# Enviro News

Winter 2016

www.et.co.uk

# Micro Pulse Lidar

*A sophisticated laser remote sensing system from SigmaSpace that provides continuous, unattended monitoring of the profiles and optical properties of clouds and aerosols in the atmosphere,*

*now available from ET.*

SigmaSpace

For meteorologists, atmospheric and environmental researchers and regulators, airports and air traffic controllers, and wind farmers.

## Applications Include:

Aerosols / Pollution Monitoring

Emission Plumes from Environmental Monitoring and Enforcement

Volcanic Ash Detection

Planetary Boundary Layer Measurements

## Looking forward to 2017

*ET are pleased to announce we will be exhibiting at the Atmospheric Ice Nucleation Conference (run by The Aerosol Society) on Jan 16th / 17th in Leeds.*

The Aerosol Society

**ET are looking forward to seeing you all at AQE next year.**

**24th - 25th May 2017**
**Telford**

## INSIDE

**Welcome to our Winter 2016 edition of EnviroNews**

What a year 2016 has been..

Whilst Brexit and Trump have swamped the news and TV channels, it has been encouraging to see the profile of air pollution and air quality rising higher and higher propelled by both the fallout from VW "dieselgate" and Client Earth's successful legal challenge of the UK Government's need to speed up plans and initiatives to improve our urban air quality. ET itself has been in the national news a few times this year with TV, radio and newspaper features on the BBC News at Six, The Guardian and a selection of local radio stations. Our fantastic zero-emissions, mobile monitoring lab, AKA "The Smogmobile" has demonstrated exactly what we can do with our range of *Faster, Better and Newer* monitoring technology and lends itself perfectly to the media who are becoming more and more aware about how poor our urban air quality can be in certain areas and the very real impact it has on health, mortality levels and reduced life expectancy.

Also, as someone who was not born until the late 1960's it was both remarkable and shocking to see an episode of Netflix's fantastic new drama series, The Crown, that featured the Great London Smog of 1952, and the politicians of the day's apparent down playing of the phenomenon until after the event, once some 4000 people had already died. Fast forward 64 years and although there are no longer any "pea-soupers" in the UK, air pollution is killing 40,000 people per year and yet still the Government seems to be unable to effectively tackle the issue (and some might say, still downplay the seriousness).

Despite the uncertainty surrounding Brexit (and Trump), one thing for sure is that ET is busy, very busy. Busy building and supplying new air quality monitoring stations for the UK and overseas, busy selling greenhouse gas and methane analysers (note the methane focus in this issue) and busy servicing and maintaining our wide and diverse client bases' instruments and systems.

In the background we are continuing to pioneer new measurement and monitoring technologies, such as the NASA developed, Sigma-Space Micro Pulse Lidar and improve how we measure $NO_2$ and particulates, the 21st century equivalents to the Great Smog of 1952.

Echoing the words of Lord Kelvin, "to measure is to know" and whilst we can't as a company, solve the worlds air pollution and climate change problems, we can most certainly provide the tools and systems to enable precise, accurate and reliable measurements for those that do have the power to make a difference.

*Duncan Mounsor*
*Managing Director*

# New faces

We have a few new (and returning) faces we would like to welcome to our team.

Mike Smith
**Customer Services Manager**

Mike is an emissions monitoring expert and co-creator of the UK's first ISO 17025 quality system for conducting emissions on customer sites. Mike now manages the resources scheduling for the commissioning and service of ET equipment .

Cherry Connolly
**Admin Coordinator**

Cherry supports our Customer Services Manager to ensure the smooth and efficient running of the Service Team and looks after the Admin, Stores and Workshop areas of the business.

Macauley Medcroft
**Trainee Technical Support**

Macauley joined ET straight after completing his A levels. With passion for IT, he is now providing valuable support to our TSE.

David Goddard
**Workshop Supervisor / Test & Repair Engineer**

We are also very pleased to announce that David Goddard will be returning to ET in January. David, an MOD trained electronics and avionics engineer, worked for ET from 1989 to 2004 before leaving for a stint with BAE Systems in Saudi Arabia. David is comming back to help us improve systems and supervise our workshop. He will also help with test and repairs.

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# NEW product news

## Aerosol and cloud profiling with the Micro Pulse Lidar (MPL)

The Micro Pulse Lidar product family from Sigma Space offers the most versatile laser remote sensors for aerosol and cloud profiling. Equipped with the most sensitive single photon-counting technology, these lidars are in use worldwide for aerosol research, planetary boundary layer observation, air-quality monitoring and forecasting.

Based on the same principle as radar, MPL transmits laser pulses that scatter (reflect) off particles in the atmosphere. MPL then measures the intensity of backscattered light using photon-counting detectors, and transforms the signal into atmospheric information in real time.

Sigma Space has been manufacturing MPL systems since 2004 under license from NASA*.

MiniMPL is a Sigma Space innovation that takes lidar technology to a new level of portability, power efficiency, and cost effectiveness, while maintaining an exceptional signal-to-noise ratio.


*High-resolution aerosol profiling*

*Optically robust, resistant to misalignments*

*Low-maintenance, optimized laser*

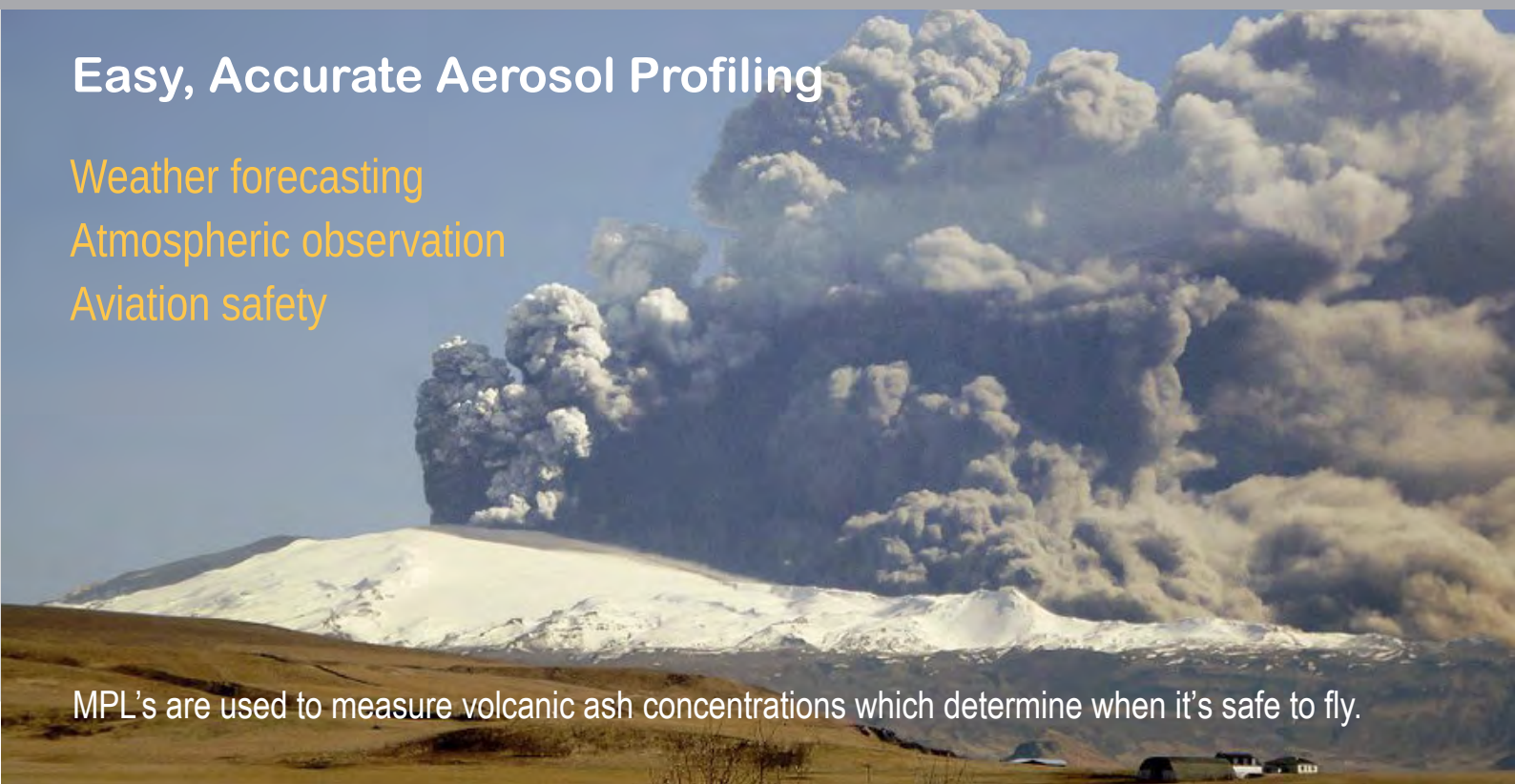
*Eye safe (ANSI Class II)*

*Continuous, autonomous data collection*

*Operational in minutes*

## Easy, Accurate Aerosol Profiling

Weather forecasting
Atmospheric observation
Aviation safety



MPL's are used to measure volcanic ash concentrations which determine when it's safe to fly.

# NEW product news

TELEDYNE
ADVANCED POLLUTION INSTRUMENTATION
Everywhereyoulook™


## Introducing the new compact Ozone Analyser available from ET

## 430 Compact Ozone Analyser

The 430 is a compact analyser that uses the proven UV Absorption principle. The small footprint and robust design make it ideal for a variety of applications including, but not limited to, rural and remote monitoring, urban saturation studies, “hot spot” identification, enhanced ambient network monitoring, atmospheric research and citizen science/community scale monitoring.

### Features

- Ranges 0 - 100 ppb (min), 0 - 20,000 ppb (max)
- Measurement Units ppb, ppm
- Zero Noise < 1 ppb (RMS)
- Span Noise < 0.5% of reading (RMS) above 100 ppb
- Lower Detectable Limit < 2 ppb
- Zero Drift < 1 ppb/24 hours
- Span Drift < 1% full-scale/24 hours
- Low Power, AC and DC operation

## The TAPI range of Portable Gas Calibrators and Zero Air Systems

The new range of portable Gas Calibrators and Zero Air Systems from Teledyne API are designed for the demanding requirements of trace-level analyser calibrations. Housed in a high-density, molded travel case and includes an integral handle and wheels for durability and ease of use in the field.

### Features

- Generates precise calibration gases for $SO_2$, $H_2S$, NO, $NO_2$, CO, $O_3$ and others
- Large, vivid, and durable color graphics display with touch screen interface
- Ethernet, RS-232, and (optional) USB com ports
- Front panel USB ports for peripheral devices and firmware upgrades
- Built into high density, molded travel case

# NEW product news

TELEDYNE
ADVANCED POLLUTION INSTRUMENTATION
Everywhereyoulook™

## T200P Photolytic NO - $NO_2$ Analyser

The Model T200P provides measurements of NO and $NO_2$ using our Model T200 NOx analyser combined with a patented high efficiency photolytic converter.


*For Urban/Ambient Applications*

**With patented high efficiency Blue Light Converter (BLC)**

### Features

- Ranges: 0-50 ppb to 0-4,000 ppb, user selectable
- High efficiency photolytic converter with specific conversion of $NO_2$
- Ethernet, RS-232, and (optional) USB com ports
- Front panel USB connections for peripheral devices and firmware upgrades
- 8 analog inputs (optional)
- 0.40 ppb lower detectable limit
- Catalytic ozone scrubber

## T200UP Trace-Level Photolytic NO - $NO_2$ Analyser

*For Ultra-Sensitive - Trace Level*

The Model T200UP provides Trace-Level measurements of NO, NOX and $NO_2$ using our Model T200U NOX analyser combined with a patented high efficiency Blue Light Converter (BLC). The BLC, also known as photolytic converter, provides a very specific conversion of $NO_2$ with conversion efficiency similar to molybdenum.


**With patented high efficiency Blue Light Converter (BLC)**

### Features

- Ranges: 0-5 ppb to 0-2,000 ppb, user selectable
- High efficiency photolytic converter with specific conversion of $NO_2$
- Ethernet, RS-232, and (optional) USB com ports
- Front panel USB connections for peripheral devices and firmware upgrades
- 8 analog inputs (optional)
- 50 ppt lower detectable limit
- Catalytic ozone scrubber

# Monitoring Methane

$CH_4$

Methane ($CH_4$) is a relatively prominent component of the atmosphere, with a global average concentration of 1.8 ppm, a 2.5-fold increase since pre-industrial levels. The processes involved in the release, transportation, and removal of methane from Earth's atmosphere are complex, and form an important part of the global carbon cycle.

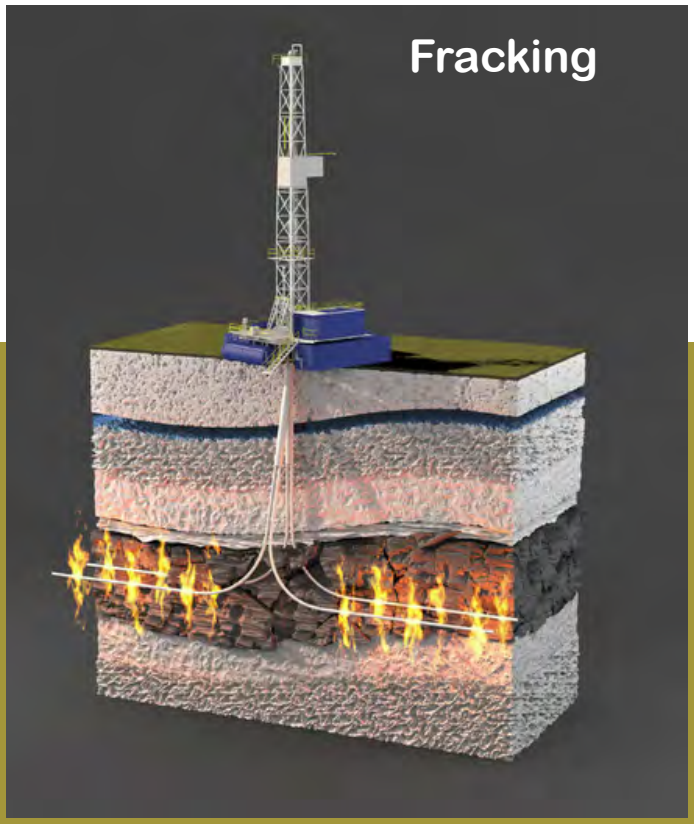
Methane produced from sources such as wetlands, forest fires, livestock, waste processing, and fracking is carried upwards through the troposphere by rising air currents, where it is primarily removed by the oxidative action of hydroxyl radicals, forming $CO_2$ and water vapour. Ruminants (livestock) are a significant source of methane, releasing more $CH_4$ worldwide than the entire energy industry. Rice paddies are also a large contributor to the global methane budget, being responsible for 15-20% of all anthropogenic emissions.

In addition to being removed by reactions with OH radicals, methane is also removed by methanotrophic bacteria in soils. Forested areas are particularly efficient in removing methane, as there is a greater rate of gas exchange between the soil and air, and the conditions in the soil are favourable for these bacteria.

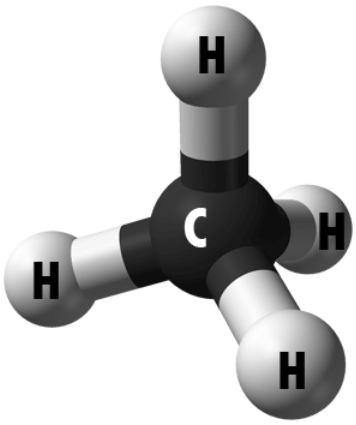
The mechanisms behind these exchanges, and the full extent of their effect on atmospheric methane concentrations, are not fully understood. The developing field of soil flux research aims to quantify these exchanges, using a variety of scientific techniques including soil flux accumulation chambers and eddy covariance.

Per molecule, methane gas has a global warming potential 34 times greater than $CO_2$ when considered over a 100 year time horizon, according to a 2013 report by the Intergovernmental Panel on Climate Change (IPCC). When considered over a shorter time frame of 20 years, the GWP increases to 86 times that of $CO_2$. This is because although methane only has an average lifetime of 12.4 years in the atmosphere, it is a potent greenhouse gas that is very effective in trapping heat, through both direct infrared absorption and secondary climate forcing processes. Methane eventually breaks down naturally in the troposphere, yielding $CO_2$ and water vapour, both of which also contribute to the greenhouse effect.

*In light of methane's significant contribution to global warming, and recent findings that leakage and emissions from fracking have been vastly underestimated, having the capability to accurately measure $CH_4$ has never been more important.*




## Farming




# *Enviro Technology is able to provide a wide variety of $CH_4$ instrumentation to suit almost any application.*

The RLGD-100 ‘hairdryer’ from Focused Photonics Inc. is a handheld, laser based device designed to detect methane leaks remotely, at distances of up to 30 metres. Optimised for ease of use and ultra-fast response, using the ‘hairdryer’ is as easy as point, click, detect!

## *The world’s smallest, lightest, cavity-ringdown greenhouse gas analyser.*

The microportable gas analyser from Los Gatos Research is a lightweight, highly portable $CH_4/CO_2/H_2O$ instrument capable of taking fast, precise measurements while on the move. Use the sampling wand to easily detect leaks while on foot, or attach the sub-6kg microportable to a drone and take your research to the skies!

**weighs less than 6kg**

In addition to the new microportable, LGR also offer the ever popular 15kg ultraportable greenhouse gas analyser (UGGA), the rack-mounted fast greenhouse gas analyser (FGGA), capable of true 10Hz measurements for use in eddy covariance studies, and the methane carbon isotope analyser (MCIA), for precise measurements of δ13C at measurement rates of up to 5Hz. All of these LGR instruments use the patented detection method of off-axis ICOS, a 4th generation cavity-enhanced technique that provides a path length of several kilometres, while avoiding the drawbacks of conventional CRDS.

Eosense partners with LGR to provide an easy, complete solution for soil flux chamber research. Simply connect an ultraportable gas analyser to an eosMX multiplexer, set out up to 12 eosAC recirculating soil flux chambers, and control the entire system wirelessly via the LGR analyser.

# Case Study

## ET supplies "trailblazing" remote sensing multi-gas Opsis DOAS air quality monitoring system to the University of Brighton.


One of the many benefits of the Opsis DOAS (differential optical absorption spectroscopy) air quality monitoring system is the ability to perfectly tailor the mix of gases that the client needs to measure. In the case of the University of Brighton (UoB) system, these gases were $SO_2$, $NO_2$, $O_3$ as well as formaldehyde ($CH_2O$) and nitrous acid ($HNO_2$). Another benefit of this optical, open-path, remote sensing technology is the capability to easily add additional gases and in the case of UoB, benzene ($C_6H_6$) was added shortly after installation.

Reflecting on the project, ET's Managing Director, Duncan Mounsor comments "this was a classic example of the great team effort I see time and time again at ET".

Duncan continues; "making the initial sale was the easy part, but without the time and effort put in by my colleagues Mark Burston, Russell Cook and Anthony Ingram in finding the best site location, dealing with the technical side of things, jumping through administrative hurdles and precisely planning the installation, the project would not have gone to plan and the customer wouldn't have been completely satisfied".

The project was funded by JOAQUIN, and EU based project linking scientists and universities from France, Netherlands and the UK.

The system, officially opened by Caroline Lucas MP in December 2015, is used to specifically monitor the relationship between $HNO_2$ and $NO_2$ in the nitrogen cycle. Understanding HONO evolution is crucial in elucidating nitrogen cycling in the atmosphere.

*Brighton MP, Caroline Lucas, Britain's only Green Party Member of Parliament, officially opened the station on Friday 18 December 2015 and praised the University for its "Trailblazing" Research into Air Quality.*

# Tapi Training at ET


Earlier in the year we were delighted to welcome Teledyne API's Director of Customer Service, Mike Troy, to ET for some training on several of the new TAPI products such the the **T500U CAPs, T200UP, T200P** and some refresher training on the older ones.

All of our service engineers attended the training including our workshop engineers. Training certificates were issued to each and everyone of our service team.

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A Teledyne Technologies Company

## Low cost AQM sensors

Unlike others, ET has been hanging back a little with regards to low-cost, indicative sensor based air quality monitoring systems (sometimes called pods or nodes etc). This cautious approach is based on the company's experience with earlier technologies a few years ago and as a result of articles, papers and research by leading academics that have been testing them.

Whilst we realise that there is both a great momentum and desire by suppliers and users alike to get these devices out to market and on to a street corner near you ASAP, care and consideration should be taken, especially with regards to sensor performance for some species, especially $NO_2$. Things are definitely moving forward, however it is important to manage customers expectations carefully and at the end of the day, a low cost sensor, no matter how it is "dressed up" will only ever serve as an approximate indicator of concentration levels, and not an accurate and precise replacement for a professional, reference method instrument.

ET is however pleased to be able to offer the AQT400 web-enabled, multi-gas air quality monitoring sensor unit which certainly has a place in-between passive diffusion tubes and professional reference method instruments. ET's Sales Director, Mike Webley, explains "the AQT400 is first and foremost, an indicative device only, but for those clients and users working on very tight budgets or who wish to either permanently or temporarily install a small, self-contained, screening tool, then the AQT400 is certainly worth investigating".

Two versions are available, the AQT410 which just measures gases ($NO_2$, $SO_2$, $O_3$ & CO) and the AQT420 which adds a laser based particulate channel ($PM_{2.5}$ & $PM_{10}$) to the gases listed.

Both devices allow the user to access and download the raw measurement data, and as Mike concludes: "what you see with the AQT400 is really what you get; there are no smoke and mirrors or hidden algorithms or corrections".

**Call us to discuss how the AQT410 or AQT420 could benefit you.**

01453 733200
sales@et.co.uk

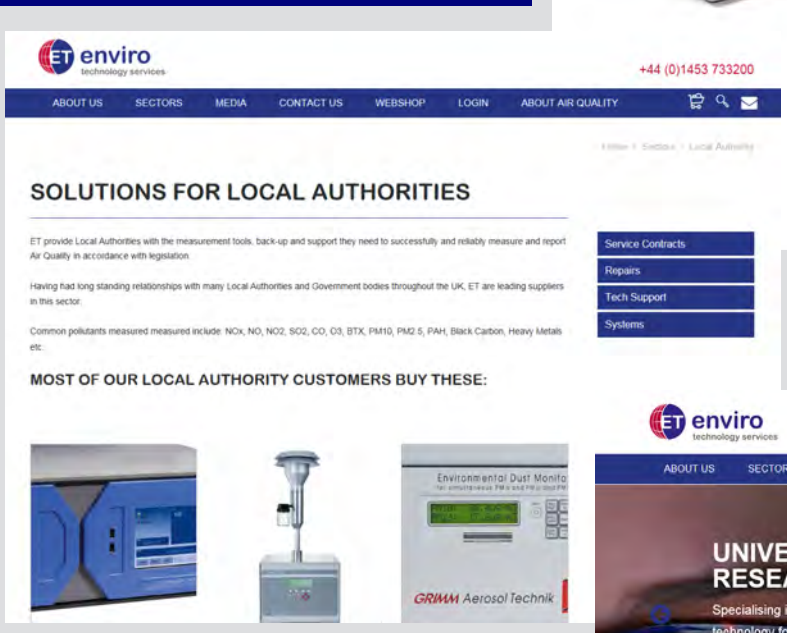
# Keep an eye out for ETs new Website!

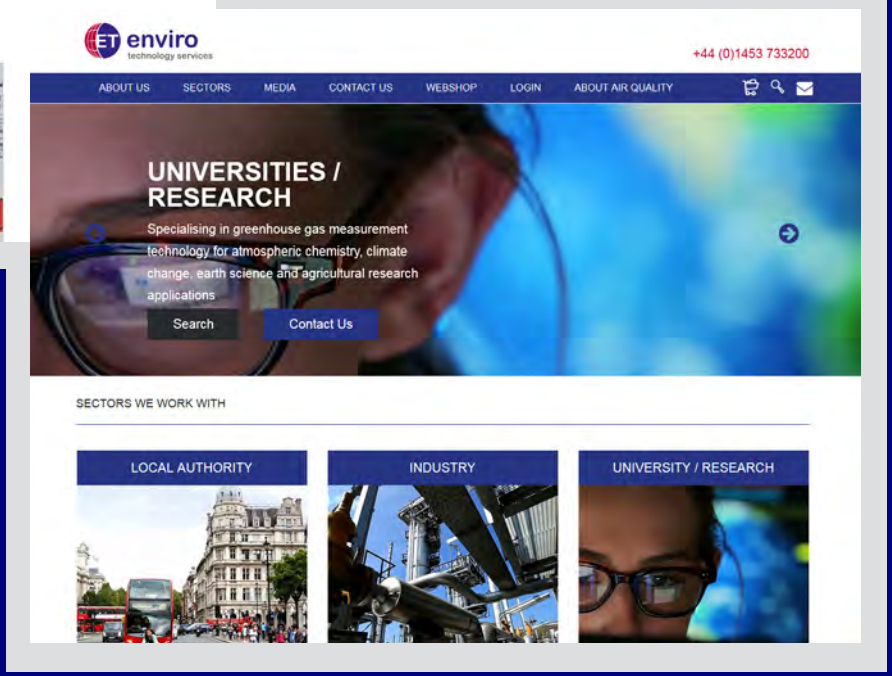
Lately, ET have been busy with a refresh of our branding and the development of a new website.

We're almost ready to launch the new site , so keep a look out.

Products can be found by looking in the sector relevant to your area of business or by using the search facilty. Customers will still be able to purchase consumables such as filters and regulators as well as some of our more compact Handheld Particle Counters and Indoor Air Quality monitors through the webshop for your convenience.

*The new navigation system makes it easier to find whats relevant to you.*


Over the years we have noticed which products are bought regulary by Local Authorities, Industry and Research institutions, our 3 main sectors of business, so it made sense to display these first with the option of searching our extensive product catalogue if desired.

Now you will be able to see not only a product description and datasheet but also the servicing information for that product.

The new site is geared towards making the site more user friendly. We'd love to hear your thoughts on it once we go live at the end of January 2017.