



Nanoparticle Monitoring

GRIMM  AEROSOL
TECHNIK

DURAG GROUP

AIRMODUS

Airux
DIFFERENT THINKING.
BETTER MEASURING.



URG

 DROPLET
Measurement Technologies

Small particles can make a big difference

As our understanding of aerosol formation processes continues to improve, it becomes increasingly apparent that the smallest of particles play an important and often misunderstood role. Aerosol particles in the nanometre size range are instrumental in the formation of clouds and secondary aerosols, yet they are notoriously difficult to quantify. There is therefore an immediate need for accurate, reliable aerosol measurement instruments that are sensitive to particles as small as 10nm, and for these instruments to be accessible to non-specialist researchers.

Ever a proponent of emerging and innovative measurement technologies, **Enviro Technology Services Ltd** has partnered with several manufacturers of cutting-edge nanoparticle instruments, including **Grimm Aerosol Technik**, **Airmodus**, and **Droplet Measurement Technologies**. Through our expert partners, we are able to offer a range of nanoparticle instruments to suit any research application.

Some of our most capable and exciting nanoparticle instruments are highlighted in this brochure. This is by no means an exhaustive list, so anyone with an interest in nanoparticle measurement is encouraged to contact our expert sales team to discuss their requirements.

email: sales@et.co.uk or call: 01453 733200

Grimm Aerosol Technik

World-class Solutions for the analysis of **aerosol particles**.

Enviro Technology Services has been partnered with Grimm Aerosol Technik in Germany for many years and has installed dozens of Grimm's model EDM180 Optical Particle Counters for our UK clients.

More recently, the limelight has been on nanoparticles, and Grimm's tried and tested 54xx family of CPCs (Condensation Particle Counters).

Grimm CPCs are available either as benchtop or 19" rack-mounted versions, with a maximum single particle counting concentration of 150,000 particles / cm³, and an impressive response time of < 3 s.

Grimm CPCs can be used as standalone particle counters or combined with a DMA column and neutraliser to create an SMPS+C system.



Grimm SMPS+C systems can be equipped with a range of neutralisation sources including Ni-63, Am-241, or a non-radioactive soft X-ray charger. DMA columns are available to provide particle size distribution in various ranges, with the 10 – 1,094 nm "L-DMA" being most popular.

For non-ambient applications where aerosol concentrations are much higher (up to 10⁸ p/cm³), Grimm also offer SMPS+E systems, which feature a Faraday Cup Electrometer as the detector instead of a Condensation Particle Counter.

SMPS+E system *Scanning Mobility Particle Sizer + Electrometer*

For simultaneous measurement of nanoparticles and larger aerosols including PM₁₀, a Grimm SMPS+C system may be combined with an EDM-180 optical particle counter in a single rack, with a single inlet, enabling the full size range of 5 nm – 32 µm to be measured.



EDM-180
Optical Particle Counter

GRIMM  **AEROSOL
TECHNIK**
DURAG GROUP



Grimm 5416
High-End Condensation Particle Counter

Portable applications

For portable applications, Grimm also offer the 1371 MiniWRAS. This portable, battery-operated unit combines a 31-channel optical particle counter (0.253 – 35 µm) with a 10 channel Faraday Cup Electrometer (10 – 193 nm).

A complete size spectrum can be collected in just 60 seconds, and the weight is less than 8 kg, making the 1371 MiniWRAS ideal for mobile applications and indoor monitoring.



Airmodus

World leaders in the measurement of the very **smallest of particles.**

While conventional CPCs can only measure down to a D50 of 4 nm (50% of 4 nm particles are counted), Airmodus can provide accurate counting down to just 1 nm, using their pioneering PSM system (Particle Size Magnifier).

The Airmodus PSM connects to the inlet of a standard Airmodus or GRIMM CPC, and adds an additional growth stage, enabling the measurement of particles that would otherwise be too small to detect. Before being passed to the CPC and grown in butanol, sampled particles pass through a chamber of supersaturated diethylene glycol in the PSM, boosting the size of the smallest particles by condensation, and making them suitable for further growth and subsequent detection in the CPC.

The original Airmodus PSM enabled 50% cut-offs between 1-4 nm. The newly released PSM 2.0 expands the size range to 1-12 nm. The PSM can be operated in either a fixed mode (fixed cut-off size), stepping mode (cycles between several user-defined cut-offs), or scanning mode (scans through the entire size range).

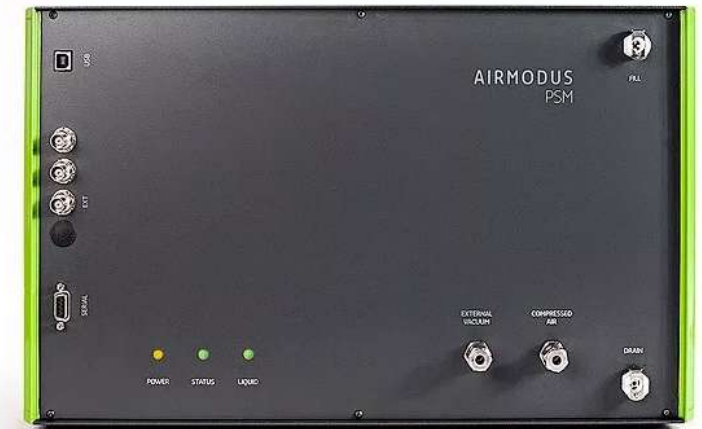
With the new expanded size range of 1-12 nm, extremely high sensitivity capable of measuring as low as 100 particles / cm³, and capability for 2 months autonomous operation, the PSM 2.0 is suitable for a wide variety of applications where accurate measurement of the smallest particles is required.

As Airmodus say, it's the small things that count!

The PSM 2.0 can be combined with Airmodus' latest A30 CPC to create an A11 nCNC system. The A30 itself is one of the most user-friendly and compact CPCs on the market, with a touch screen interface, adjustable D₅₀, and less than 5 kg weight. Integration with Grimm CPCs, as well as legacy 3rd party instruments, is also possible.

A11 nCNC
nano Condensation Nucleus Counter system

AIRMODUS



A10
Particle Size Magnifier



A30 CPC
Condensation Particle Counter



Droplet Measurement Technologies

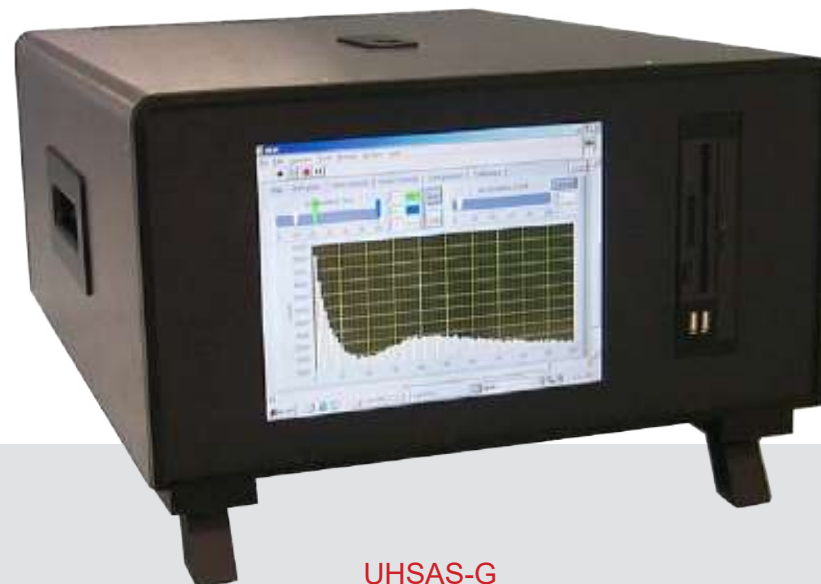


Get the technology you need to build climate models, monitor emissions, **improve air quality**, inform cloud seeding, or ensure proper icing certifications for aircraft safety.

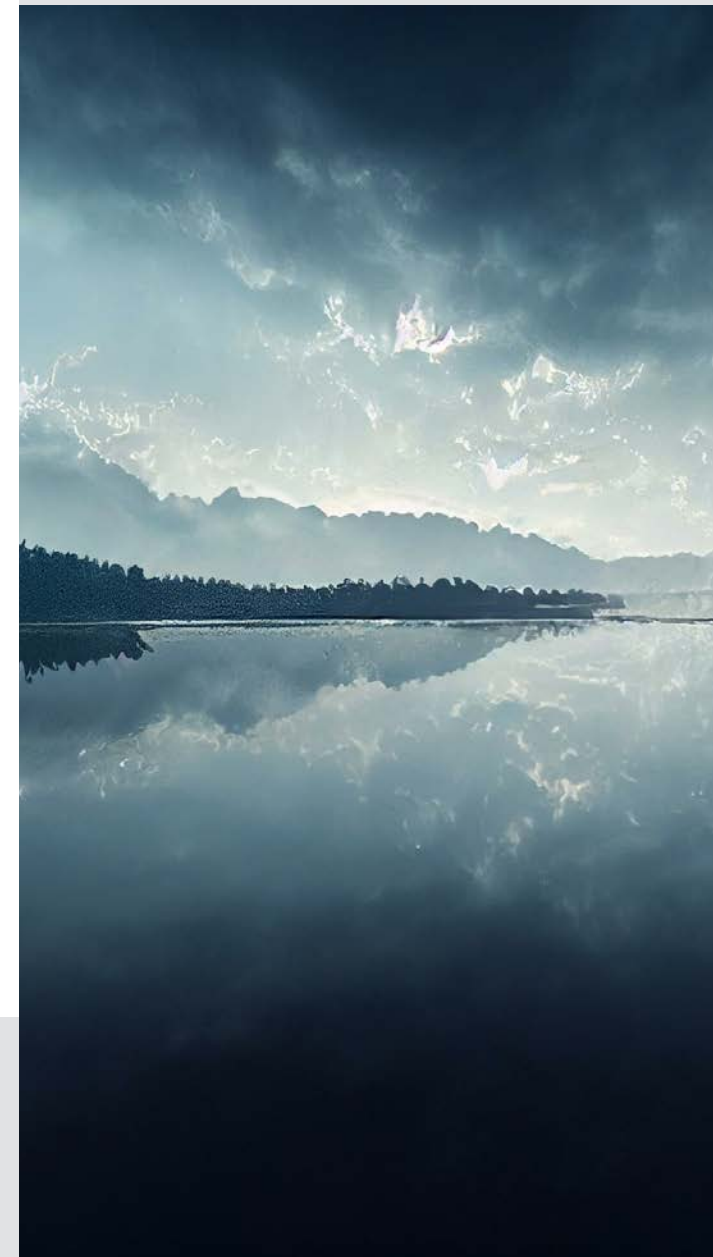
Based in Colorado, USA, Droplet Measurement Technologies are world-leading manufacturer of aerosol research instruments. Droplet's products enable detailed analysis of aerosols on a particle-by-particle basis, both in ground-based and airborne applications.

The Ultra-High Sensitivity Aerosol Spectrometer, or UHSAS-G, is a ground-based optical scattering, laser-based aerosol particle spectrometer for sizing particles in the 0.06 to 1 μm range. The UHSAS-G uses a 1,064 nm laser and high sensitivity detector array to count particles in up to 100 user-defined bins, with resolution as fine as 1 nm/bin. Data is collected in real-time, and included LabVIEW designed software allows in-depth visualisation of data with customisable histogram views.

For ease-of-use, the UHSAS-G features an onboard computer with built-in monitor, built-in pump with adjustable flow control, and easy user calibration functions. Maintenance requirements are low, and power consumption is only 200W, making the UHSAS-G suitable for vehicle-based measurements, especially where high accuracy and resolution are required.



UHSAS-G
Ultra-High Sensitivity Aerosol Spectrometer



AirYX

Novel **gas measurement techniques** for industrial and scientific applications.



AirYX is a spin-off company from the University of Heidelberg specialising in highly sensitive DOAS instruments for atmospheric research. Their innovative ICAD analysers for NO_2/NO_x have already pushed the boundaries of trace gas research with extreme sensitivity and selectivity, and AirYX have now added an interesting product for aerosol research in the ICAD HONO.

Nitrous acid or HONO is a little-understood component of photochemical smog. It is a relatively short-lived intermediate formed by reduction of NO_2 , and eventually breaks down to produce hydroxyl radicals. HONO is thought to be the most significant contributor to hydroxyl radicals in polluted air, making it a key component of the ozone budget. These hydroxyl radicals go on to initiate myriad photochemical processes which result in secondary aerosol formation.

There is strong correlation between high HONO concentrations and accelerated secondary aerosol formation. Aerosol particles also have the capability to act as a catalyst, initiating OH- forming reactions in HONO molecules attached to the surface. Particulate pollution and HONO are therefore intrinsically linked, and the complexities of this relationship are only just beginning to be understood, thanks to new, more sensitive technology.



A high grade ICAD NO_x instrument purchased by the University of York. Customized with a special temperature stabilisation to adapt to the warm climate, the ICAD provides NO_x data for the BLEACH (Bermuda boundary Layer Experiment on Atmospheric Chemistry of Halogens) project.



Low power consumption

The AirYX ICAD-HONO-200L measures HONO and NO_2 with a time resolution of up to 2 seconds, and sub-ppb level precision. The analyser is built into a 19" rackmount package weighing 12kg and requiring only 40W. Maintenance requirements are minimal, and regular recalibration is not needed due to the intrinsically calibrated DOAS technique.

The ICAD-HONO-200L is therefore suitable for a wide variety of applications, including mobile vehicle-based measurements.

[Learn more about mobile vehicle-based measurements with the ICAD-HONO-200L here.](#)

ICAD-HONO NO₂-200L

In Situ HONO and NO₂ Monitor – High Grade Version

URG

Actively involved in the research and development of sampling instrumentation for a variety of **ambient air measuring technologies** to ensure the air we breathe is the best it can be.



Enviro Technology Services is the official UK and Ireland distributor for URG's extensive range of cyclones, denuders, and sampling systems for aerosol research. Based in Chapel Hill, North Carolina, URG Corp manufactures inlet components with a wide range of flow rates, cut points, and fittings to suit any application.

Some of URG's most popular products include the **URG-2000 series stainless-steel cyclones**. These reliable workhorses are easily integrated with 3rd party aerosol instruments or custom laboratory inlet systems. URG-2000 series cyclones are also included in some OEM aerosol instruments as standard due to their ubiquity, such as the Sunset Laboratory M4G OC-EC Analyser.



In addition to supplying the research community with inlet systems for over 35 years, URG manufactures the unique **AIM-9000 online ambient ion monitor**. The AIM-9000 uses a special Teflon-coated $PM_{2.5}$ cyclone to sample airborne particulate ions such as nitrate and phosphate onto a unique parallel plate denuder. Anions and cations are separated with 99.8% collection efficiency and passed to ion chromatographs for analysis and speciation.

The AIM-9000 is able to quantify hourly averages of airborne nitrate, sulphate, nitrite, phosphate, chloride, ammonium, sodium, calcium, potassium, magnesium, ammonia, hydrogen chloride, nitric acid, nitrous acid and sulphur dioxide with a detection limit of $0.05 \mu\text{g}/\text{m}^3$.



AIM-9000
Online ambient ion monitor

Other products



Visit our website to download other product brochures www.et.co.uk



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