

**9th ETH-Conference on Combustion Generated Nanoparticles  
15th -17th August 2005**

## **Poster-Abstract Form**

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Title: **Mobile Application of CAST for Calibrating Aerosol-Monitors relating to Mass- and Number-Concentration**

### **Poster-Abstract:**

The MfM-U Project (environmental monitoring of flanking measures) is concerned with the changes of the immissions of air pollution and noise along main transit roads in Switzerland due to shifting heavy trucks from road to railway for transit purposes. In order to quantify the influence of heavy (transit) trucks, a variety of aerosol-monitors is applied in six fully automated monitoring sites.

The experience of the first 18 months of measurement activity showed miscellaneous problems and instrument behaviours in applying new and mainly laboratory-optimized monitors (such as condensation particle counters, optical attenuation soot monitors etc.) for continuous monitoring of ambient air. inNET Monitoring AG was therefore charged with the development of a control- and calibration method suited for field-use.

The Solution of a mobile Combustion Aerosol Standard (CAST) was compiled in collaboration with the Federal Institute of Metrology and Accreditation (Metas) and Matter Engineering AG. To Reach every monitoring station in the field the mobile calibration equipment was built into a – rather small – vehicle based on a Volkswagen Caddy, whose loading capacity of 700kg was fully utilized. Thanks to a battery supported electric supply and a pure sine converter the climatized equipment is able to be operated even at sites with insufficient infrastructure and the reference monitors can be run in standby mode during the transport which decreases time-to-measurement and increases measurement stability. The test aerosol is generated and diluted in the vehicle and transported in a conductive tube to the inside of the measurement station, where it is splitted to the different control and test monitors. To control the generated test aerosol a reference condensation particle counter and surface monitor are installed in the station. For testing mass-related Monitors (Soot-Monitors, PM-Monitors) the reference is assured by a sample aerosol filter which is analysed gravimetrically in the laboratory.

The first field measurements took place in March 2005 in the alpine region of central Switzerland. The vehicle was positioned as near as possible to the monitoring station in order that the the CAST reference aerosol could be transported with minor loss to the sample inlets of the test and reference monitors running inside the monitoring containment by a conductive tubing of 14 meters length. The main aim of these test measurements was to quantify the influence of ambient pressure to particle number and size distribution of the aerosol generated by the CAST (Version 1, without pressure compensation). Therefore two condensation particle counters and a differential mobility analyzer were additionally placed and run inside the vehicle.

The three measurement sites were located at 480, 950 and 1430 meters above sea level, what caused pressure steps of about 50 hPa from site to site. The results of these measurements are to be found in 'Schlatter/Perrochet, metas, Technischer Bericht Nr. 235-10026, Bern-Wabern, 2005'.

In May 2005 the first campaign for quality assurance of MFM-U has been carried out with this equipment. The results allow to refer the measured ambient particle concentrations to a common national standard and to detect hidden instabilities of the monitors.

The particle calibration vehicle is appropriate to a variety of other field applications (eg. mobile transect measurement, vehicle tracking measurement) - and ready for operation within a few hours.

# Mobile Application of CAST for Calibrating Aerosol-Monitors relating to Mass- and Number-Concentration

*inNET Monitoring AG, P. Boehler, D. Schuler*

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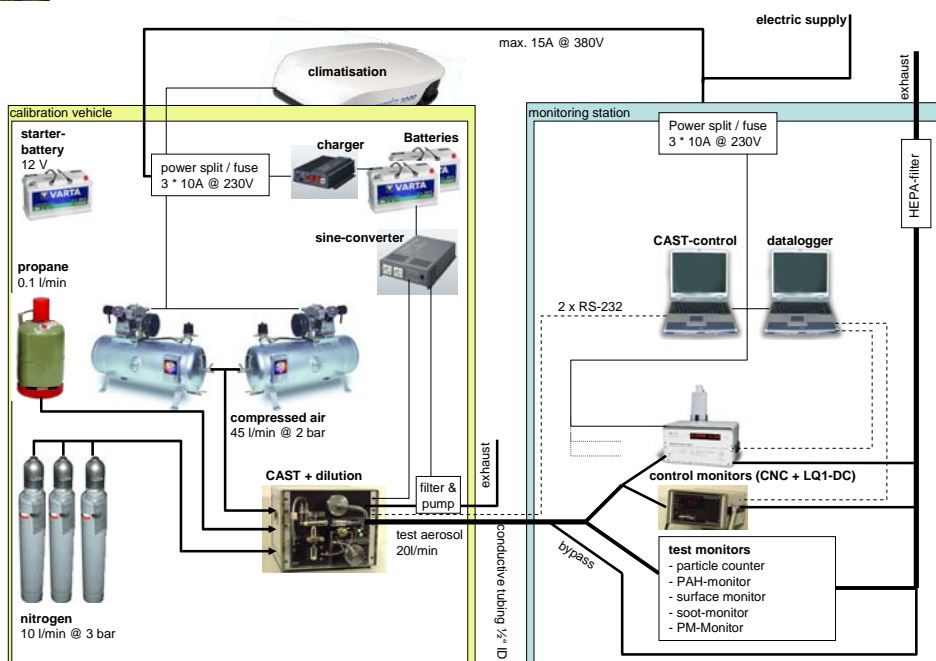
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