



In this issue:

- Particulate composition and ultra-fine particulate counting (down to 1-3 nm)
- Field-portable Greenhouse Gas, Ammonia and Methane/Acetylene analysers
- Isotopic N_2O , CO_2 and CH_4 analysers
- Isotopic "Triple" Water Vapour/Liquid Water analysers
- Newer and better ways of measuring NO_2 and NO_x
- UV DOAS open-path multi-gas monitoring systems

Plus:

Interested in ultra-fine particles and "freshly nucleated" aerosol measurement?

Airmodus CEO (and particle physicist)

Minna Vakeva will be in the UK in March 2015

to introduce the AII n-CNC nano condensation nucleus counter which counts particles down to 1-3 nm.



Want to schedule a meeting? email us today!



ET has a demonstration

Los Gatos Research Ultra-portable Greenhouse Gas Analyser (CO_2 , CH_4 , H_2O)

Photograph by Antony Dubber, British Antarctic Survey

Book your free DEMO of the Los Gatos Research Greenhouse Gas analyser today!

sales@et.co.uk



Welcome

Here at Enviro Technology, it would appear that over the last few years, to quote from Bob Dylan, the times they are a-changin’

Since starting out in 1983 our goal and vision has always been to provide the best products, systems and customer service for air quality monitoring.

After over 30 years in the environmental monitoring business, the last few years have certainly seen a shift from what I would call our “regular” business (i.e. selling and maintaining real-time gas analysers and particulate monitors for the classical air pollutants, NO_x, SO₂, CO, O₃, PM_{10/2.5}) towards products that either measure these pollutants in newer, better ways, to products that tell us far more about the actual composition of the air that we breath and enable us to better understand the atmospheric/biospheric processes and natural cycles of our planet.

For example, for many years we have measured the mass concentration of one of today’s deadliest urban pollutants, PM₁₀ and more recently PM_{2.5} particulate matter, but other than telling us if we comply with UK/EU standards, what else does this actually tell us? The answer is very little. To understand PM much more, we need to look at the composition, and for the very small “ultra-fine” particles (those thought do the most damage to health) that have very little mass, but may be present in very large numbers, we need accurate ways to count them. But currently there are only a handful or real-time fine particulate counters or instruments focusing on particulate composition on the UK’s national networks.

The technology now exists (and we will look at some in this newsletter and subsequent issues) to actually measure the black carbon, bioaerosols, metals, ions etc. that make up PM and to count the numbers of ultra-fine particles per cm³.

Another technological advancement in gas measurement instrumentation that has really come to fruition over the last few years is the use of lasers and spectroscopy, once the realm of very large and very expensive lab based instruments, but now increasingly available in smaller, lower priced and even field deployable designs.

Cavity Ringdown Spectroscopy and variations and adaptations of this, enable us to measure greenhouse gases, trace gases and stable isotopes, directly in real time, with high sensitivity, high precision and in some cases resolution rates up to 10 Hz or faster.

ET has and continues, to find, bring to market, and crucially provide UK support for cutting-edge instruments and technology for scientists and researchers working in many sectors including atmospheric chemistry, air quality, oceanography, earth science, climate change, ecology, agriculture and many more.

In each edition of EnviroNews we will be focusing on a particular partner company offering innovative and cutting-edge measurement technology. We are kicking off with **Airmodus**, a Finnish company specialising in nanoparticle counting.

We hope you enjoy our inaugural “scientific” edition and look forward to speaking to you and discussing how our measurement technology can help with your research applications.



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FOCUS on AIRMODUS

Airmodus is a Finnish company founded in 2010 by Professor Markku Kulmala, Head of Atmospheric Sciences at the Department of Physics, University of Helsinki.

Airmodus offers tools for aerosol researchers and industries dealing with aerosol particles.

Why, how and when are aerosol particles formed?

- Airmodus provide research and monitoring solutions for all scientific and industrial applications where gas to particle conversion is of interest
- Magnifying the nano particles into detectable sizes giving the ability to detect the growth of the particles in real-time
- Airmodus technologies enable observing the early stages of particle formation, as opposed to merely modelling the phenomena and observing the only the larger particles
- Airmodus **uncovers the unknowns** of particle formation
- Airmodus products enable the detection and monitoring of ultrafine particles and the early stages of aerosol particle formation
- For researchers studying e.g. particle interactions at the molecular level, or methods of nano particle synthesis and processing

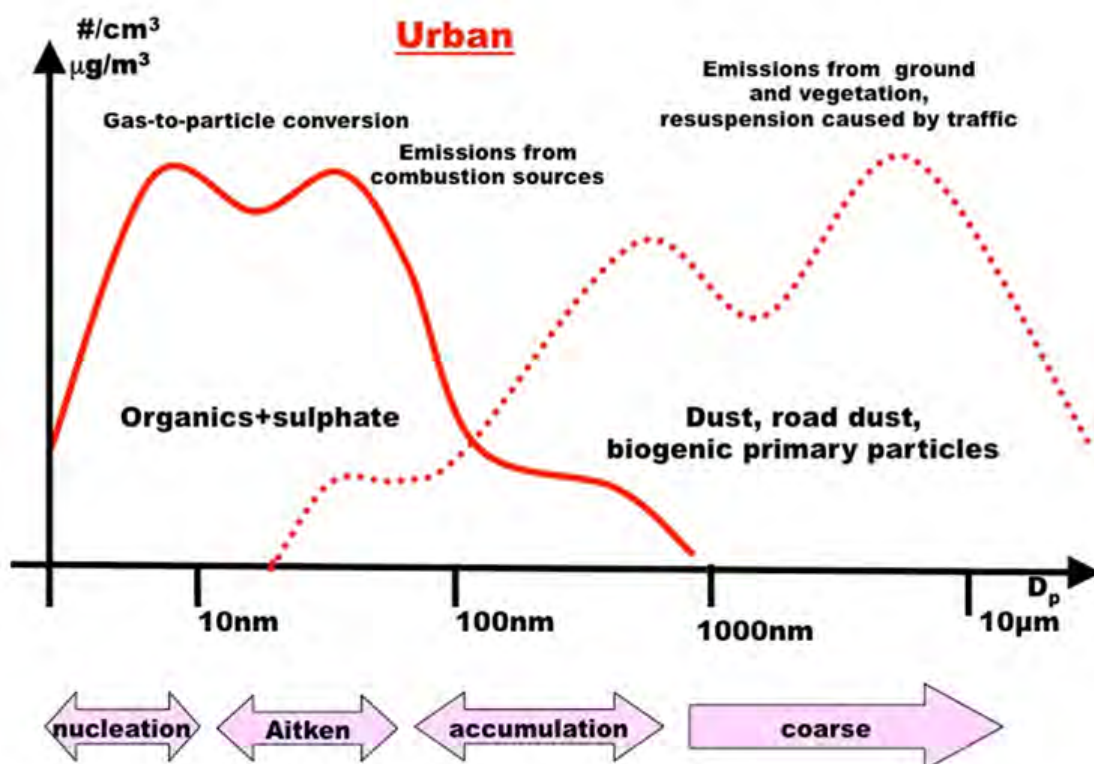


Figure: Hanna Vehkamäki ja Veli-Matti Kerminen



AII Nano Condensation Nucleus Counter

Study and monitor particles smaller than the detection threshold of any CPC.

The Airmodus AII can be used to measure the total number concentration of sub-micron particles, or to learn about characteristics and dynamics of the 1-3 nm particles in real time.

Airmodus products are available in the UK and Ireland exclusively through Enviro Technology Services Plc.

Los Gatos Research Off-axis ICOS Isotopic & Trace Gas Analysers



Isotopic N₂O

LGR's Isotopic N₂O analyser is the World's first commercial analyser capable of measuring isotopic site-specific nitrogen and isotopic oxygen in nitrous oxide.

- Measurements of site-specific isotopic nitrogen in N₂O (¹⁴N¹⁵N¹⁶O, ¹⁴N¹⁵N¹⁶O, N₂O)
- Measurements of δ¹⁵N, δ¹⁵N^α and δ¹⁵N^β enable quantification of N₂O sources and sinks
- Measurements of δ¹⁸O allow quantification of nitrification processes
- No cryogenics or water cooling required

Isotopic CO₂

4 isotopologues, 3 isotope ratios, 2 modes, 1 instrument.

LGR's newest Carbon Dioxide Isotope Analyser (model CCIA-46) employs a mid-infrared quantum cascade laser to record high resolution absorption lineshapes of all the stable isotopologues of CO₂ in a single scan.

- Reports the mole fractions of ¹²CO₂, ¹³CO₂, CO¹⁷O and CO¹⁸O and thus the isotopic ratios δ¹³C, δ¹⁷O, δ¹⁸O in real time
- Up to 5 Hz resolution
- 0.1 per mil accuracy





Methane Carbon Isotope Analyser

$\delta^{13}\text{C}_{\text{CH}_4}$ for methane ranging from 1 ppm to 100%
LGR's Methane Carbon Isotope Analyser (MCIA) reports measurement of $\delta^{13}\text{C}_{\text{CH}_4}$ and methane concentration (mole fraction) directly, continuously and without sample preparation.

- Three models available spanning the entire range of methane levels in landfills, mudlogging studies, biogas reactors and ambient air
- Data rates as fast as 1 Hz



Triple Isotopic Water Analyser

The world's first Triple Isotopic Water Analyser!
4 isotopologues, 3 isotopic ratios, 2 phases, 1 instrument.

LGR's Isotopic Water Analyser (model IWA-45EP) is the only instrument for isotopic water measurements (liquid water and water vapor) capable of reporting all major isotopologues (H_2O , H^2HO , H_2^{17}O , H_2^{18}O) simultaneously.

Star
Product



Ultra-Portable Greenhouse Gas Analyser

This revolutionary instrument packs LGR's patented Off-axis ICOS technology into a tough, rugged Pelican case providing real-time, high precision measurements of CH_4 , CO_2 and H_2O (vapour).

- Mains (110-230VAC) and battery power (12VDC) operation
- Large capacity solid-state hard drive for data logging
- Internal Wi-Fi router for pairing with iPad/android tablet or PC/Mac
- Only 15kg and low power consumption (80 W)
- Other models available for NH_3 , H_2S , and methane/acetylene

Los Gatos Research products are exclusively available
in the UK through Enviro Technology Services Plc

Advances in NO_x, NO_y and NO₂ measurement technology

From their humble beginnings in the late 1970's, real-time NO_x analysers have come a long way.

As well as benefitting from 21st Century advances in electronics and microprocessor control, measurement performance gains have been made along the way too allowing us to measure faster, with greater sensitivity and with some models, direct NO₂ measurement with higher accuracy, repeatability and precision.



T200



T500U CAPS

ET has a wide range of chemiluminescent NO_x analysers for ambient and trace gas measurements. Models also available with photolytic NO₂ to NO converters as well as the T500U CAPS direct-reading (non-chemiluminescent) NO₂ analyser for “true” NO₂ measurement.

Ambient level / trace gas NO _x analysers				
Model	Range	Detection Limit	Measures	Technique
T500U	0-5 ppb to 0-1000 ppb	<40 ppt	NO ₂ (Direct)	CAPS (Cavity Attenuated Phase Shift)
T200U	0-5 ppb to 0-2000 ppb	50 ppt	NO _x – NO (NO ₂ indirect)	Chemiluminescent (Ultra sensitive) Molybdenum converter
T200UP	0-5 ppb to 0-2000 ppb	<50 ppt (NO) <100 ppt (NO ₂)	NO _x – NO (NO ₂ indirect)	Chemiluminescent (Ultra sensitive) Photolytic LED “Blue-Light” converter
T200U NO _y	0-5 ppb to 0-2000 ppb	<50 ppt	NO, NO _y	Chemiluminescent (Ultra sensitive) with remote Molybdenum converter
T200	0-50 ppb to 0-20 ppm	<1.0 ppb	NO _x – NO (NO ₂ indirect)	Chemiluminescent Molybdenum converter

We are also able to supply higher range NO_x analysers.

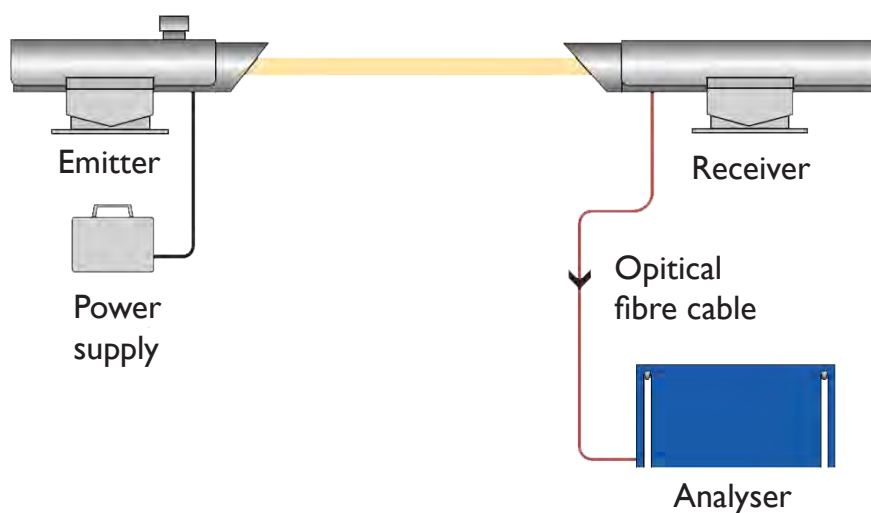
Teledyne API products are exclusively available in the UK through Enviro Technology Services Plc

Opsis UV DOAS Long - Path / Open - Path

Real-time, multi-gas, open path systems

The Opsis System measures multiple gases over an Open Path using the DOAS (Differential Optical Absorption Spectroscopy) technique.

- Can be configured to measure multiple gases in one system including NO, NO₂, SO₂, O₃, Benzene, Toluene, Xylene, Formaldehyde, NH₃, HONO₂ etc
- Fast response, Optical Monitoring technology
- Non-contact, no pumps, valves, sample lines etc
- Representative 'path-averaged' ambient air monitoring
- If you have a requirement to measure other gases please contact us



Opsis products are exclusively available in the UK through
Enviro Technology Services Plc



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