An update to the development of the Wee-g: A high-sensitivity MEMS-based relative gravimeter for multi-pixel applications

Kristian Anastasiou, Giles Hammond, Douglas Paul, Karl Toland, Abhinav Prasad, Steven Bramsiepe, Elizabeth Passey, and Henrietta Rakoczi

Institute for Gravitational Research, School of Physics & Astronomy, University of Glasgow

k.anastasiou.1@research.gla.ac.uk

giles.hammond@glasgow.ac.uk

University of Glasgow

Wireless, battery-powered surveying

Surveying around the Physics building, UoG, with the Wee-g

Characteristics

Mechanical / Sensor / Operation		Electrical	
Geometric anti-spring sensor	Resonant frequency of 8 Hz	Power consumption	5 - 10 W
Noise floor	10 µGal/$\sqrt{Hz}$	Environment	Temperature, Pressure, Humidity
Field-friendly form factor	22 cm height, 24 cm diameter	3-axis inclinometer	Resolution of 0.005 °
Weight	< 5 kg	Internal battery option	~ 7 – 14 h lifetime
Tilt adjustment	Manual: ± 10 °, motorised: ± 1 °	Thermalisation time	~ 1 h, but device can be transported thermalising
Enclosure	IP67 rated		
Data communication/logging	Custom GUI (Windows OS)		

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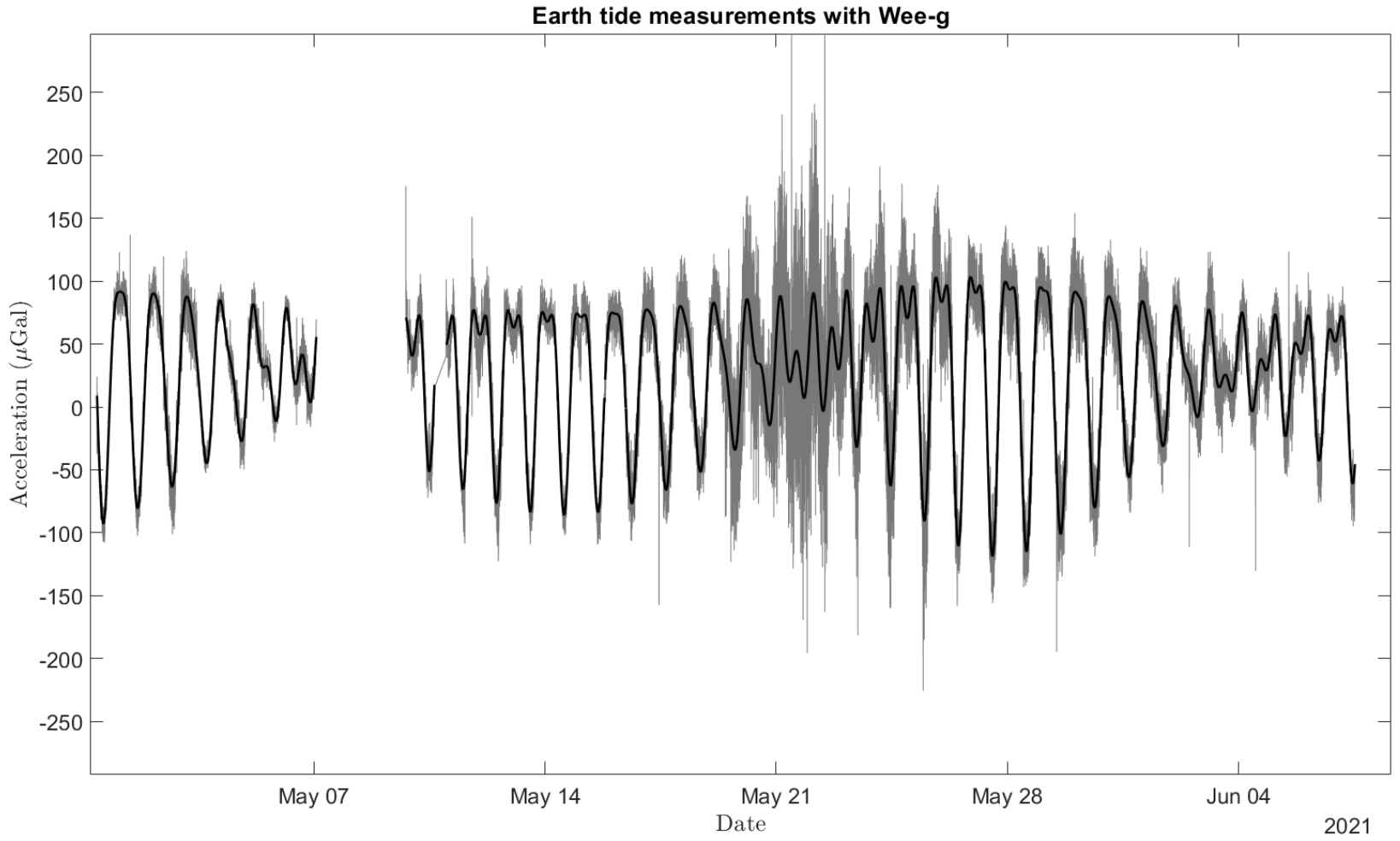
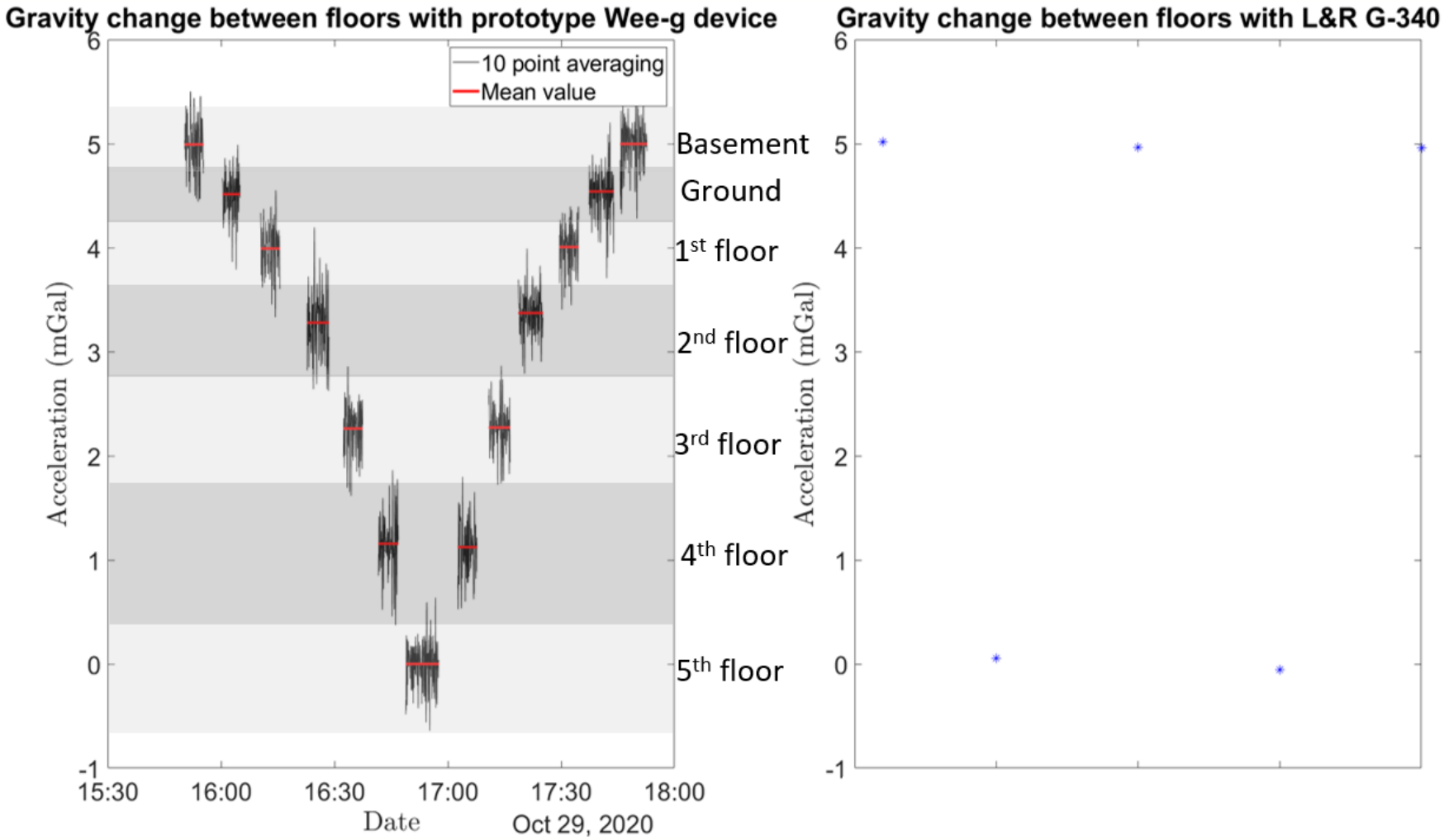
Tracking of the Earth tides



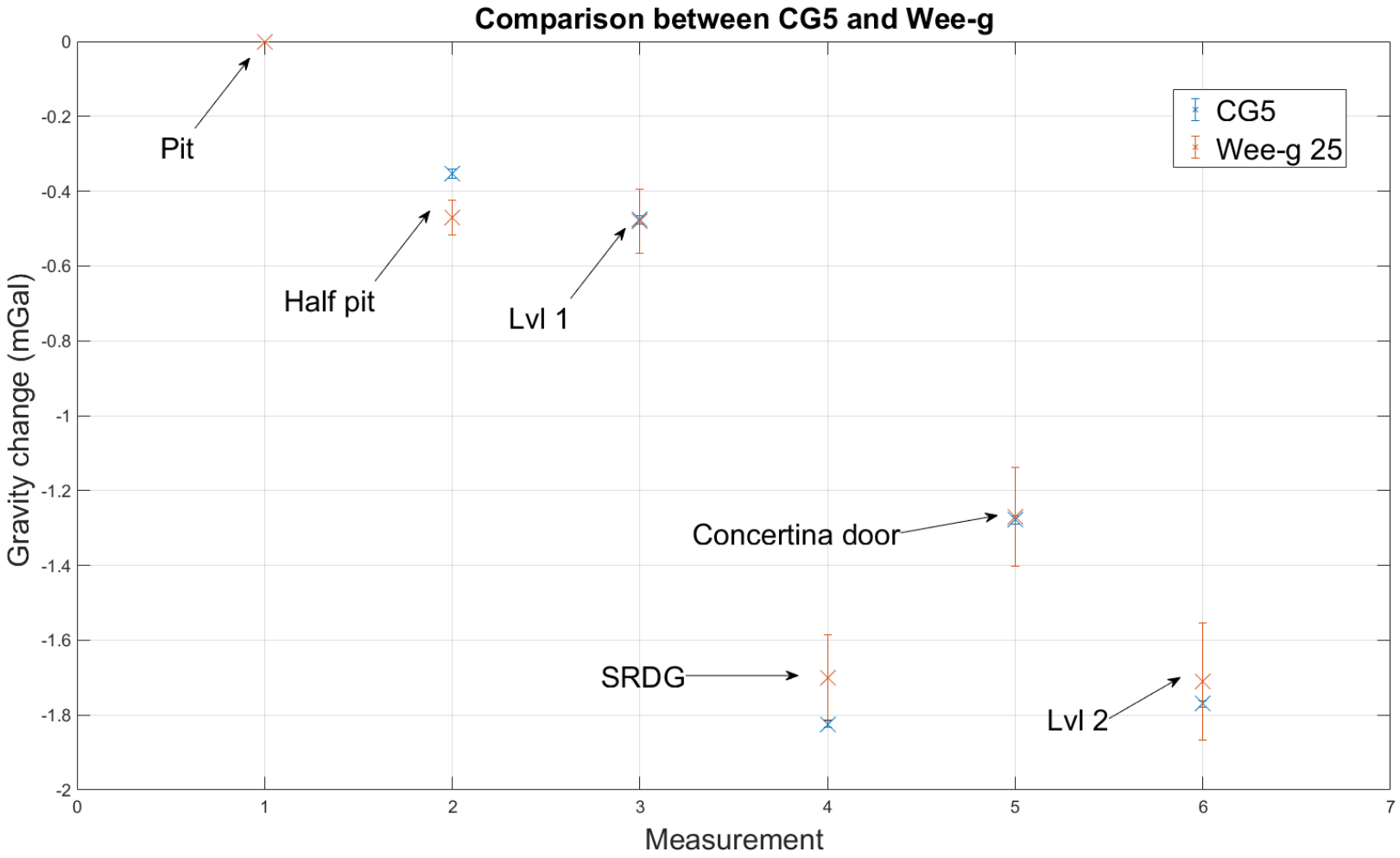
25 µGal pk-pk sensor noise (without LP filtering), regressed against the tides

Gravity change at different floors



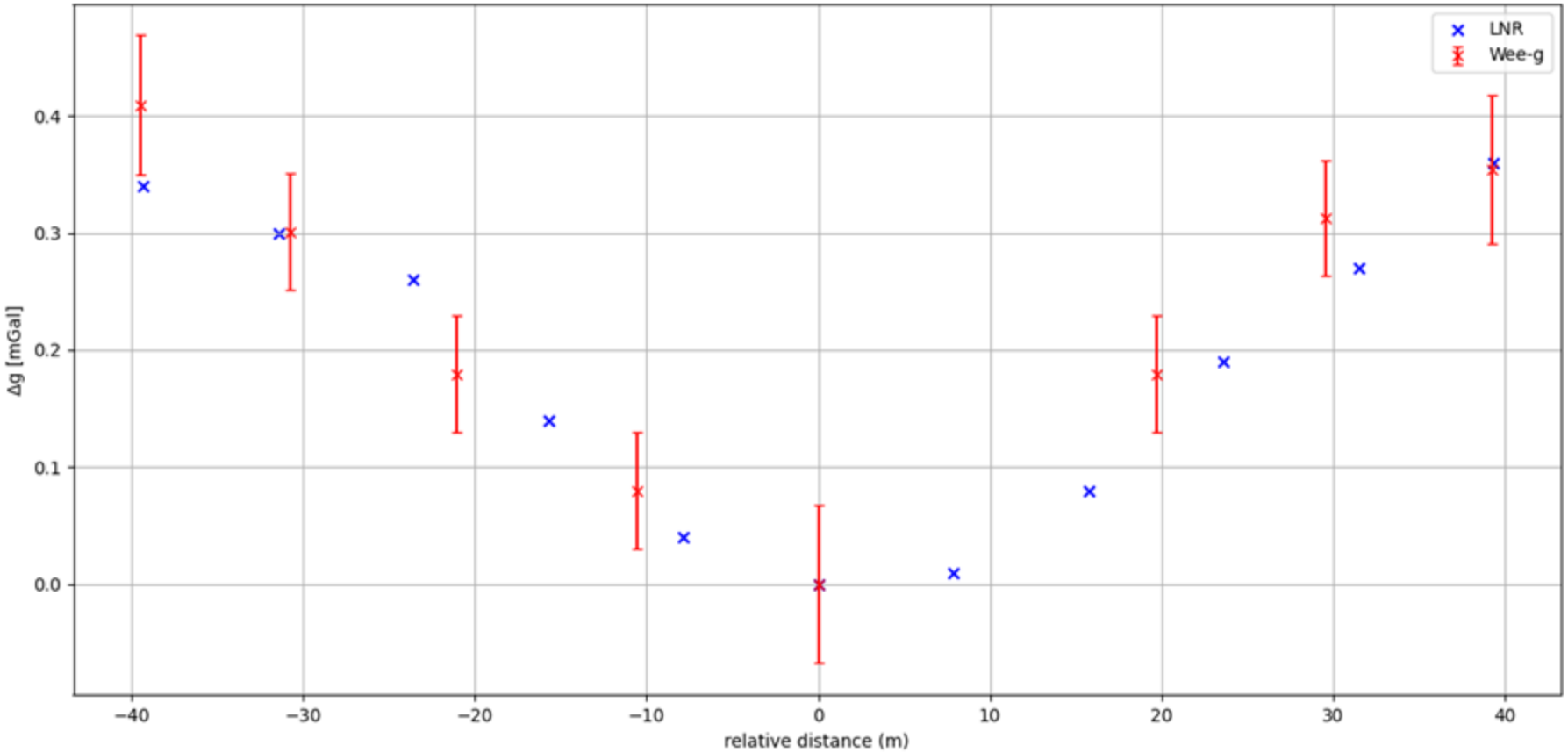
Gravity changes from 0.5 to 1 mGal between floors in the Physics building, UoG, measured with the Wee-g. The total gravity change from top to bottom (~ 5 mGal) was measured using a L&R

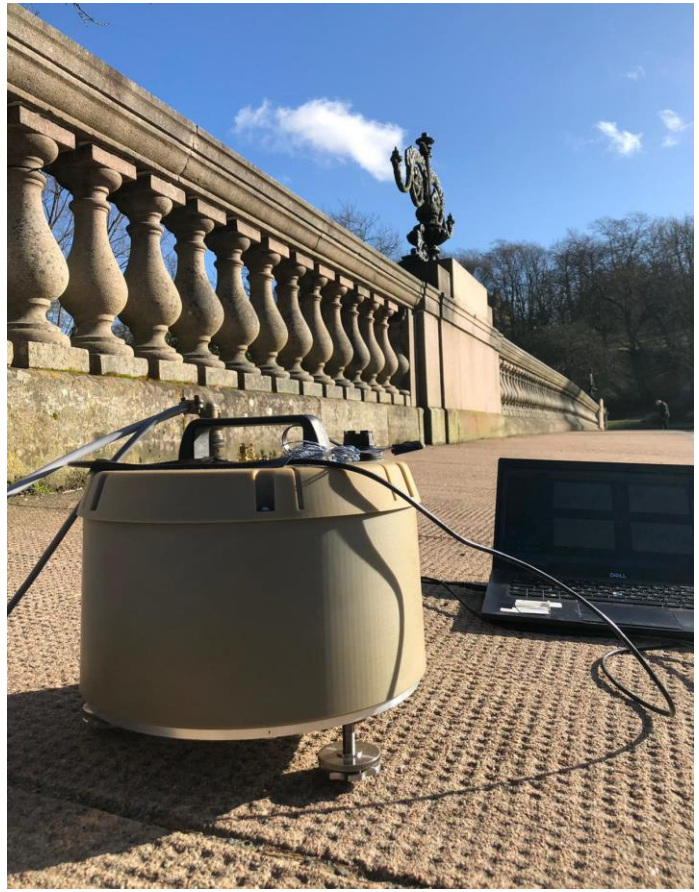
Building survey



Surveying different locations around the Physics building, UoG

Bridge survey





Line survey across the Prince of Wales bridge at Kelvingrove park, Glasgow

Taking the Wee-g in the field

- Both wired and wireless surveys done in the field
- Data also collected in internal non-volatile memory, bypassing the need for on-site computer for acquisition

Wee-g at Fort Widley, Portsmouth, England (2021)

Wee-g at Kilkenny, Ireland (2021)

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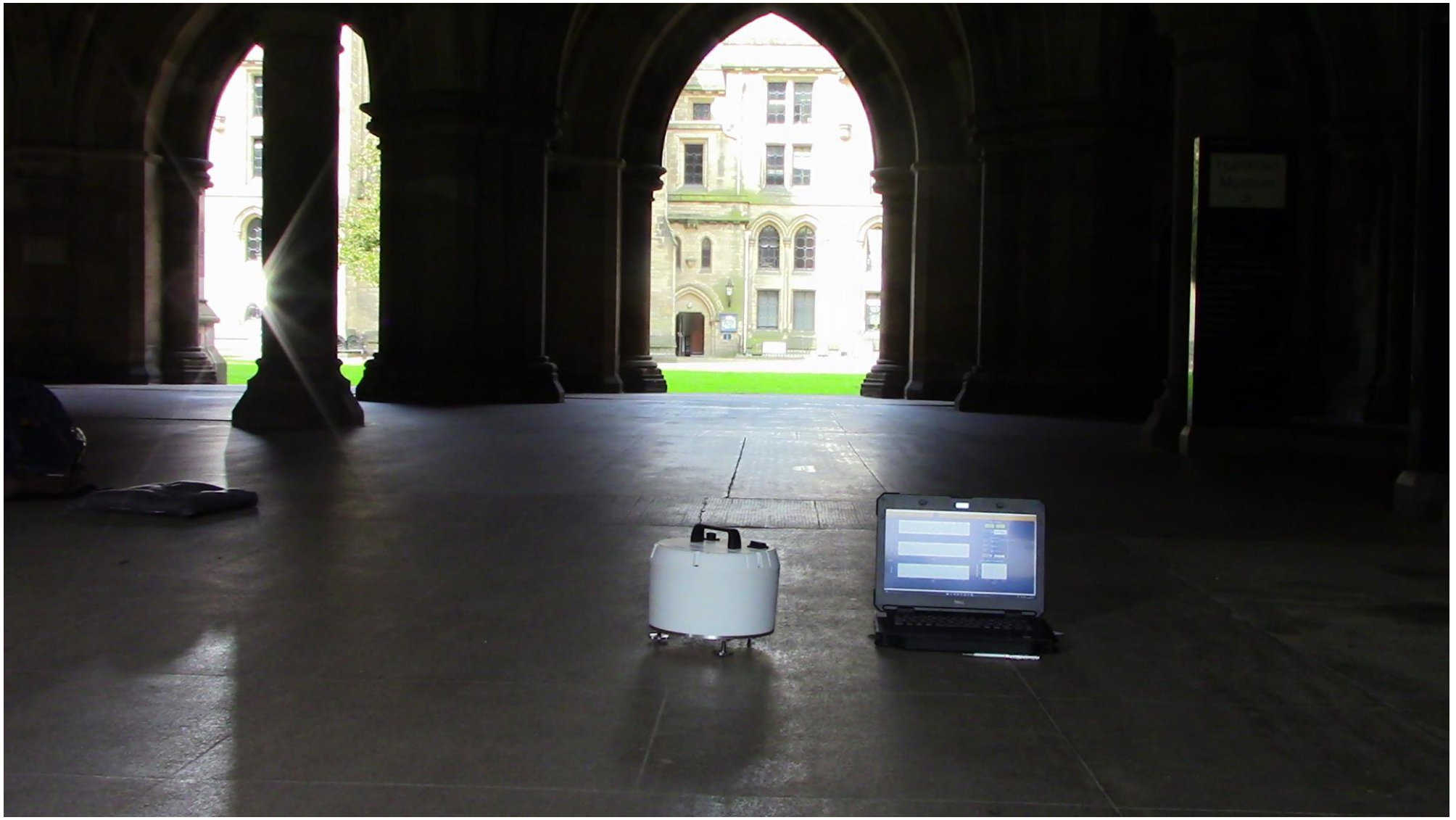

Thank you for your time

… Questions?