

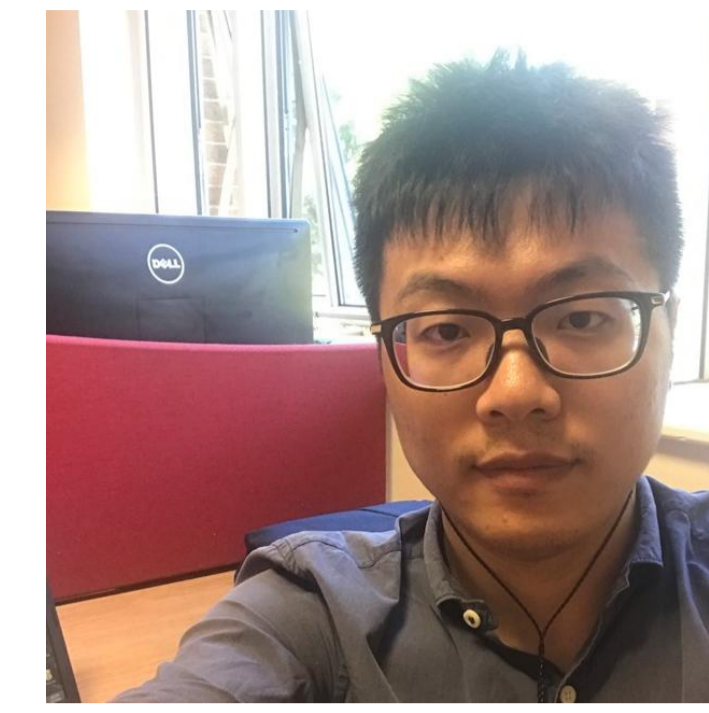
Boundary Layer Wind tunnel

University of Bristol

Department of Aerospace Engineering



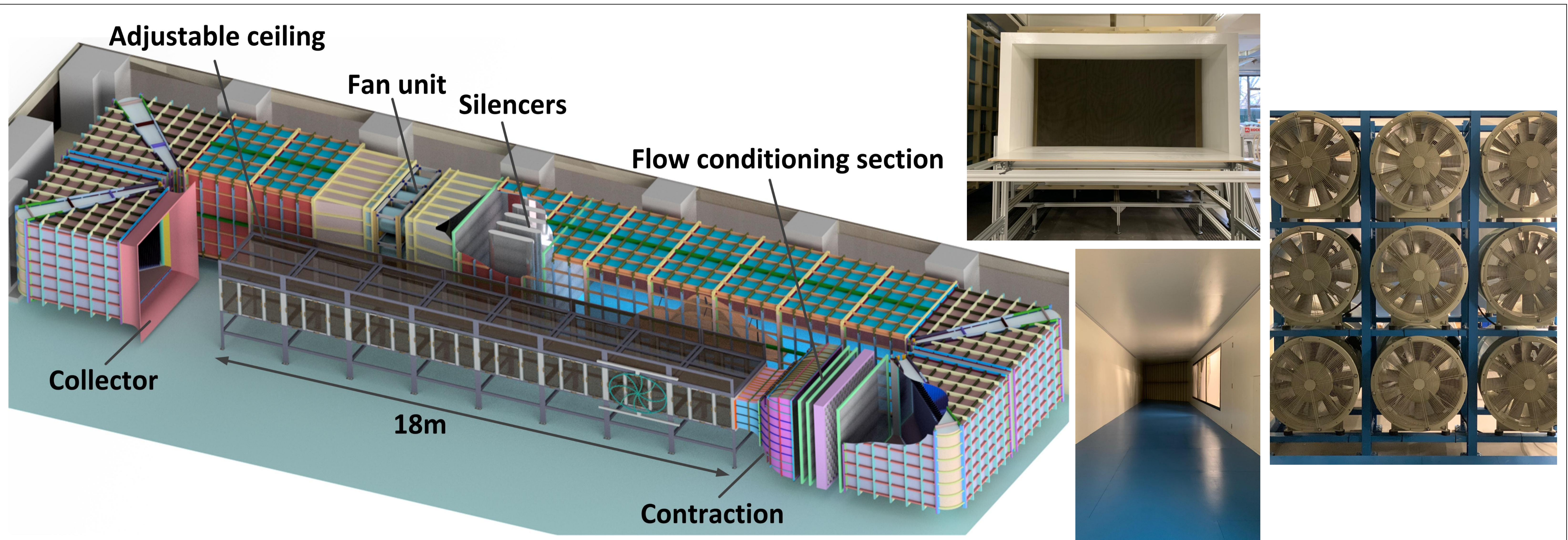
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Facility capabilities

- A new multi-purpose, closed-circuit, 30-meter long, boundary layer wind tunnel facility, designed with modular components to enable **versatile operations for multi-disciplinary research** which includes fundamental boundary layer flows, applied aerodynamics and aeroacoustics, wind energy, environmental flow and pollution dispersion and atmospheric chemistry research
- Powered by **9 axial fans with a total power of 240kW**, and has a **2m (width) × 1m (height) × 18m (length) test section**
- Multi-fan configuration allows independent operating modes to achieve steady flow velocity of **1.5m/s to 35m/s with low turbulence intensity**
- **Unique capabilities** include boundary layer suction control, variable pressure gradient ceilings, large MEM-based beamforming arrays, densely populated static and dynamic pressure sensors, drag force plate, particle dispersion release and capture mechanisms, acoustically transparent Kevlar wall test section
- Interdisciplinary research effort between the School of Civil, Aerospace and Mechanical engineering, and the School of Physics and Chemistry

Research applications

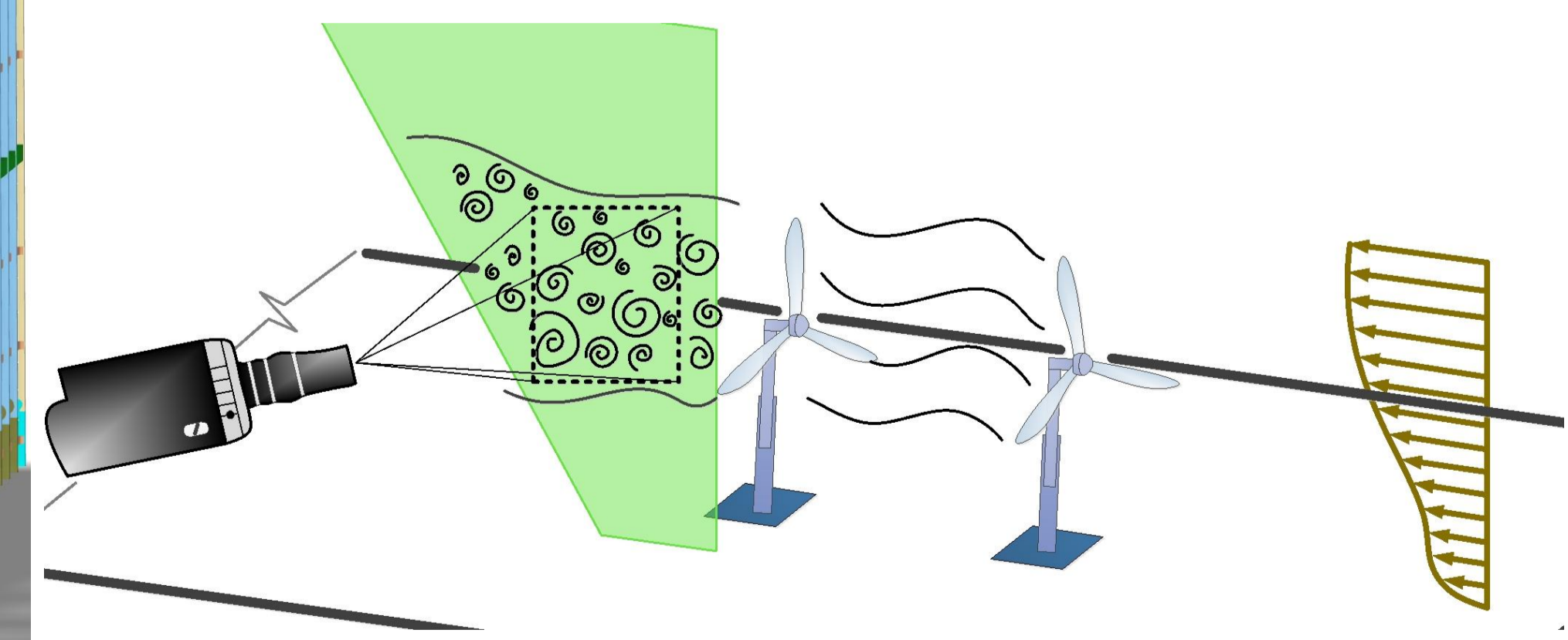
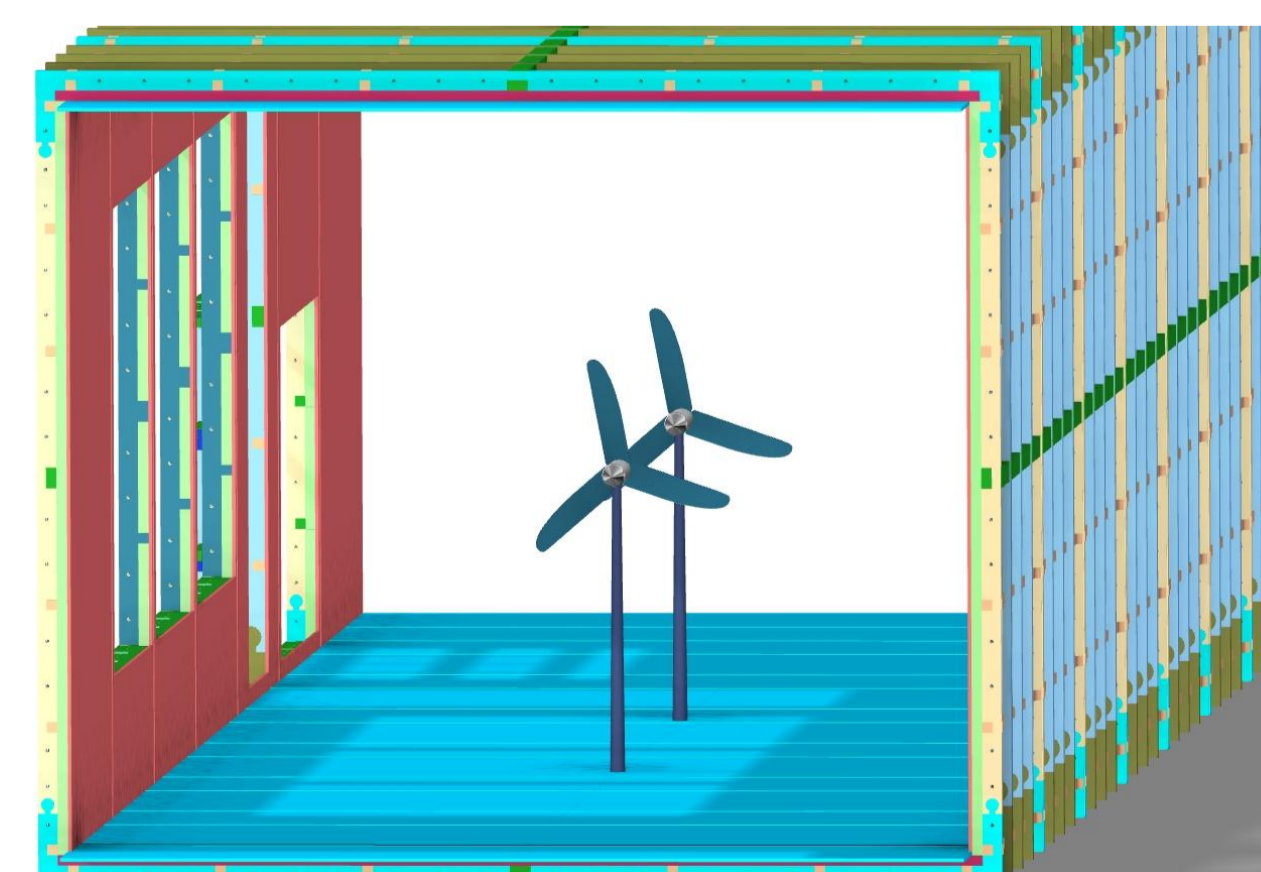
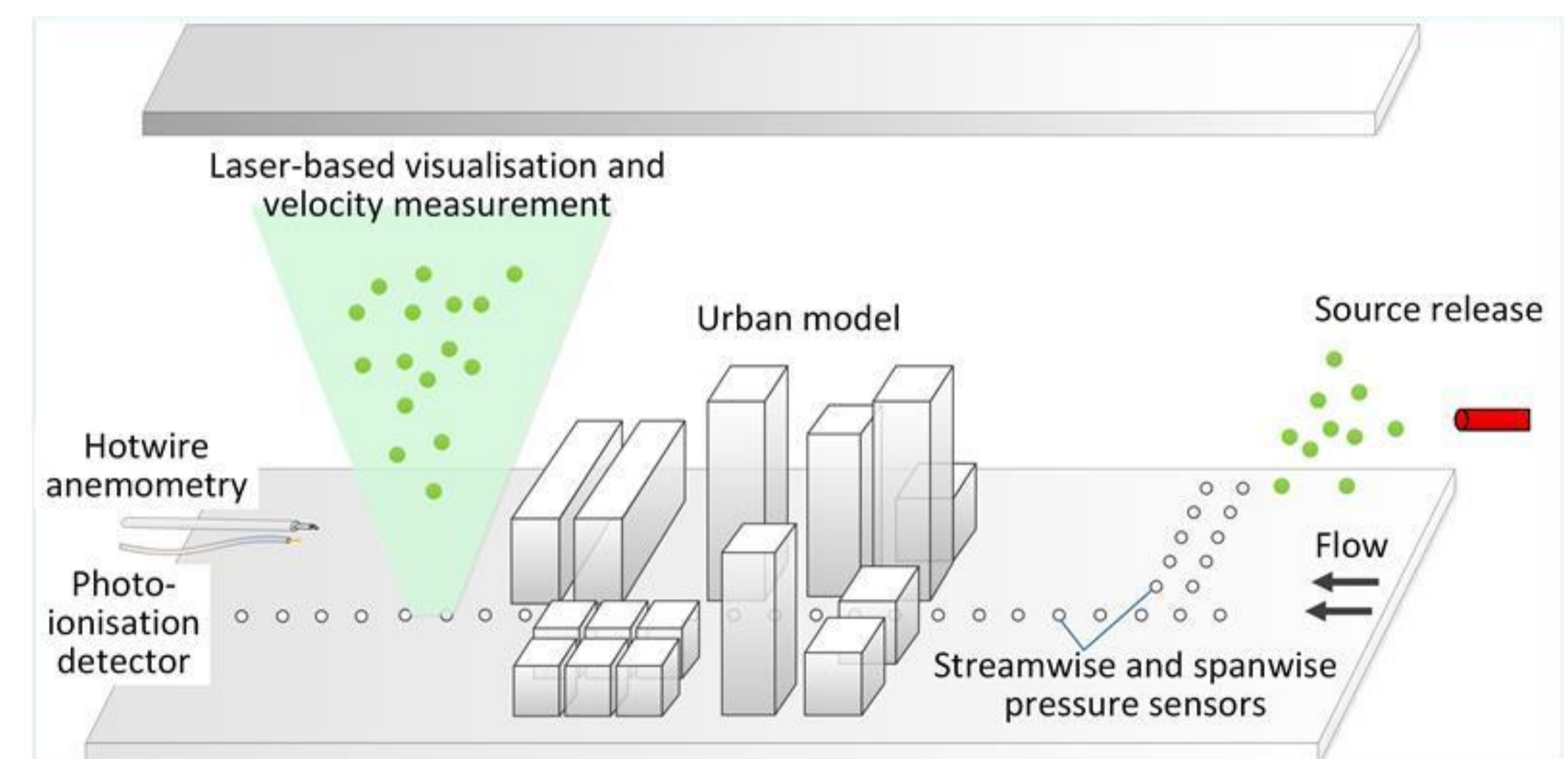
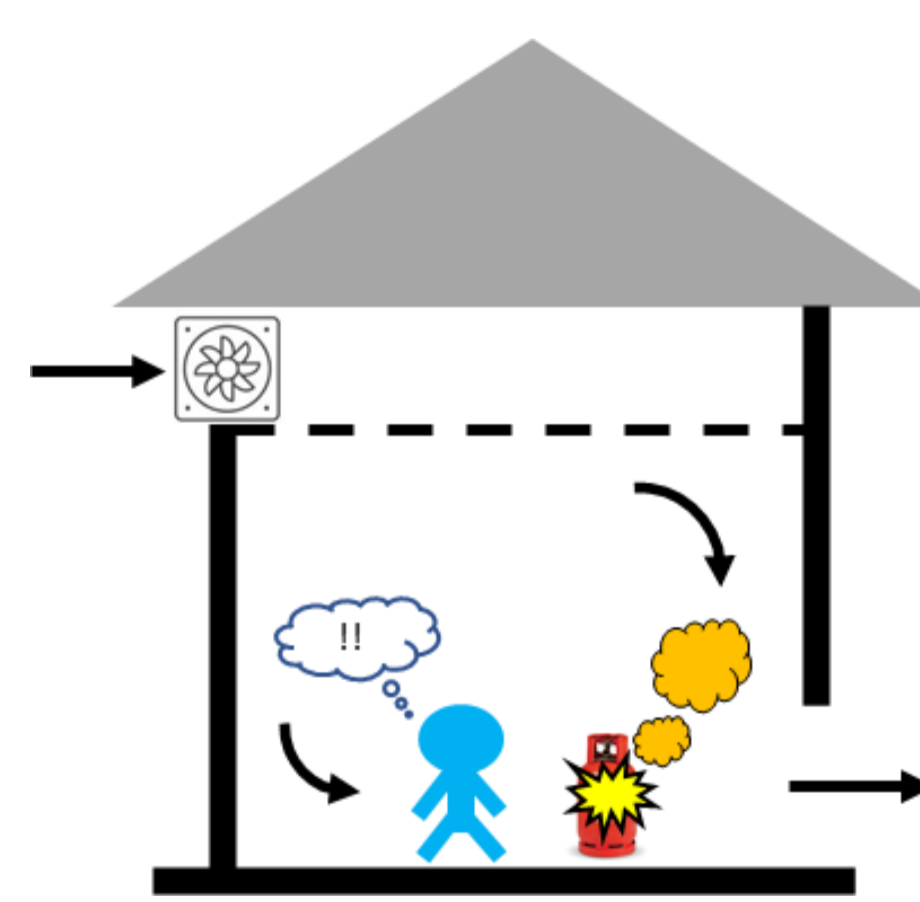
Atmospheric boundary layer flows

- Develop tools for urban pollution modelling¹ (Marie-Curie Doctoral Network)
- Couple laboratory data with real-time air quality data (partnership with AQC)
- Advance understanding on the wake interactions and aeroacoustics of wind turbine farms and develop control strategies

Turbulent mixing and scalar dispersion

- Investigate effects of thermal and mechanical turbulence on scalar transport
- Develop in-house particle dispersion measurement technique¹
- Study pollutant dispersion under calm wind condition¹ (ASSURE)
- Investigate particle resuspension under aerodynamic impacts¹ (Aerosol CDT)

¹In collaboration with Bristol's Atmospheric Chemistry team



Industrial partners and funding agencies

