

TELLUS South West Regional Lidar Survey



Robinson, C; Jordan, T; Biszczuk, M; Ireland, L; Barker, A;
Beasley, M; Vidamour, A; Arnold, R; Dinn, M; Ferraccioli, F; Fox, A
British Antarctic Survey, Cambridge, United Kingdom
carob@bas.ac.uk



**British
Antarctic Survey**

NATURAL ENVIRONMENT RESEARCH COUNCIL



**British
Geological Survey**

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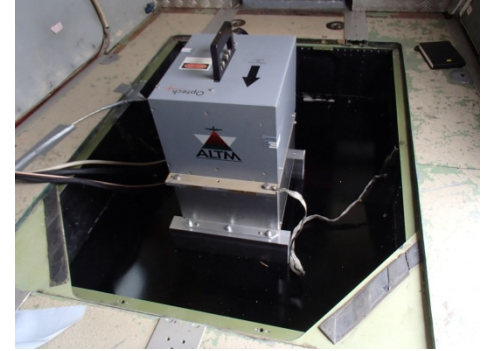
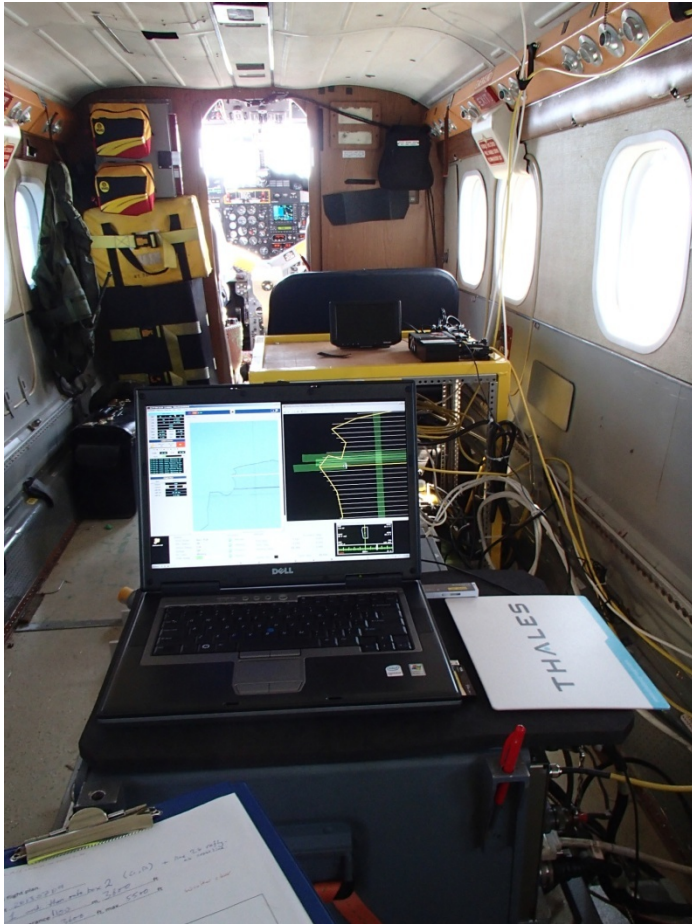
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Who we are - NERC Air Fleet (as of Q4 2013)



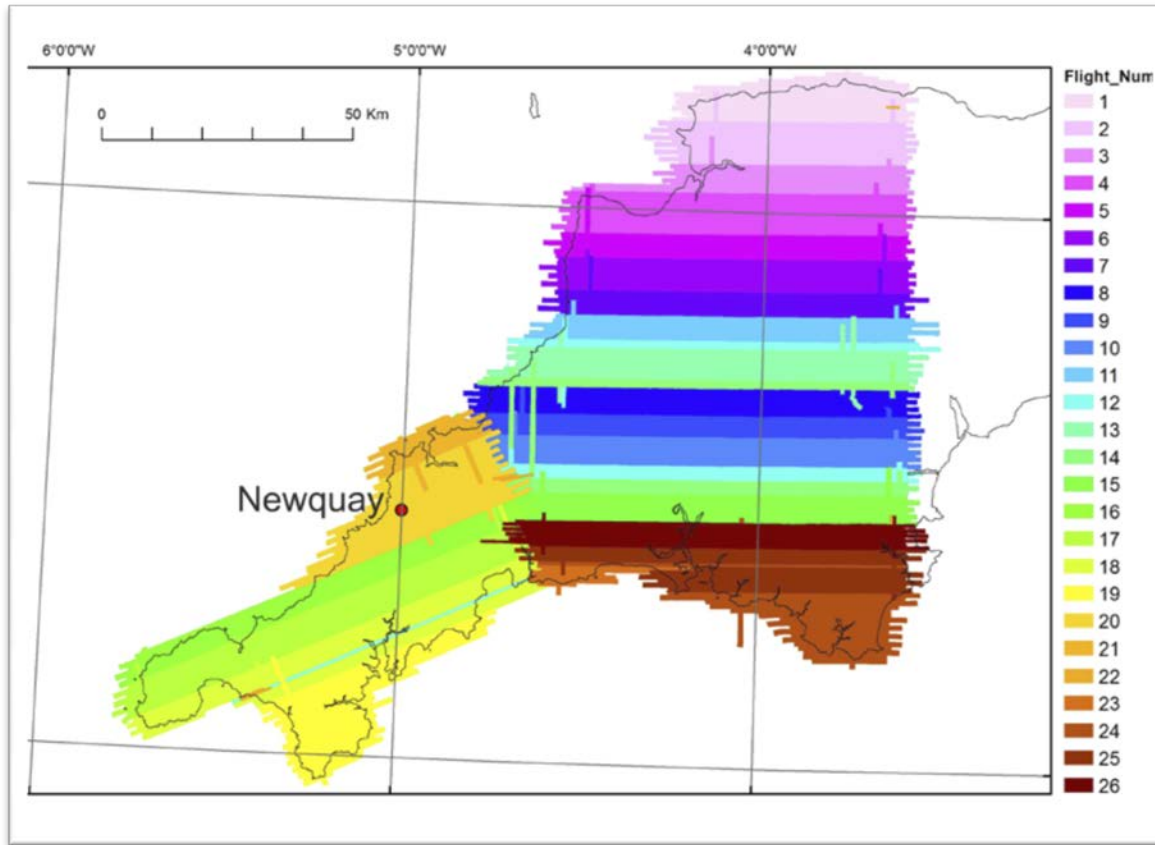
- Air Unit – aircraft operations
- BAS and wider NERC family – engineers, specialists and scientists
- Four de Havilland Twin Otters
- de Havilland Dash 7
- Dornier 228
- Four survey aircraft
- Survey Dash 7 (enhanced survey capability 2014)
- Environmental instrumentation – geophysics, imaging (mapping), metrological, atmospheric
- Available for use; FBL used in Tellus South West regional lidar survey

What - TELLUS South West Lidar Platform



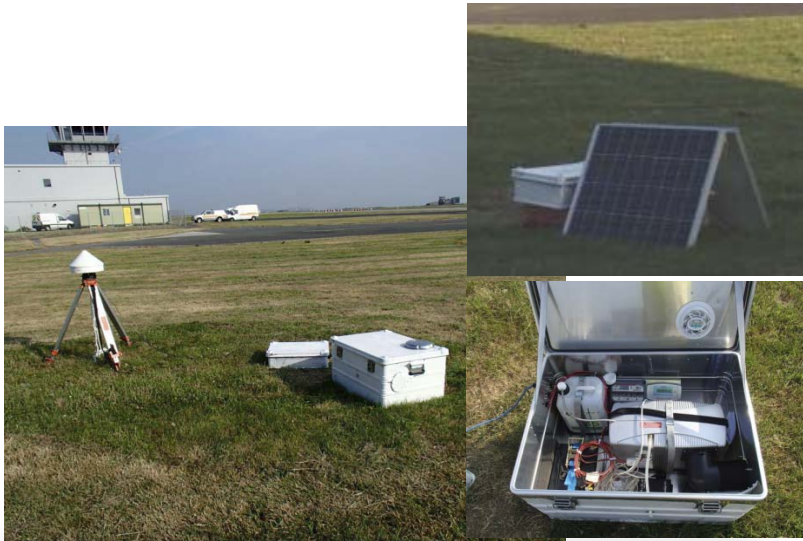
- Mobilised from Canada and onsite for Survey in under 2 weeks
- Expertise – Helica, ARSF-DAN, MAGIC, Air Unit, engineers, scientists, NERC
- Optech 3100EA Lidar
- One day install (Helica / BAS)
- One test and calibration flight (Duxford)
- 5 days operational training (software planning to processing)

Where - Lidar Airborne Survey (Cornwall/Devon)

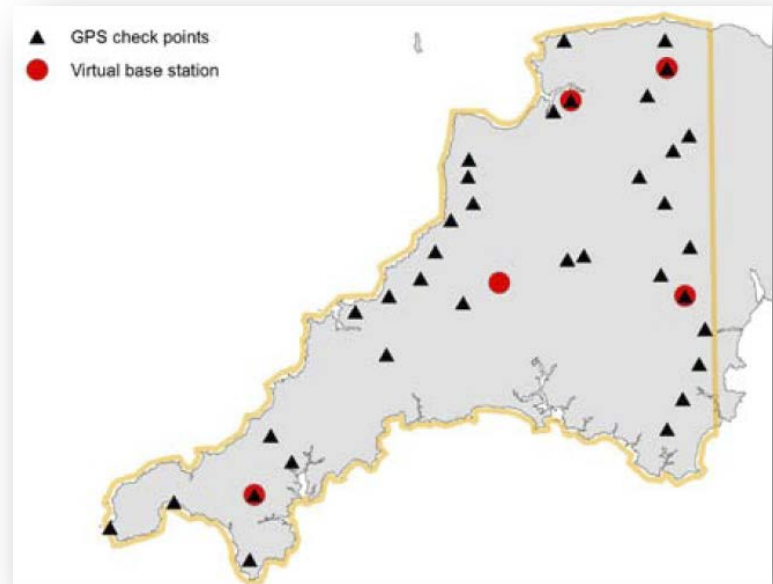
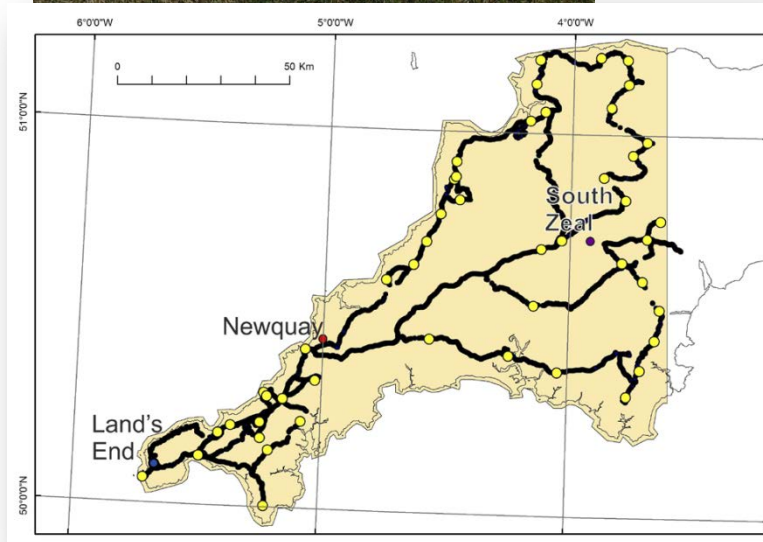


- Newquay airport (base) and Lands End airport (service)
- Temperatures +22°C
- High work tempo
- 2 flights per day in first fortnight (91 % complete)
- 26 flights over 30 days including regulatory pilot rest days and aircraft service
- Nominal 1100m altitude at approx 120 knots (20%-25% overlap)
- Area covered: 9400 km²

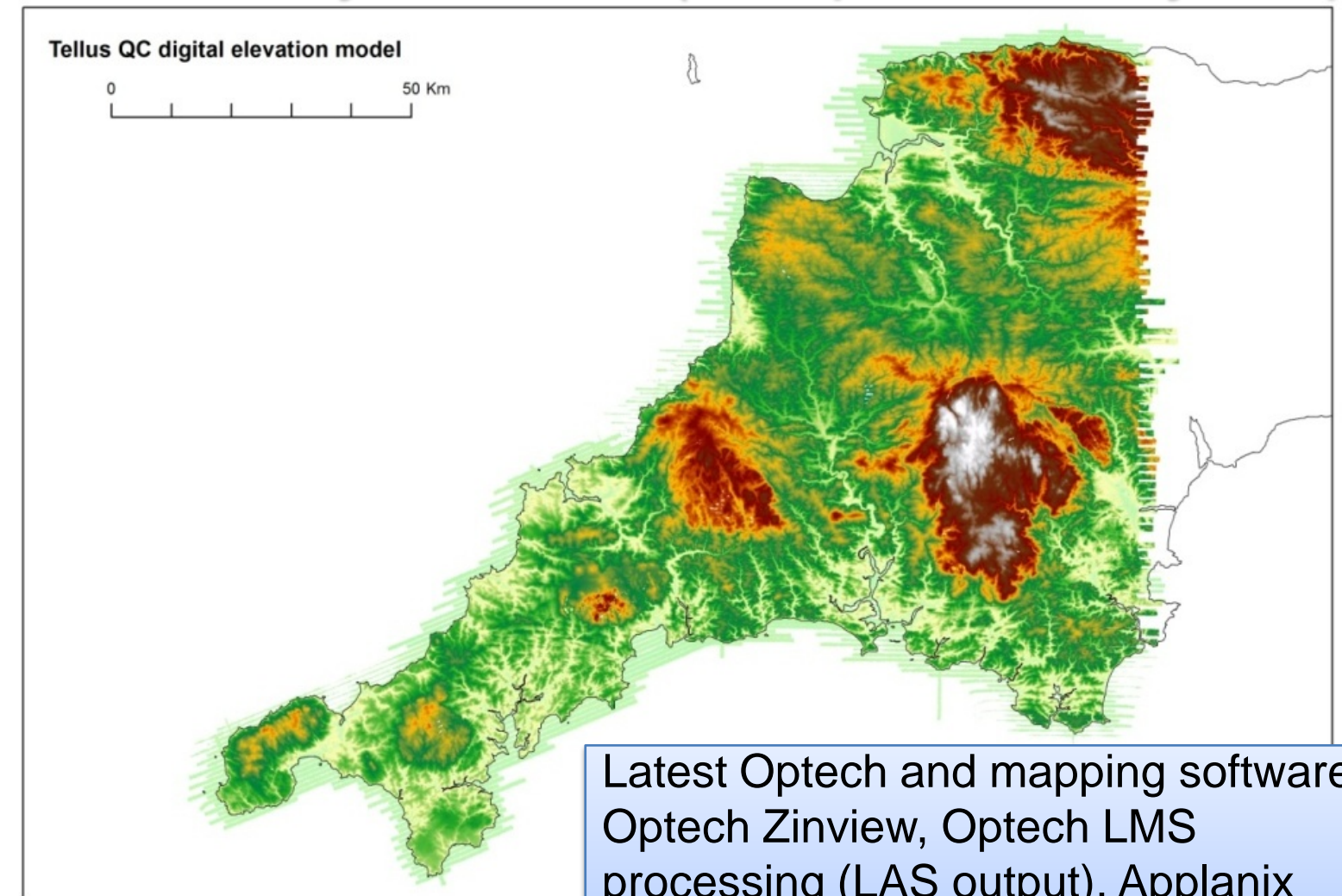
Lidar Airborne Survey (Cornwall/Devon)



- GPS base stations at South Zeal, Newquay and Land's End
- Kinematic GPS ground survey and static GPS check points
- OS virtual GPS base stations

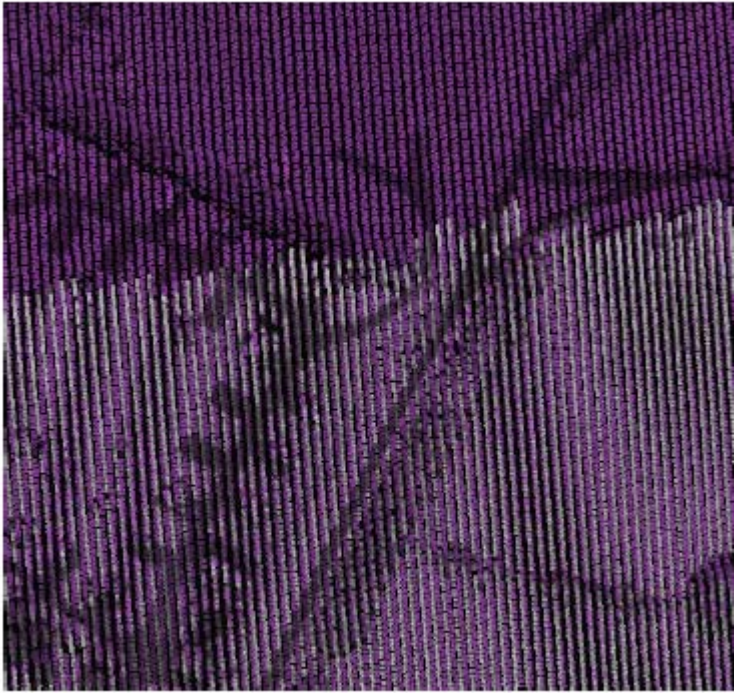


Survey and QC (completed daily map)

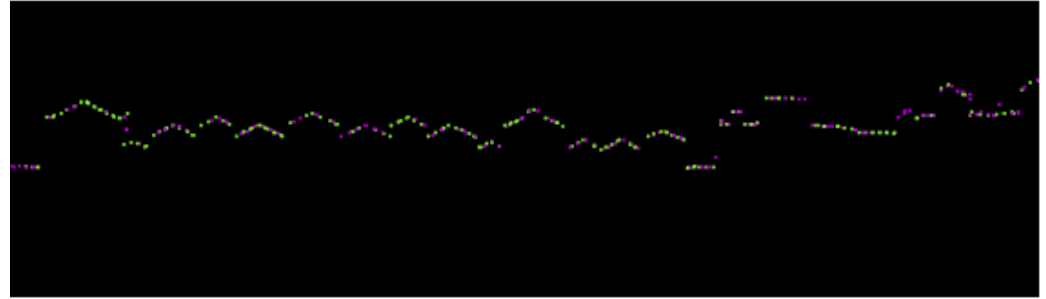


Latest Optech and mapping software;
Optech Zinview, Optech LMS
processing (LAS output), Applanix
POSPac MMS, Novatel Waypoint,
ArcGIS, TerraSolid (TerraScan)

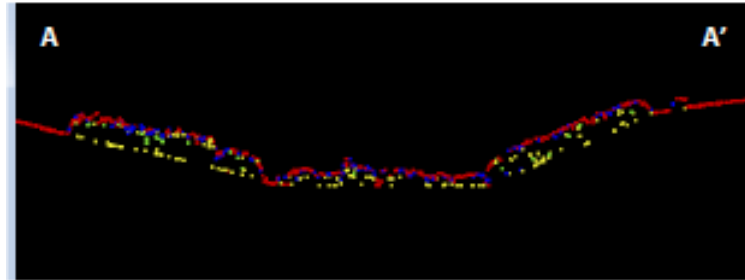
Survey and QC



Overlap? Point density? Features?



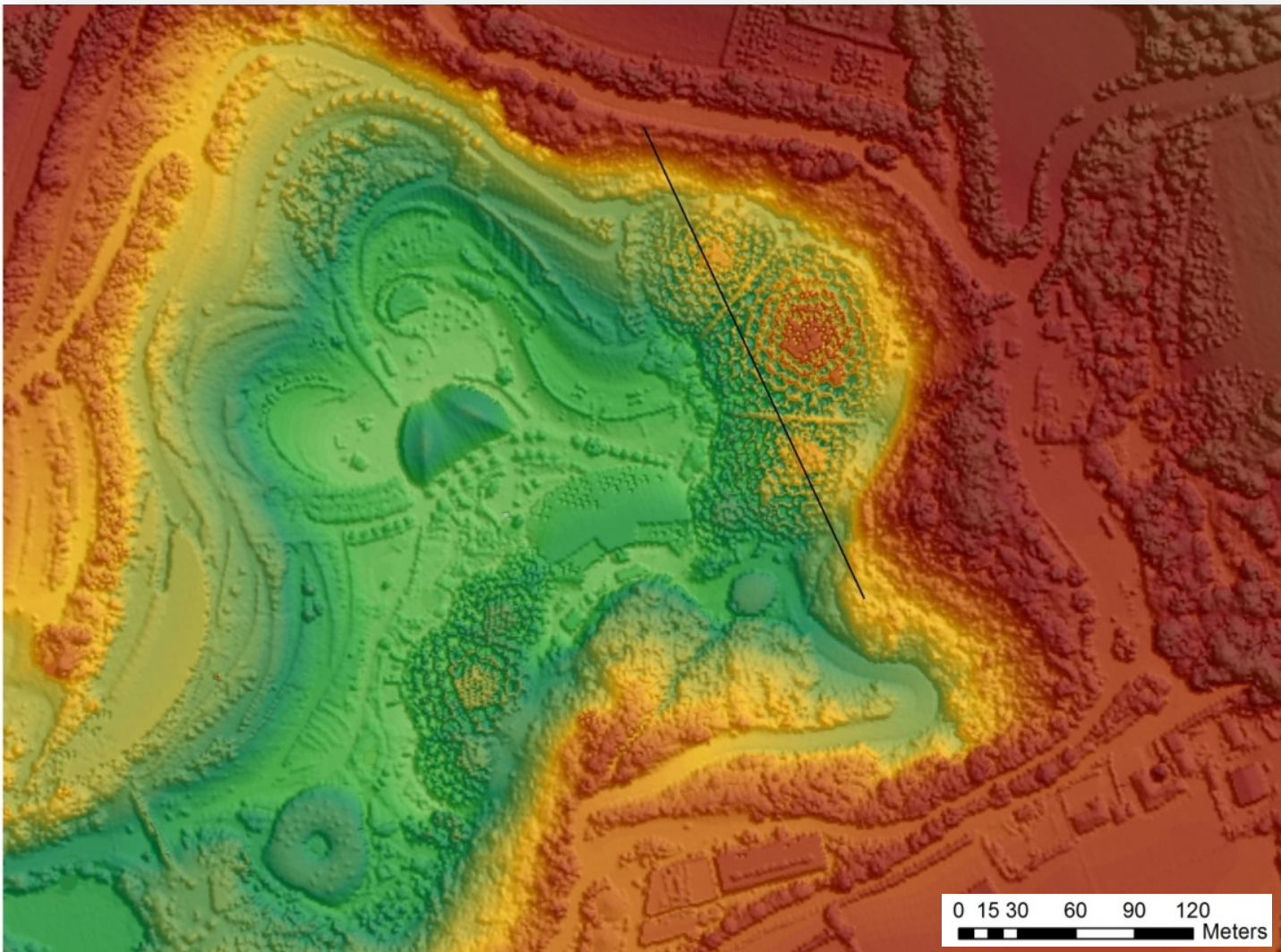
Roof lines?



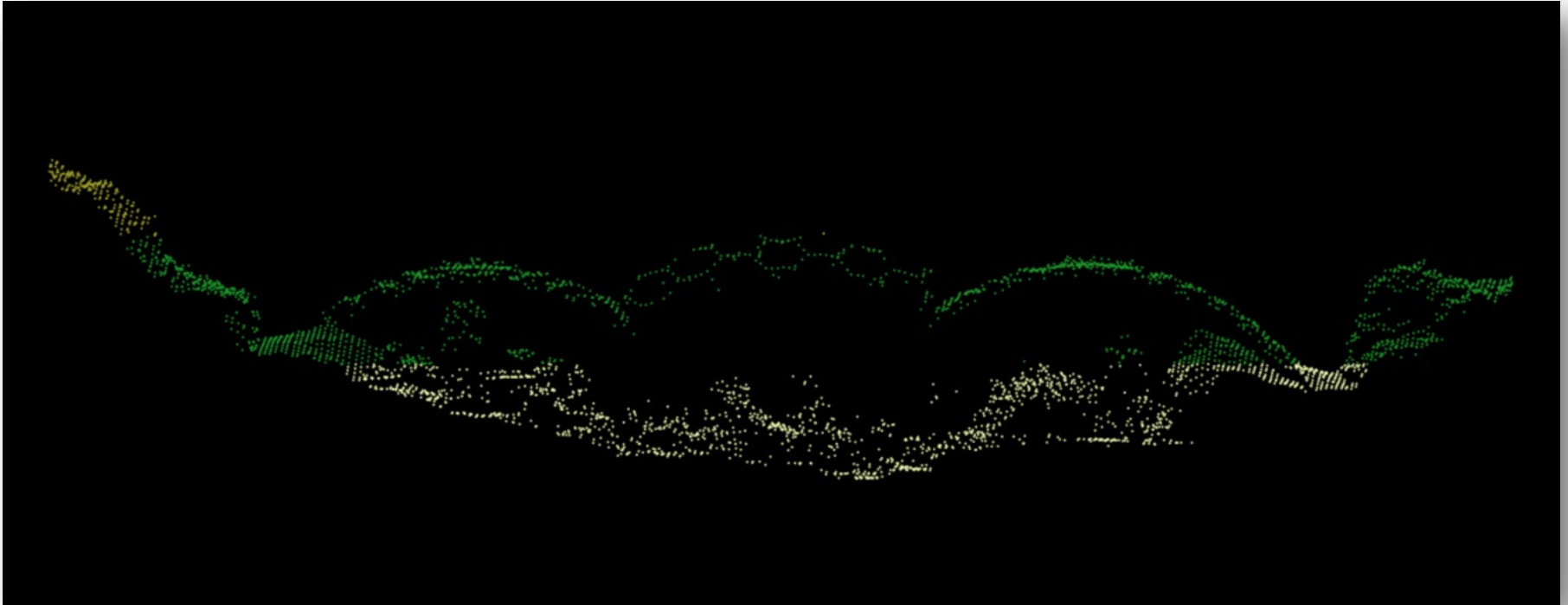
Vegetation?

- Alignment to our GPS check points and kinematic surveys
- Accuracy vertical 0.14 m, with a standard deviation of 0.1 m (Req. 0.25m)
- Point density of one point per metre squared (Req. 1 point/m²)

Survey and QC

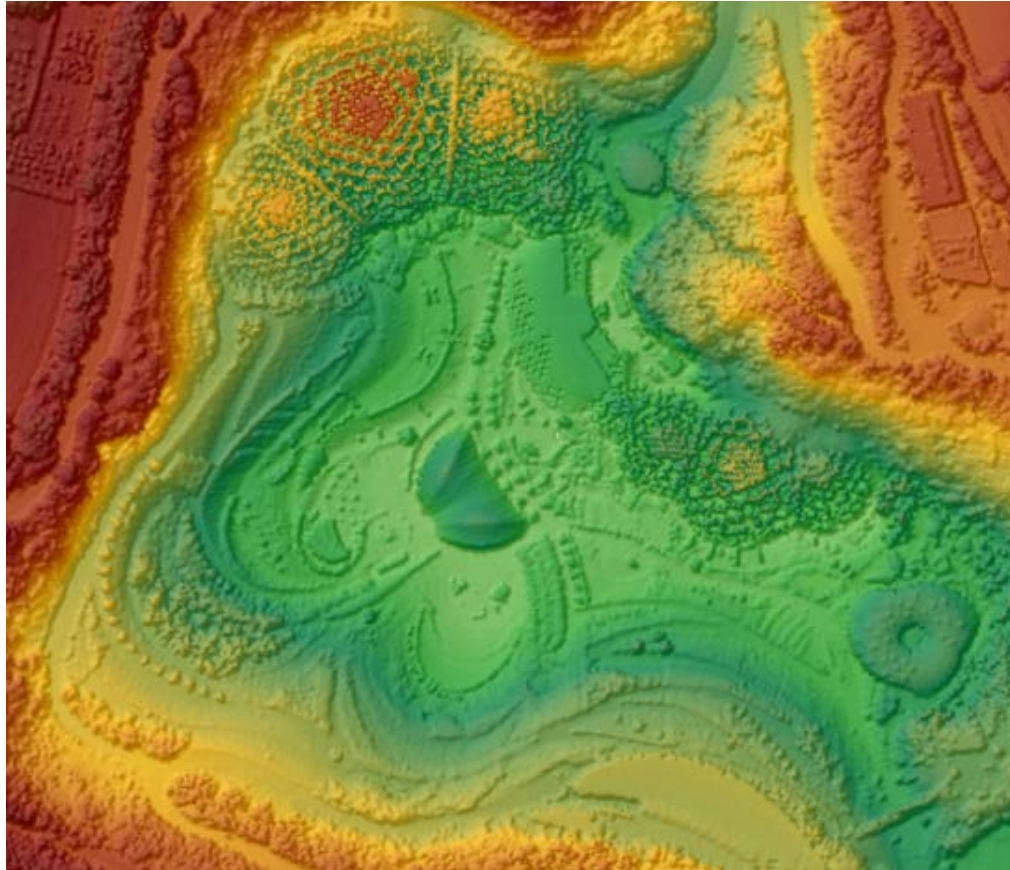


Eden Project Bio-Domes



Eden Project (10 metre swath elevation) – Jordan et al

Survey and QC (one final check)



arcGIS and Google Map data – ambiguities in data, water bodies e.g. ponds

Final Thoughts

- TELLUS SW (lidar phase 1 - full leaf canopy) delivered effectively
- Collaboration and engagement remain key to achieve larger airborne surveys
- NERC has flown a wide range of survey and scientific instrumentation
- New equipment and Dash 7 survey modifications
- NERC facility allows scientist and the wider community to investigate and explore in all regions of the globe

