

## CABIN AIR QUALITY

New aircraft architectures and technology developments - such as new materials, filters and electronics miniaturisation - provide an opportunity for reviewing and enhancing cabin air quality.

In line with the globally increasing awareness of air quality, there is a growing interest to address complex cabin air quality issues (comfort, health, safety). In this context, the main achievements are:

**Industrial cabin air quality Framework based on Continuous Air quality Sensing (IFCAS) proposed:**

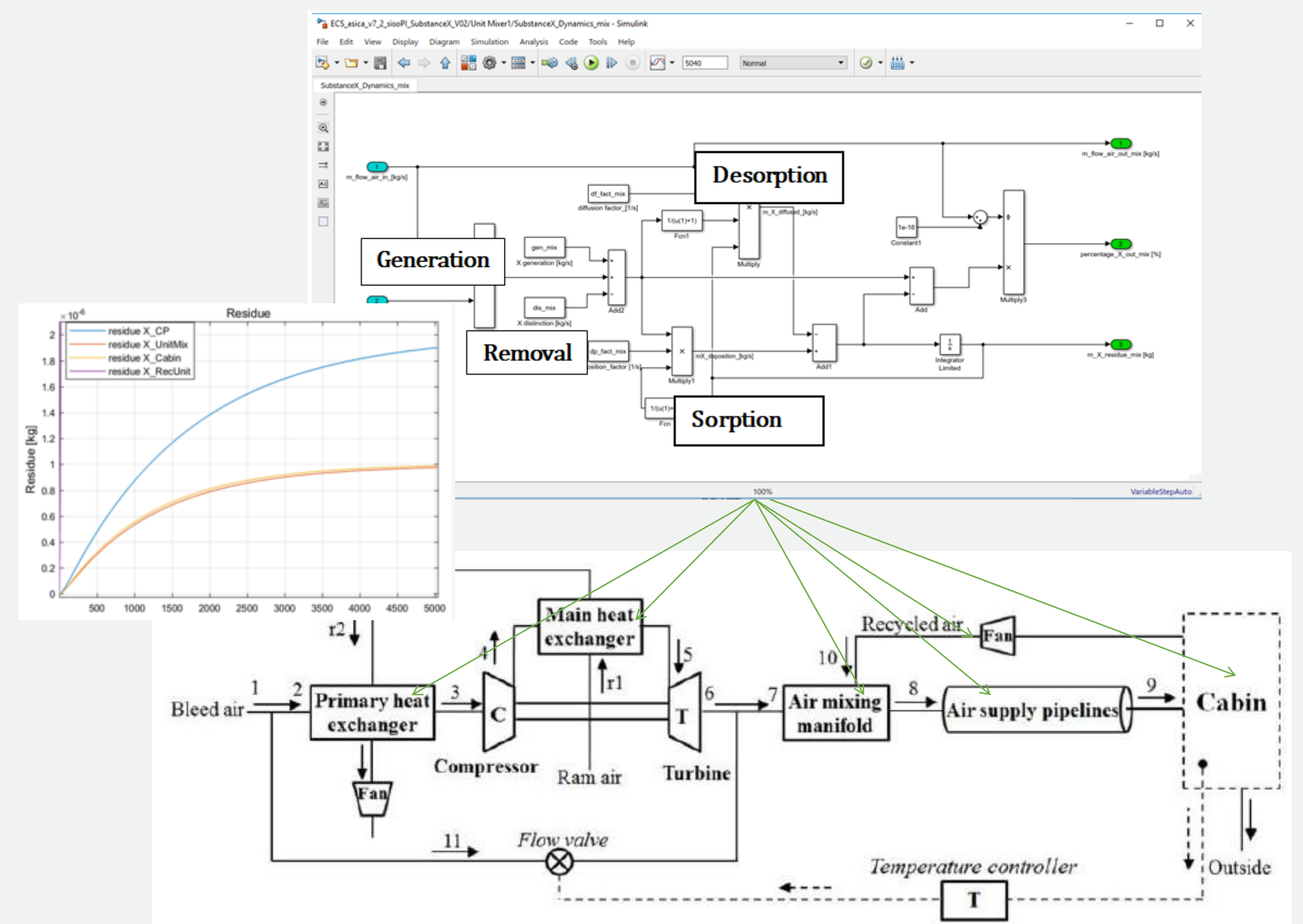
- Feasible pathway to address complex cabin air quality issues
- Well-placed network of distributed low power, low weight sensors across the cabin
- IFCAS data for different time-horizons:
  - Prognostic and condition-based health management
  - Evidence-based answers to concerns
  - Improve comfort and better design the air

**Real-time experimental methodology of air quality at normal or elevated temperatures developed for:**

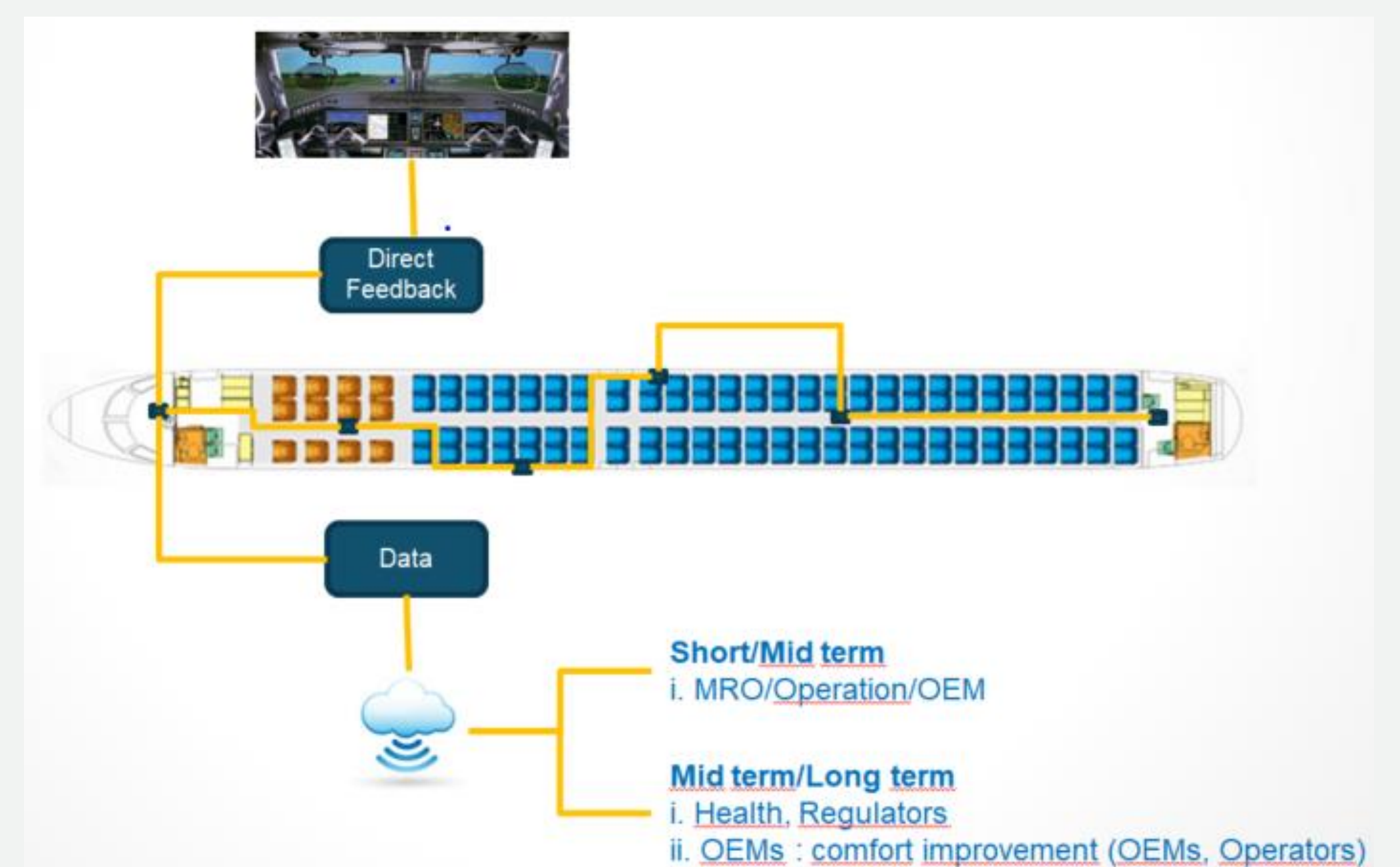
- New materials investigation
- COTS sensors testing

**Recommendations for:**

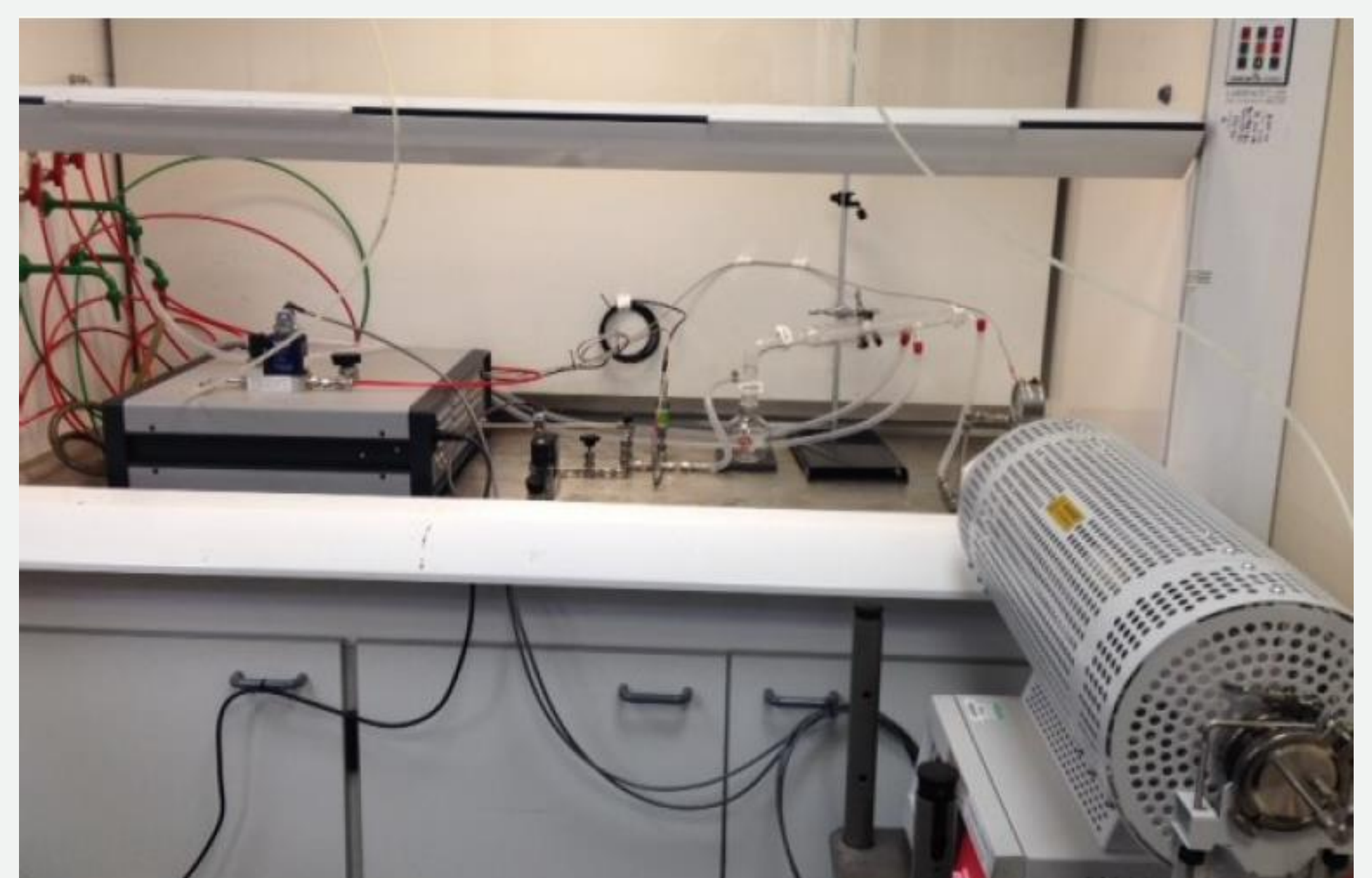
- Cabin air quality assessment guidelines
- IFCAS maturation with wider stakeholder involvement



Cabin air quality building block for aircraft environmental control system (ECS) model. ECS schematic from [1]. Verification of the integration of the building block.



IFCAS concept architecture (cabin/cockpit pictures Embraer)



Experimental apparatus for characterisation of gas emissions at elevated temperatures in real-time using commercial gas sensors and thermal desorption tubes

[1] H. Yin et al., "Modeling dynamic responses of aircraft environmental control systems by coupling with cabin thermal environment simulations," *Build. Simul.*, vol. 9, no. 4, pp. 459–468, 2016