



# EVT Eye Vision Technology

*Technology is our passion !*



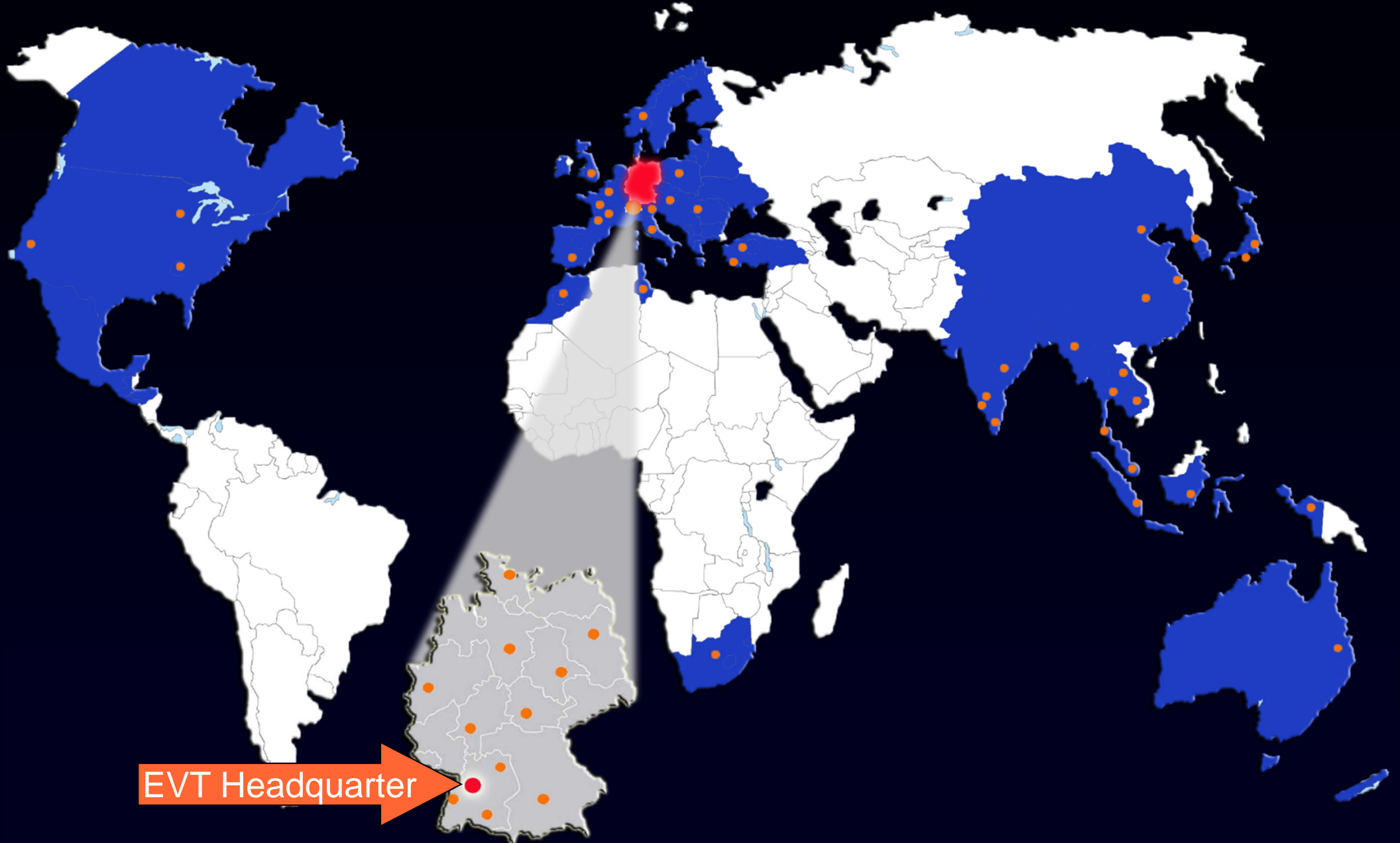
# EyeVision

Messen und Prüfen per Drag und Drop

Kombination von  
Bolometrie Sensorik und 3D Sensorik  
als Lösung für u.a. Verbundwerkstoffe



# EVT Standort & Distribution



EVT Headquarter



# EyeVision

Optische Mess- und Prüf-Software



# „Ready to Use“ Bildverarbeitungssoftware

Eine Software für alle Anwendungsfälle



# EyeVision

## Hardwareplattformen



# EyeVision verfügbar auf

**Vision Sensors**  
*EyeSens*  
ObjectCount  
OCR Reader  
DMC Reader  
Pattern Match  
Bar Code Reader

**Smart Cameras**  
*EyeCheck*  
*EyeSpector*

**3D Sensors**  
*EyeScan 3D*

**Embedded Systems**  
• USB  
• GigE  
*EyeDisplay & EyeVBox*

**PC-Based High End Machine Vision Systems**  
• USB  
• FireWire  
• GigE  
• Camera Link  
• CoaXPRESS

**EyeVision SDK**  
Development Libraries

Vision Sensoren

Smart Kameras

3D Sensors and Systems

Embedded Systeme

PC Systemen

Windows, LINUX, MacOSX, VCOS



# EyeVision Sensorauswahl

- 1-D Sensoren (Zeilenkamas grau/farbe)
- 2-D Sensoren (Matrixkamas grau/farbe)
- 2-D Temperatursensoren (Bolometriesensoren)
- 3-D Sensoren (Triangulation, Flächensensor)
  
- X-Ray
- Ultraschall





# EyeVision

Prüfablauferstellung „Drag and Drop“



# Einlernoberfläche

The screenshot displays the EyeVision software interface. The main window is titled 'Programmeditor (3D\_2\_1\_2\_measure.ckp)'. It features a menu bar with 'Datei', 'Bearbeiten', 'Ansicht', 'Optionen', 'Befehlsverwaltung', 'Fenster', and 'Hilfe'. Below the menu is a toolbar with various icons. The central area contains a table with columns: 'Nr.', 'S', 'G', 'T', 'I', 'E', 'B', 'Kommentar', and 'IM'. The table lists 23 items, including 'Punktliste', 'Rechtecktaster', 'Gerade', and 'Winkel'. To the right of the table is a 'Camera Viewer' window with tabs for 'Camera / IM 0', 'IM 1', 'IM 2', 'IM 3', and 'Standbild'. The 'Camera / IM 0' tab is active, showing a 3D scene with a red and yellow plane. Below the camera viewer is a control panel with 'Livebild', 'Zoom', and 'Navigator' sections. The status bar at the bottom shows 'Cam connected', 'TeachIn', and '331 / 27 (0)'. Two large orange arrows point from the table and the camera viewer towards the center of the image.

Nr.	S	G	T	I	E	B	Kommentar	IM
1								
2								
3							Verwaltung 3D Daten	0
4								
11							Punktliste	
12							Rechtecktaster	
13							Gerade	2
14								
15							Punktliste	2
16							Rechtecktaster	2
17							Gerade	2
18								
19							Winkel	2
20							Text	2
21								
22								
23								

Bildanzeigen für  
Grau- und Farbbild,  
2D, 2 ½ D, 3D Punktwolke

Programmeditor – grafische  
Drag and Drop Programmierung



# Beispiel Prüfmerkmal einlernen

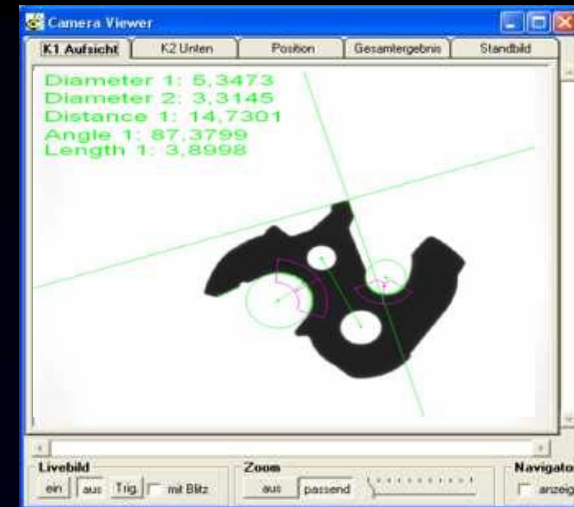
- Image acquisition
- Calibration tools
- Filter commands
- Object detection
- Edge detection
- Geometry
- Measurement tools
  - Area check
  - Calliper (horizontal)
  - Cross-section
  - Determine point of
  - Distance
  - Fitting pin measur
  - Free calliper
  - Measure gap width
- Sequence control
- Communication
- Code reader
- Others



Program editor (Example Positio...)

No.	S	G	T	I	R	C	Comment	IM
1			T				Reset Point list	0
2			T				Reset calibration	0
3								
4								
5			T				Load images	0
6								
7								
8			T				Mark Position adjustment	0
9			T				Find object	0
10			T				Jump if NOK	0
11			T				Calibration	0
12								
13								
14			T					
15			T					
16			T					
17			T					
18			T					
19			T					
20			T					
21			T					
22			T					
23			T					
24			T					
25			T					
26			T					
27			T					
28								
29			T					
30								
31								
32			T				Mark Wrong number of objects	0
33			T				Write "Error"	0
34								
35								
36								

Find: \_\_\_\_\_ Next Back 32%





# Beispiel Prüfprogramm Biegewinkel

## Ziele

- Kantenantastung
- Geradenbestimmung
- Winkelbestimmung



# Lösung



EyeVision

File Edit View Options Command administration Window Help

EyeVisionComplete

- Object detection
- Edge detection
  - Circle counter
  - Circle probe
  - Contour tracing
  - Edge counter(straight line)
  - Rect probe
  - Riemann-probe
- Geometry
  - Angle
  - Circle
  - Distance to a straight line
  - Point
  - Point list
  - Straight line
- Measurement tools
- Sequence control
- Communication
- Code reader
- Others
- Color

Program editor (BendMachine.ckp)

No.	S	G	T	I	R	C	Comment	IM
1								
2		✓	T	✓	✓	✓	Image capture	0
3								
4		✓	T	✓	✓	✓	Point list	0
5		✓	T	✓	✓	✓	Search edge	0
6		✓	T	✓	✓	✓	Straight line	0
7								
8		✓	T	✓	✓	✓	Point list	0
9		✓	T	✓	✓	✓	Search edge	0
10		✓	T	✓	✓	✓	Straight line	0
11								
12		✓	T	✓	✓	✓	Angle	0
13								
14		✓	T	✓	✓	✓	Text	0
15								
16		✓	T	✓	✓	✓	Send angle to PLC	0
17								
18								
19								
20								
21								
22								

Find  Next Back

Commands (1-20) were executed 46%

Camera viewer

Camera / IM 0 IM 1 IM 2 IM 3 Fixed-image

Live image     With flash

Zoom

Navigator  Display  8bit Gray

Local system TeachIn No. 16: 0,0 (0 ±0) Demo61:24



# EyeVision im Einsatz



# EyeVision

## Beispiel im Prüfmodus



# Beispiel Prozess Display

EyeVision - [Prozeß Display]

Datei Bearbeiten Ansicht Optionen Befehlsverwaltung Fenster Hilfe

1 2 3 4 P TT GT BP

**EVT**

1000.0 FPS

Punktwolke

2 1/2 D transformation

Auswertung

Schnitt 3D Punktwolke

IR Bild 2D Grau

Hauptmenü

START

STOP

ZURÜCK

Vorwahl

59

1

von 0

akt. Ergebnis

Bad

Cam not connected Bereit ... warten auf Eingabe ...





# 3D Sensoren zur Erzeugung einer Punktwolke

Triangulations-Sensor



Triangulations- Sensor Ic



# Verschiedene 3D Sensoren eine Software EyeVision

Flächensensoren Ic



Flächensensoren

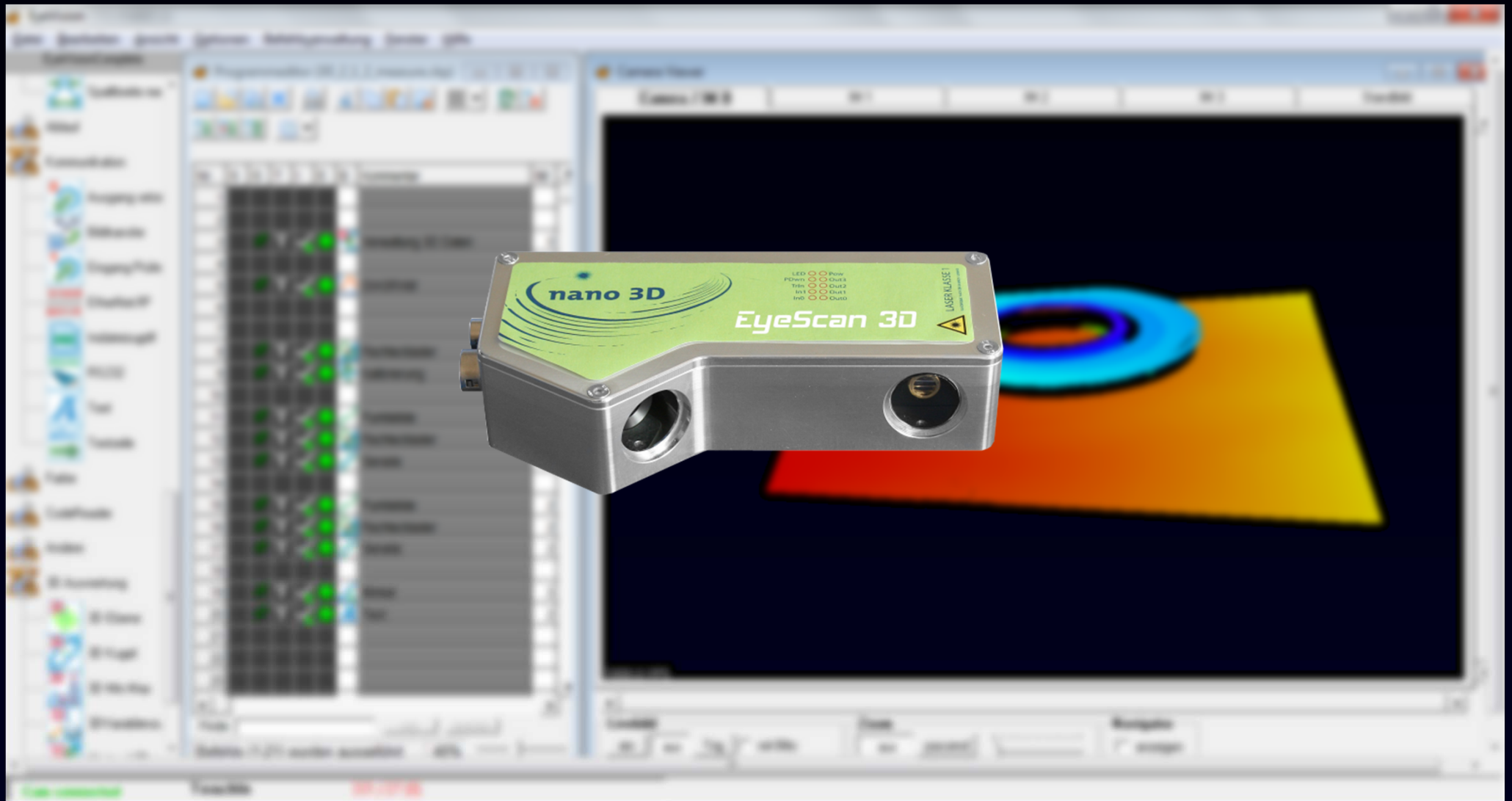




# Beispiel eines 3D Sensors



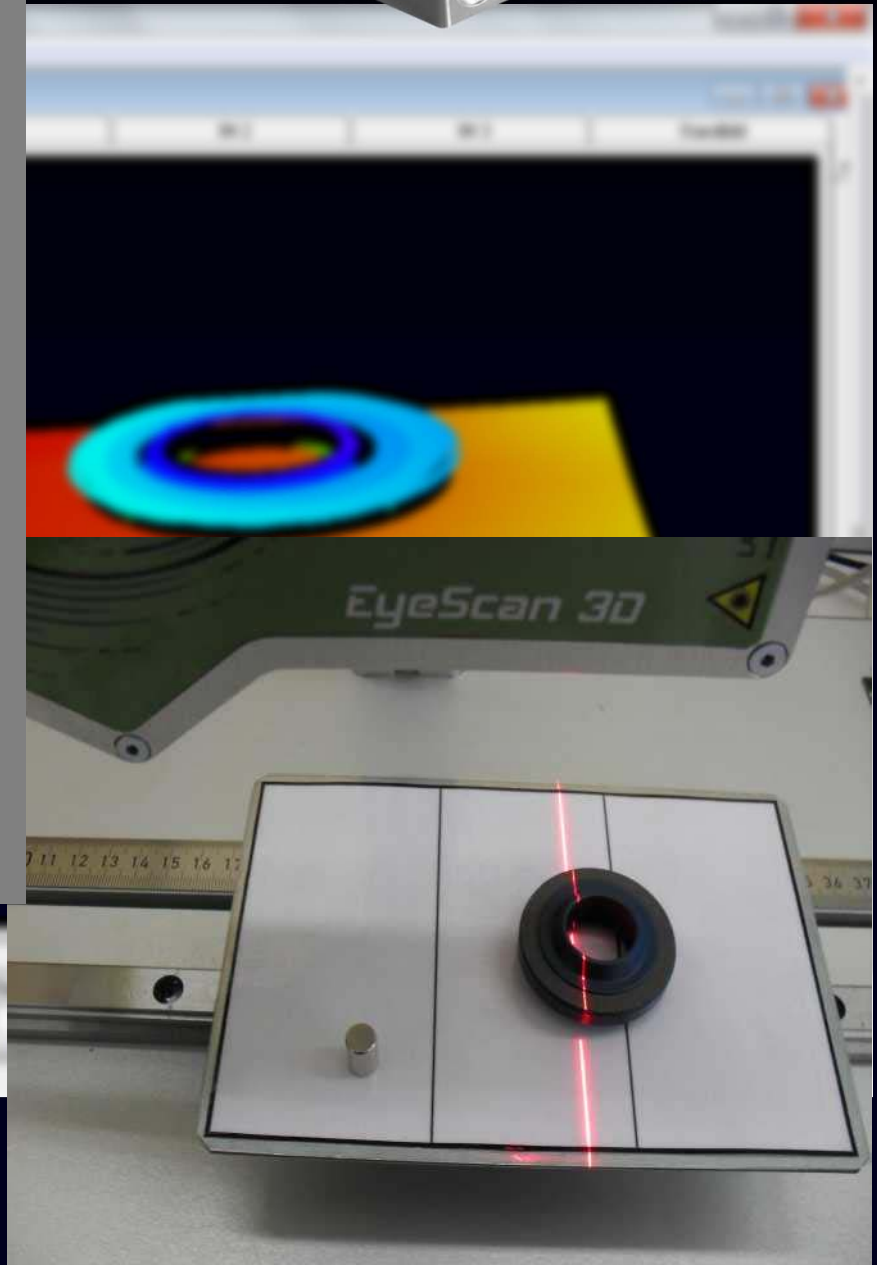
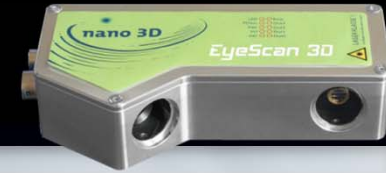
# Triangulations- Scanner





## Technical Data: EyeScan LT 3D

Scan Rate	up to 400 Hz
Laser	Class 1, wave length 635nm, rated power 5 mW
Interface	2 x Input, 4 x Output
Supply Voltage	24 V $\pm$ 20%
Dimension	140 x 70 x 35 mm
Lateral Resolution	80 - 300 $\mu$ m
Vertical Resolution	15 - 50 $\mu$ m
Horizontal Range	50 - 200 mm
Vertical Range	25 - 90 mm

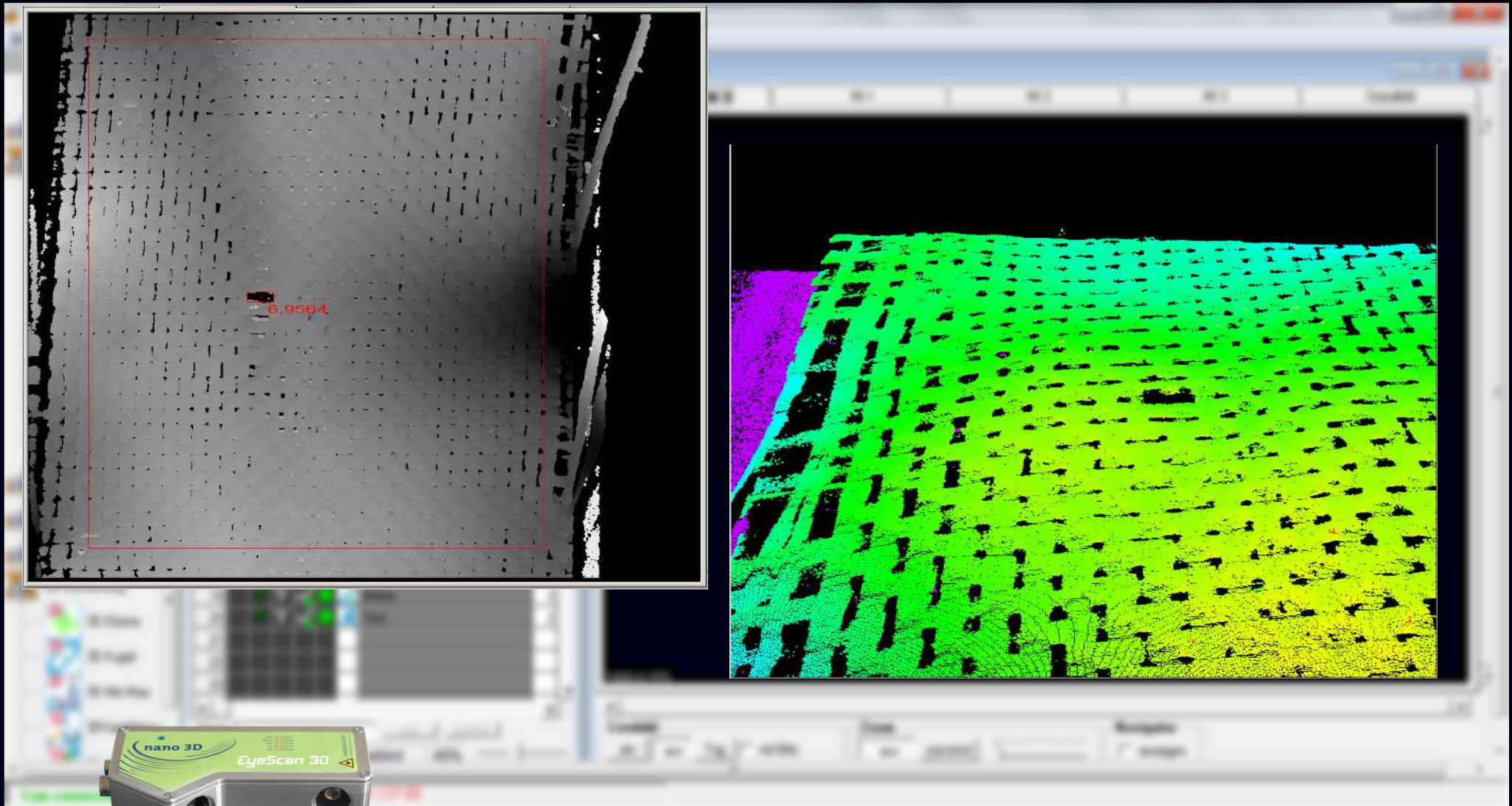




# Beispiel von 3D Punktwolken

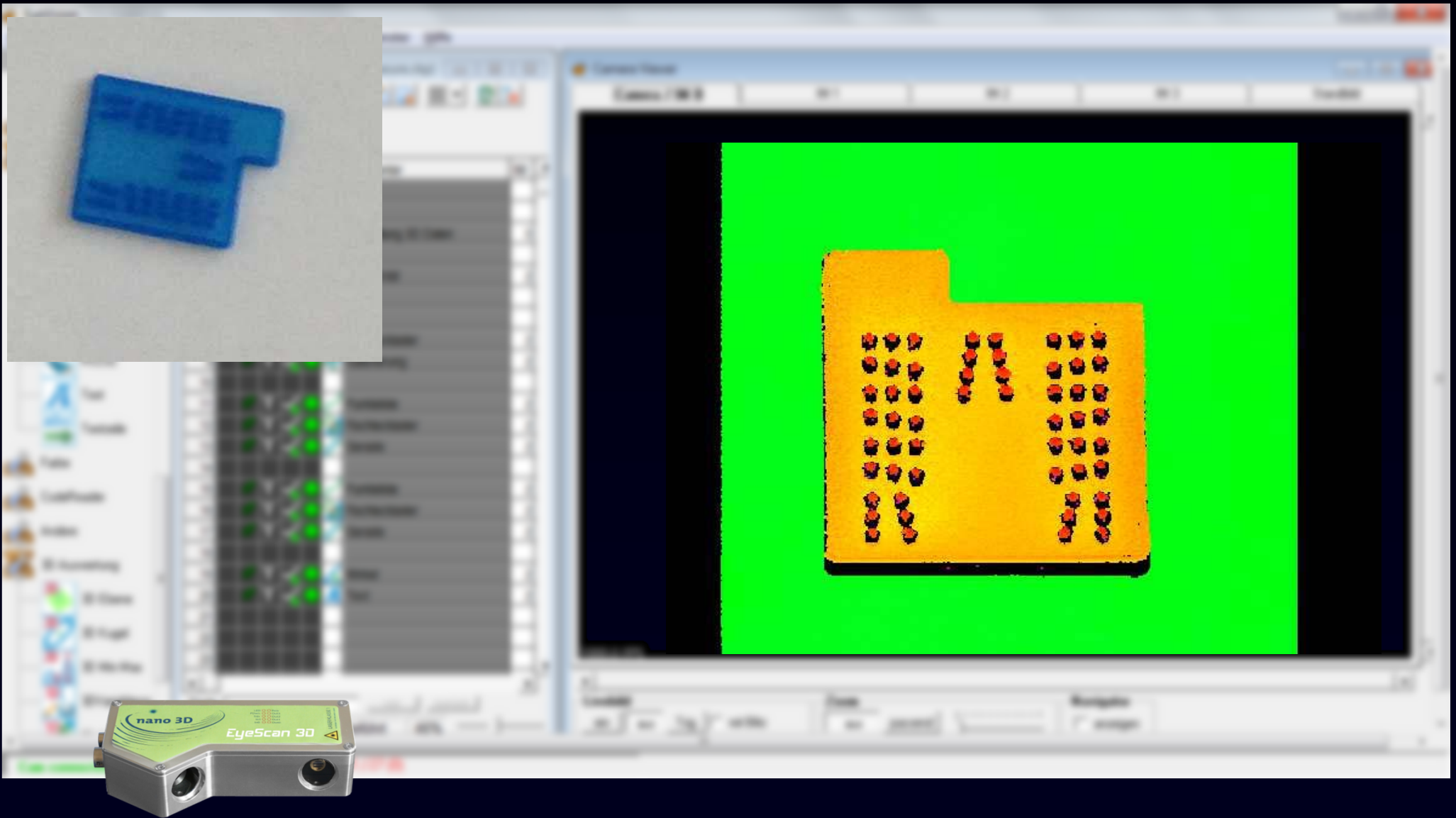


# Verbundfaserwerkstoff





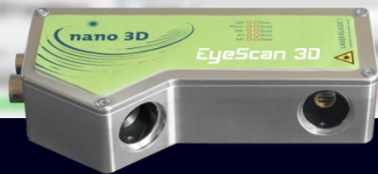
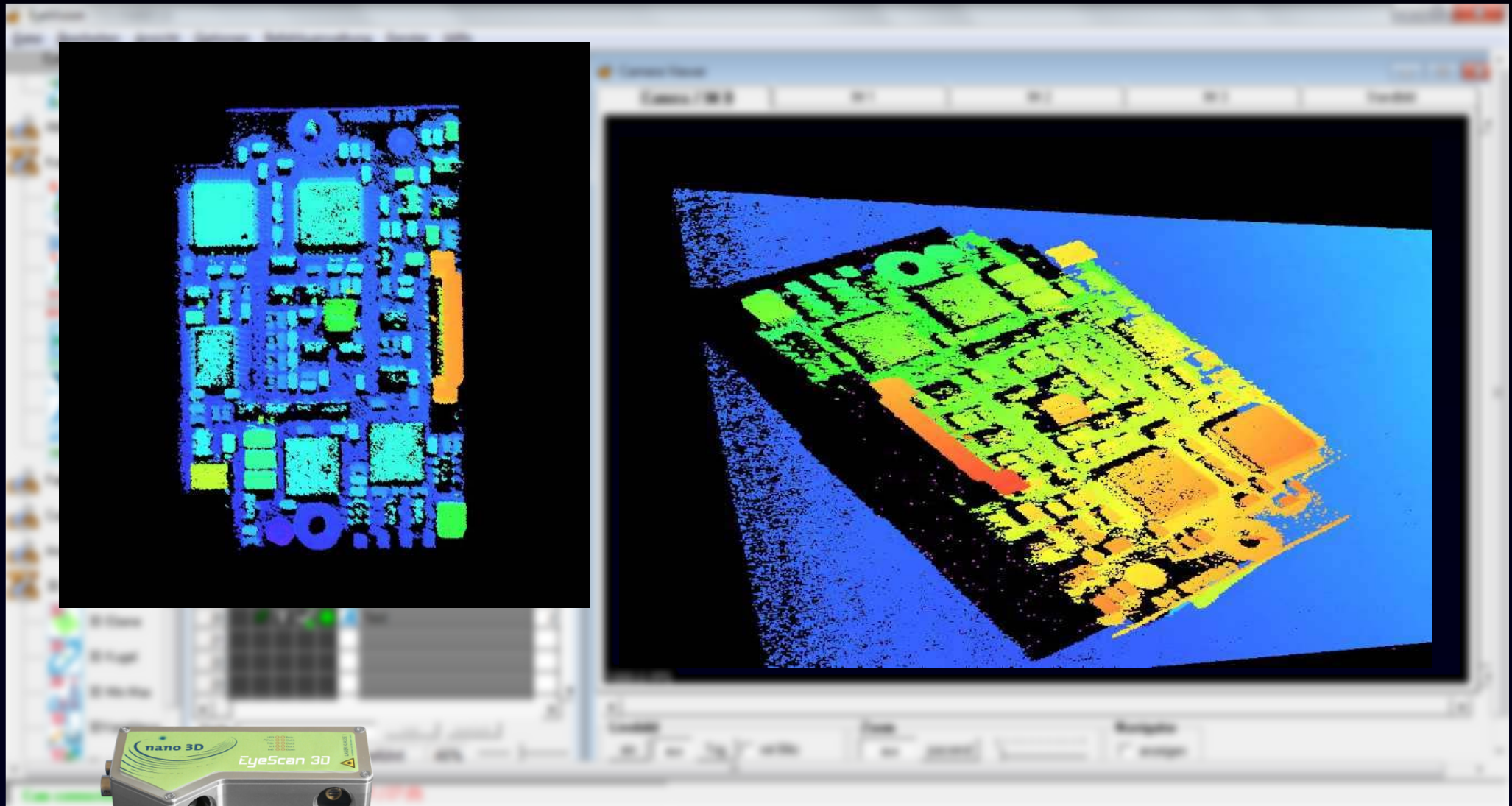
# Andruckpunkte aus Gummi





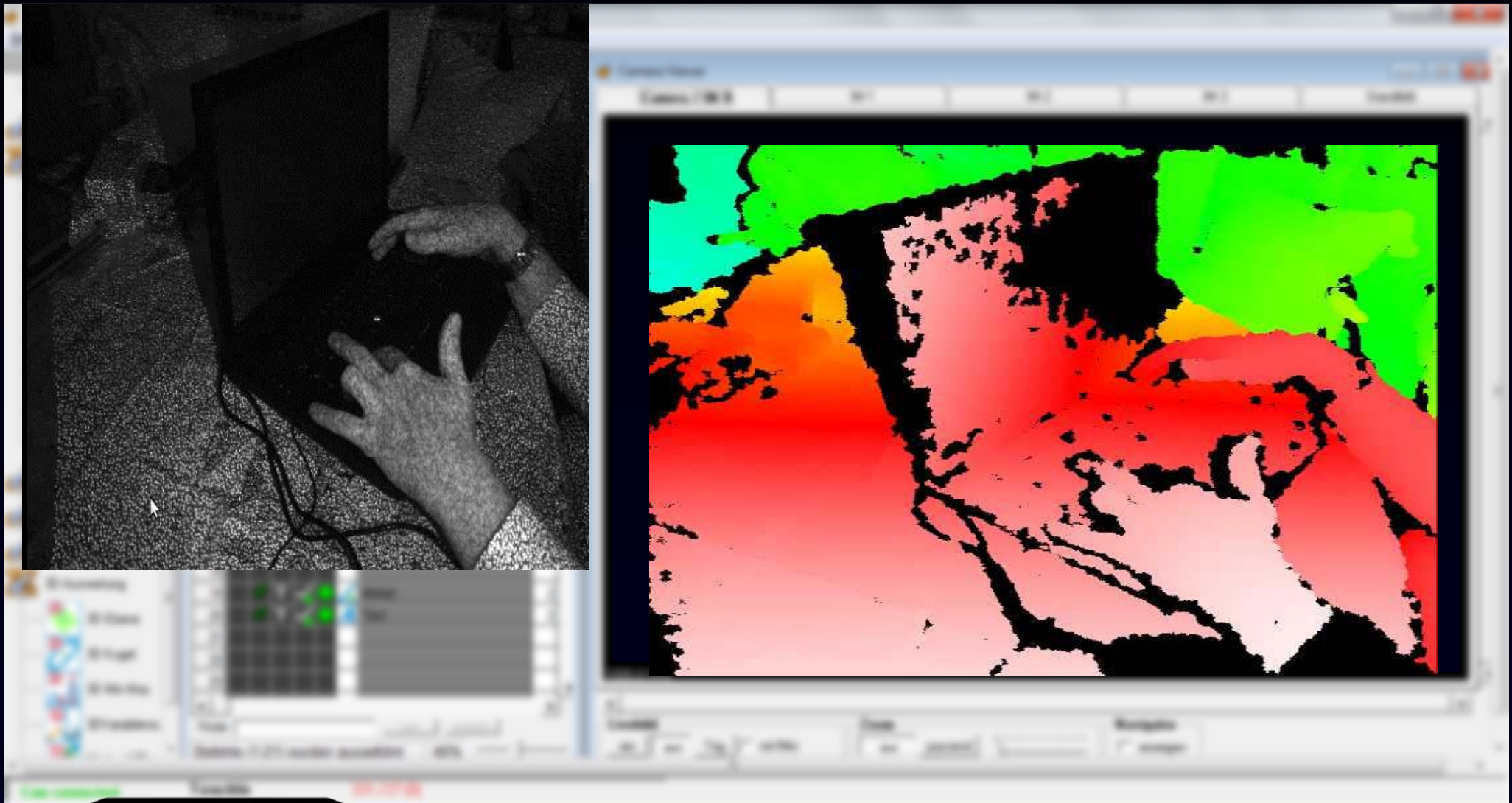


# Platinenkontrolle





# Arbeitsbereich Überwachung





# Wärmebildauswertung mit IR - Kamera

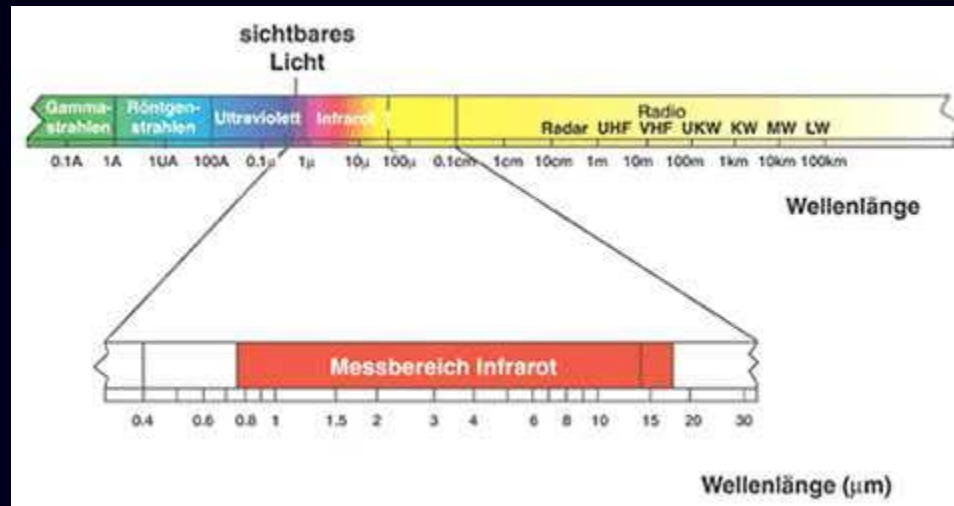


# Wärmebildkamera (Bolometriesensoren)

- „sieht“ Wärmestrahlung
- 2D Wärmebild



Optris IR Camera





# Beispiel IR Bild

The screenshot shows the EyeVision software interface. At the top, there is a menu bar with 'Datei', 'Bearbeiten', 'Ansicht', 'Optionen', 'Befehlsverwaltung', 'Fenster', and 'Hilfe'. Below the menu bar are navigation buttons '1', '2', '3', '4', and 'P', and status indicators 'TT GT BP'. The main area has an orange background with the 'EVT' logo and an eye icon. On the left, there is a 'Camera 16 Bit' window showing a black image. In the center, there are two main image displays: 'Wärme 3D Darstellung' (a 3D point cloud of a face) and 'Wärme Helligkeit' (a grayscale IR image of a face). Below these are two red boxes with arrows pointing up: 'Temp als Z Wert' and 'Temp als Grauwert'. On the right, there is a 'Hauptmenü' panel with 'START', 'STOP', and 'ZURÜCK' buttons, a 'BEREIT' status indicator, a 'Zähler' (2944), a 'Vorwahl' (526), and an 'akt. Ergebnis' (Bad) button. At the bottom, there is a taskbar with 'Lokales System', 'Bereit', and a status bar showing '... warten auf Eingabe ...'.



# Beispiel Sensorkombination

IR – Kamera

3D - Triangulationssensor



# Defekt in Carbonfaserbauteil

- Einschlagsdefekt
- Im Graubild kaum zu erkennen





# Beleuchtung

Wärmestrahler  
z.B. Halogenstrahler





# IR Sensor

The screenshot shows the EyeVision software interface. The main window is titled "Camera / IM 0" and displays a live video feed of a human face. The face is overlaid with a false-color temperature map, where warmer areas are shown in red and yellow, and cooler areas are shown in blue and purple. The software interface includes a menu bar at the top with options like "Datei", "Bearbeiten", "Ansicht", "Optionen", "Befehlsverwaltung", "Fenster", and "Hilfe". On the left side, there is a sidebar with various tool categories such as "Bildeinzug", "Kalibriertools", "Filterbefehle", "Objektdetektion", and "Geometrie". The central area contains a "Programmator (Neu\_0.cpk)" window with a table of commands and their execution status. The bottom status bar shows "Lokales System", "TeachIn", "41 / 24 (255)", and "Demo 74:36".

Nr.	S	G	T	I	E	B	Kommentar	IM	Parameter
1									
2			T				Verwaltung 3D Daten	0	Datei laden
3									
4									
5			T				Verwaltung 3D Daten	0	Datenkonvertierung
6									
7			T				Filter Tool Set	1	Filter: Konvertierung
8									
9			T				Objekte zählen (Blob)	1	unt. Schw. 166 ob. S
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									

Falschfarbdarstellung der Temperaturwerte



# IR Sensor Verarbeitet

The screenshot displays the EyeVision software interface. On the left is a toolbar with various processing tools. The main window is divided into two panes:

- Programmator (Neu\_0.cpk):** A table listing commands and their execution status.
- Camera Viewer:** A window showing a live image from the camera with a green bounding box around a detected object and its temperature value.

Nr.	S	G	T	I	E	B	Kommentar	IM	Parameter
1									
2			T	✓	●		Verwaltung 3D Daten	0	Datei laden
3									
4									
5			T	✓	●		Verwaltung 3D Daten	0	Datenkonvertierung
6									
7			T	✓	●		Filter Tool Set	1	Filter: Erosion Filter
8									
9			T	✓	●		Objekte zählen (Blob)	1	unt. Schw: 166 ob. S
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									

Camera Viewer: Camera / IM 0 | **IM 1** | IM 2 | IM 3 | Standbild

Livebild: ein | aus | Trig. |  mit Blitz

Zoom: aus | passend

Navigator:  anzeigen 8bit Grau

142,8711

Befehle (1-13) wurden ausgeführt 46%

Lokales System TeachIn 656 / 137 Demo 68:25

Objektsuche nach Bereichen mit bestimmter Temperatur



Aufnahme  
mit  
3D Sensor



# 3D mit Triangulationssensor

EyeVision

EyeVision3DComplete

Programmeditor (carbonverbund.cpk)

Nr.	S	G	T	I	E	B	Kommentar	IM	Parameter
1									
2			✓	✓	✓	✓	Verwaltung 3D Daten	0	Datei laden
3									
4									
5			✓	✓	✓	✓	Verwaltung 3D Daten	0	Displayeinst
6									
7									
8			✓	✓	✓	✓	Filter Tool Set	0	Filter: Aussc
9									
10			✓	✓	✓	✓	Verwaltung 3D Daten	0	Datenkonvert
11			✓	✓	✓	✓	Fenster	1	ROI-Fenster
12			✓	✓	✓	✓	3D Ebene	0	Ebenen Best
13			✓	✓	✓	✓	3D Ebene	0	Ebenen Subi
14									
15			✓	✓	✓	✓	Verwaltung 3D Daten	0	Displayeinst
16									
17									
18			✓	✓	✓	✓	Filter Tool Set	0	Filter: Aussc
19			✓	✓	✓	✓	Filter Tool Set	0	Filter: Reflex
20									
21			✓	✓	✓	✓	Filter Tool Set	0	Filter: Aussc
22									
23									
24									
25									
26									
27									
28									
29									
30									
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32									
33									
34									
35									
36									
37									
38									
39									

Camera Viewer

Camera / IM 0 IM 1 IM 2 IM 3 Standbild

1000.0 FPS

Livebild ein aus Trig mit Bilz Zoom aus passend Navigator anzeigen Punktwolke

Cam connected Teachln 114/599

Start | TODD.txt | DMC.dip | Anti-patter... | Total Com... | Git Bash | Common... | gltk: EV3 | foobar200... | Qt Designer | SpeedCrunch | QtNokia3... | Eigene Dok... | metis [Run... | EyeVision | 15:56 25.10.2013



Fusion der Sensordaten  
zu einem  
neuen Bild



# Fusion 3D und IR Sensor



The screenshot displays the EyeVision software interface. On the left is a sidebar with various inspection modules. The main window is split into two panes. The left pane is the 'Program editor (New 5.ckp)' showing a table with columns for No., S, G, T, I, R, C, Comment, IM, and Parameter. The right pane is the 'Camera viewer' showing a 3D point cloud of a rectangular object with a temperature gradient from blue (cold) to red (hot). The status bar at the bottom shows 'Local system', 'TeachIn', '29/3 (25)', and 'Demo72:25'.

No.	S	G	T	I	R	C	Comment	IM	Parameter
1									
2	✓	✓	✓	✓	✓	✓	3D Control	1	Load file
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
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22									
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24									
25									
26									
27									
28									
29									

Temperatur als Z-Werte – Blau kalt – Rot heiß



In fusionierten Bildern lassen sich die Fehler  
einfacher auswerten.



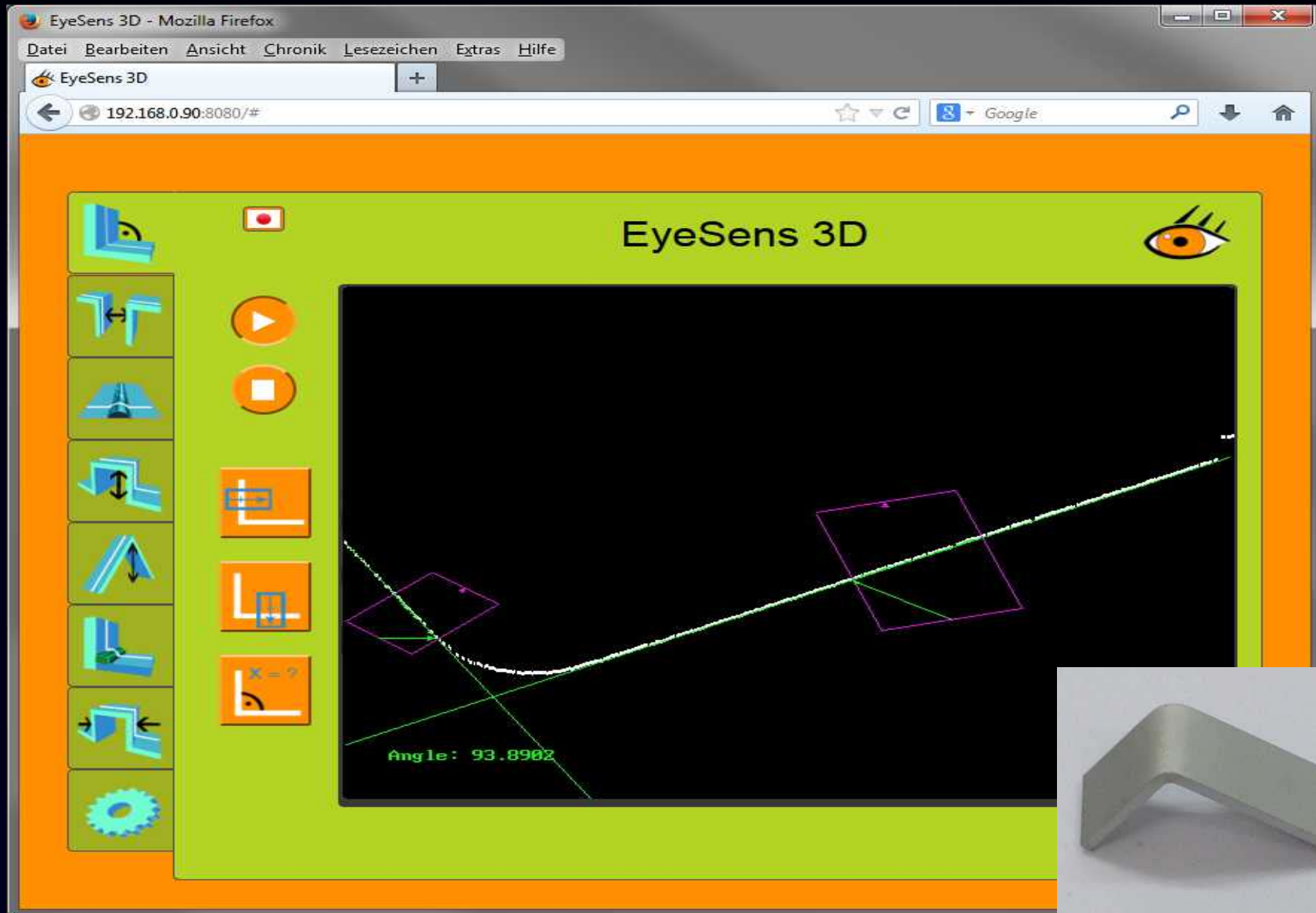
# EyeSens 3D

hier auf der Messe





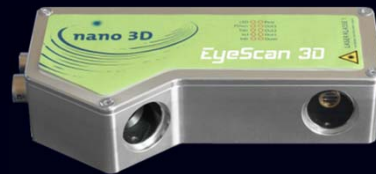
# 3D Ready to use Sensor



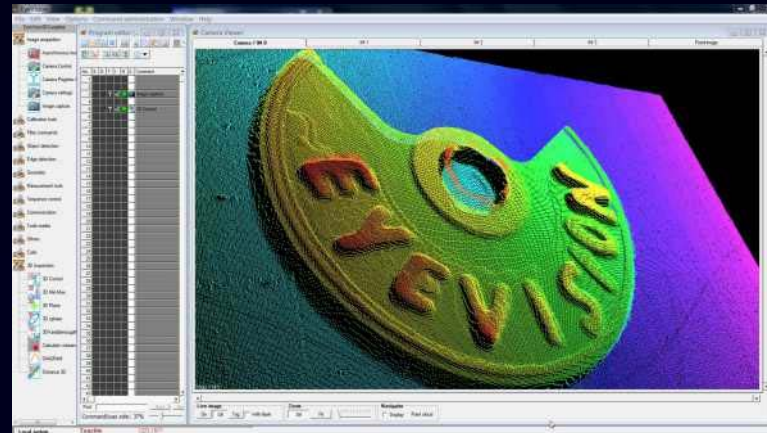


# Einfacher 3D Einstieg

Preisgünstiger Sensor EyeScan 3D Nano



Standard „ready to use“ Software EyeVision





# EyeVision Seminare

## Regelmäßige Schulungen

Monatliches Basis-Seminar

Alle 2 Monate Advanced-Seminar

Wo: Karlsruhe \* Chicago \* Singapur \* Tokyo



# Vielen Dank



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