

Dublin City University Digital Twin: Test Bed for IoT Sensor Data Visualization

CityVis 04/11/2022

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Insight

SFI RESEARCH CENTRE FOR DATA ANALYTICS

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FUNDED BY:



Acknowledgments



Safecility
Better Compliance, Safer Clients



Dublin City University Campuses

DCU Alpha

DCU Glasnevin

DCU St. Patricks

DCU All Hallows

Google Earth

1985

Imagery Date: 4/26/2021 53°22'48.67" N 6°15'06.86" W elev 0 m eye alt 2.49 km

Alpha



Glasnevin

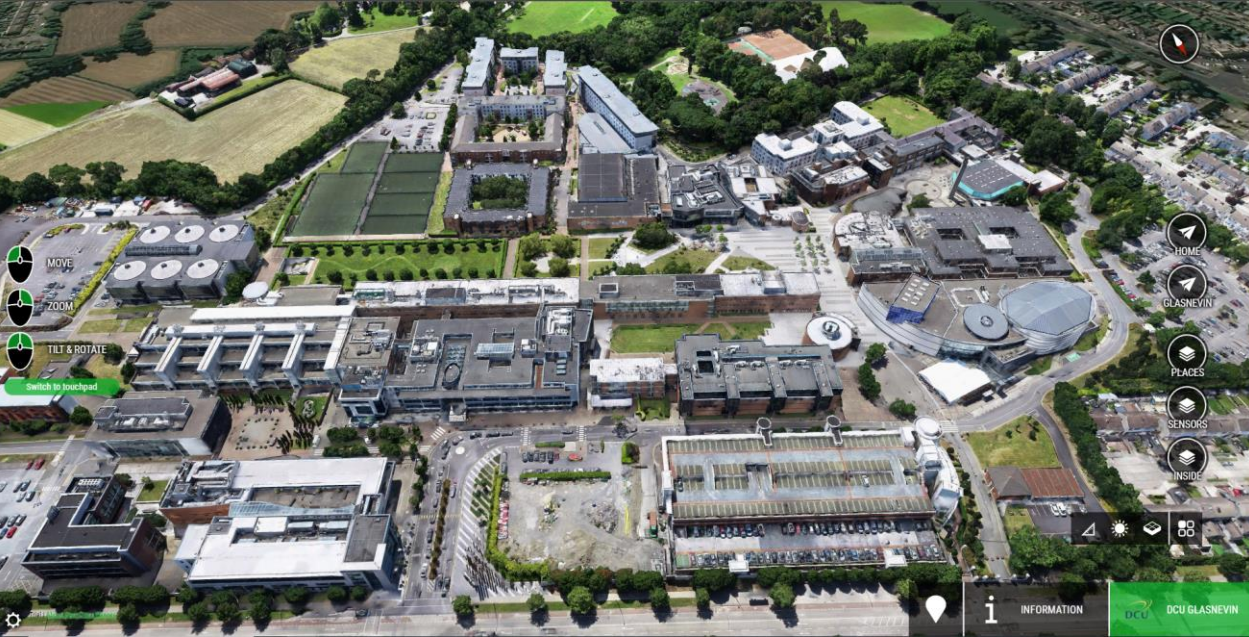


St. Patrick's



All Hallows





Digital Dublin City University Campuses

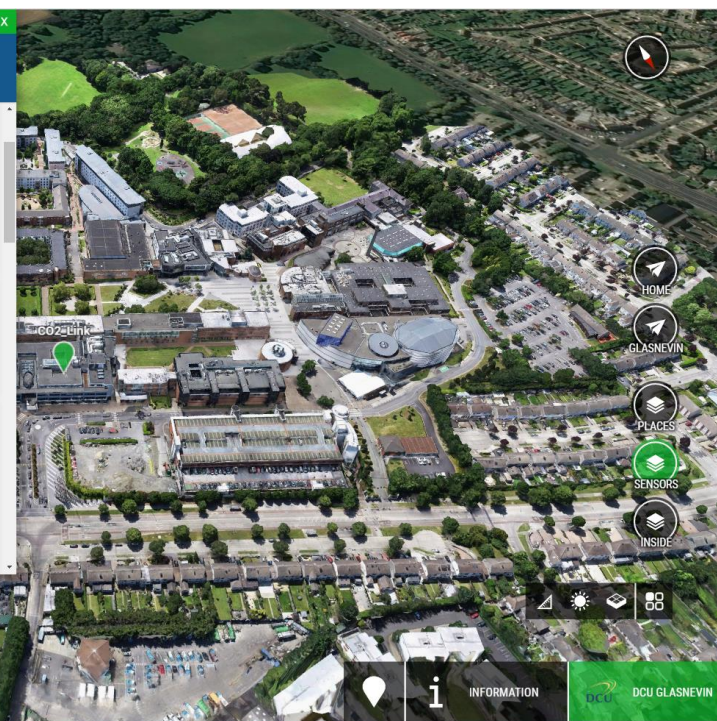
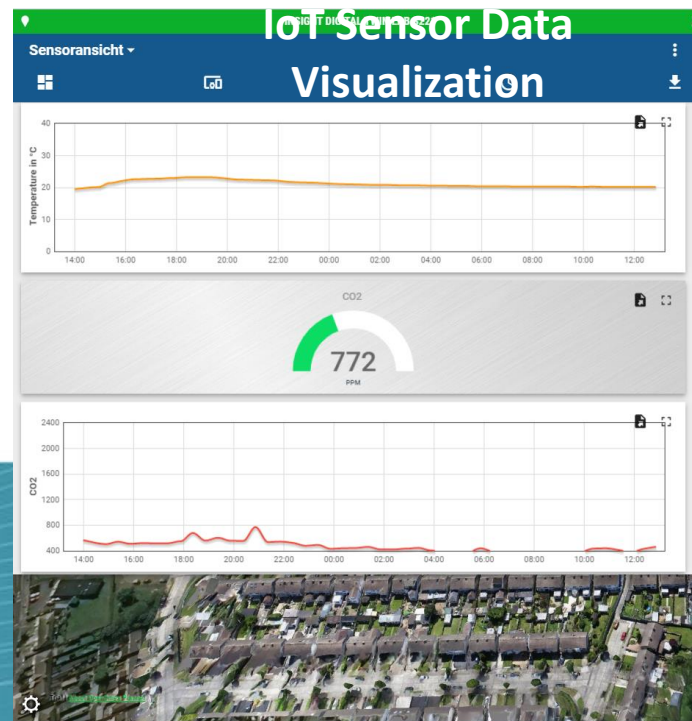
Smart DCU



Physical Object



Digital 3D Model



Digital Twin

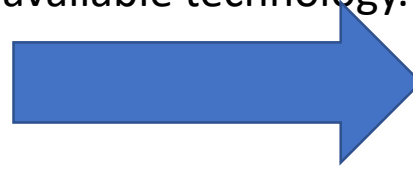
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Background



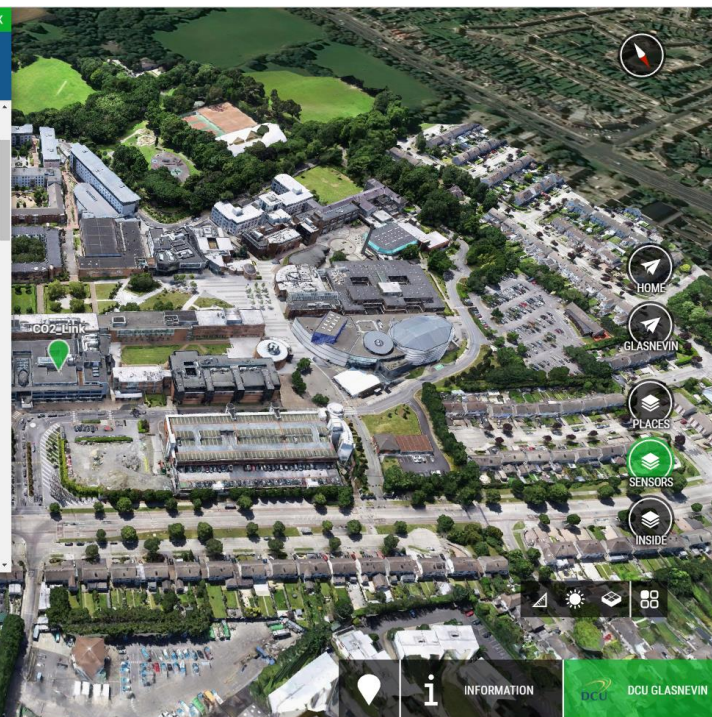
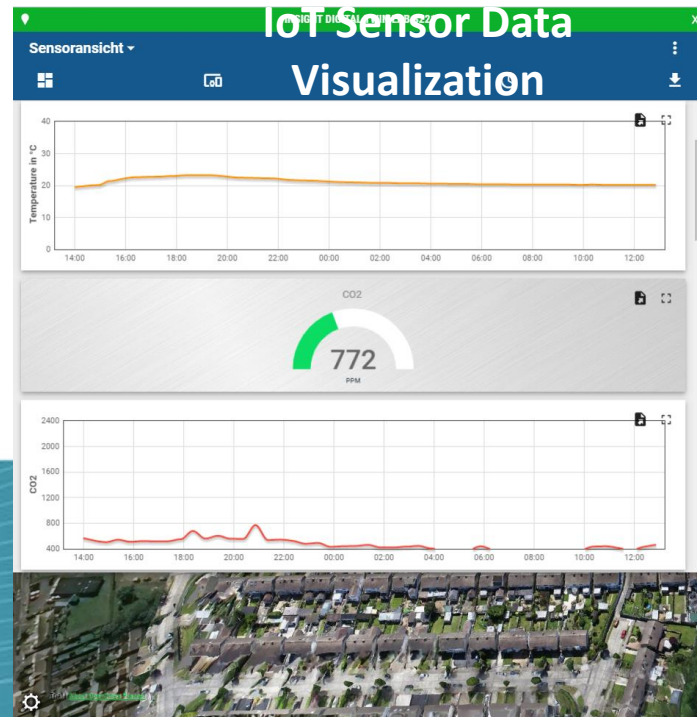
Physical Object

Evidence how a digital 3D model can be created in few days with the available technology.



Digital 3D Model

Research Purpose



Visualization of IoT Sensor Data

Digital Twin

Insight SFI RESEARCH CENTRE FOR DATA ANALYTICS



Drone Photography



+
GPS Information



Drone Photography Processing



Digital 3D Model



ContextCapture
CONNECT Edition

Export



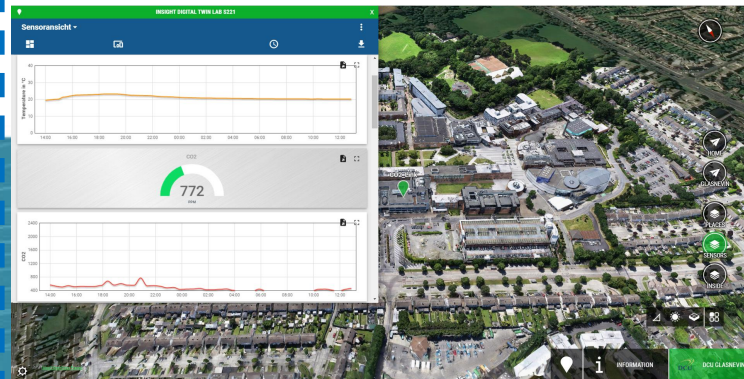
CO2 IoT
Sensor



URL

Link
Embedding

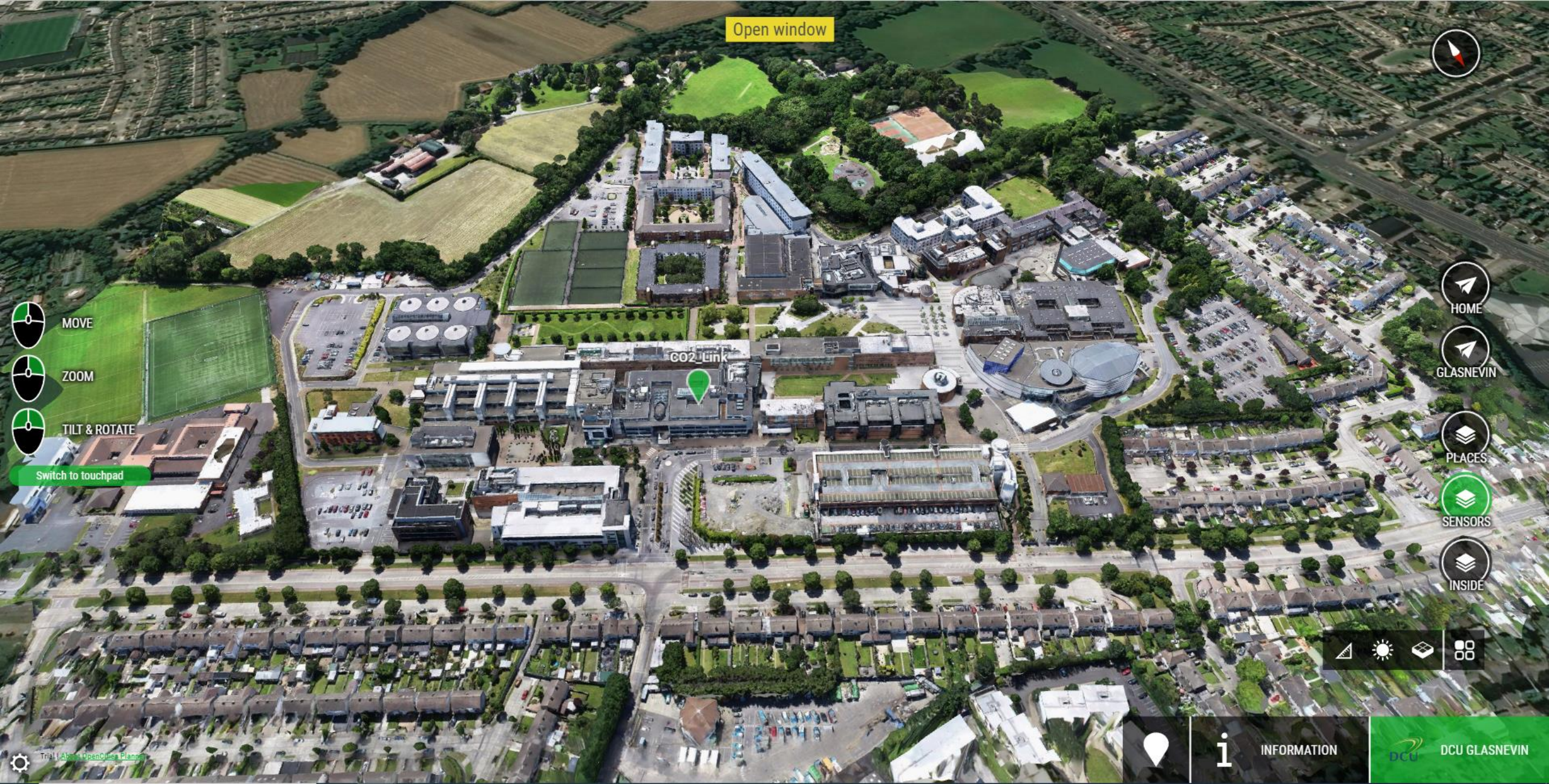
Digital Twin



Digital 3D Model Publication



Methodology



Open window



MOVE



ZOOM



TILT & ROTATE

Switch to touchpad



HOME



GLASNEVIN



PLACES



SENSORS



INSIDE



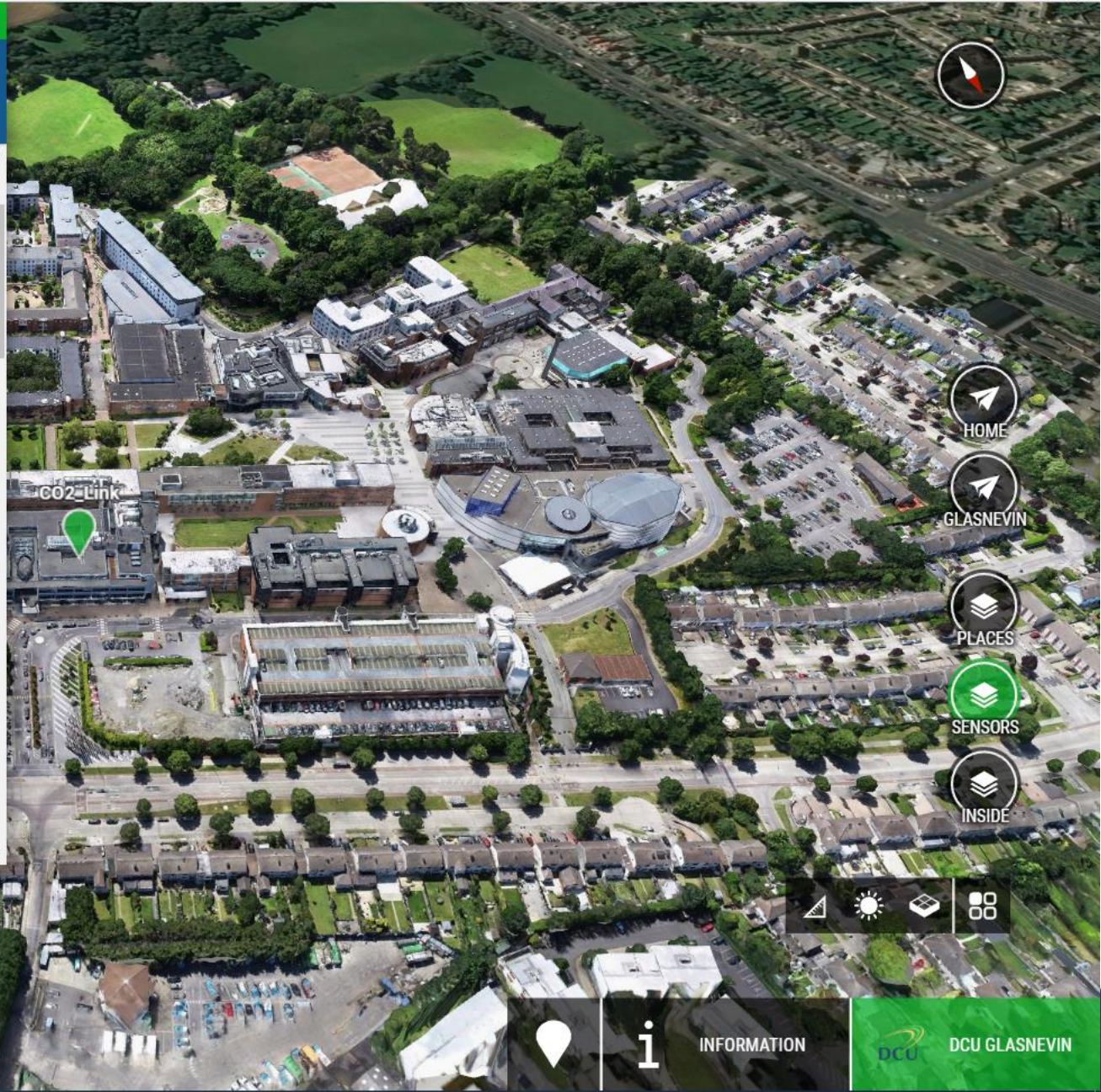
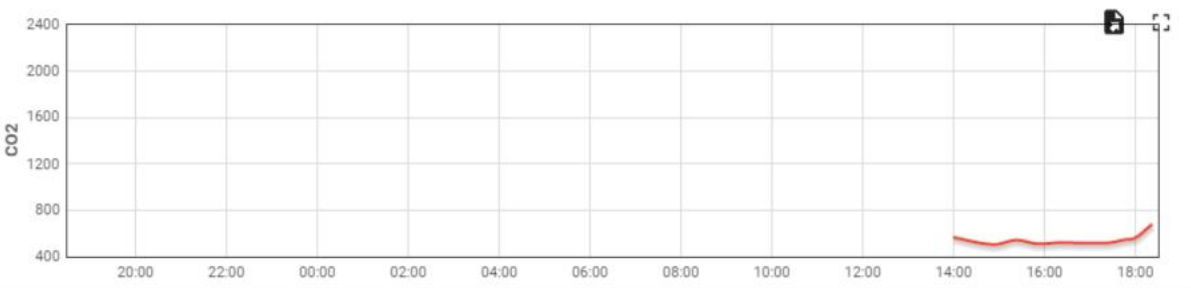
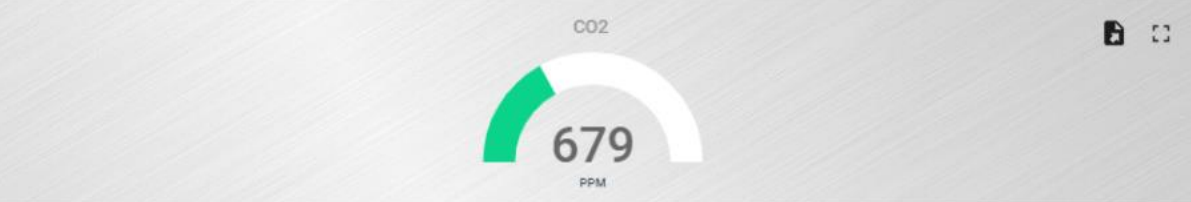
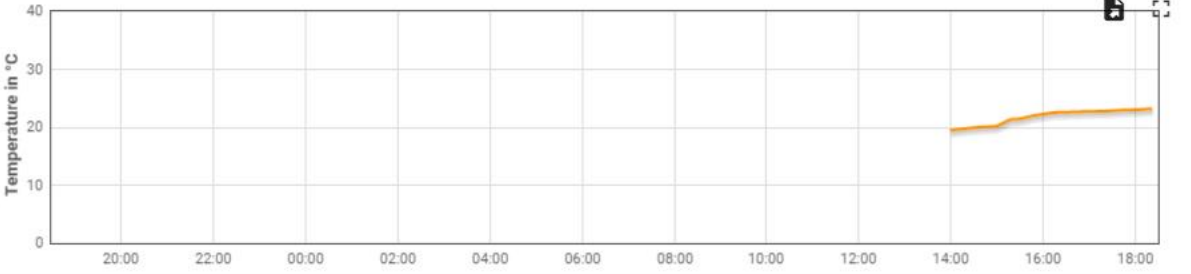
INFORMATION



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Results

Sensoransicht ▾



INFORMATION



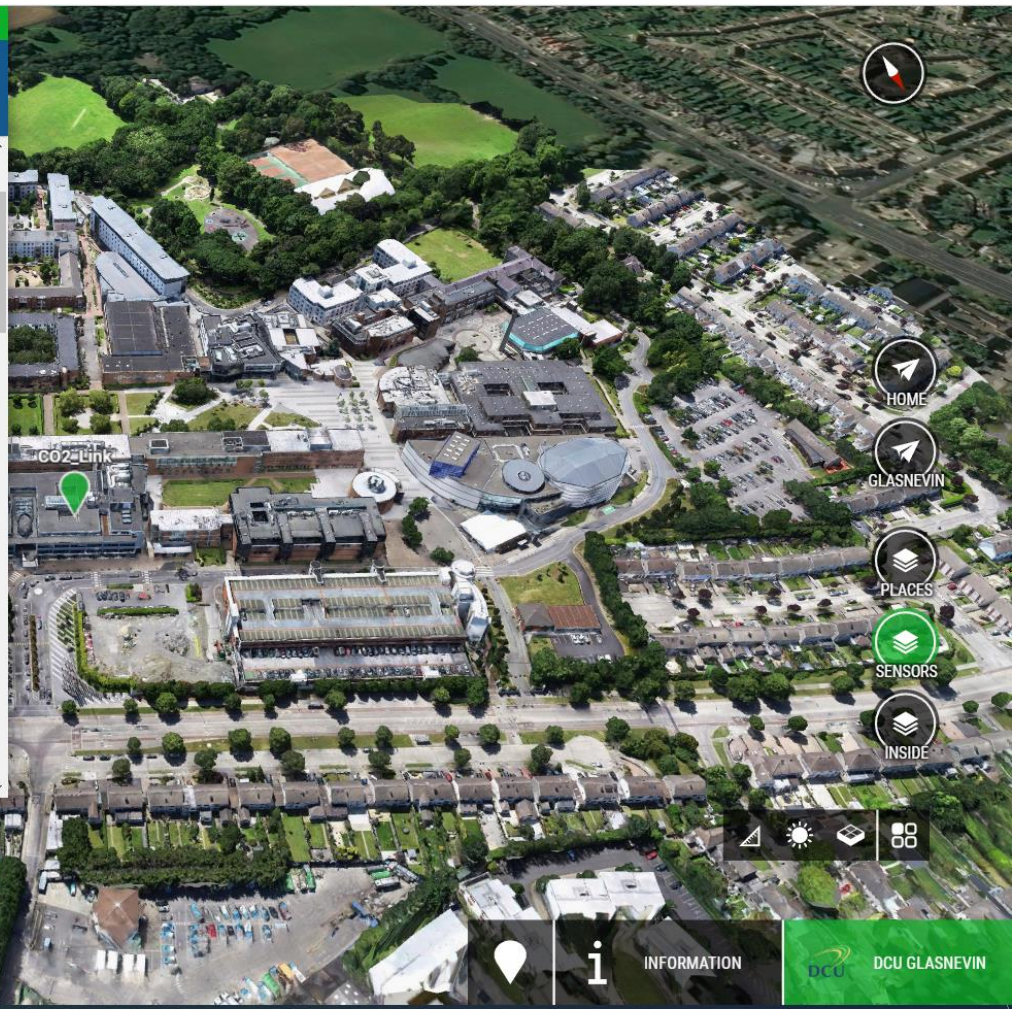
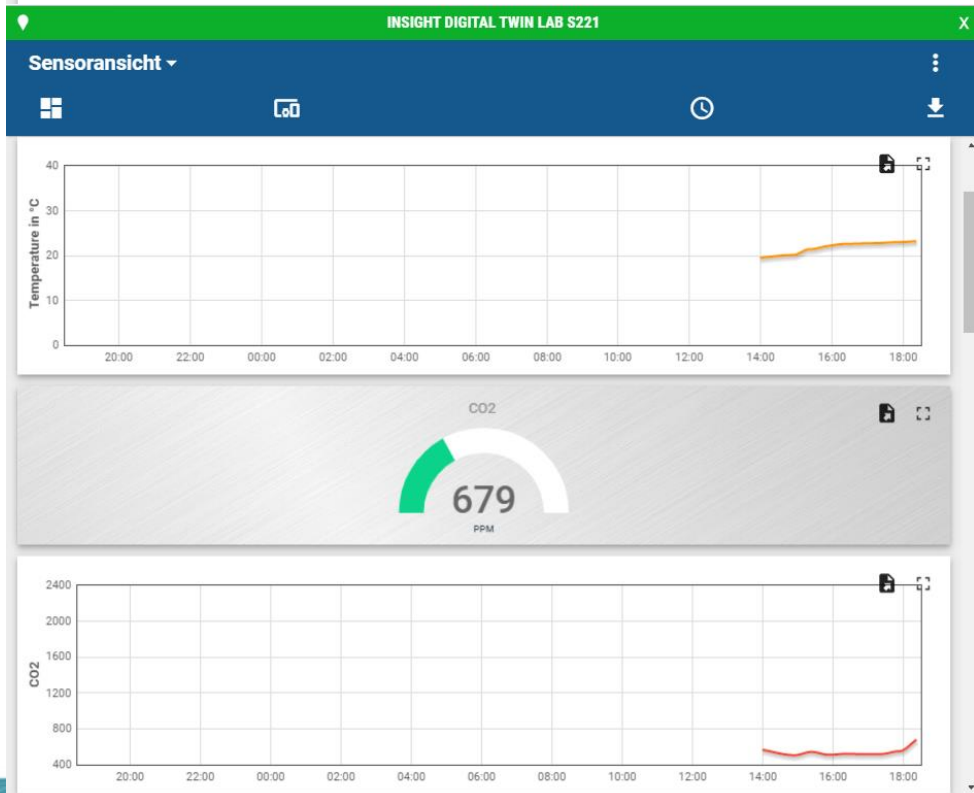
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Results

Normal Dashboard

Gesamtansicht > Gebäudeansicht Febris v1 ▾ safacility building Realtime - last day

Snr	Name	Time stamp	Temperature	CO2 level ppm	Humidity	Preassure	battery voltage
FE-3328	Device 1 - Insight Digital Twin Lab	16:14:30, 13.7.2022	22.4	358	51	1018	3.482
FEBR-5137	Rename 2	16:32:12, 18.8.2022	21.9	331	54	1003	3.4
FE-3329	Device 2 - Smart Dublin Office	20:16:54, 13.8.2022	26.7	203	54	1010	3.062
FEBR-5113	Attic Office	19:06:16	19.2	525	60	1016	4.644



Visualization on DCU Digital Twin

Value



Value

Test before large scale

Manipulation of the microcosm

Visualization of pilot results onsite

Glasnevin Campus is a small city

Pilot Projects

IoT Sensors

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Value

Practical Implications

Early analysis of results

Test under different condition

Better understanding of results

Different type of projects can be tested

Value

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Pilot Projects

IoT Sensors

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Practical Implications

Testing

Stakeholders

Social

Impact

Quick deployment
in real scenarios

Speed up the
analysis of results

Building of a
smart region

**Practical
Implications**

Early analysis of
results

Test under different
condition

Better
understanding of
results

Different type
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Value

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Glasnevin
Campus is a
small city

Pilot Projects

IoT Sensors

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Impact



Next steps

- Include more sensors.
- Indoor Mapping.
- Implementation of VR tours.

References

- [Fuller et al., 2020] Fuller, A., Fan, Z., Day, C., & Barlow, C. (2020). Digital twin: Enabling technologies, challenges and open research. *IEEE access*, 8, 108952-108971.
- [Sehrawat and Gill, 2019] Sehrawat, D., & Gill, N. S. (2019, April). Smart sensors: Analysis of different types of IoT sensors. In *2019 3rd International Conference on Trends in Electronics and Informatics (ICOEI)* (pp. 523-528). IEEE.

Questions?