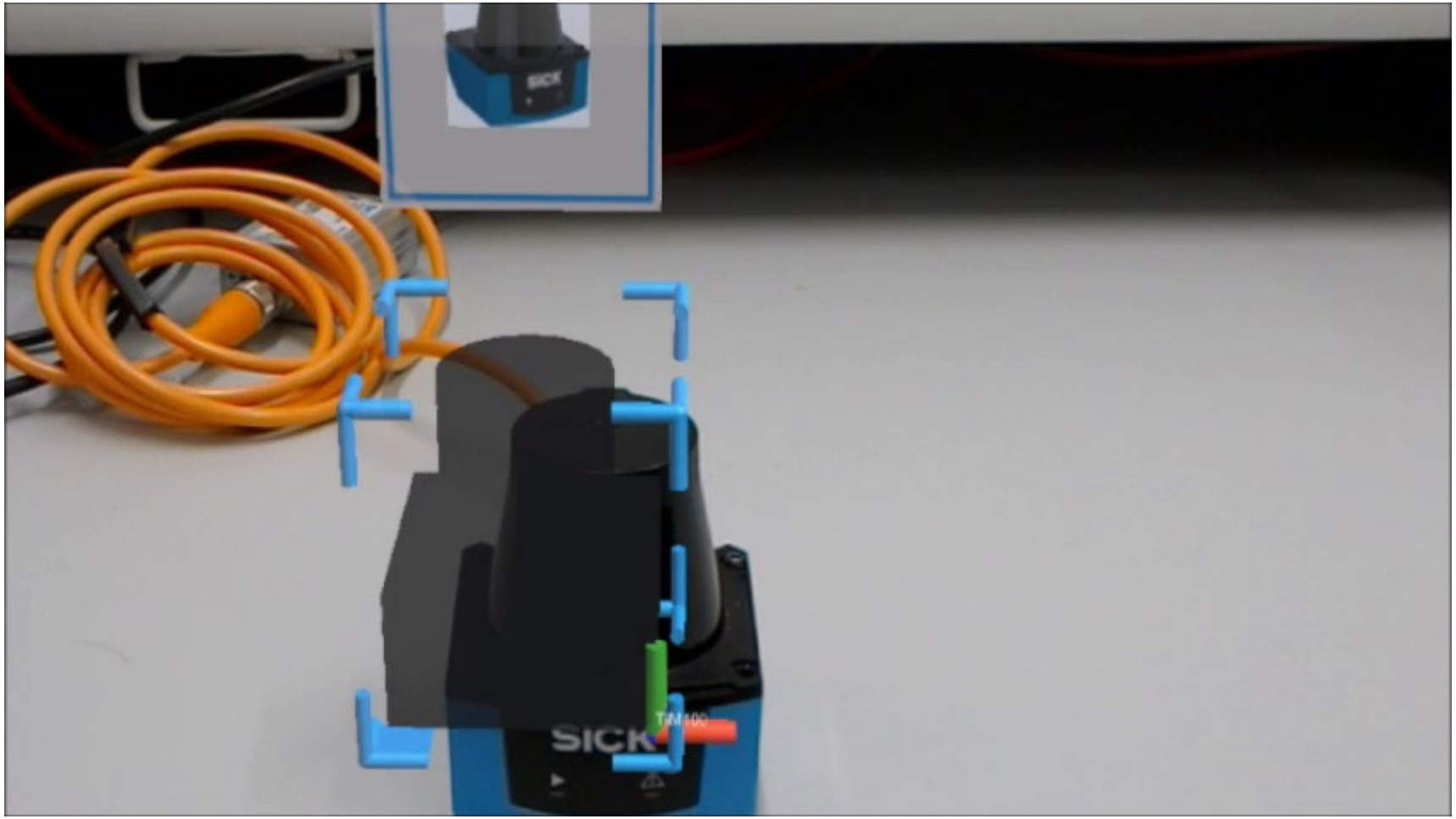




HERAUSFORDERUNG AUTOMATISCHE MONTAGEERKENNUNG



SCHLUSS

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TAKE HOME MESSAGE
HOLOLENS & SMARTE 3D SENSORIK

SICK
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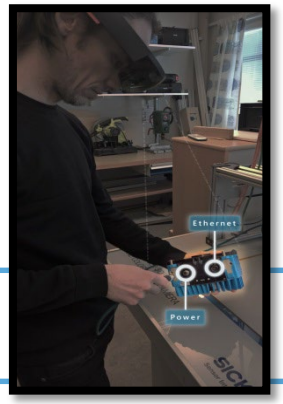
SICK bietet heute **3D Sensoren** an, die **3D Applikationen** lösen können.

Die Inbetriebnahme und Konfiguration in 3D ist eine **mentale Herausforderung**.



Wir sind **offen** für AR/VR Lösungen und unsere ersten Gehversuche lieferten **vielversprechende Ergebnisse**.

DANK AN MEINE KOLLEGEN:

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JOHAN FALK
MARCEL HAMPF

Uwe Hahne – uwe.hahne@sick.de

GBC09 BU05 3D Compact Systems

VAR² 2017 - Realität erweitern

4. Fachkonferenz zu VR/AR-Technologien in Anwendung und Forschung

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