

Case Study: Salamander

New capabilities create novel commercial water and gas monitoring devices

The challenge

There is a strong and growing legislative drive to improve prediction of water quality in distribution and gaseous contaminants in the subsurface. A prerequisite for improved prediction is enhanced monitoring; current methods are not able to provide data of sufficiently high quality at an acceptable cost.

Changes in legislation and consumer perceptions, combined with an ageing pipe network have meant that monitoring of water quality is becoming increasingly important. Monitoring of water systems is a difficult task due to the sheer size and inaccessibility of underground networks.

Similar problems make current methods of ground-gas monitoring ineffective due to a mismatch between sampling frequency and concentration variability. This has implications for risk prediction in contaminated areas and greenhouse gas auditing.

The University of Manchester solution

Scientists in the University's School of Earth, Atmospheric and Earth Sciences (SEAES) have developed new research capabilities and expertise in hydrological and hydrochemical investigations, highlighting the inadequacies of existing environmental monitoring equipment. They recognised the need for more temporally and spatially complete datasets; to monitor more and model less. This approach improves the ability to predict the behaviour of both large distributed assets, such as the water distribution system and also environmental systems, such as methane in the sub-surface.

Salamander Group was formed as a spin out company in order to develop and licence commercial products resulting from research capabilities and expertise in hydrological and hydrochemical monitoring.

Funding from the Natural Environment Research Council (NERC) enabled University scientists to design and develop a datalogging system for environmental applications which matured to industry specific devices. Research and development continued to embed the products by objectively demonstrating their commercial utility, and by developing methods of best practice involving their use.



The University of Manchester's research has been crucial not only in developing new best practices around the products but clearly and objectively explaining these to the end users.

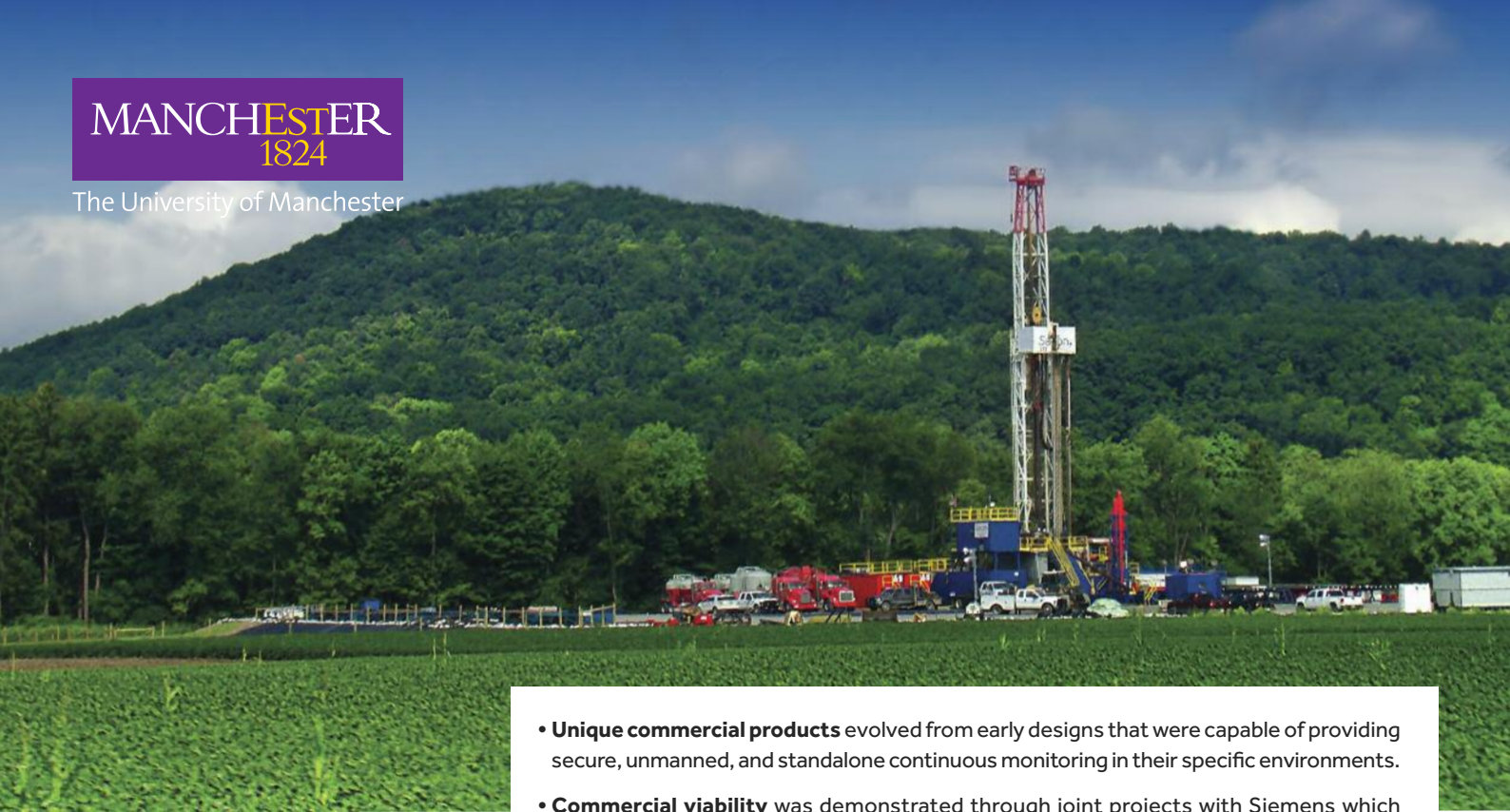


*Dr John Gaffney,
Product Manager,
Siemens Water Technologies*



Salamander is a leading developer of continuous environmental data monitoring products that are licensed globally. The small spin-out company is active in all aspects of successful technology transfer from academic research to private sector investment and ultimately selling new technology into global markets.

www.salamander-group.co.uk



- **Unique commercial products** evolved from early designs that were capable of providing secure, unmanned, and standalone continuous monitoring in their specific environments.
- **Commercial viability** was demonstrated through joint projects with Siemens which included research to develop and disseminate a new ground-gas monitoring methodology. This led to a suite of branded products embedded with licences and readied for distribution to end users.
- **Industry specific methodologies** were developed that met the needs of industry and brought about change in commercial asset management practice; Hydraclam and Chloroclam water monitoring devices and Gasclam ground gas-monitoring device.



NERC funded research was critical in both recognising a research gap and commercial opportunity, but also in refining product development and demonstrating usability.”



*Dr Stephen Boulton,
Programme Director,
School of Earth, Atmospheric
and Environmental Sciences,
The University of Manchester*

The benefits

NERC funded projects have allowed the University to research industry requirements and develop specific solutions that precisely meet the needs of business by developing commercially ready products. The University has benefited from strengthened links with external partners which have led to further collaborative working, with industry funded projects employing postdoctoral researchers from the University.

- Hydraclam is currently being used as an investigative tool by all major UK water service providers, with some deploying networks of devices for long-term condition monitoring.
- Hydraclam and Chloroclam have had a direct impact on industry best practice, which has been embedded through continued collaboration and interaction between the University, the licensee / manufacturer, and the end user.
- Siemens has been granted licenses for Hydraclam and Chloroclam, with royalties paid to Salamander.
- Gasclam is now licensed globally to Lonscience Ltd, and has already sold 300 units. The long term demand for Gasclam looks secure as the product is stimulating growth in a market for monitoring greenhouse gases associated with fossil fuel extraction, such as shale gas and coal-bed methane. Twenty Gasclams are currently in use around UK shale gas extraction sites.
- Gasclam has impacted on best practice in ground-gas monitoring in the UK and the US, with all regulators and many practitioners now aware of the potential for a revised methodology using gas concentration data with high time resolution. Methodologies using this data have been included in guidance documents, and Gasclam use is now widely recommended by regulators.