



Benchmarking FDS using Two Box



bmralph



@BMR_fire



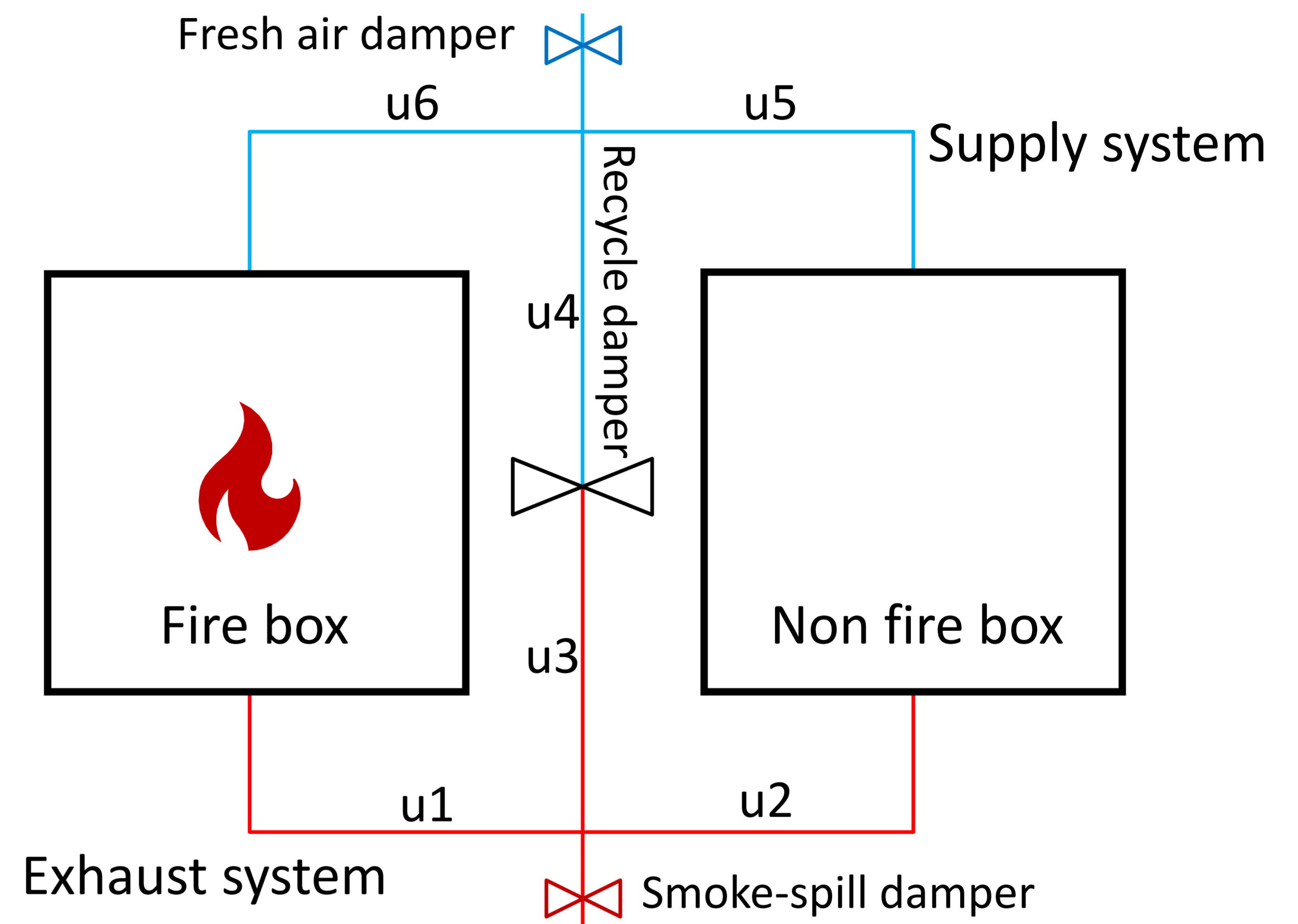
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Over 50% of deaths occur outside of the room of fire origin and smoke inhalation leads to over 60% of fire fatalities. It is important to study fire and smoke spread outside of the enclosure of fire origin; for example by way of corridors, stairs and shared ventilation systems

Large experiments examining the two-way coupling of a total building system and a fire are difficult and expensive to carry out. Benchmarking and validation data within this parameter space are limited; for example the FDS Validation Suite currently only has one set of experiments which include well defined mechanical air handling systems

This poster presents “work in progress” being carried out on benchmarking FDS 6.6.0 using data from a novel experimental rig.

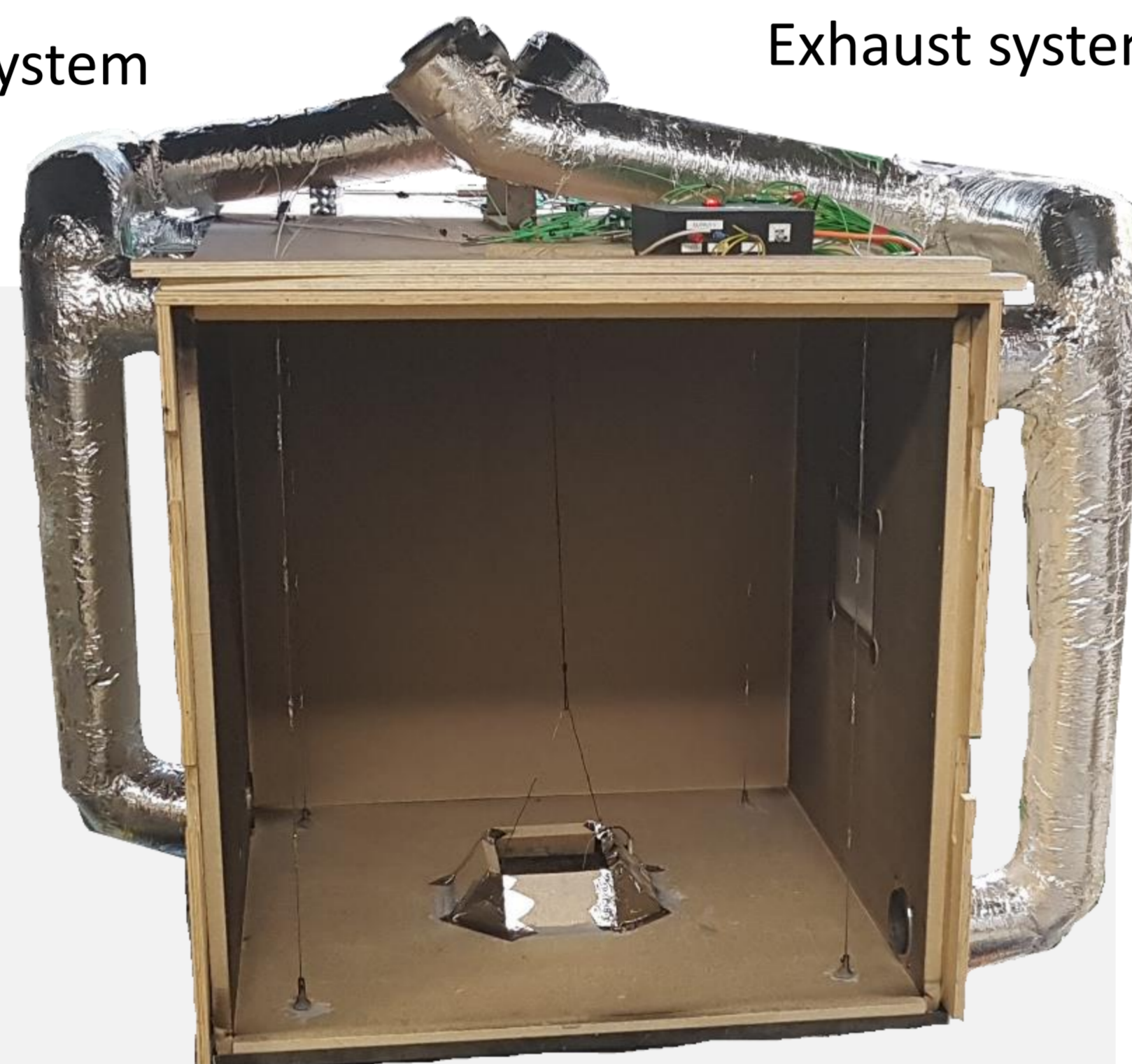


Supply system

Exhaust system

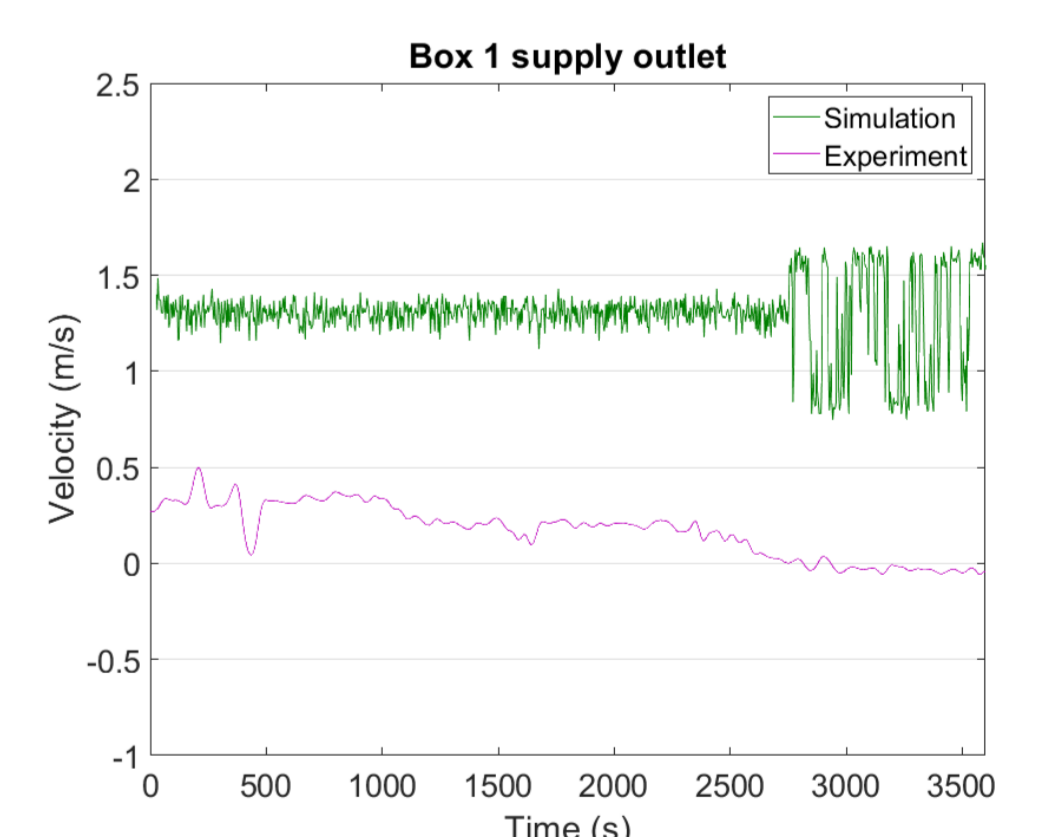
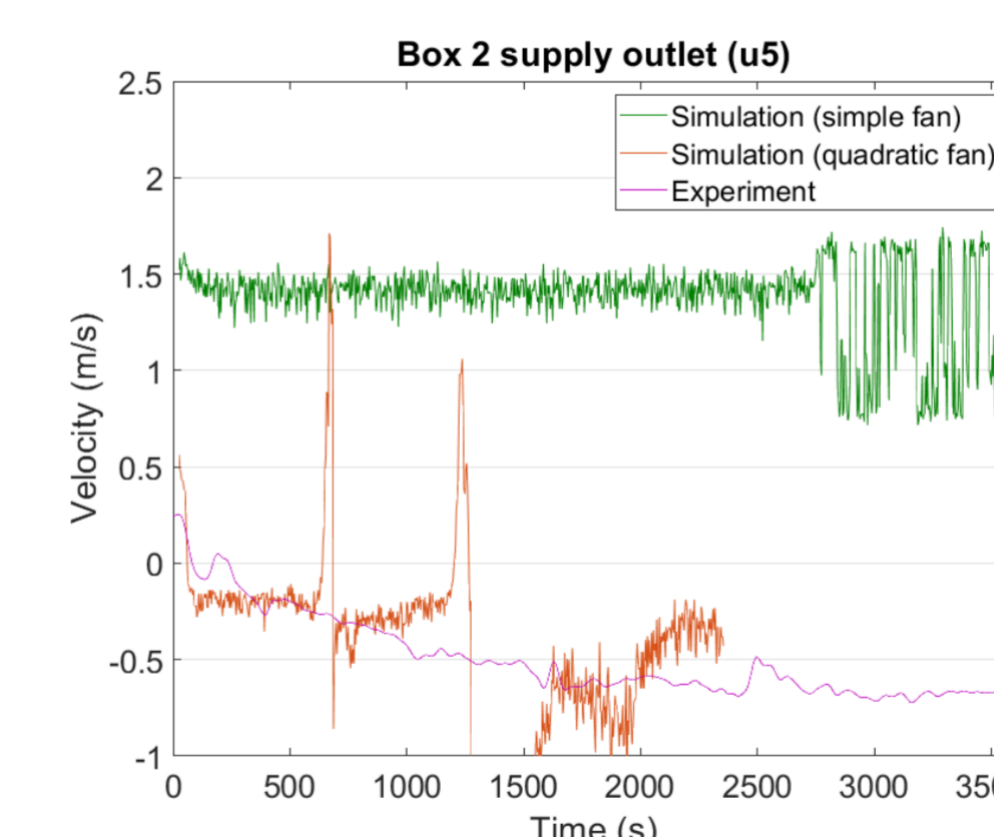
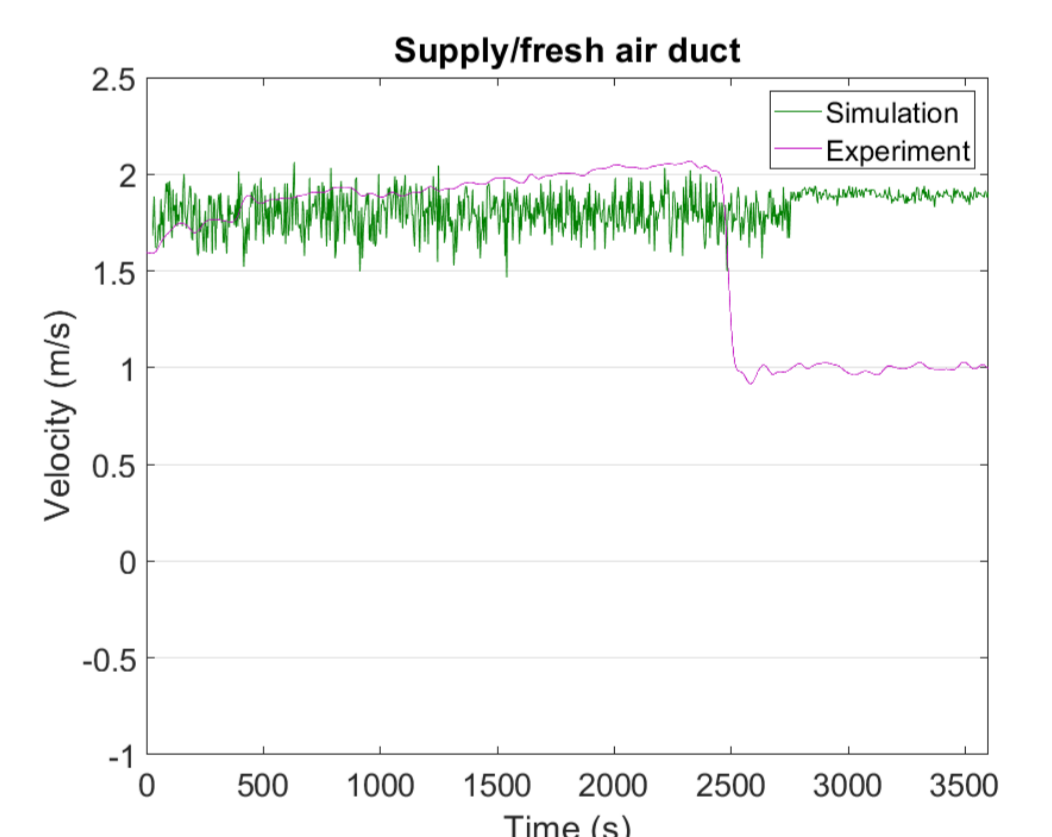
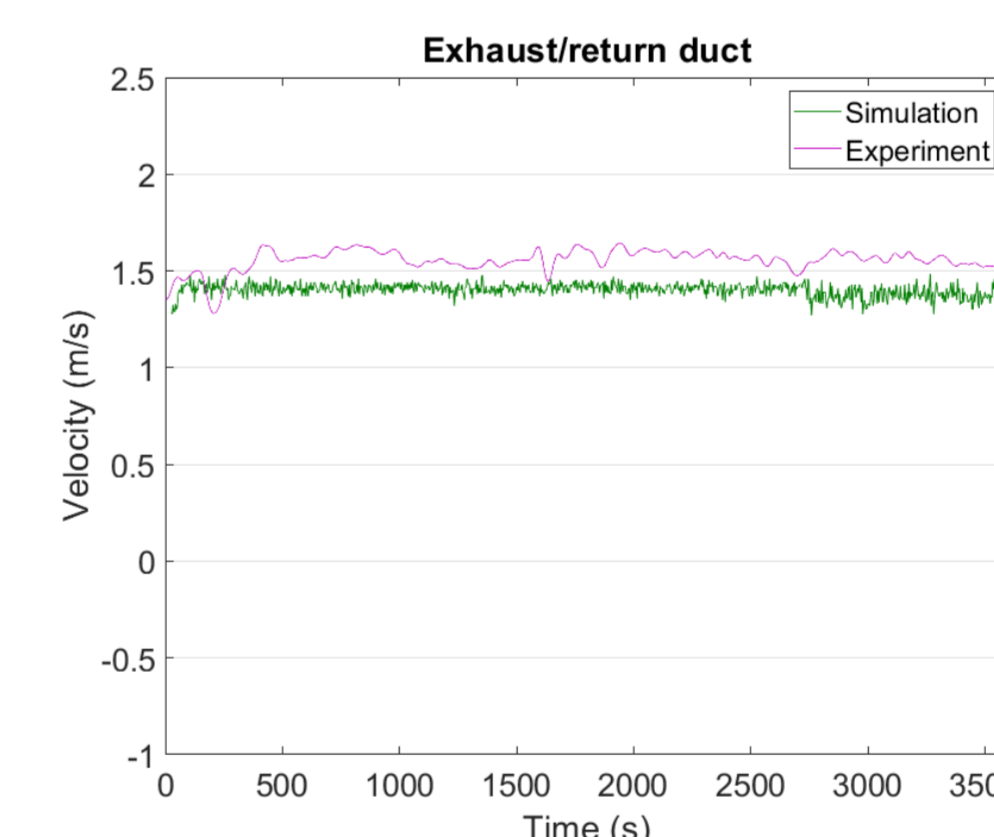
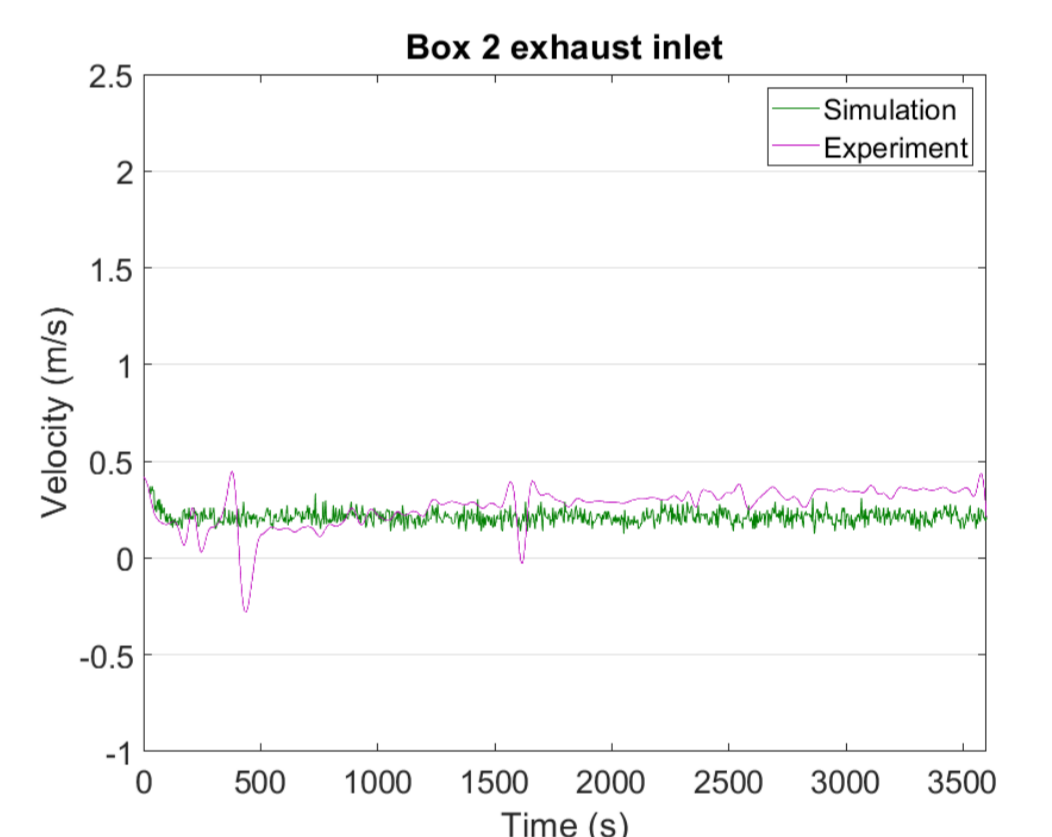
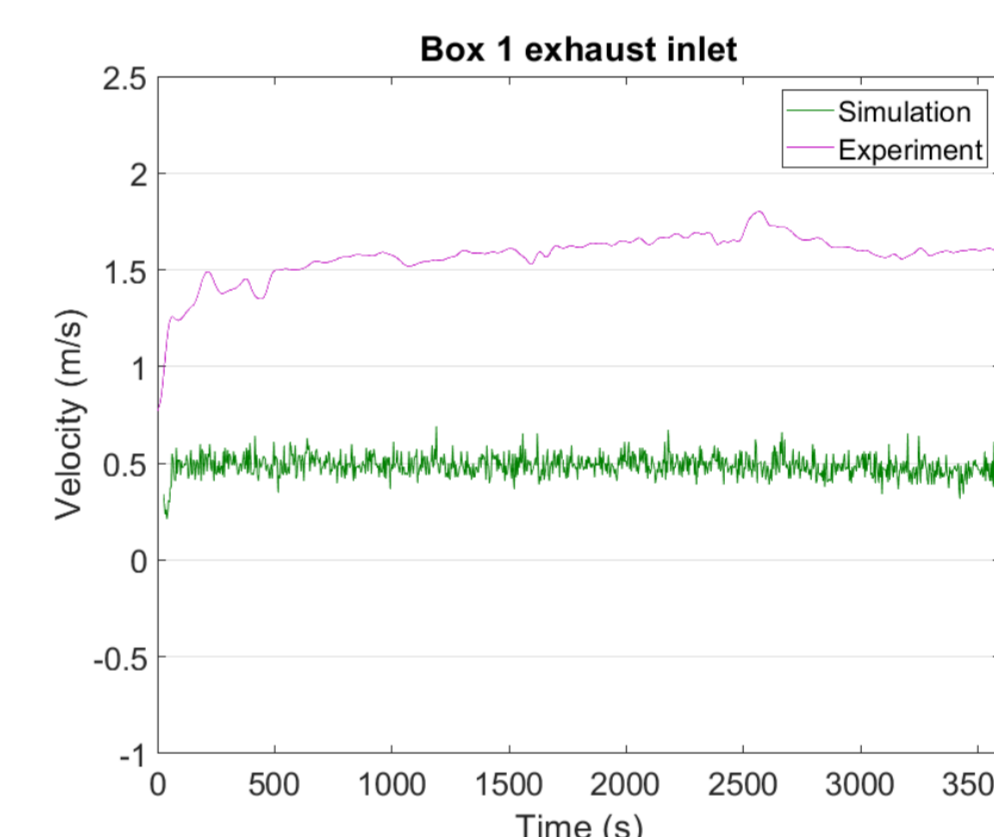
Two Box comprises a fire box and a non-fire box connected only by a shared ventilation system

The fire source is a propane sand burner with air co-flow to ensure continued burning in the closed enclosure

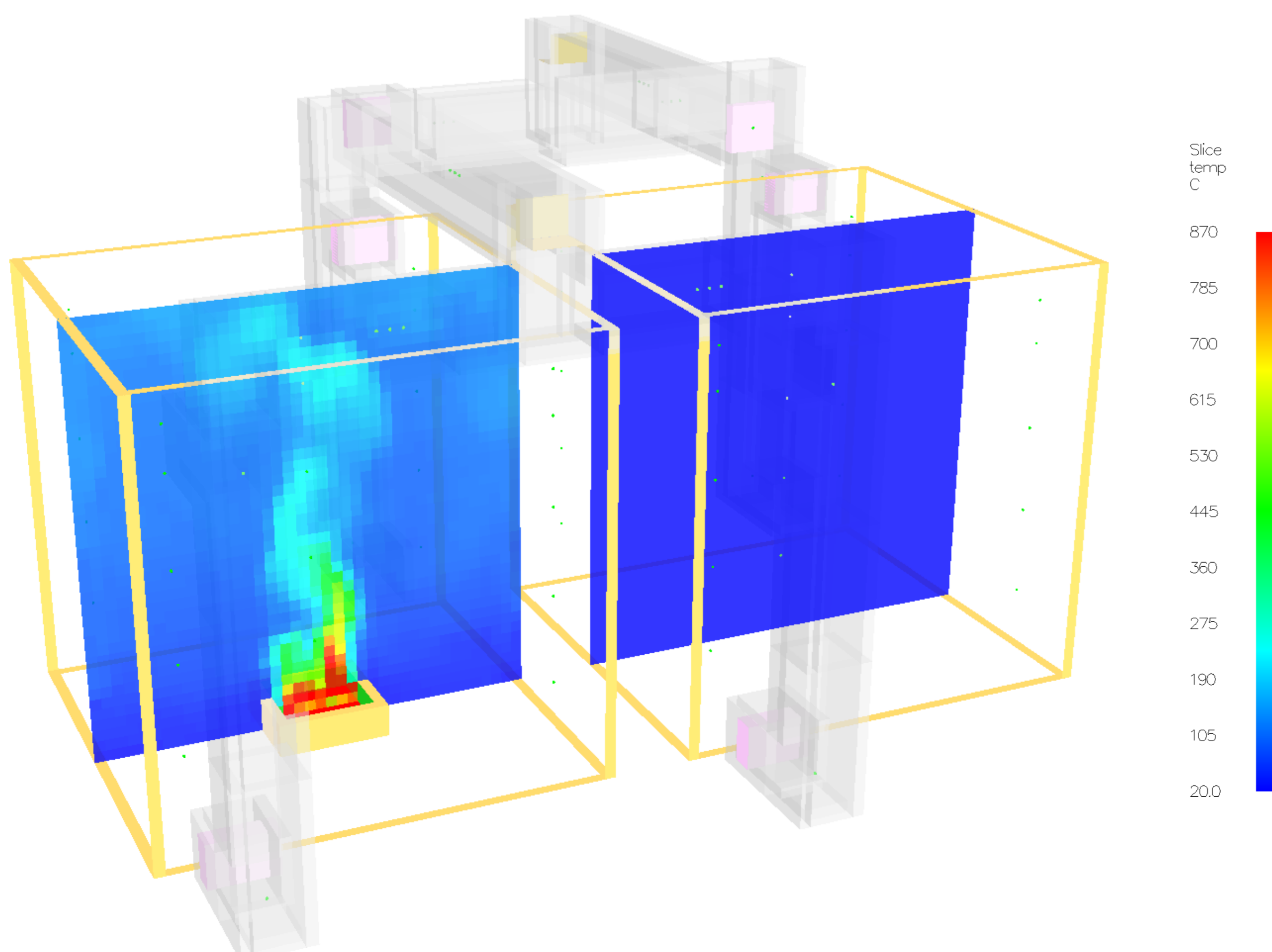


Exhaust and supply fan speed, propane flow rate and ventilation arrangement can all be varied

Instrumentation comprises thermocouple arrays in the boxes and the ducts and bi-directional probes in the ducts



Contact me to discuss these results and more!



To do list:

- Investigate unusual behaviour
- Refine model (fan model, leakage, etc.)
- Mesh and parameter sensitivity study
- Uncertainty study (experimental, input parameters, model)
- Coupled hybrid modelling benchmarking (use of HVAC sub-model)