



Dear MetNH3 Newsletter reader,

The partners of JRP MetNH3 consortium present in this newsletter an update of the work performed within the first nine months of the project “Metrology for Ammonia in Ambient Air”. A more general description of the aims of the project can be found in the publishable summary on the project webpage <http://metnh3.eu>.

Research Highlights

The project is in its early stages and certain scientific tasks planned for the first nine months are important for its overall success. Progress in these areas is summarised below:

WP1 has as main objective the **development of improved gas mixture standards** by static gravimetric and dynamic methods. The partners from NPL and VSL have *produced reference gas mixtures* prepared by gravimetry at two different amount of substance fractions (10 $\mu\text{mol/mol}$ and 100 $\mu\text{mol/mol}$). These mixtures are stored in different commercially available cylinders in order to test their long-term stability over the course of the project. Partners BAM and METAS have started working on two *mobile generators* for the dynamic generation of reference gas mixtures. These devices will serve to generate and dilute NH_3 from a source of higher amount of substance fraction to ambient air levels (0.5 to 500 nmol/mol). The reference gas mixtures produced will also serve as calibration references for the standard optical methods developed in WP2 and for testing the field measurement techniques of WP3. The work in both tasks will continue over the next months. In addition, research on the adsorption of NH_3 on various material surfaces will commence involving the partners VSL and METAS together with REG2, UH.

WP2 aims at the development of **standard optical measurement methods**. The partners PTB, MIKES, DFM and CEH conducted a literature survey on state-of-the-art spectroscopic ammonia measurement methods and relevant absorption wavelength ranges. Based on the literature survey the concept of an extractive and an open-path spectrometer has been selected and will be investigated in more detail. *Extractive cavity ring-down spectrometers* (CRDS) from Picarro Inc. are used by several project partners and will be evaluated regarding their applicability for traceable ammonia amount fraction measurements in the 0.5 to 500 nmol/mol range. Design and assembly of a *sampling-free spectrometer* based on an open multiple-pass cell and a quantum cascade laser has been started at MIKES. PTB and DFM began to evaluate the possibility of *absolute operation of the spectrometers*, which would eliminate the need for calibrations with gas mixtures. This is particularly important in the case of the sampling-free spectrometer.

WP3 deals with the validation and **dissemination to field measurement techniques**. The development of two facilities has been started in order to characterise different ammonia analysers as well as passive samplers and denuders. The *Controlled Atmosphere Test Facility* (CATFAC) has been employed to generate dry and humidified atmospheres containing ammonia at well-defined amount fractions, under controlled environmental conditions of

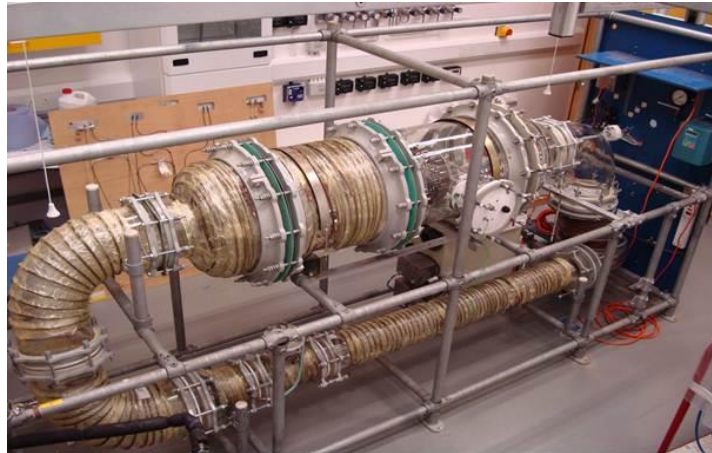


Photo of the CATFAC. © Nick Martin, NPL

temperature, relative humidity and wind speed relevant to ambient monitoring. NPL has designed the CATFAC and conducted the first ammonia test measurements including a modification of a CRDS to minimise the undesirable cross interference effects by water vapour. UBA has started the characterization of a *Proficiency Test Facility* for ammonia measurements. The proficiency test facility will be capable of providing 12 individual working places with well characterized test gas mixtures containing ammonia and common atmospheric trace gases.

Dissemination of project results

Partners of MetNH3 will present the project and its results at the following **conferences in 2015**:

- 12.-17.04.2015 European Geosciences General Assembly, Vienna. <http://www.egu2015.eu/>
- 10.-12.06.2015 GAS2015, Rotterdam. <http://www.gas2015.org/>
- 21.-24.09.2015 CIM2015 - International Congress of Metrology, Paris. <http://www.metrologie2015.com/>

They are at your disposal for discussions, suggestions and input.

A **project workshop on the progress in ammonia metrology** open for collaborators and interested parties is planned to take place in the first quarter of 2016.

To date, **12 collaborations with various key players for ammonia metrology** were formed. Interested parties have committed to exchange information with MetNH3 and to support the research in their specific areas of expertise (www.metnh3.eu). Should you be interested in our project and could make a nonfinancial in-kind contribution, valuable to the aims or our project, do not hesitate to get in touch with any of the JRP Partners. The JRP partners are consulted by an external **board of advisors**.

Contact and further information

Every 6 months a **newsletter** is published containing MetNH3's latest results, which you are very welcome to forward to your contacts interested in metrology for ammonia in ambient air. **To register for the newsletter contact any of the JRP partners.**

METAS (Federal Institute of Metrology), Switzerland. [Bernhard Niederhauser](#)

BAM (Federal Institute for Materials Research and Testing), Germany. [Dr. Carlo Tiebe](#)

DFM (National Metrology Institute), Denmark. [Dr. David Balslev-Harder](#)

MIKES Metrology (VTT Technical Research Centre), Finland. [Dr. Tuomas Hieta](#)

NPL (National Physical Laboratory), United Kingdom. [Dr. Nick Martin](#)

PTB (National Metrology Institute), Germany. [Dr. Andrea Pogány](#)

UBA (Federal Environment Agency), Germany. [Dr. Klaus Wirtz](#)

VSL (National Metrology Institute), The Netherlands. [Janneke van Wijk](#)

Researcher Excellence Grants

REG1: CEH Centre for Ecology and Hydrology, United Kingdom. [Dr. Christine Braban](#)

REG2: UH University of Helsinki, Finland. [Dr. Olavi Vaittinen](#) (Joining MetNH3 on 01/03/2015)

