

Development of new UK calibration facilities

Dr David Smith

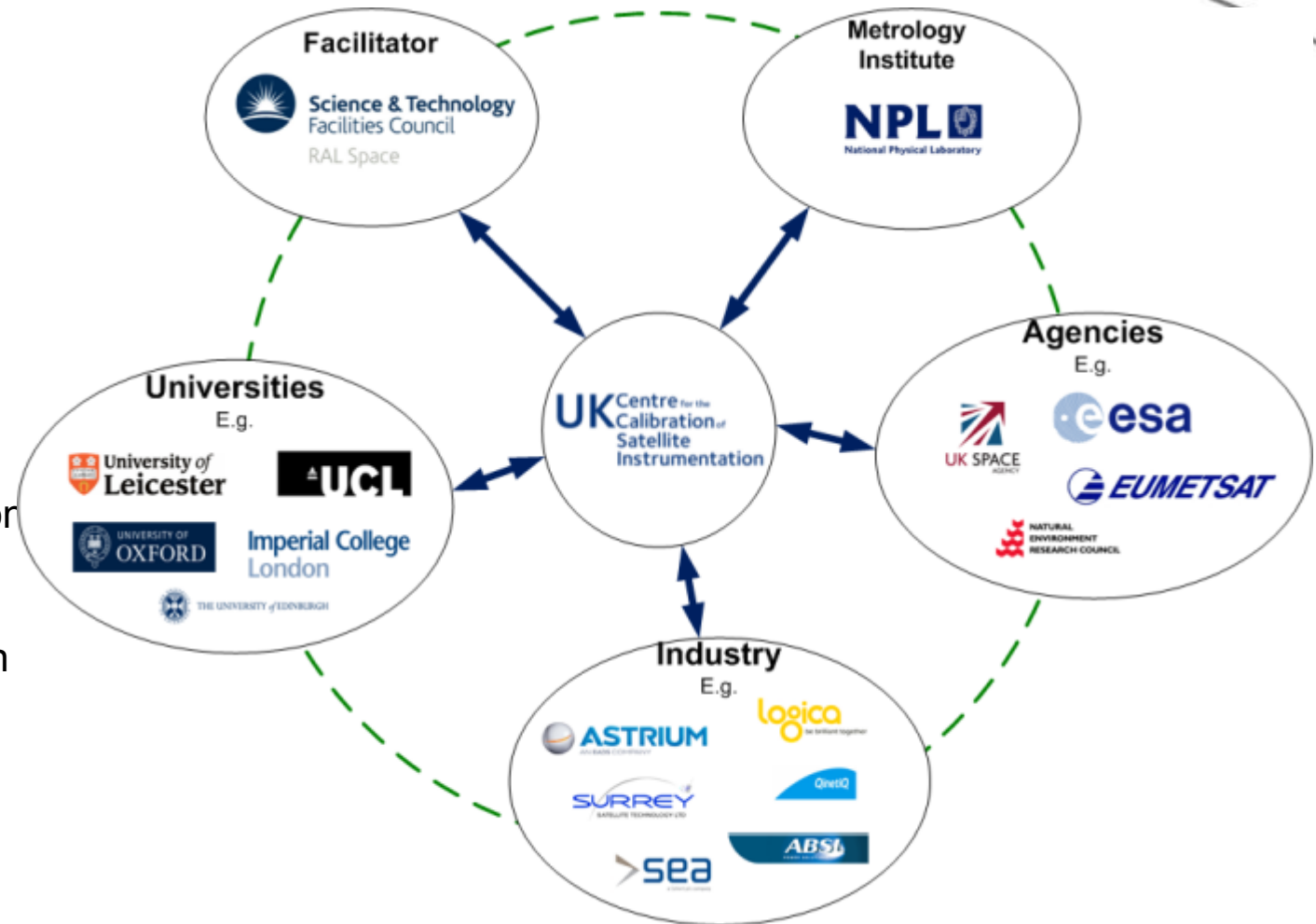
QA4EO Workshop 2011

- 4TH QA4EO Workshop “Providing Harmonised Quality Information for 2015”, was organised and hosted by RAL in October 2011
- ~70 international participants
- The workshop was directly facilitated to show strong requirements across key earth observation domains (space and non-space) and provide recommended implementation details and timelines.
- Workshop was ‘capstone’ for laying out the GEO Secretariat and CEOS QA4EO implementation milestones



Establishment of a UK CCSI

RAL – NPL Partnership



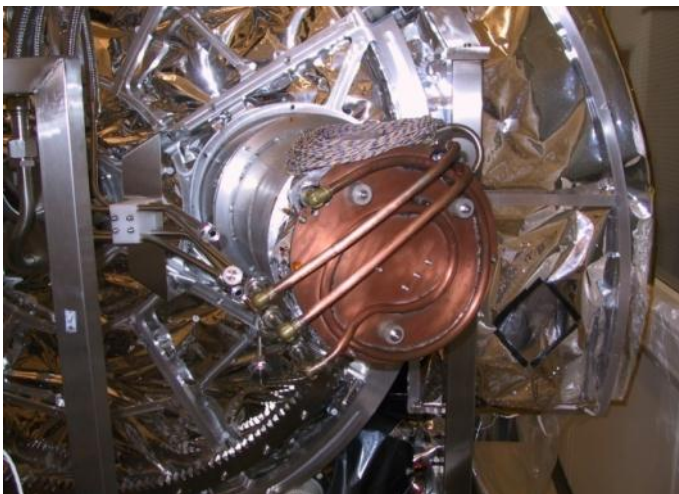
- Expertise
- Facilities
- Calibration Sources
- Traceability chain
- Test Chambers
- Equipment
- Databases
- Methodologies
- QA4EO
- Analysis Tools
- Campaign Coordination
- Sensor models
- Pre-flight calibration
- Post-launch calibration
- End-to-end chain

AATSR Calibration

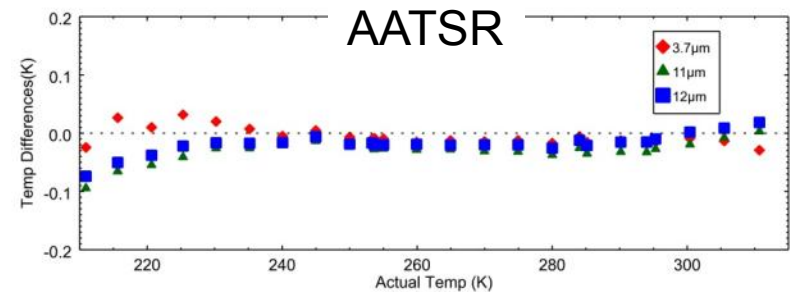
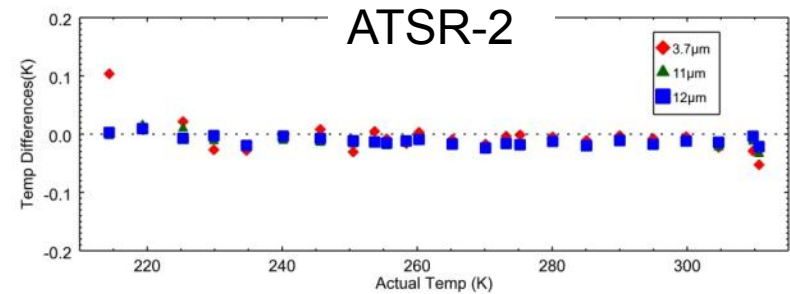
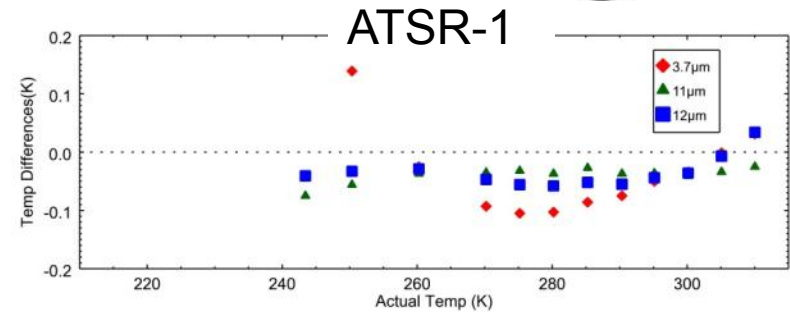
Instrument calibration performed under flight representative conditions



Blackbody emissivity >0.998
Precision thermometers calibrated to $<0.01\text{K}$
Accuracy $<0.05\text{K}$ traced to ITS-90

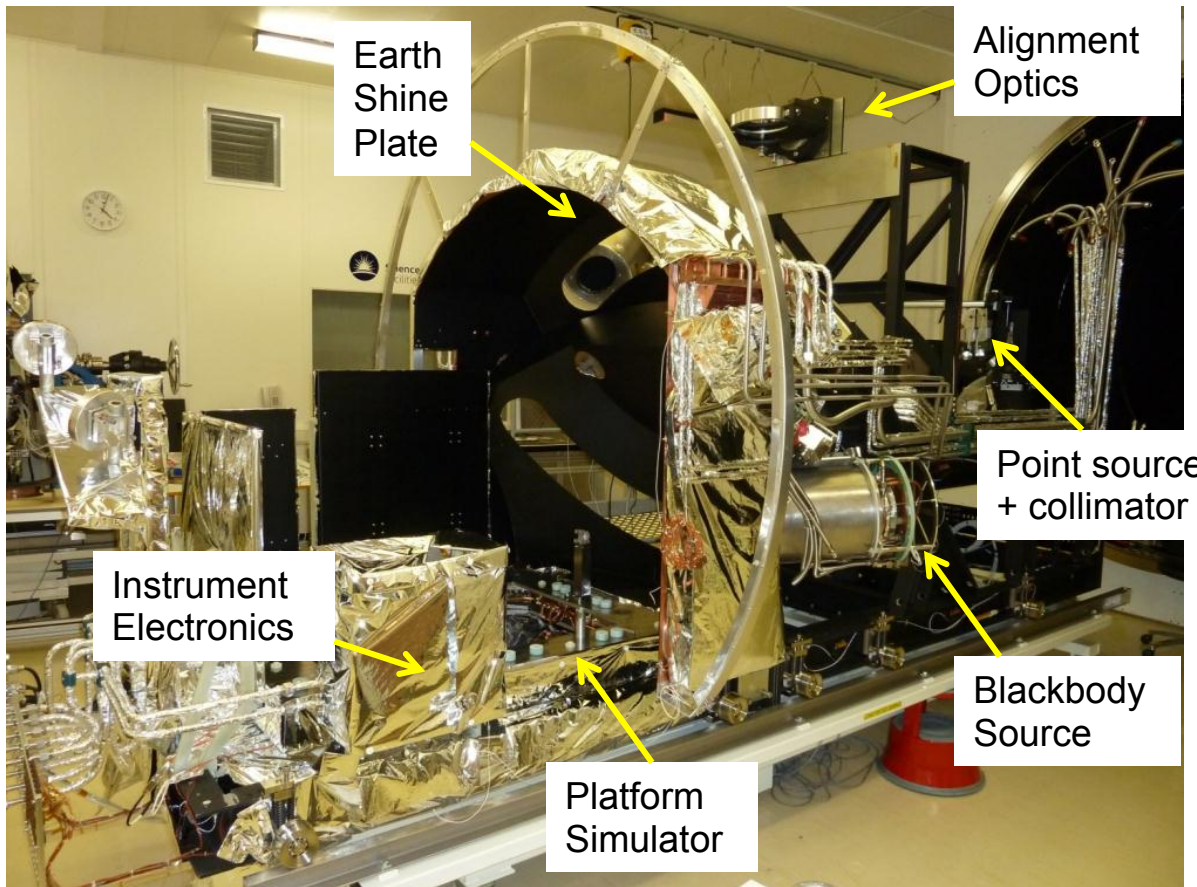


Traceability maintained through all ATSR sensors



“ATSR infrared radiometric calibration and in-orbit performance”,
Dave Smith, Chris Mutlow, John Delderfield, Bob Watkins, Graeme
Mason, Remote Sensing of Environment 116 (2012) 4–16

SLSTR Calibration Facility



- Facility commissioning completed 19th March 2012
- Tests with STM completed April-2012
- FM Testing scheduled for Q4 2013

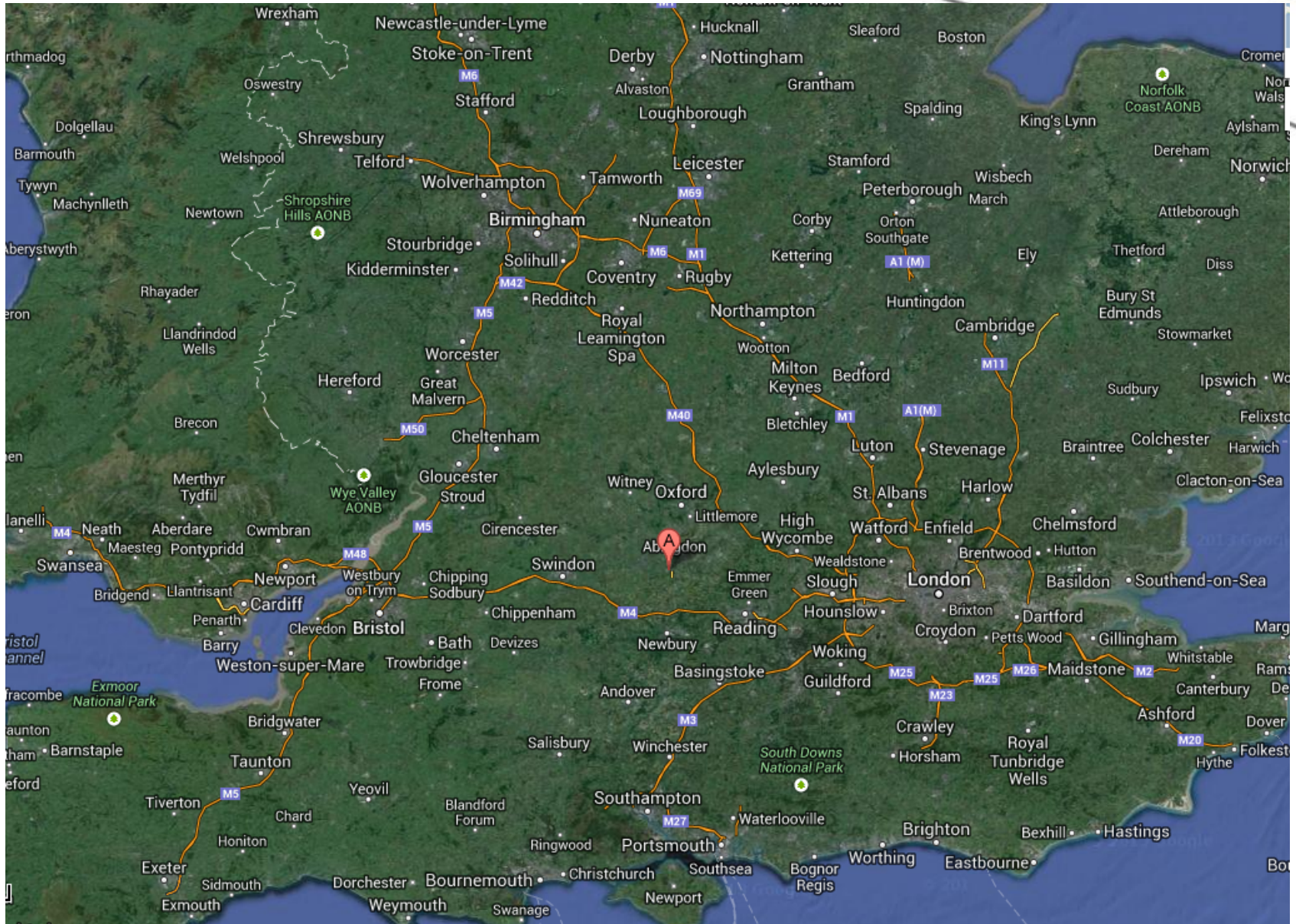
ESA requirement: to perform calibration under flight representative conditions.

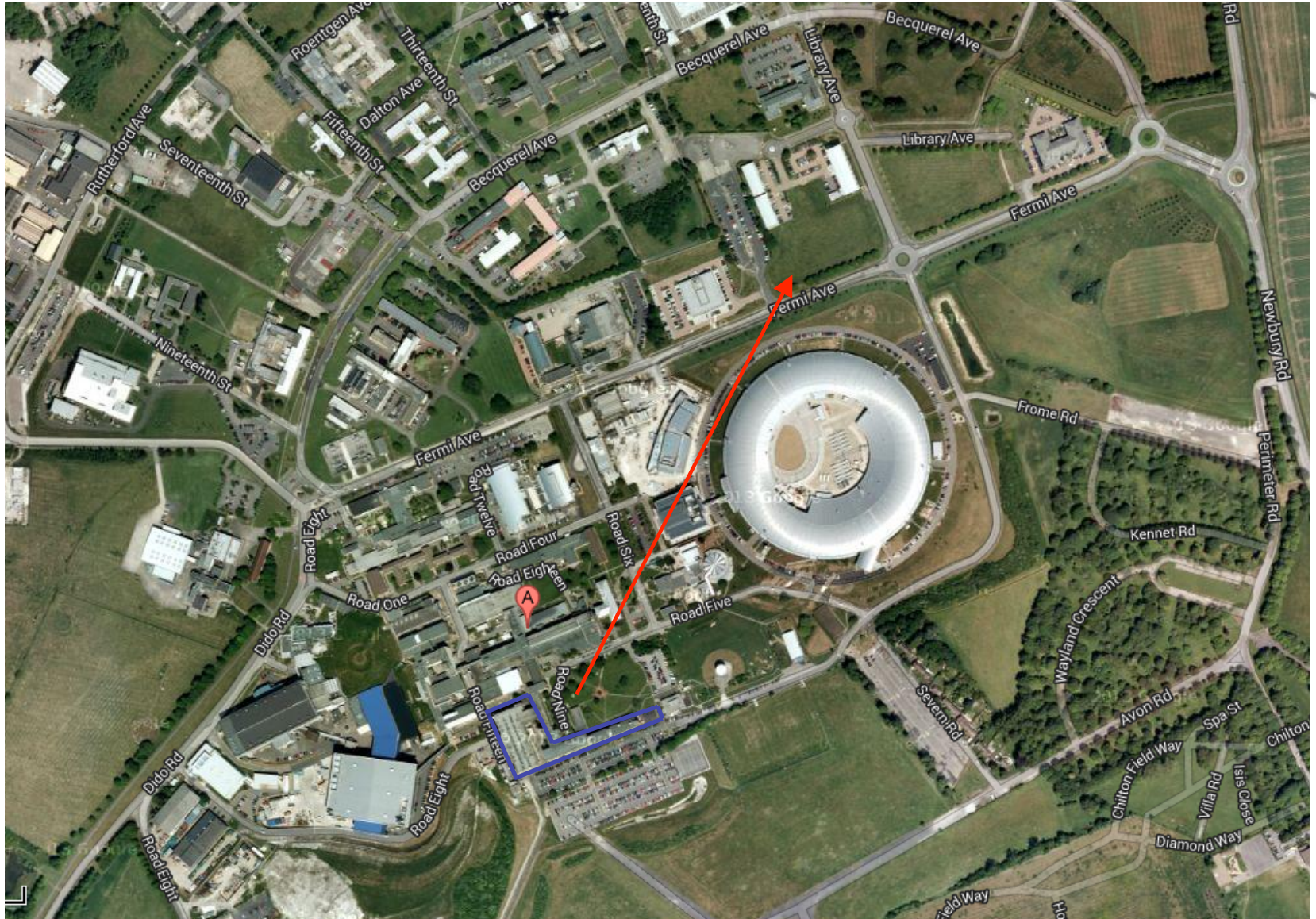
- *Thermal balance*
- *Steady State*
- *Instrument fully operational*

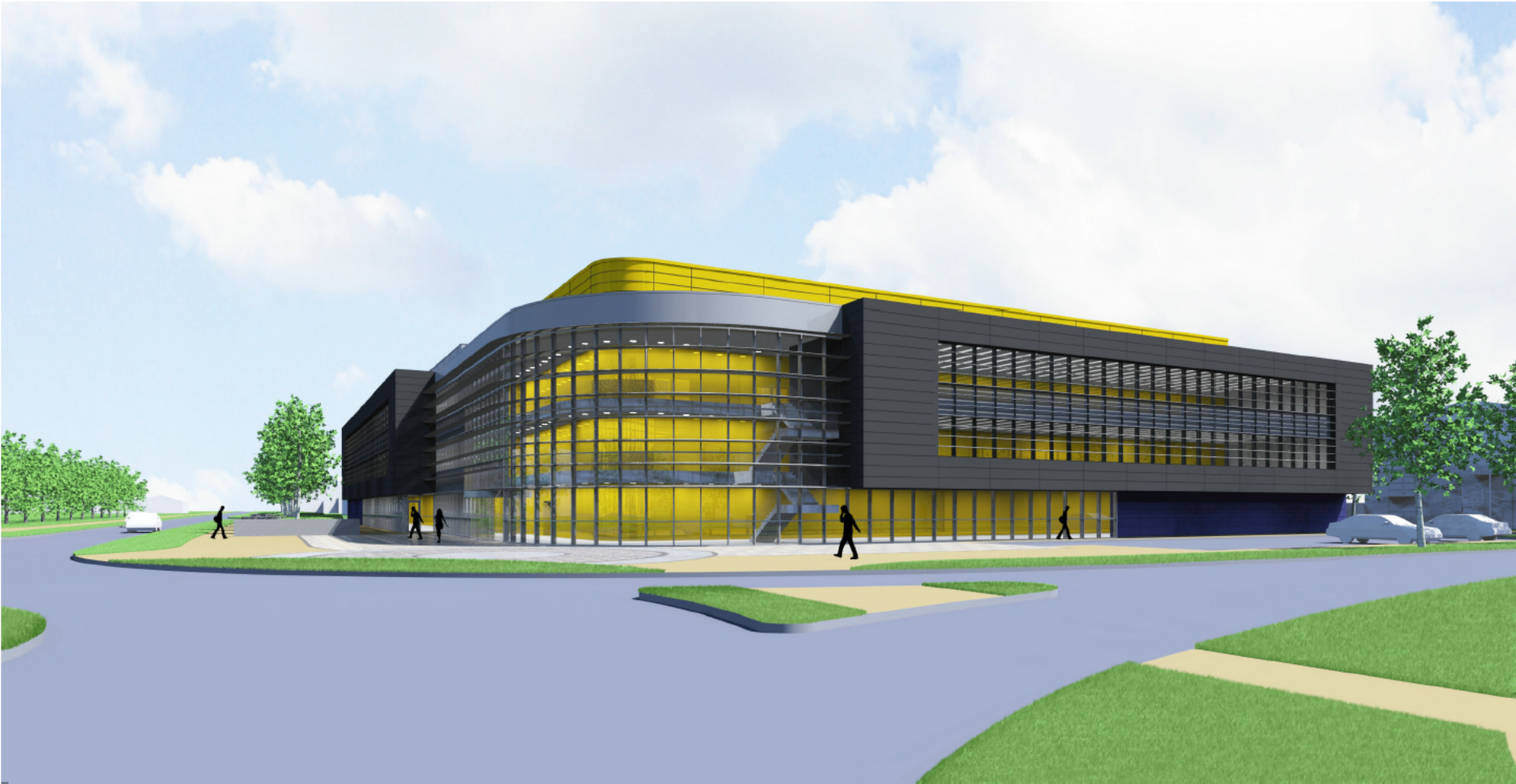
Challenges for next generation sensors



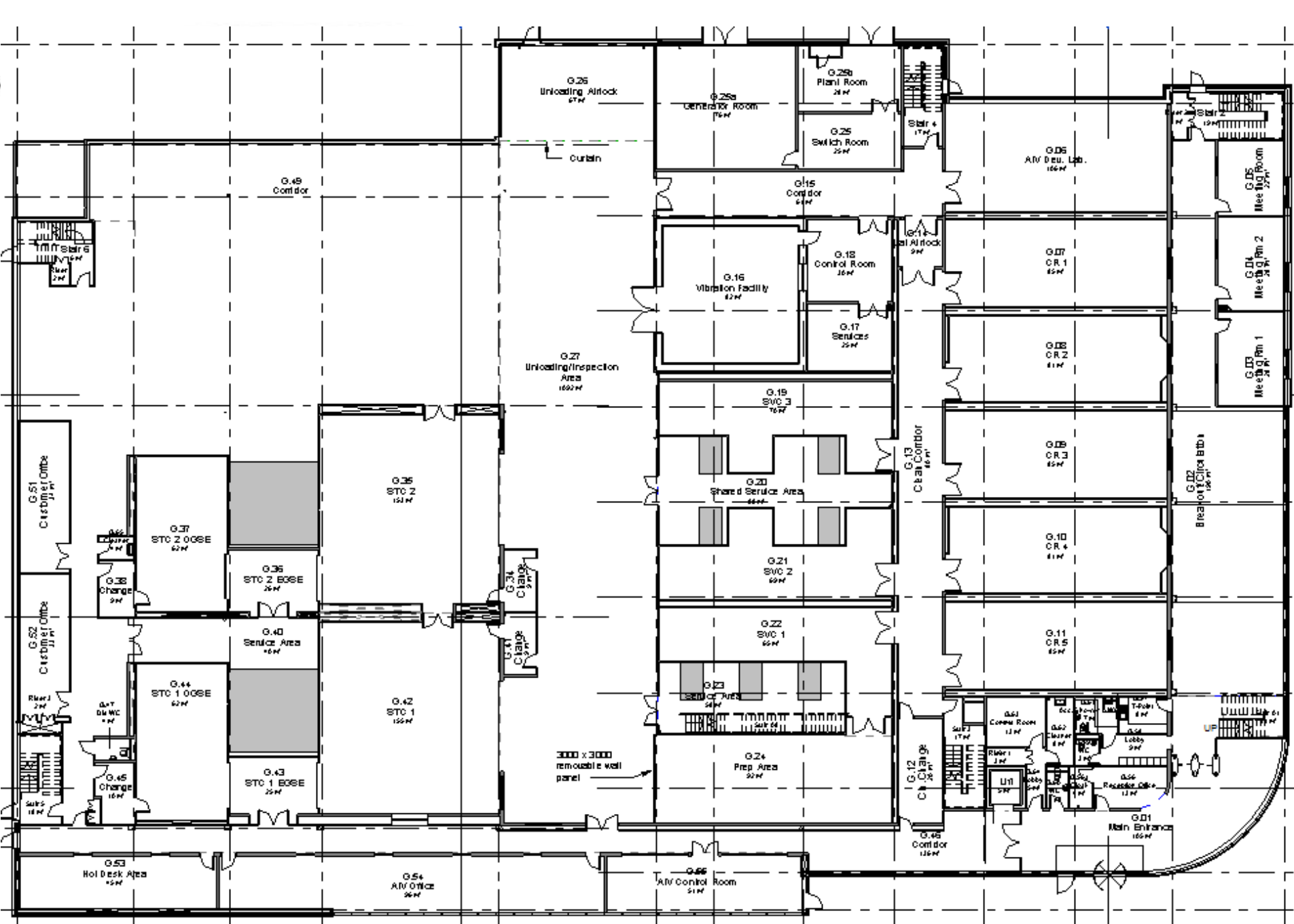
- Current and future programmes – in particular Metop Second Generation, Copernicus (Sentinel-3C/D, 4, 5) present a particular challenge on existing EU test facilities
- Many existing facilities were built in 1990s and no suited to requirements for pre-flight calibration and characterisation
 - Need for dark rooms
 - Vibration isolation
 - Increased demands on traceability of measurements
 - Need to perform end-to-end characterisation and calibration of full instrument
 - Reliance on vicarious validation as primary calibration source is not suitable for all missions – i.e. climate instruments, atmospheric sounders
- UK has responded to challenge by investing in new test facilities – focussed on calibration

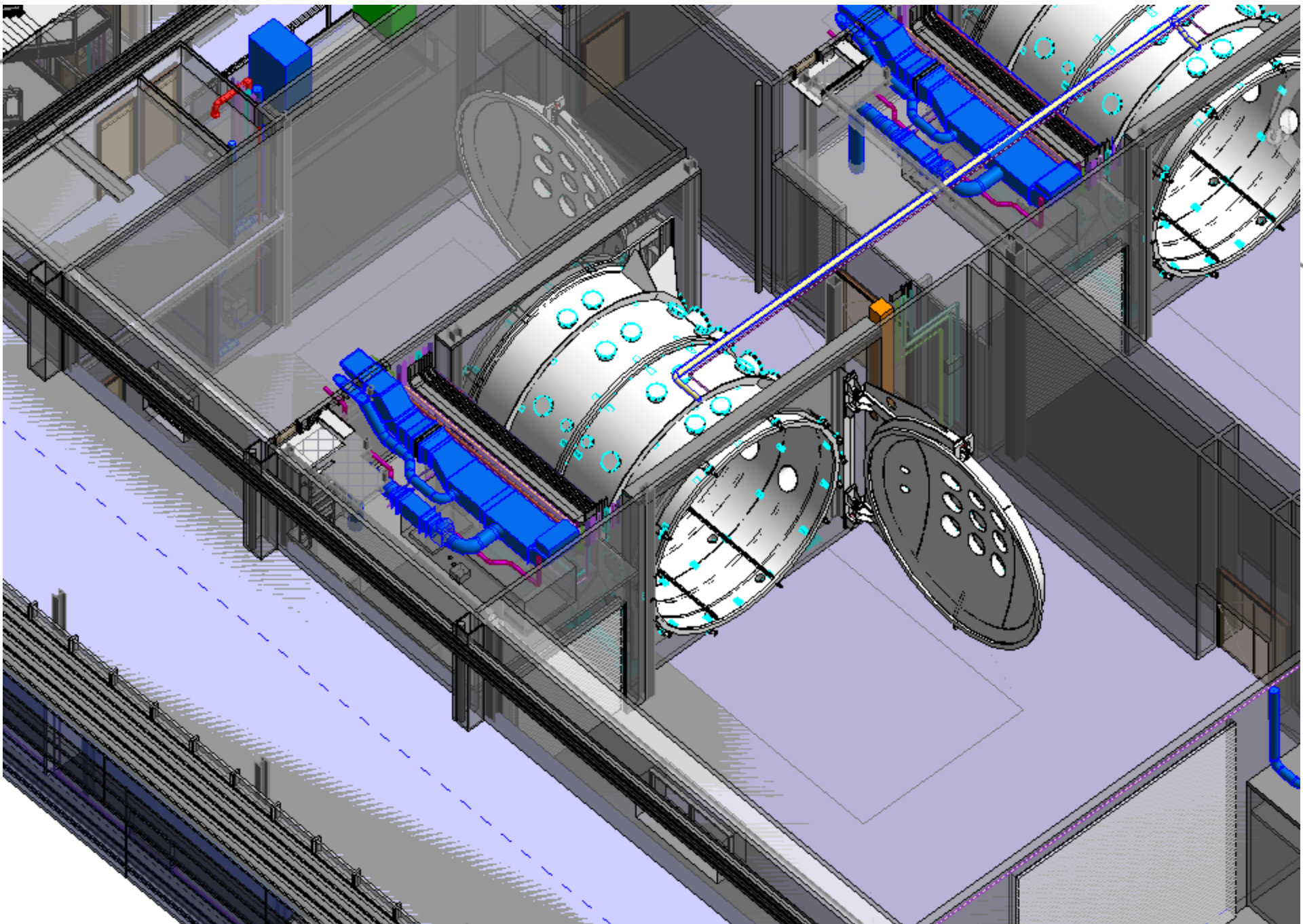


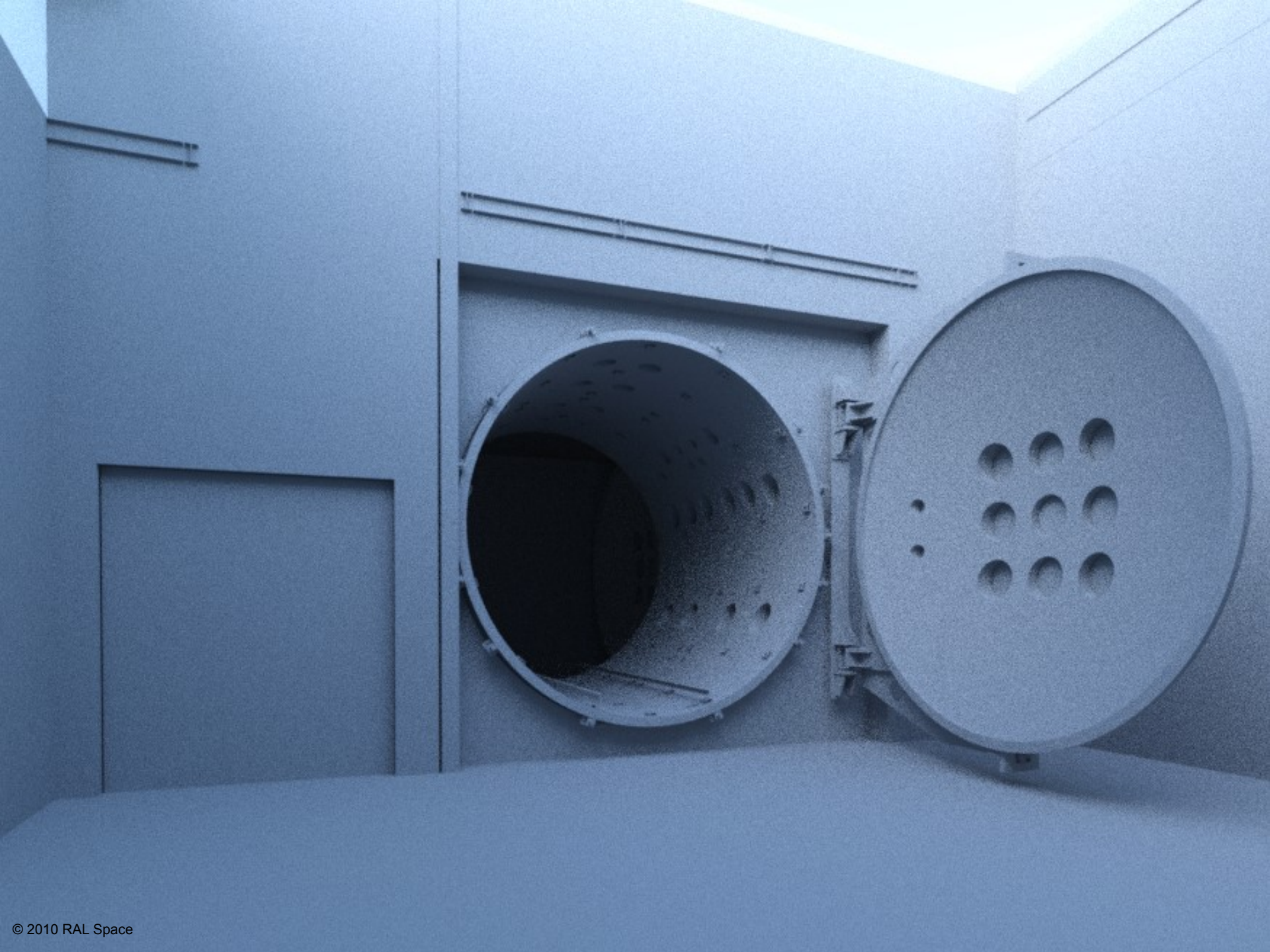




New Space Test and Calibration Facility

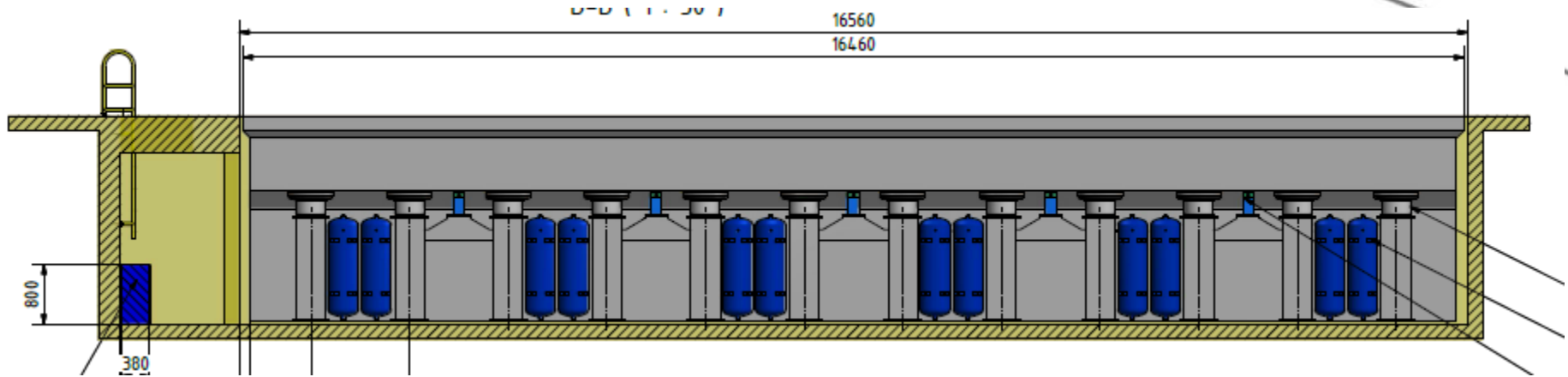






STC-5m Vibration Isolation

Anticipated layout (not finalised)



Overall mass currently ~280 tonnes

