

FIG WORKING WEEK 2019

22-26 April, Hanoi, Vietnam

Presented by the FIG Working Week 2019,
April 22-26, 2019 in Hanoi, Vietnam

"Geospatial Information for a Smarter Life
and Environmental Resilience"



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Integrating Indoor Positioning Techniques with Mobile Laser Scanner to Create Indoor Laser Scanning Models

- Yuchen Yang
- Craig Hancock
- Georgios Kapogiannis
- Ruoyu Jin

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Content

- Objective
- Methodology
- Equipment
- Models created
- Conclusion
- Question

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Objectives

- Reduce the cost of creating a indoor 3D model
- Create the model of a room
- Compare the models created
- Analysis and get the result

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Methods of creating models

- A suitable room for model creation(6*8m)
- Mobile Laser Scanner + IMU
- Mobile Laser Scanner + UWB
- Mobile Laser Scanner + IMU (With camera adjusted)
- An Android Mobile Phone
- Compare each model with a TLS created model

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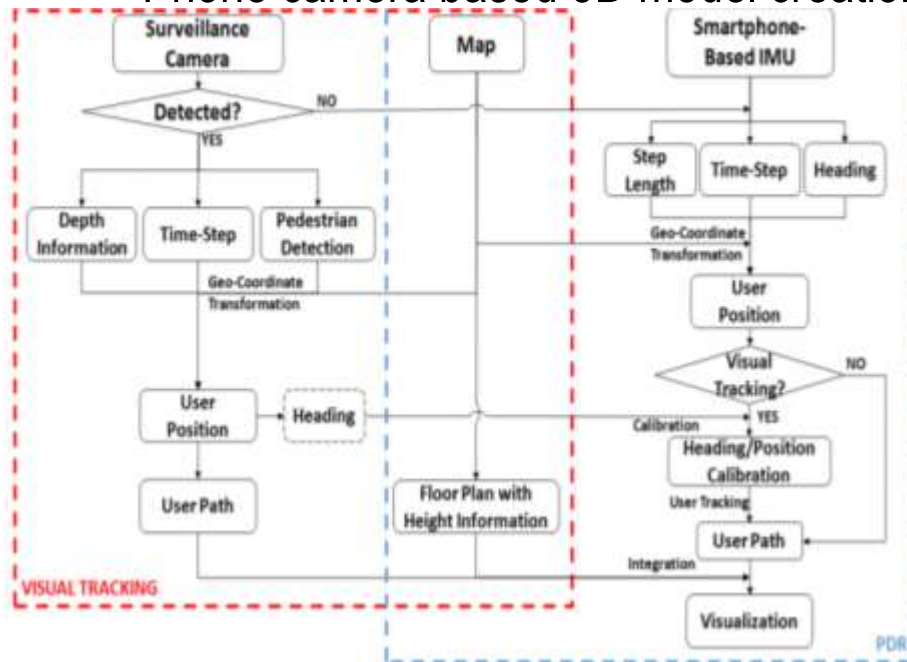
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Mobile Laser Scanner + IMU (With camera adjusted)

- IMU with camera adjusted to provide a trajectory
- Phone camera based 3D model creation from an Android Phone directly



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Working Site



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Equipment

- SICK LMS5XX LiDAR scanner
- 80m range
- -5 to 185 degree working range
- Cheaper
- Less weight



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Equipment

- Xsens MTi-G-700 IMU
- Three axial accelerometer, gyroscope and magnetometer
- One GPS unit
- 100HZ frequency



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Equipment

- A set of KUNCHEN UWB system
- 30m transmitter range
- 300HZ frequency



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Equipment

- A Leica HDS7000 Laser Scanner
- An Android mobile phone
- An camera support
- A Trolley to carry equipment



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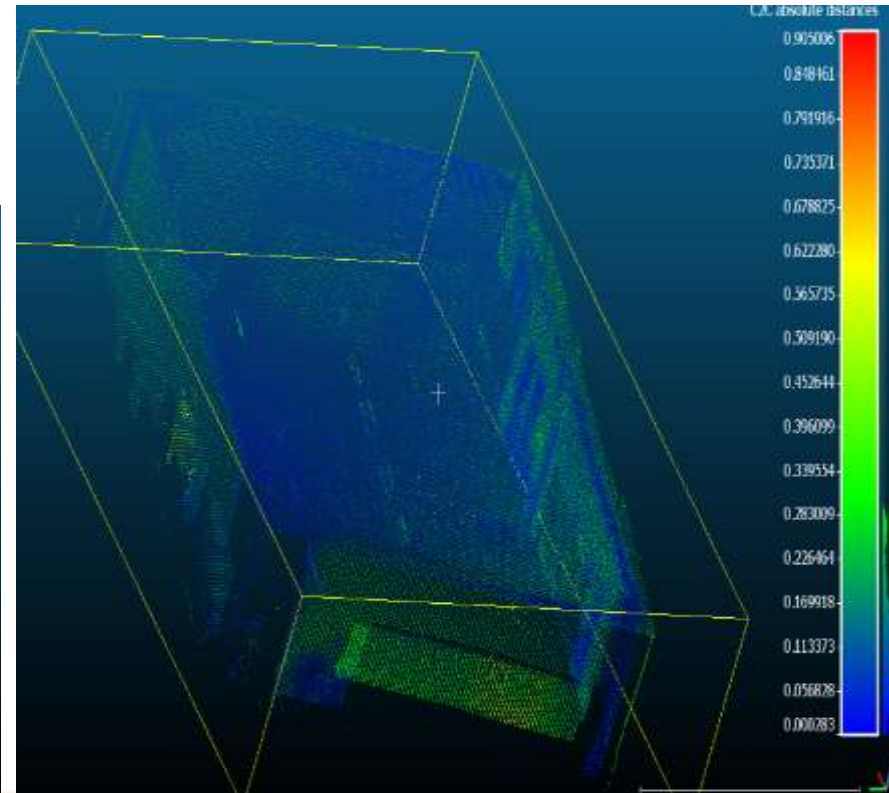
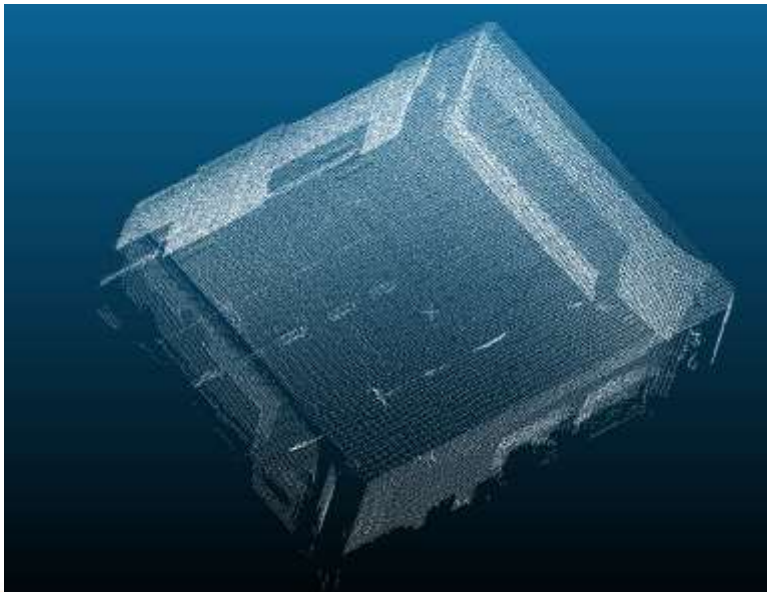
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Models Create and the comparison Result

- MLS + IMU
- 0-0.3m error



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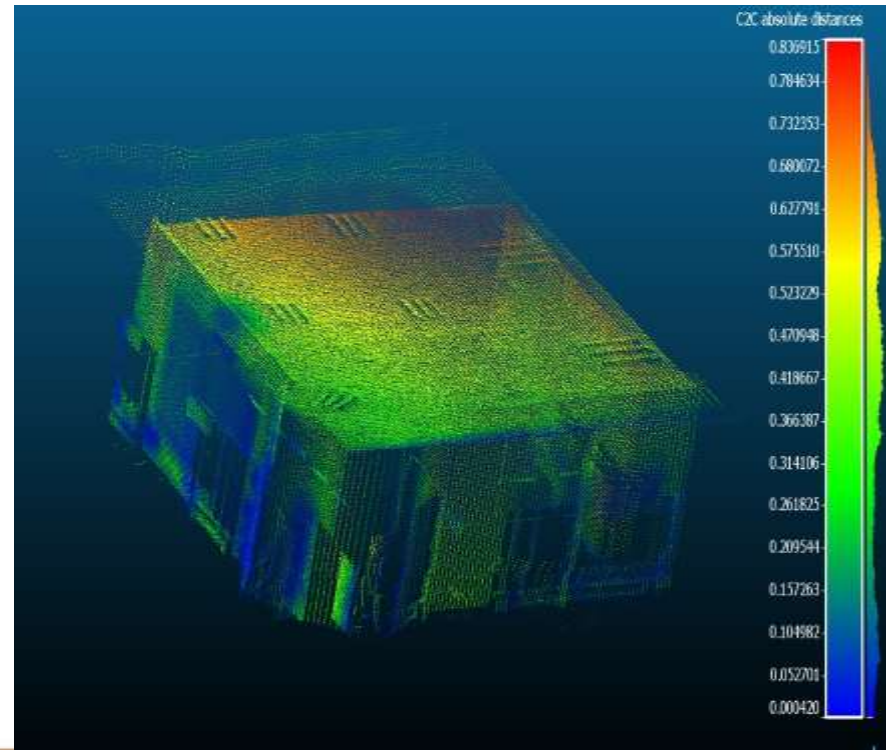
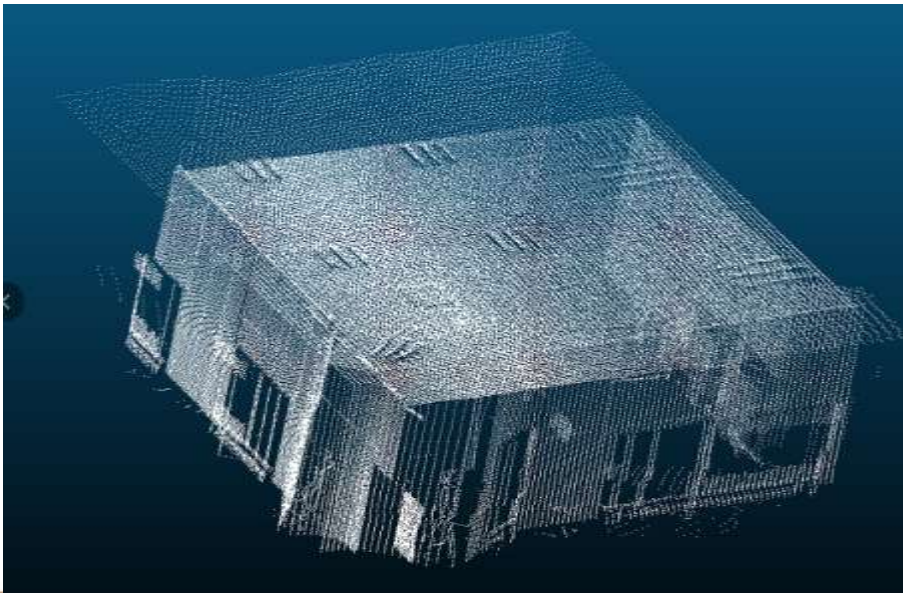
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Models Create and the comparison Result

- MLS + IMU (Camera Adjusted)
- 0-0.8m error



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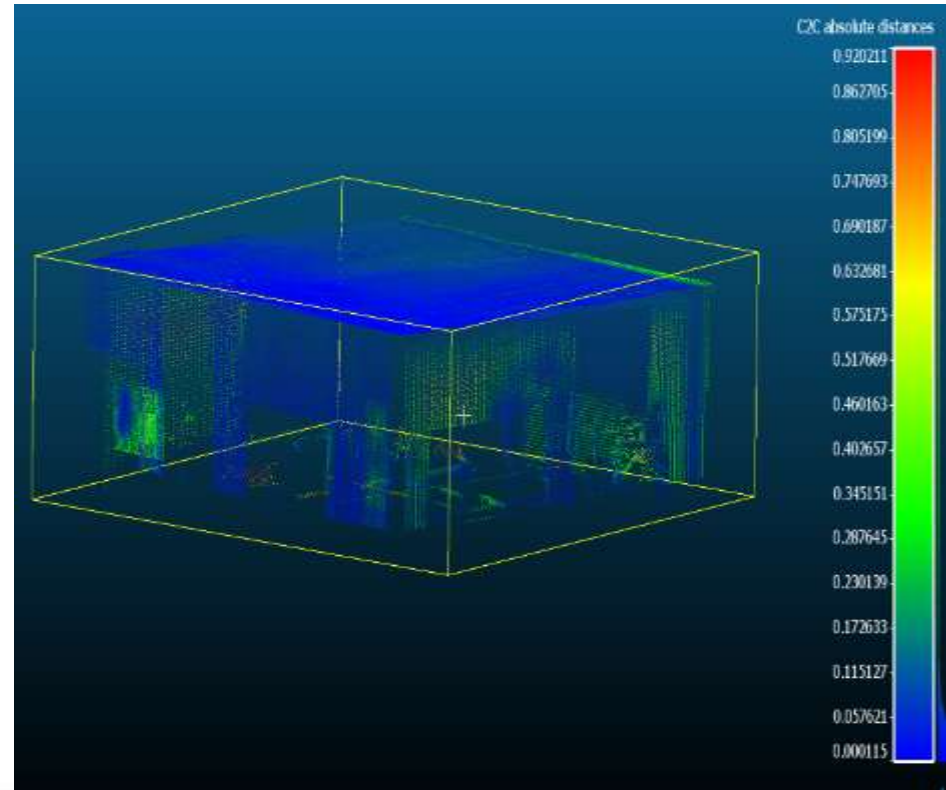
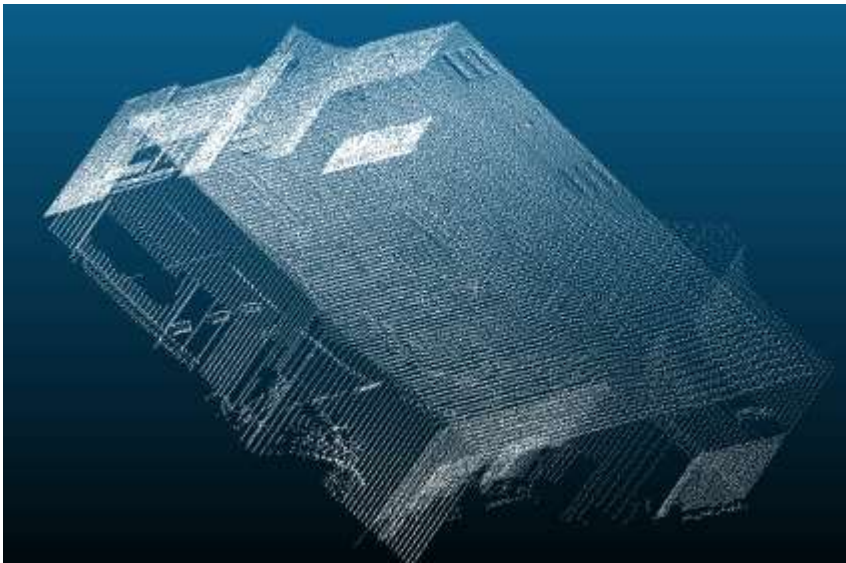
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Models Create and the comparison Result

- MLS + UWB
- 0 – 0.7m



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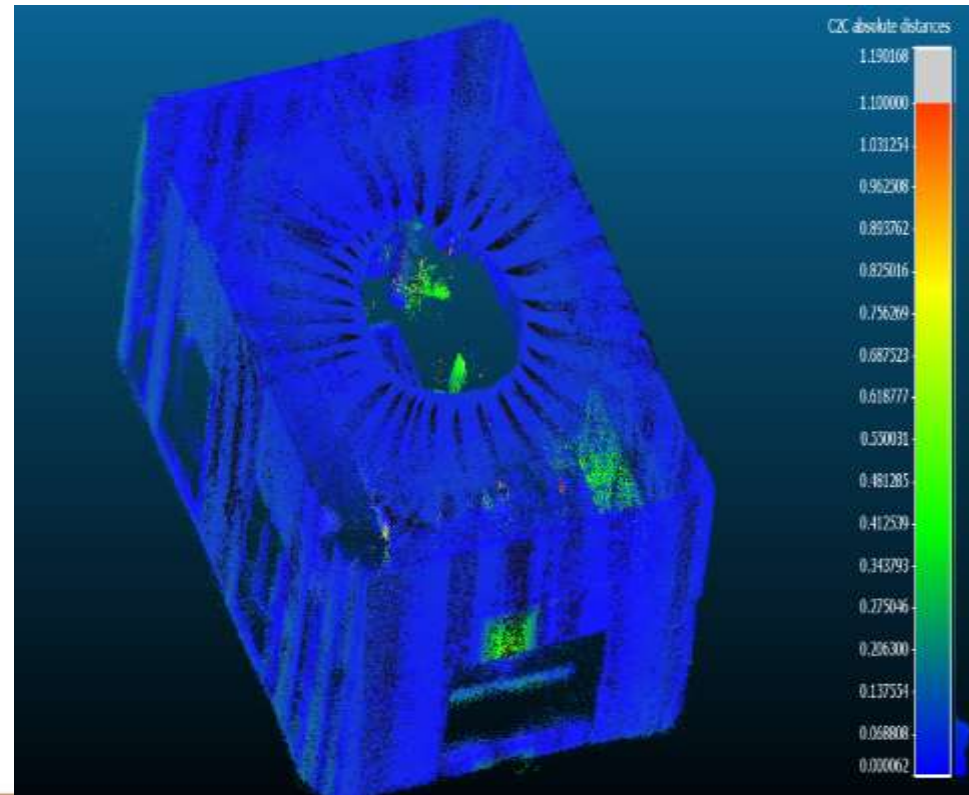
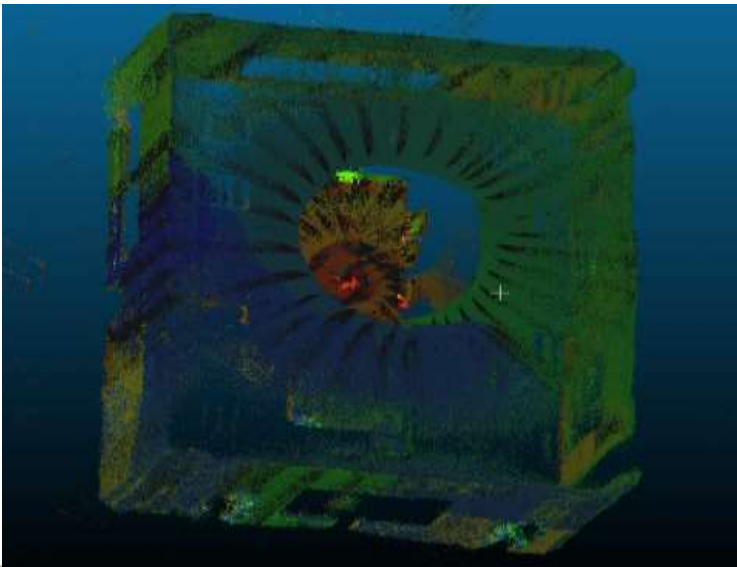
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Models Create and the comparison Result

- Android Phone
- 0-0.15m



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Final Results and Conclusion

Method	Error distribution
IMU only	<0.3
UWB	<0.7
Phone IMU+Camera	<0.83
Phone	<0.15

- The accuracy of the models are all in 1m
- The accuracy of the models might be improved

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Questions?

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