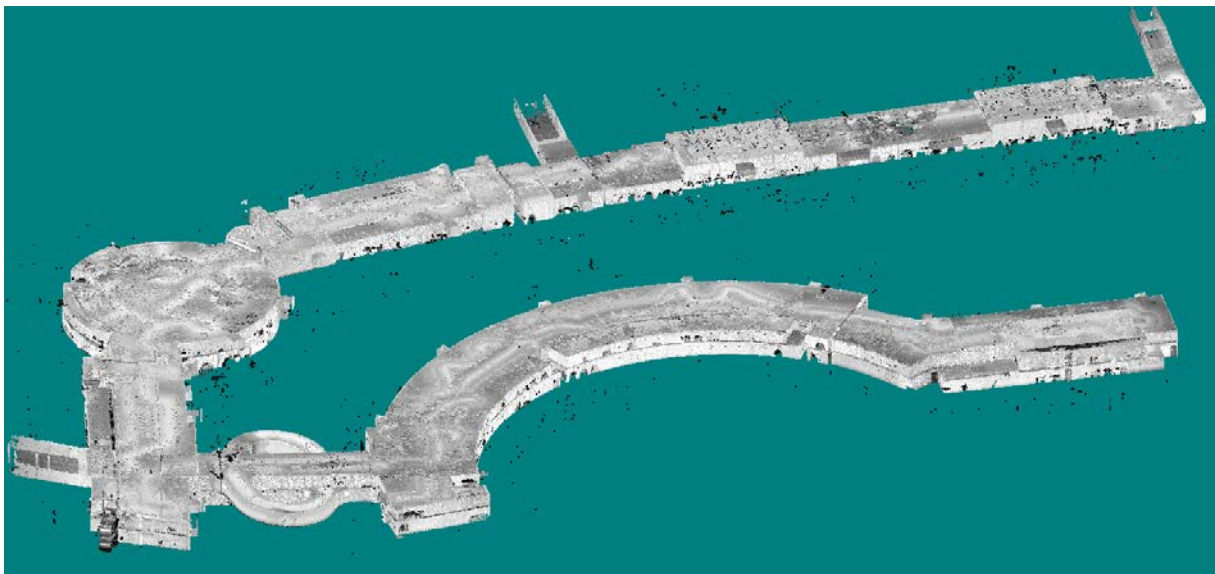


Trimble TIMMS and TX8 accuracy comparison of point clouds and 3D Models

Object: Parking deck, 2 underground levels, 13700m²



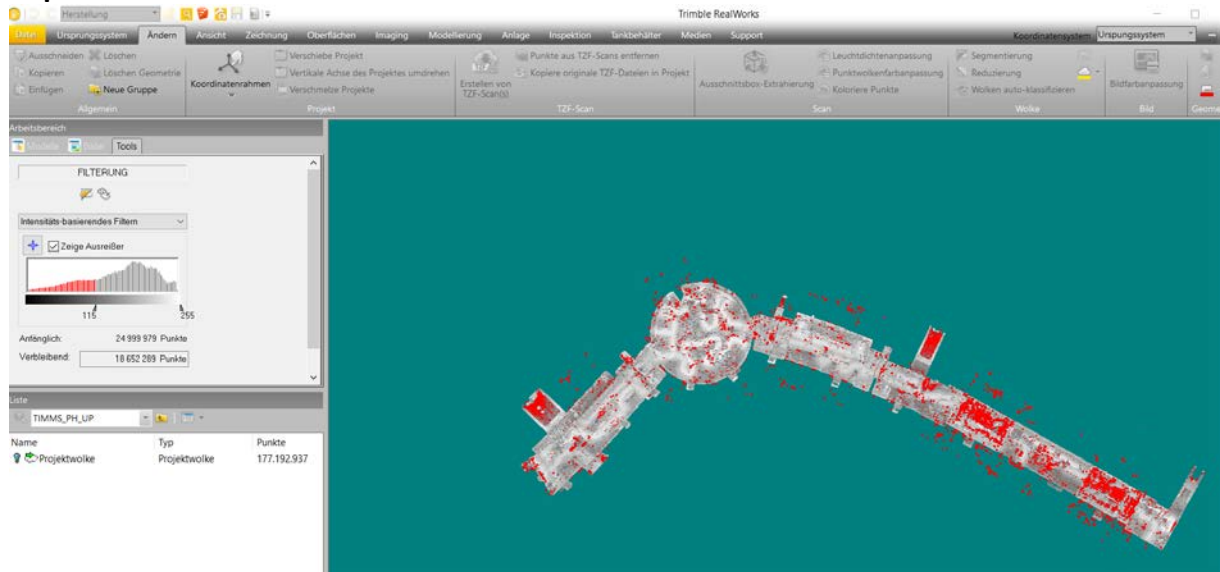
Acquisition time

TIMMS	13,700m ²	2 hours 12min
TX8	3,470m ²	57min

Data preparation of TIMMS data after TIMMS PP with Trimble Realworks

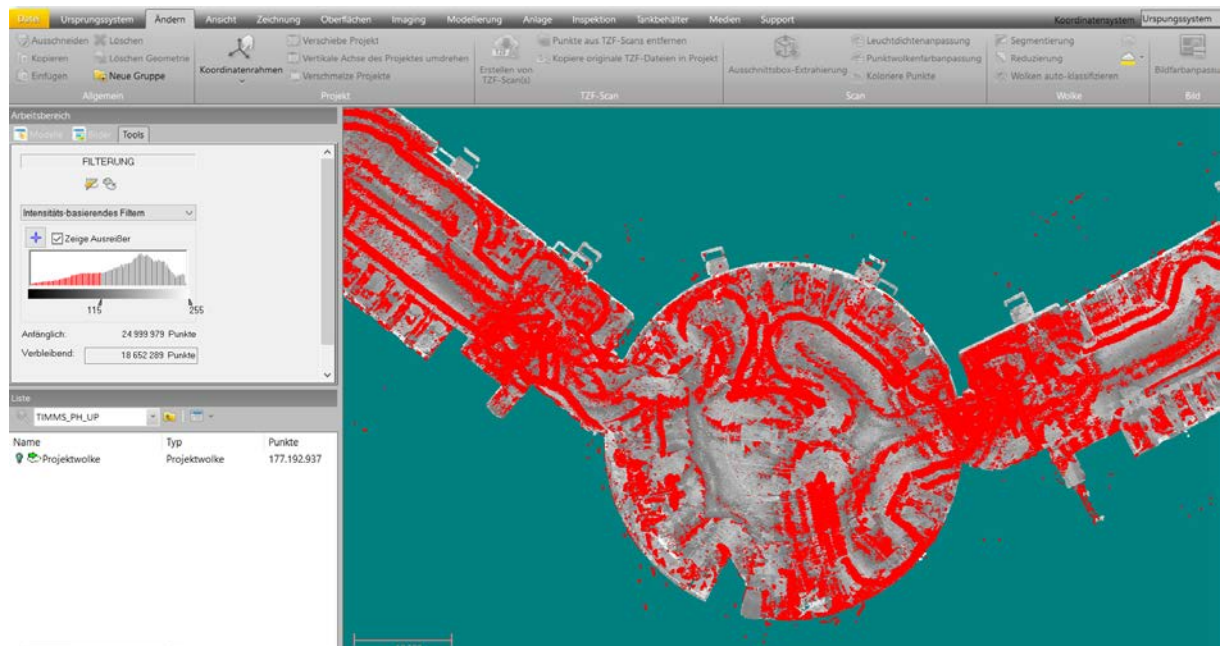
TRW Intensity reduction

Top View



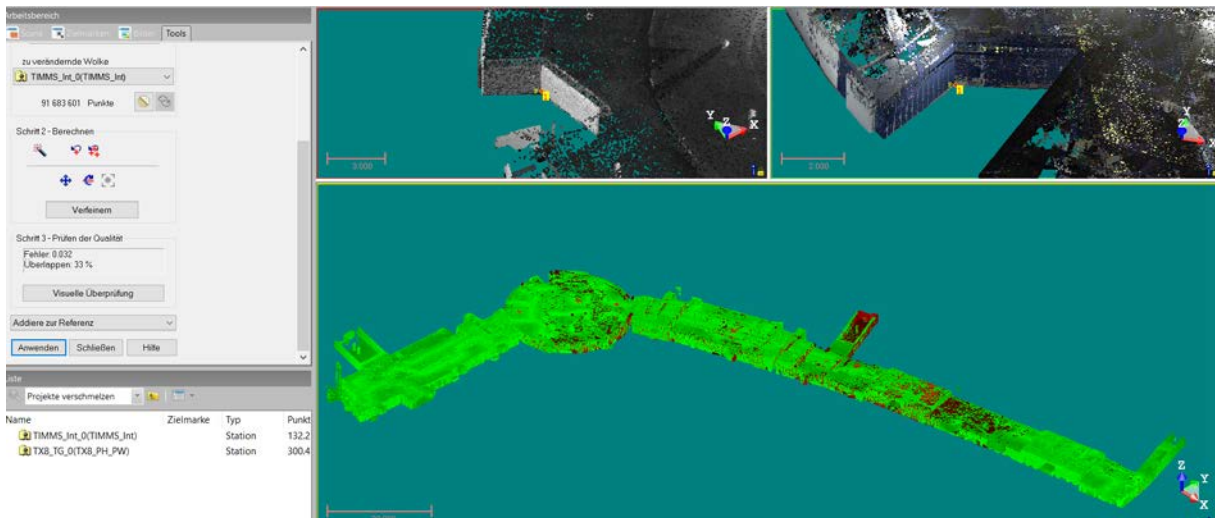
Bottom view

Intensity reduction is very useful
Should be included in TIMMS PP



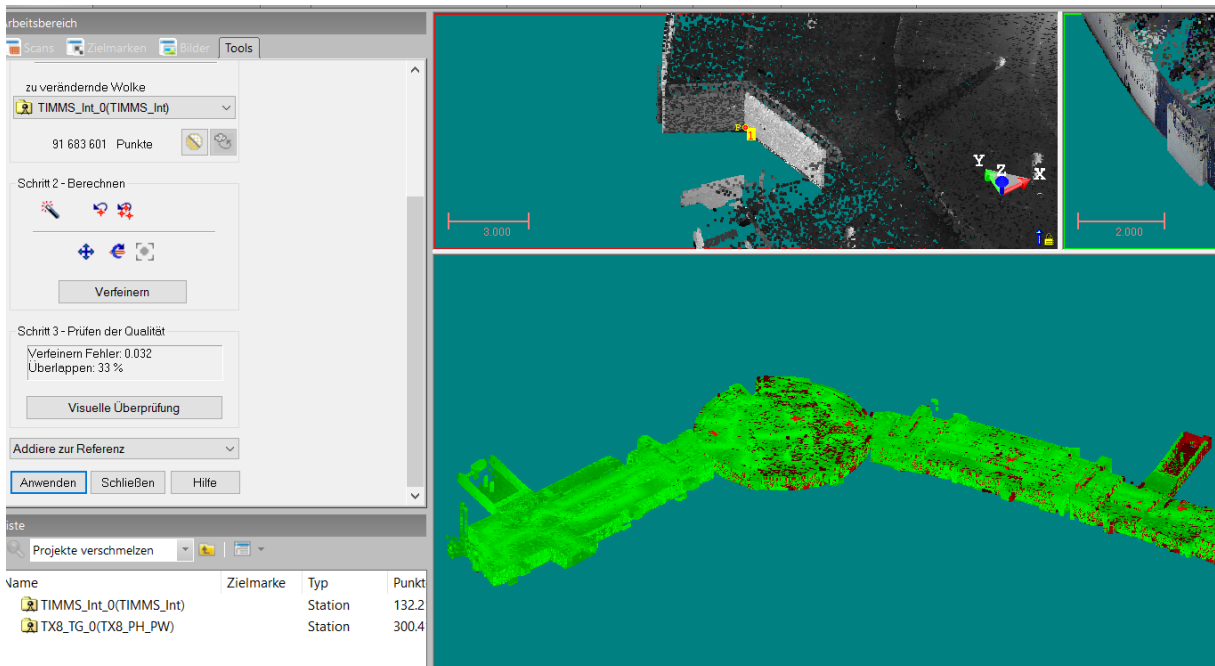
Trimble Realworks Cloud based registration

Level 1



Refine

No difference



33% of the TIMMS versus TX8 point clouds are identical, differences in the remaining parts of the clouds come from:

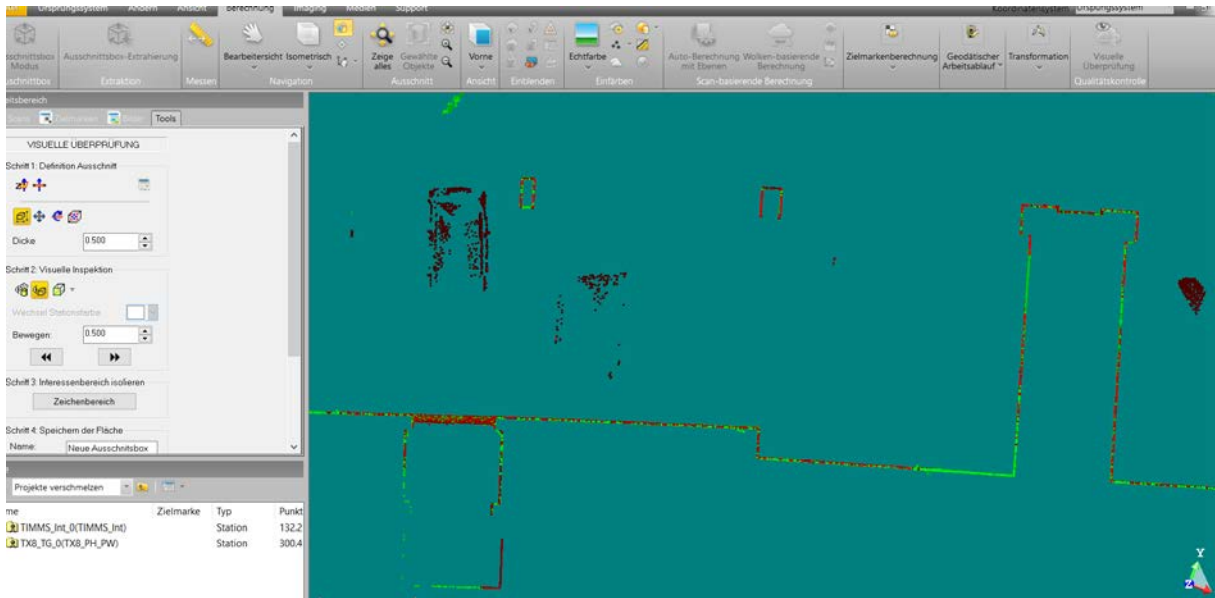
- TX8 point cloud is resolved with 5mm point spacing whereas the TIMMS point cloud is resolved with 10mm point spacing.
- The two different survey times with occupied/unoccupied parking spaces (vehicles may have been moved).

Matching Error is 32mm by point cloud spacing 5mm

No point cloud scaled

Visual inspection by cross sections

MATCH !!!



Comparison

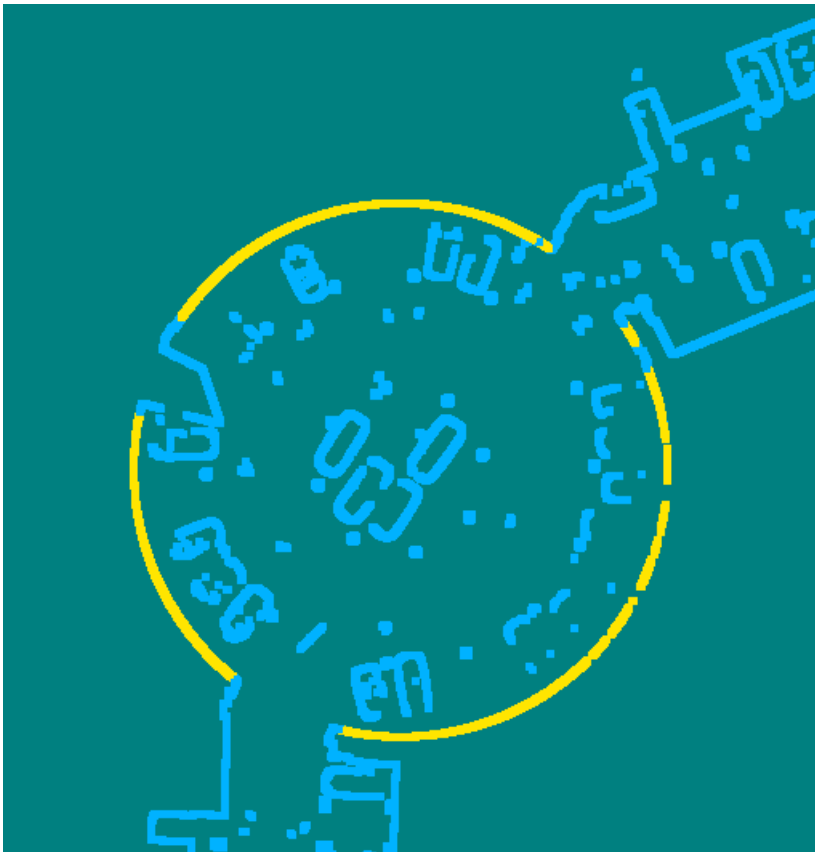
Point cloud Color

TIMMS = blue

TX8 = yellow

Large Objects

Cylindrical wall parking garage



Computed Cylinder from horizontal cross section

	Points	Noise	Diameter	CenterX	C-Y	C-Z
TX8	96,815	0.006	36.092	3.348	3.665	4.509
TIMMS	40,163	0.006	36.099	3.348	3.665	4.509
Result			+0.007	0.00	0.00	0.00

PERFECT

Length Comparison

Identically modeled objects from different point clouds

Center to center measurement (diagonal)

TIMMS Column was modeled from back-side, TX8 from front-side !!!

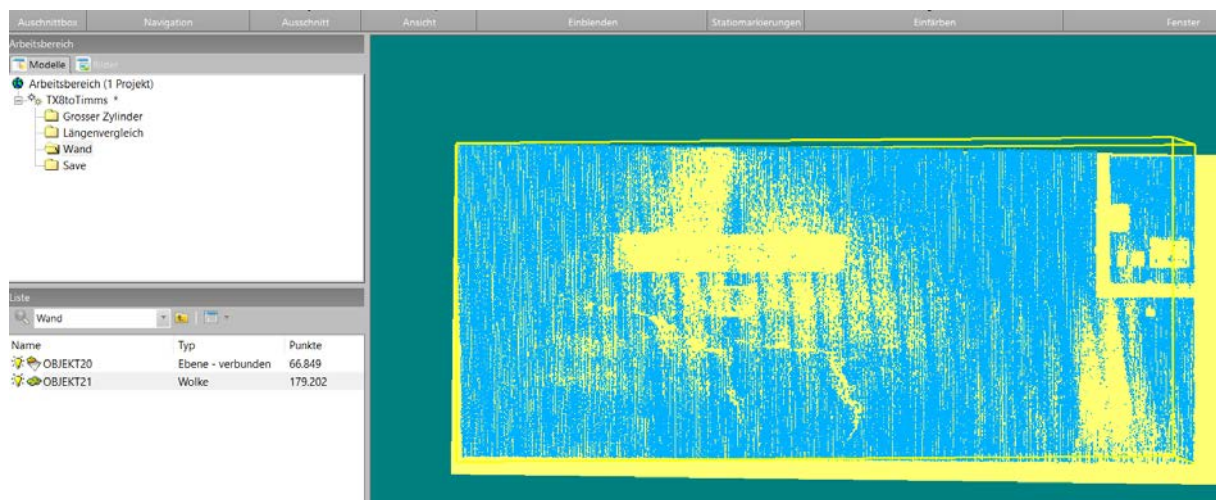
			TX8 to TX8	TIMMS to TIMMS
Column 1				
TX8	688578.230	5335611.054	151.232	151.232
TIMMS	688578.229	5335611.049		
Column 2				
TX8	688713.216	5335679.244		
TIMMS	688713.214	5335679.241		

PERFECT

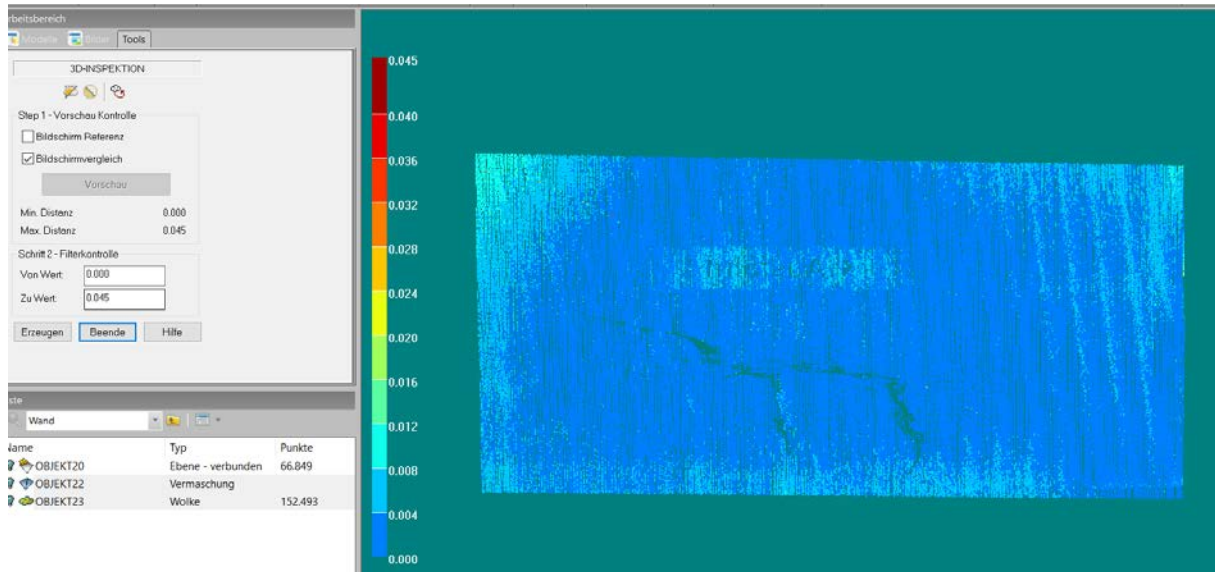
Wall Flatness

3D Inspection (wall from TX8 scan is set as reference)

Distance to TX8 69.237m ! (#points 66,849)



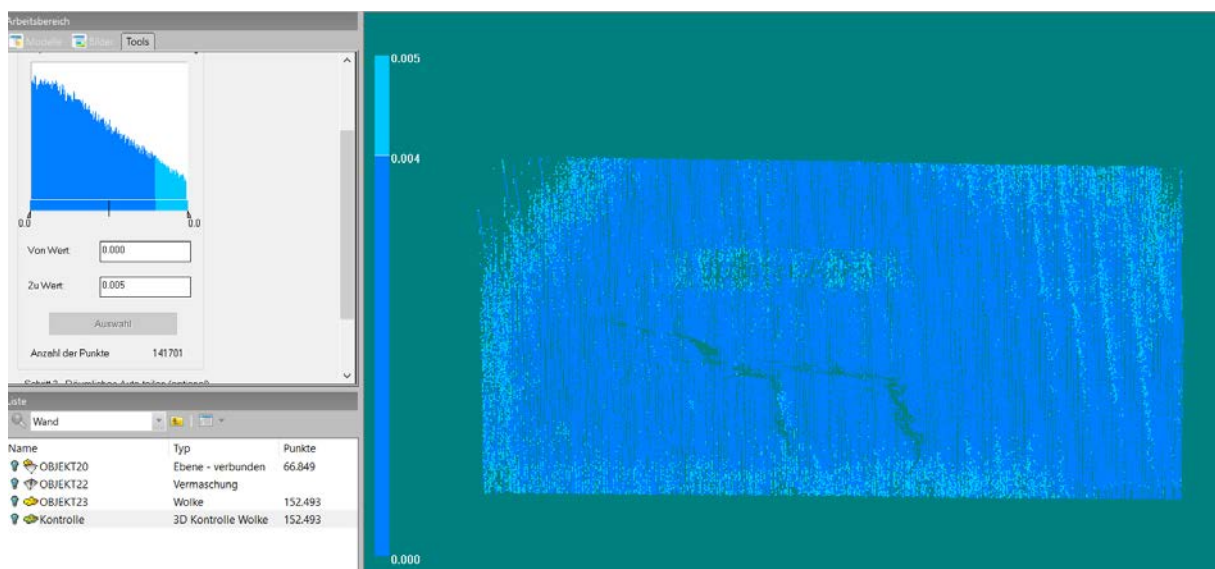
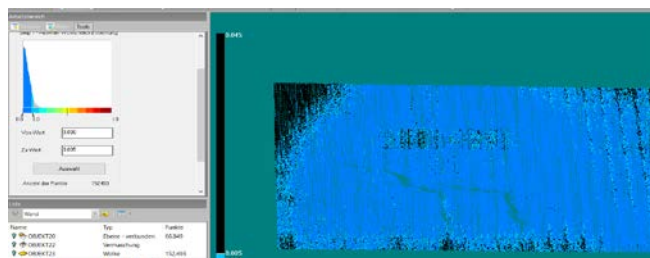
Automated **analysis without noise reduction** !!! (up to 45mm, peak error, due to only fewer than 64 points)



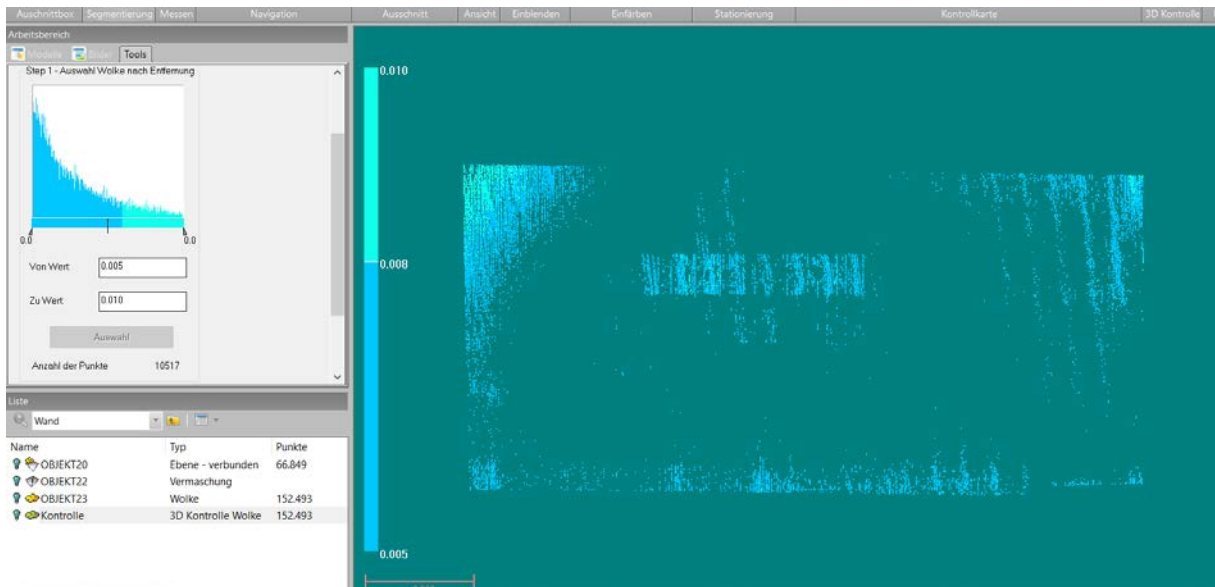
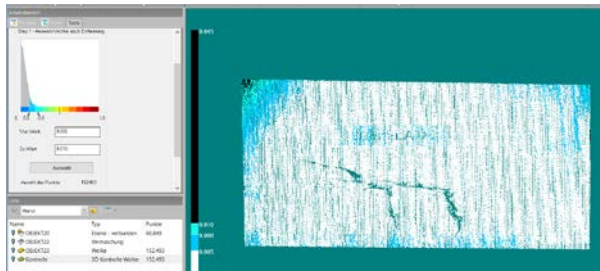
Point analyse of inspection map

#points **152,493**

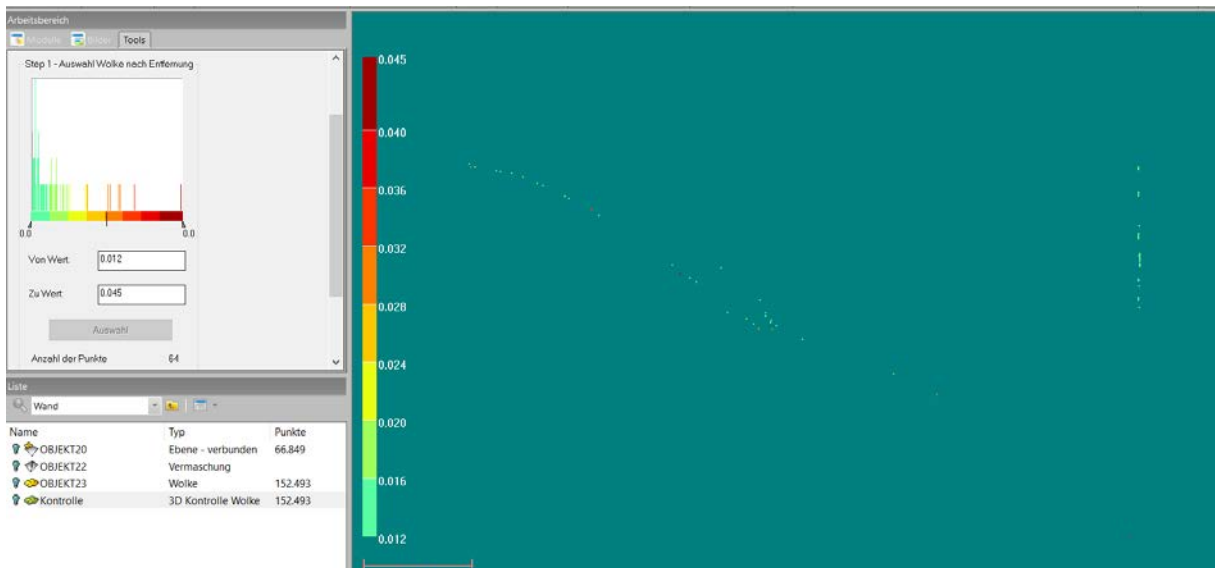
#point between 0-5mm **141,701 92.9%**



#point between 5-10mm 10,517 6.9%



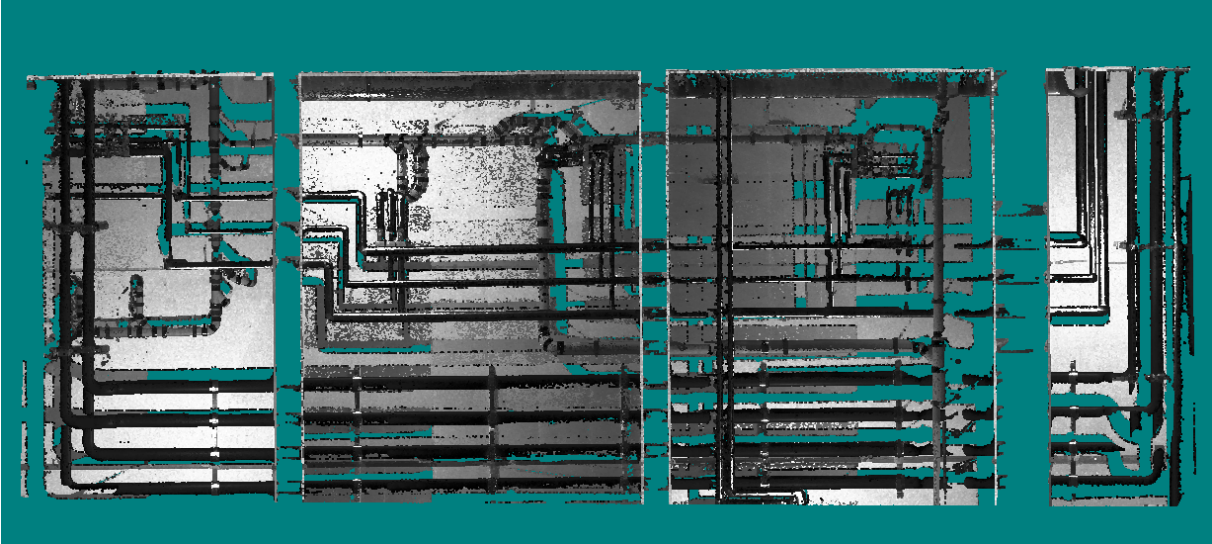
#point Distance to Object more than 12mm 64 0.04% !!!



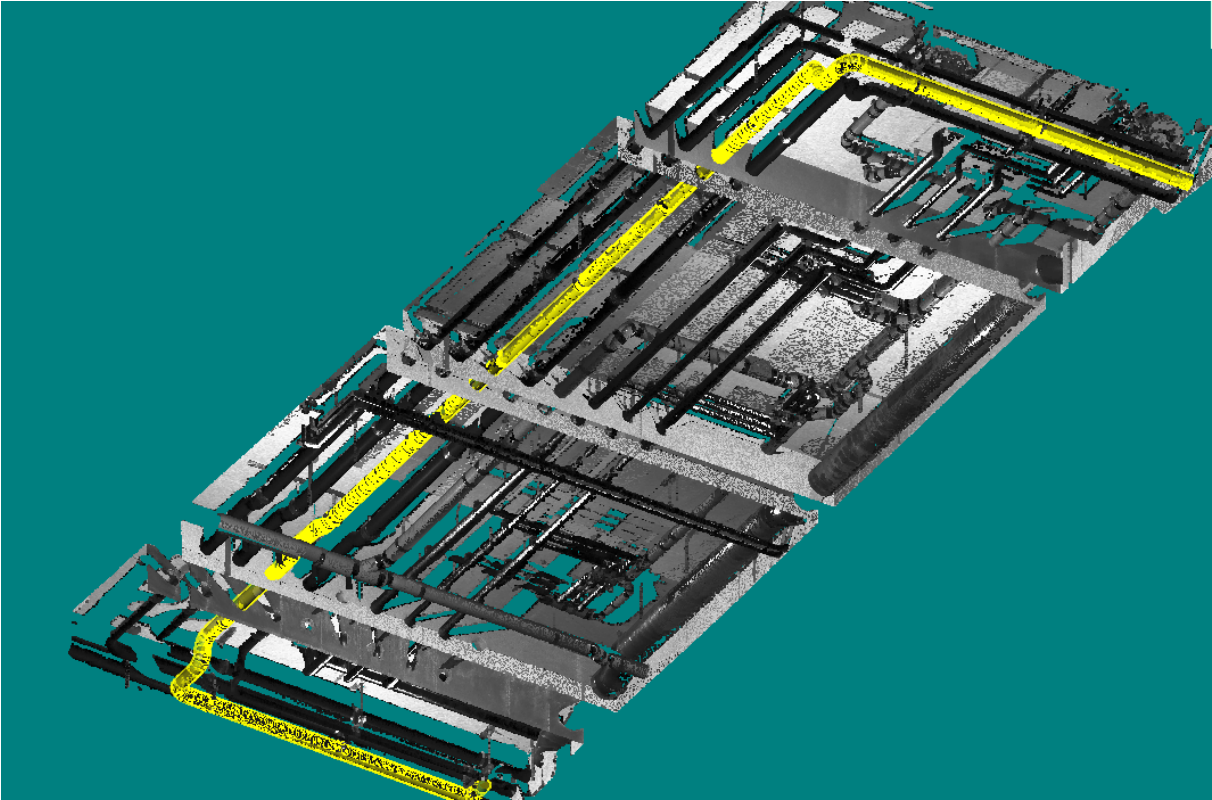
Roof Pipe Model comparison

TIMMS = yellow
TX8 = blue

TX8

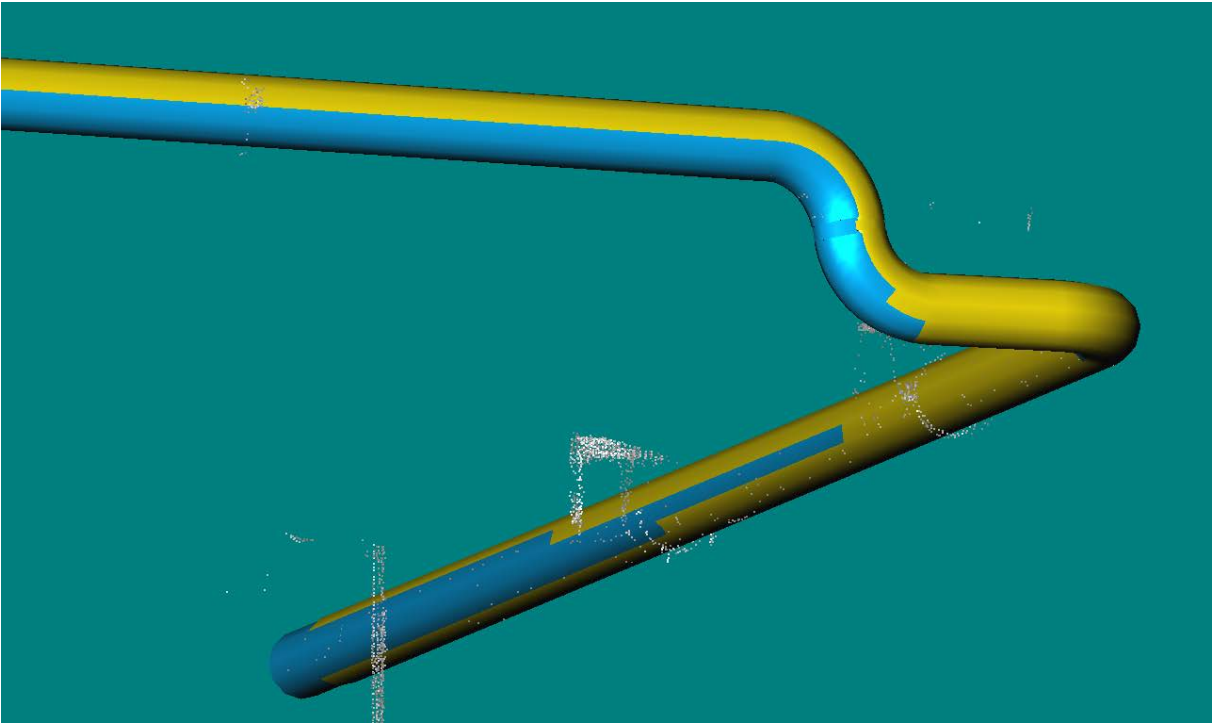


Pipe material is Black HDPE with partial mirror effect



Automated modeling with TRW easypipe

Just small interpretation errors



Screenshot from TX8 Scanexplorer



Errors detected because of noise on the point cloud with FARO X130 (TIMMS) on black mirroring surface

