

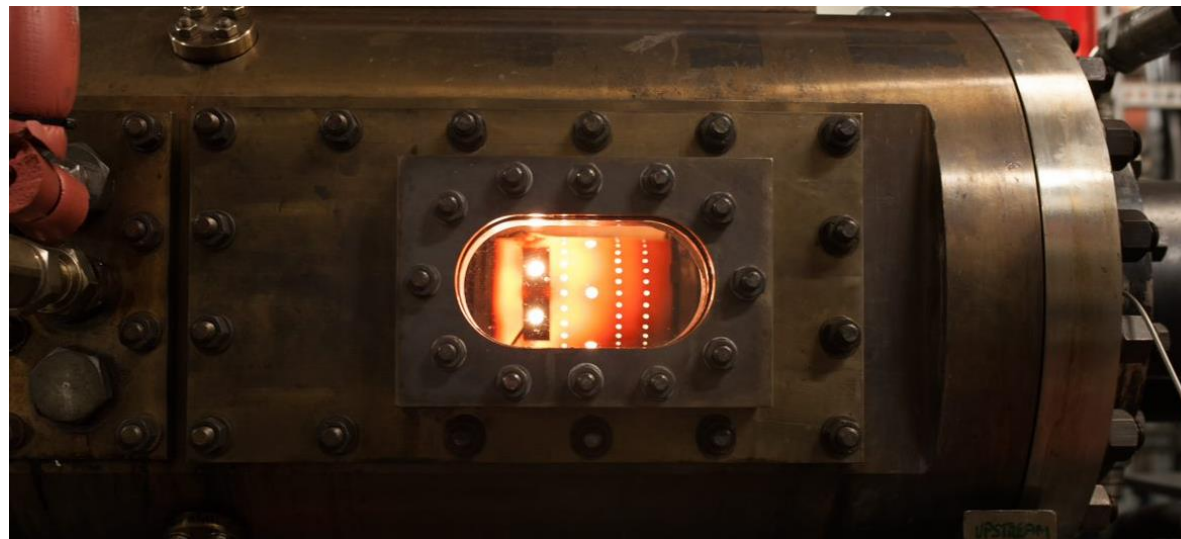
Intercomparison of two reference sampling and measurement systems for aircraft engine non-volatile PM using a small-scale RQL combustor rig burning conventional and sustainable aviation fuels



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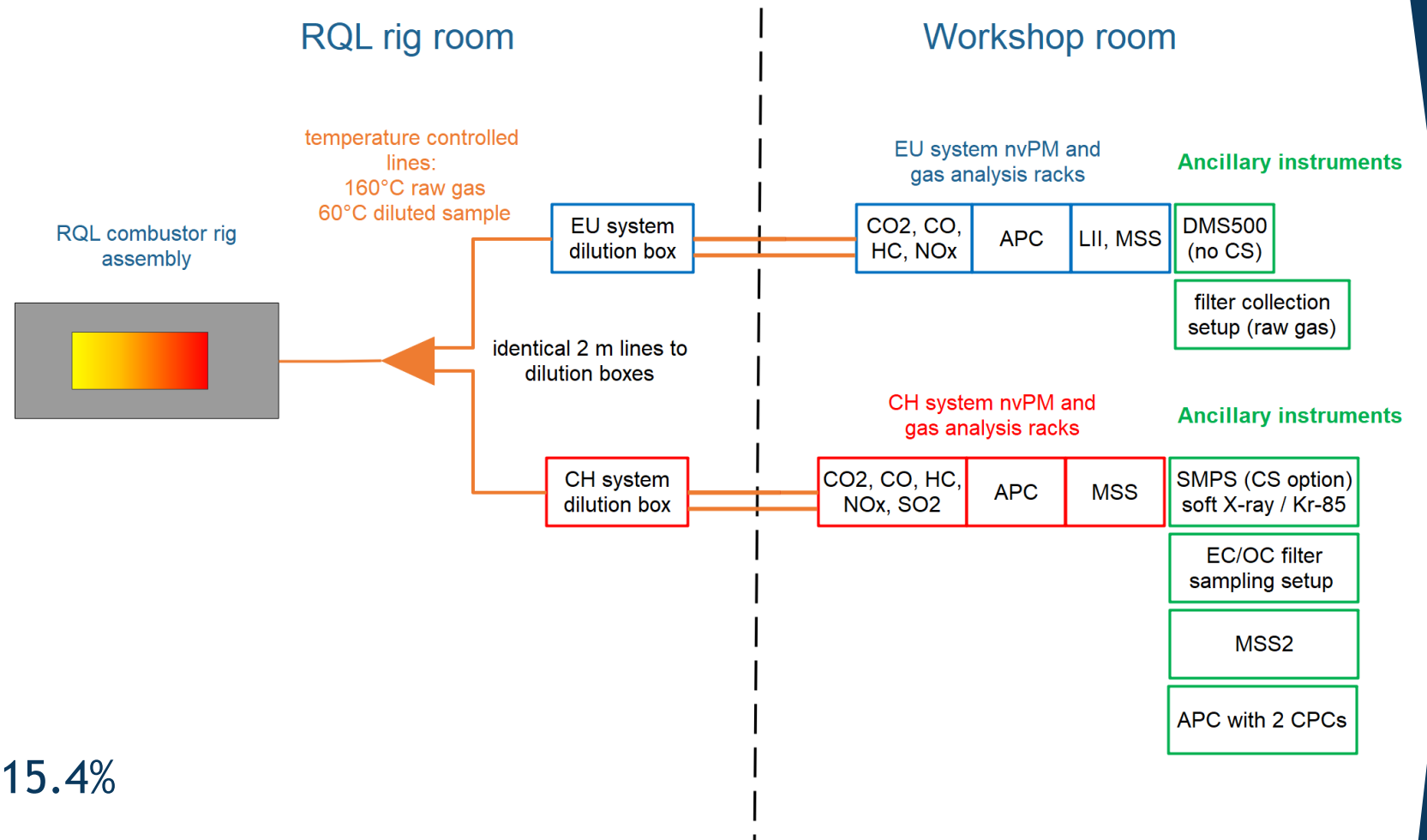
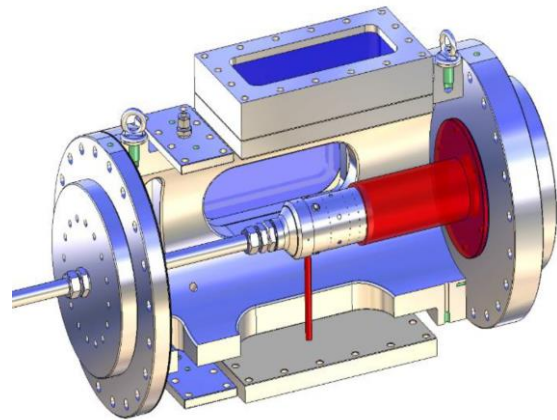
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Approach (see virtual poster for campaign video)

Generic aero engine type combustor
(rich-burn, quick-quench, lean-burn, RQL)

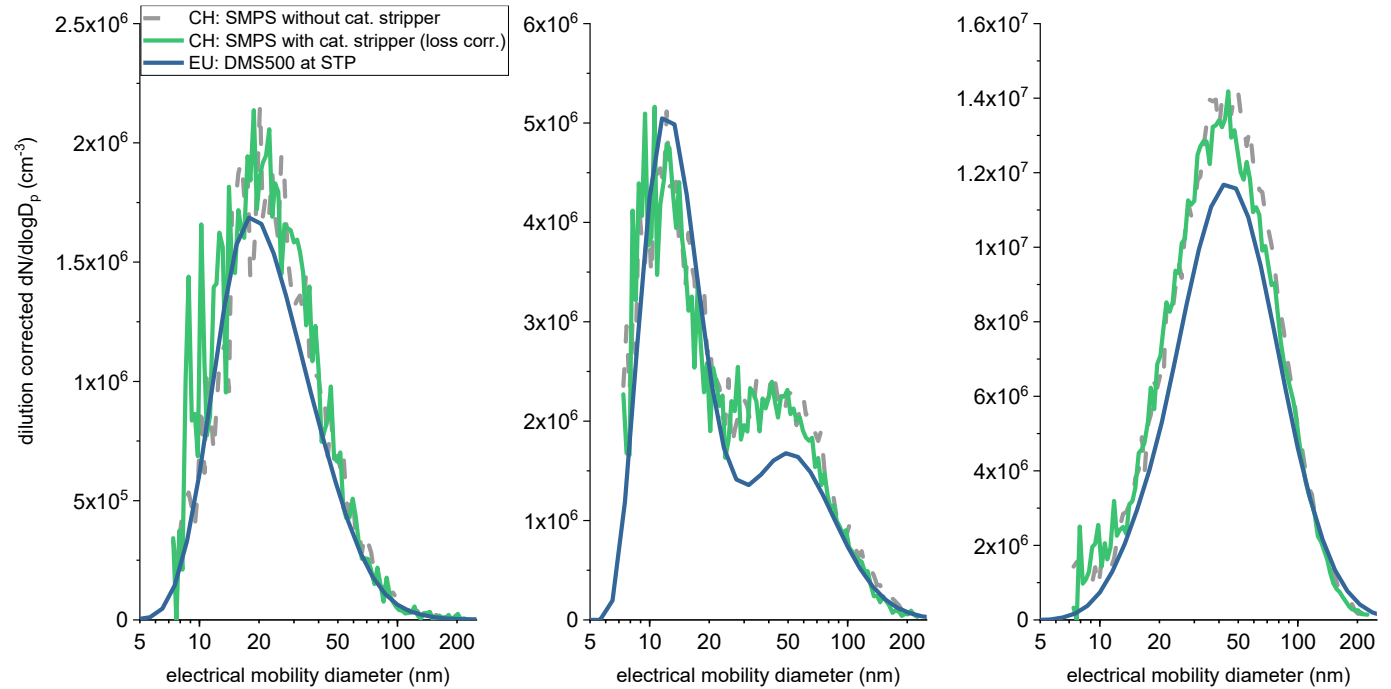
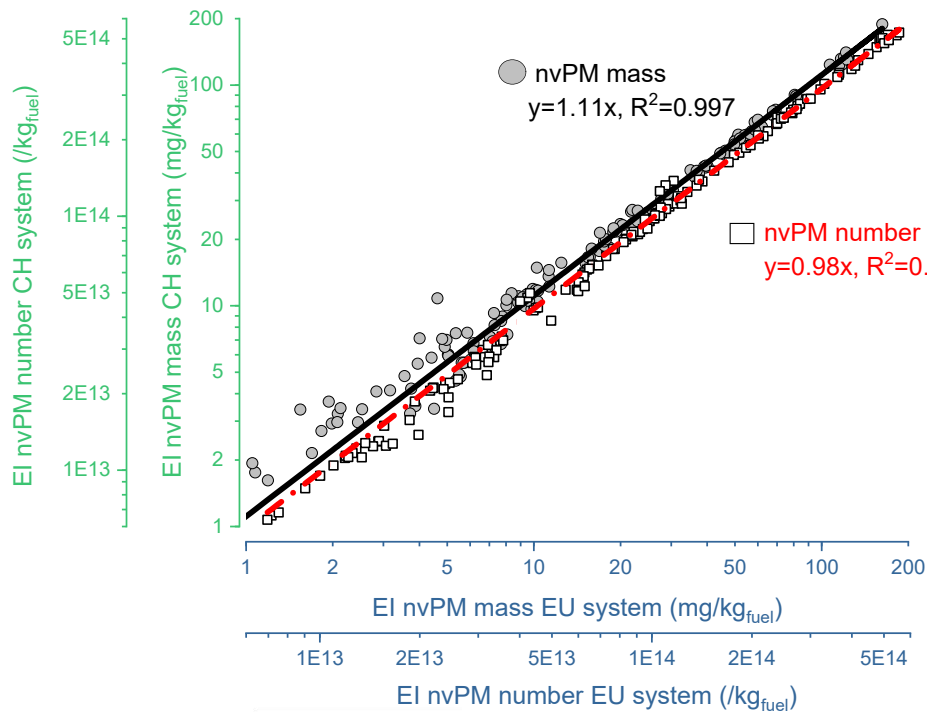


- ▶ 2-6 bar rig pressure
- ▶ 6 different fuels
 - ▶ Hydrogen content 13.4-15.4%
 - ▶ Total aromatics 0-25%
 - ▶ Sulphur 0-105 ppm (*very low*)

Results

- ▶ Agreement of the two systems (without loss correction) on average within 11% for mass and 2% for number across all test conditions and fuels
- ▶ Higher scatter at low concentrations

- ▶ Size distributions with a wide range of GMD and shapes
- ▶ No volatile fraction (even in bimodal distributions)
- ▶ Good overall agreement between SMPS and DMS500



Conclusions and next steps

- ▶ Overall a very good agreement of the two systems. Albeit there are still some discrepancies left to be investigated.
- ▶ Size distribution measurement is crucial for accurate system loss correction (especially for multimodal distributions and low mass concentrations). Evaluation of the different sizing instruments in progress.
- ▶ Next campaign (Jan 2022) to evaluate the systems drift over one year (both systems used in various test campaigns in between).