

# Modular Relaxed Eddy Covariance sensor for Air Quality: MOREC-AQ

*- A low-cost approach to air quality flux measurements*

Lekan Popoola

PI (University of Cambridge)  
Observational methods,  
sensor networks



Thomas Wall

Co-I (STFC RAL Space)  
Laser-based gas sensors



Zaheer Nasar

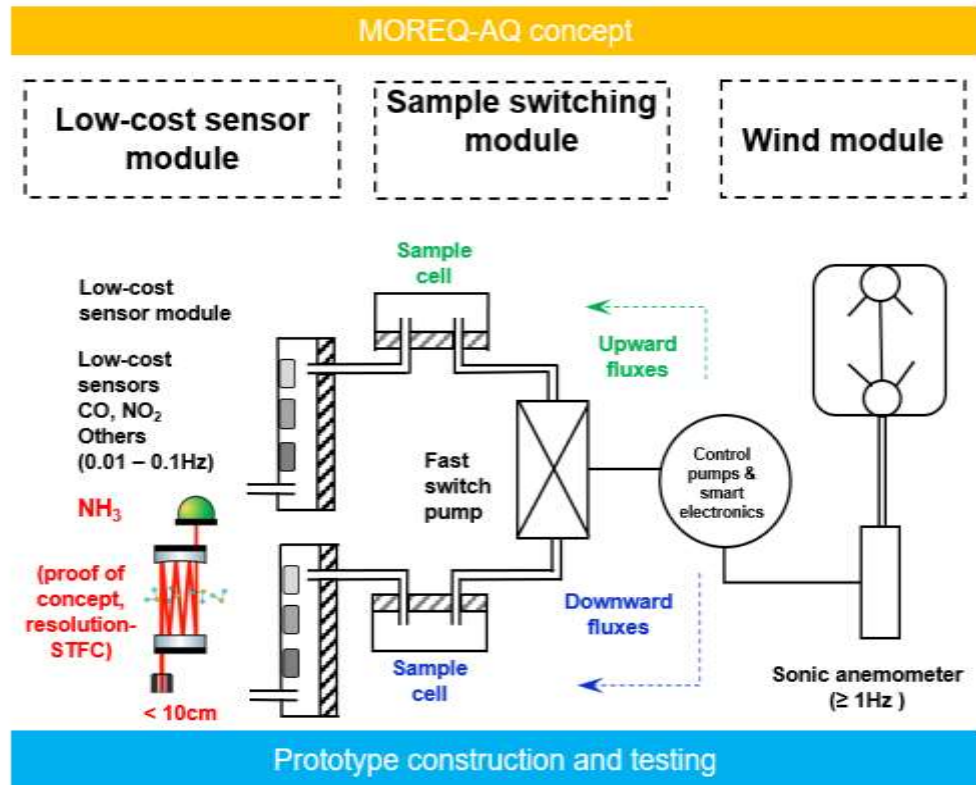
Co-I (Cranfield University)  
PM characterisation



Defra's Areas of Research Interest (ARI) in air quality challenge being addressed include:

- ARI 1: **AQ improvements** and link to health and environmental impact & outcome: (a) addressing issues **non-exhaust emission (NEE) from farming and agriculture** (b) quantifying and **costing impact of ecosystem** change
- ARI 2: evidence **capability transformation and innovation**: (a) **use of low-cost sensors** and (b) **data to improve local emission inventories**

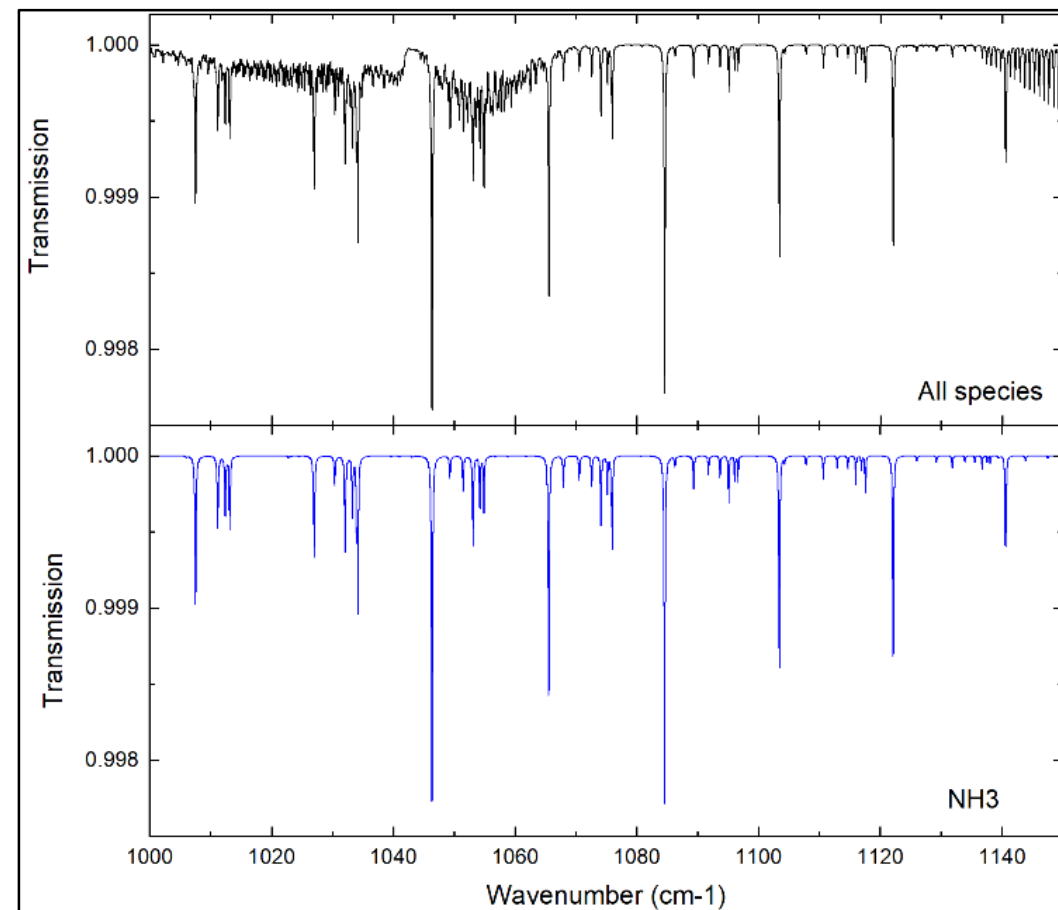
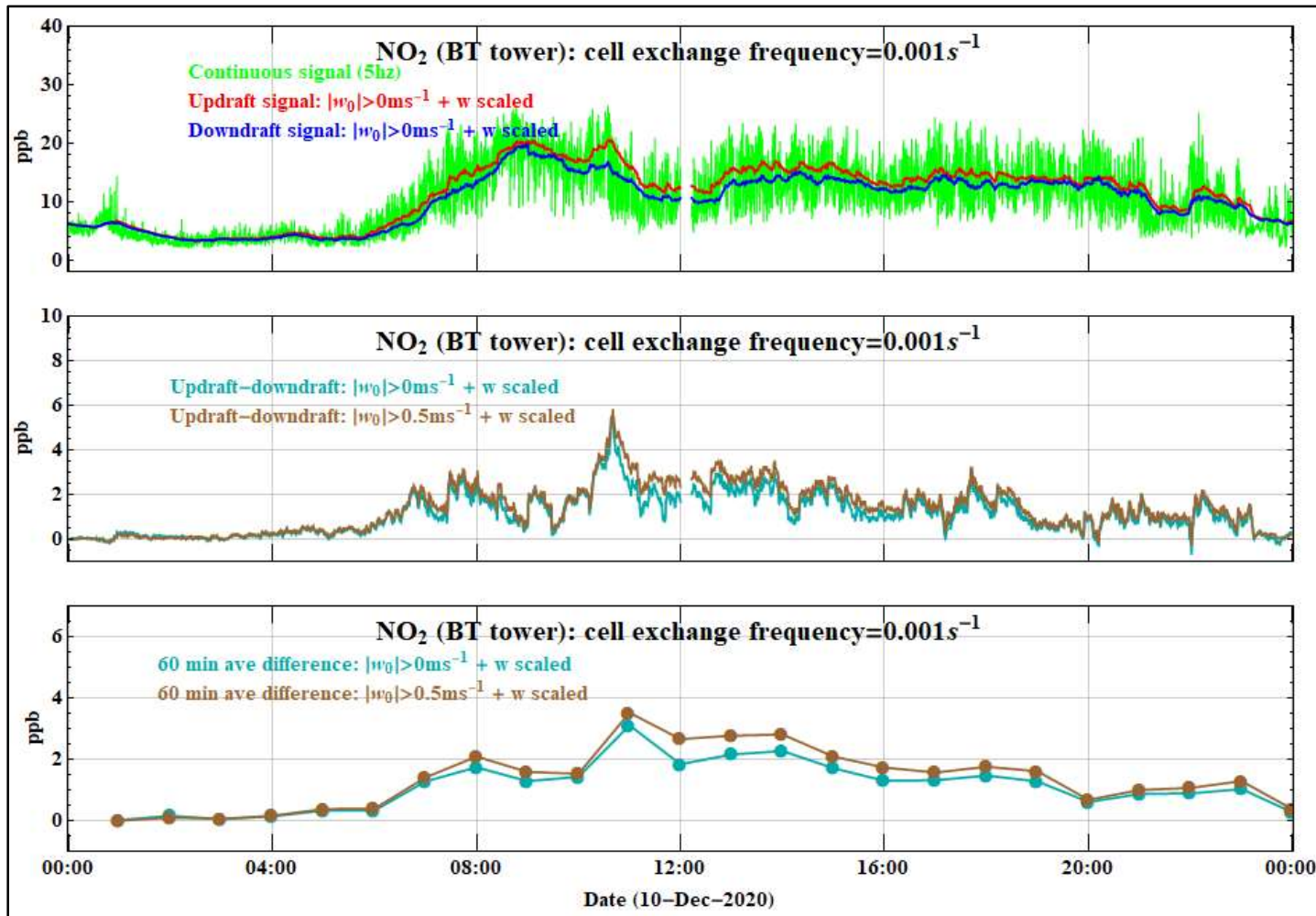
System schematic:



## AIMs:

- Proof of concept for a low-cost Modular Relaxed Eddy Covariance (MOREC-AQ) measurement approach for general flux determination
- Feasibility study of miniature NH<sub>3</sub> instrument to incorporate into MOREC-AQ  
*(Spectroscopy Group at RAL Space-link to STFC)*

# Example of outputs from MOREC-AQ



REA simulation for NO<sub>2</sub> at the BT tower

5Hz data courtesy James Lee (York)

Example of modelled transmission spectra for a Chirped Laser Dispersion spectroscopy (CLaDS) for 30m optical path

# Future plans

- Build and test an experimental prototype MOREC-AQ unit
- Explore additional species like  $\text{CH}_4$  through the STFC RAL Space Spectroscopy Group
- Explore funding to opportunities to actualise these activities
- Testing of prototype as part of Landscape-Regen project (UCam-Regen)



Rendering of the prototype MOREC-AQ unit