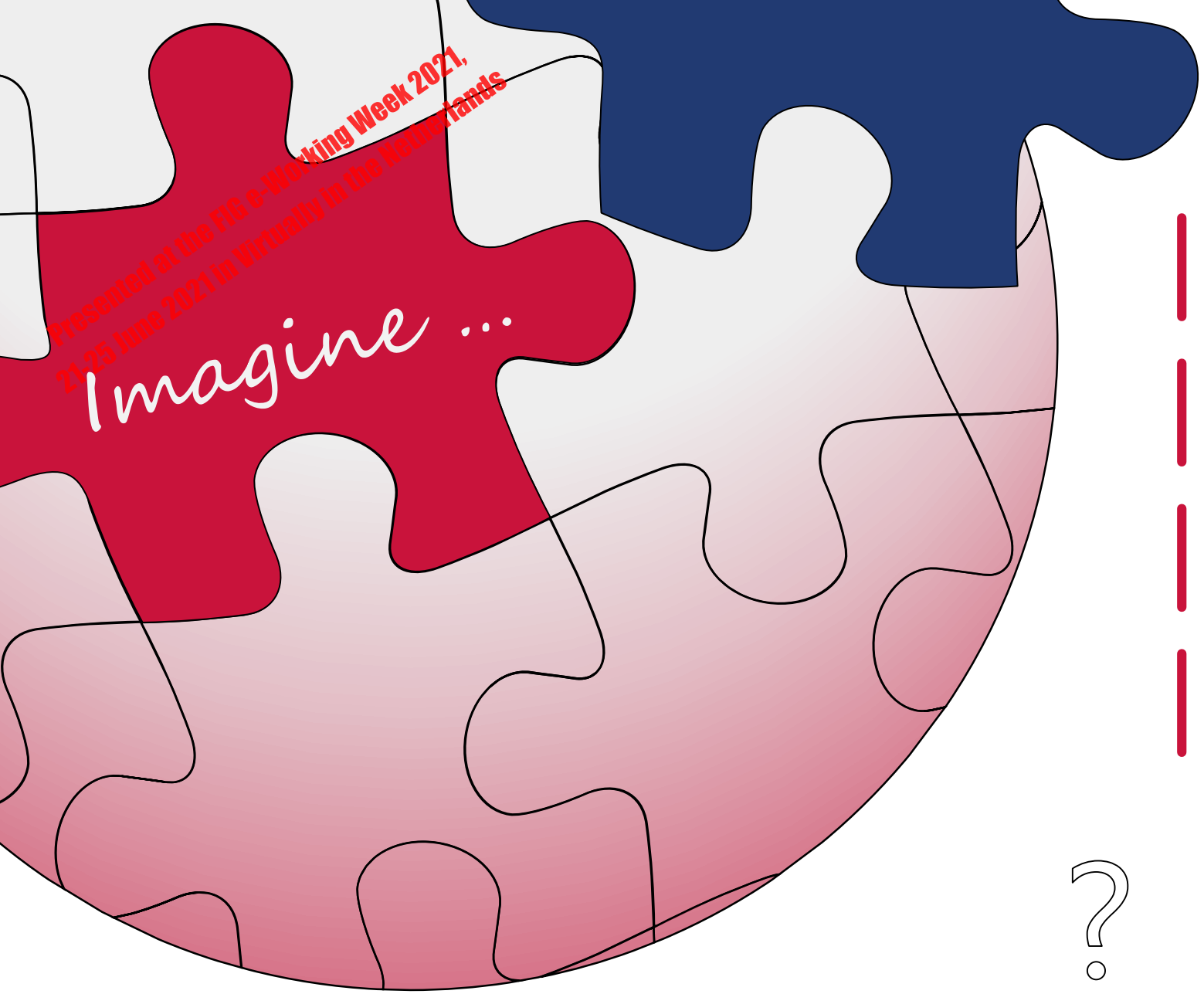

2020/04

68-years old but fit citizen

due to accident, need wheelchair

prefer aging in place

?

How to identify issues for barrier-free living?

- automated decision support[1]
- competence transfer
- Scan-to-BIM
- E-Health and Care 4.0

!

4BIM CAIRE

SMART SURVEYORS FOR LAND AND WATER MANAGEMENT
CHALLENGES IN A NEW REALITY

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e WORKING WEEK 2021
20-25 JUNE

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10968

Evaluation of point cloud data acquisition techniques for Scan-to-BIM workflows in Healthcare

ORGANISED BY FIG GIN Geo-Informatie Nederland kadaster ITC UNIVERSITY OF TWENTE.

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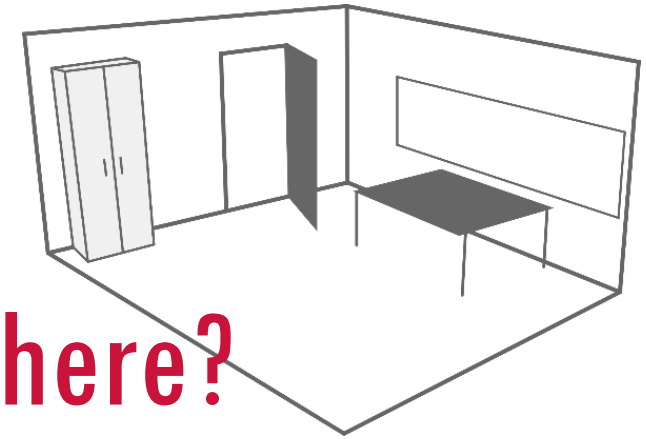
evaluate data acquisition technologies for BIM modeling of indoor places by unknowledgeable users for e-health application



Where?

investigation area

Which?

How?

evaluated sensor technologies

What?

Who?

captured 3D point cloud

How have the evaluation criteria been defined?

technical criteria	usage principle
3D point accuracy	usability of measurement
2D range accuracy	simplicity of processing
measurement noise	reliability of technology
point density	cost of sensor
	required software

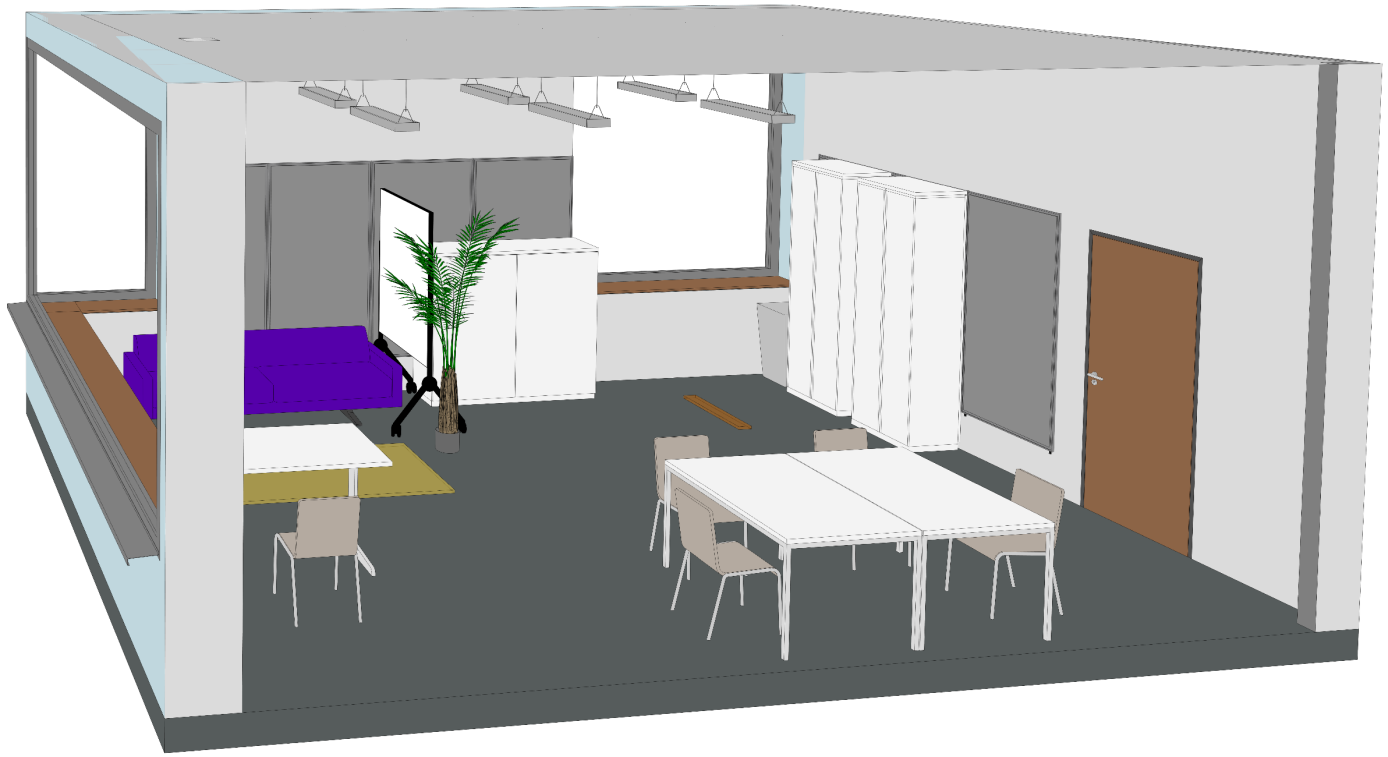
according to DIN 18040-2

Which 3D data acquisition technologies were evaluated?

	static	mobile
professional scanning	Trimble X7	Leica BLK2GO
low-cost consumer	Nikon D3200 SLR	Apple iPad Pro RealSense L515

Where was the study made?

BIM model LoD 300



Where was the study made?

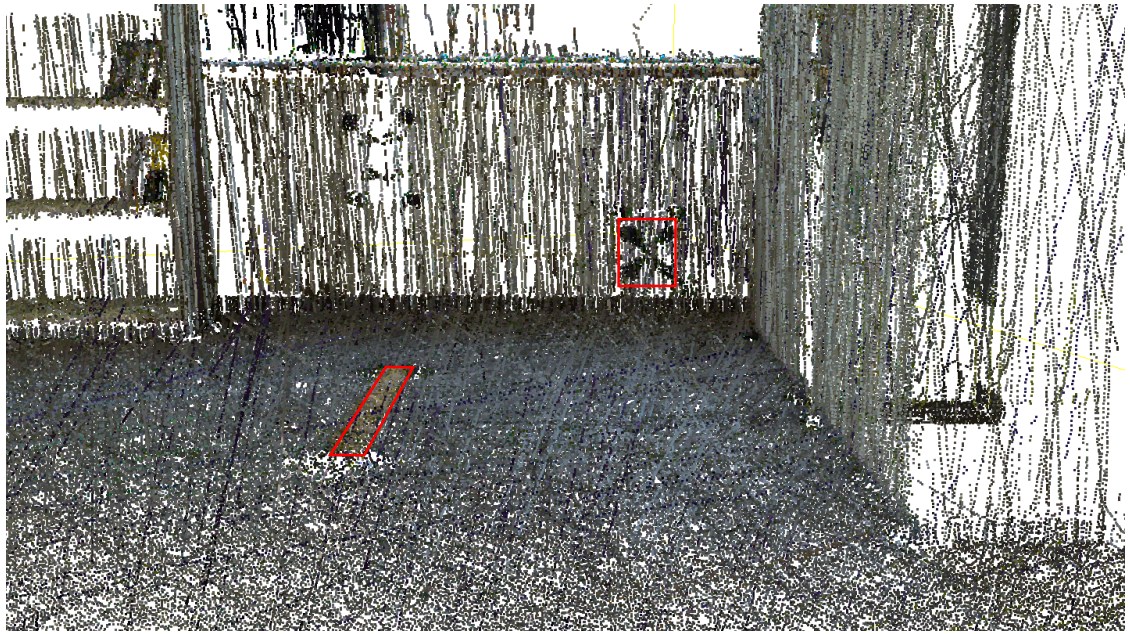
© Trimble Geospatial

reference scan of Trimble X7

Resulting 3D point cloud data of Leica BLK2GO

- ✓ geometric accuracy
- ✓ usability

- ✗ point density <> motion
- ✗ scan pattern
- ✗ high cost



© Leica Geosystems

Resulting 3D point cloud data of Nikon D3200 SLR

© Nikon

- ✓ point density
- ✓ low cost

- ✗ geometric inaccuracy
- ✗ noisy data by improper use
- ✗ special software required

Resulting 3D point cloud data of Intel RealSense L515

- ✓ geometric accuracy
- ✓ low noise
- ✓ usability
- ✓ low cost

- ✗ additional software required
- ✗ occlusion if improper use

© Intel

Resulting 3D point cloud data of Apple iPad Pro with 3D Scanner App™

© Apple

- ✓ low noise
- ✓ usability
- ✓ simplicity
- ✓ low cost

- ✗ geometric inaccuracy
- ✓ reliability

What is the result and benefit? – Lessons learned

- point cloud results from low-cost consumer products proves to be sufficient
- LiDAR as powerful technology for E-Health and several other industries dealing with fast 3D data analysis

Contact and Social Media – Bastian Plaß M.Sc.

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References

[1] Plaß, B. et al. (2021): **BIM on artificial intelligence for decision support in e-health**. In: Intern. Archives of Photogrammetry, Remote Sensing und Spatial Sciences (ISPRS)