

THE UK GAS ANALYSIS AND SENSING GROUP (GASG) - THE FIRST 30 YEARS



Past and present committee members celebrating the GASG 30th anniversary. Crowcon Detection Instruments, Abingdon, June 2023.

The following is adapted and updated from earlier articles and has been written to mark the 30th Anniversary of the inauguration of the GASG.

Joe Watson & Martin Willett, September 2023.

Foundation

During the 1980s and 90s considerable interest developed in sensors and transducers as a subject in its own right. Digital technology was burgeoning and the acquisition of digital information from a fundamentally analog world presented significant challenges. Work on A-D conversion was complemented by the development of signal acquisition circuitry that could accommodate the wide range of phenomena addressed by a rapidly expanding suite of physical, chemical and biological sensors (to detect the presence of gases) and transducers (to provide meaningful measurements).

The need for a professional organisation in the UK to facilitate information sharing on sensors and transducers was soon apparent. However, accommodating the breadth of science, technology and application methods necessary for a comprehensive approach proved challenging. As a result some initiatives were unsuccessful, although the UKSG (United Kingdom Sensors Group) was a notable exception. Early sensor conferences suffered from similar drawbacks, frequently offering programmes covering such widely divergent topics that many delegates found only a small fraction of relevance to their own interests. However, the annual Eurosensors Conference series, which began in Cambridge in 1987 and continues to thrive, demonstrated that with dedicated effort these issues could be successfully addressed.

Nevertheless, it was apparent that a more focussed approach would be beneficial. Gas detection was an obvious choice given that the UK already had significant and expanding activity in that area. The academic, industrial and commercial organisations involved at this time were indeed diverse, with interests including:

- Combustion emission monitoring to improve efficiency and reduce pollution.
- Medical gas analysis for patient monitoring and improved early diagnostics.
- Monitoring of complex gas phase processes, for example in chemical plants and refineries.

- Safety monitoring in hazardous industries such as mining, oil and gas extraction and synthesized gas production.
- Environmental and transport pollution monitoring.

The importance of gas detection equipment was derived not only from the significant economic value generated by the relevant UK manufacturers, who were opening up new applications and markets, but also in the wider benefits accruing from the use of safety-oriented instruments. The provision of early detection and analysis for worker safety facilitated sustainable processes and the reduction of environmental pollution was also a critical area of attention for the industry at that time.

By September 1993, the UK Department of Trade and Industry (DTI) had assisted in the formation of a number of 'Sensor Interest Groups' under its Advanced Sensor Technology Transfer Programme (ASTTP). Assisted by Mark Churchyard and Jo Bazeley of the DTI, a new group was formed to focus on gas sensors, subsequently named the Gas Analysis and Sensing Group (GASG). The ASTTP provided funding support for 3 years, after which the group became entirely self-supporting via membership fees, as it remains to this day.

At the GASG inaugural meeting in December 1993 the first committee was elected, comprising Joe Watson (Univ. of Wales, Swansea) – Chair, Jo Bazeley (DTI/ASTTP), Paul Corcoran (Derby University), Jonathan Gilby (City Technology), Peter McGeehin (UKSG/Captur), Russ Pride (British Gas), Graham Thomas (Graham Thomas Consultants) and John Wykes (British Coal). In March 1994, Graham Thomas was elected as GASG's first Vice-Chair.

The Sensors for Water Interest Group (SWIG) was formed around the same time and, like the GASG, continues to flourish. These are the only two organisations arising from the original DTI initiative that are still operating. Others, such as the Optical Sensors Collaborative Association (OSCA) were also successful, but had much shorter existences.

Our current Chair, Jane Hodgkinson, remarked upon the longevity of the SWIG and GASG. "I have been active in all three areas – gas sensing, water sensing and optical sensing - so may be well placed to comment. I wonder whether meetings that concentrate on a family of measurands or around a particular sector attract more people from the industries they serve. In addition, the optical sensors community has been well served by academic conferences (which also attract technology-led companies in the field). Because this group clustered around a particular technology solution, the need for a new organisation serving optical sensors was perhaps less compelling."

Aims & Operation

The original purpose of the GASG was to provide a forum for the discussion and dissemination of information on all aspects of sensing, analysis and monitoring of gases, volatiles (VOCs) and particulates in both gaseous and dissolved states including:

- New and interesting technologies for detection and measurement including sensor materials and design.
- Sampling, calibration and data analysis methods to improve the reliability, accuracy and specificity of detectors.
- Applications in the industrial and domestic sectors (including the energy industries and process control), defence, security and transport (land, sea & air). Uses in environmental monitoring, medical diagnostics, toxicology, forensics, agriculture and food.
- Human factors in measurement, both in the design of instruments and reporting of results.
- Standards development and metrology.
- The business of gas and particulate detection.

These aims have remained at the core of the GASG for 30 years, developing as the gas detection landscape is impacted by changes in technology, the environment, markets and society. The group has sought to anticipate and reflect this evolution by stimulating research and development and encouraging the adoption of appropriate gas detection methods for the benefit of all users.

For over 20 years following inauguration, the GASG was run by Joe Watson, with valuable administrative support provided by Swansea University. When this arrangement ceased in 2015, the GASG was reconstituted as an independent company, but continuing to run as a non-profit making organisation funded by members' subscriptions and meeting fees.

As Jane Hodgkinson remembers "The change was by no means straightforward. We initially looked to see whether we could join an existing scientific / engineering society as a special interest group. However, there were several problems with this approach since we were - and remain - highly multidisciplinary. Keeping the physicists and the chemists happy at the same time was always going to be a challenge! Furthermore, our members are organisations, not individuals, and collecting personal subscriptions in the same way as the societies was not appropriate. Finally we looked at using the same administration team as CoGDEM and the STA. After much financial modelling and discussion, we took a deep breath and plunged in. There were tight deadlines and at several moments when we didn't think we were going to make it with our reserves intact. But

we held our nerve and eventually managed to incorporate as a company. The GASG funds were signed over, and we were on our own - and haven't looked back since!"

The management of the GASG is now carried out by the Board of Directors supported on a day-to-day basis by the secretariat at the Source Testing Association.

Joe Watson served as Chair for over 20 years before being appointed President and was succeeded in 2015 by the current Chair, Jane Hodgkinson of Cranfield University. Kim Chandler (Johnson Matthey) was Vice Chair for several years before Peter Walsh (Health and Safety Executive) took over in 2016. Many dedicated members have served on the committee during the past 30 years and the group has only been able to fulfil its aims through their voluntary efforts.

Membership

Throughout its history, the GASG membership has included representatives from many of the sensor and equipment manufacturers in the UK, along with university research groups, government and private laboratories focusing on gas/particulate sensing and monitoring. Many large-scale users of such technology have also been active in the group. Membership has always been available to all teams and individuals with interests in gas sensing and analysis, and organisations outside the UK are also welcomed. Great efforts have been made to maintain fees at moderate levels and from the outset the group has sought to be as inclusive as possible, by offering tiered memberships at Academic/Consultant, Industrial and Corporate levels.

Notable early supporters included Mike Byrne (EI Electronics, Ireland), Stuart Hopkins, (formerly of SIRA and then a consultant), Rob Newbury, (then of Pollution Monitoring Systems and now a consultant) and Mike Williams (Cranfield University). Leading organisations which have featured strongly in the group's history include British Gas, City Technology, Crowcon Detection Instruments, E2V (later SGX), Kane International, EI Electronics and Edinburgh Instruments. In addition, the Health and Safety Executive has been a long-term supporter of the group, providing many speakers and hosting multiple meetings. Many gas sensing and instrumentation startup firms (such as Alphasense, formed in 1997) have also been enthusiastic members and have prospered alongside the group.

Inevitably there have been changes in membership over 30 years as organisations respond to developments in gas detection technology, applications and markets. However, overall numbers have been comparatively stable – there are typically over 50 members with wide-ranging interests.

Activities

The GASG primarily serves members by arranging themed technical meetings which focus on the latest developments in gas sensing and analysis, addressed by leading UK and international experts. These bring together manufacturers, users, research organisations and academic departments who share interests in the field. A key feature of all GASG meetings is the provision of ample opportunity for members to discuss current issues with speakers and each other in an informal atmosphere during breaks in the presentation programme. This is recognised as a significant strength of the organisation.

Three technical meetings per annum have been organised throughout the past 30 years, and only in extreme circumstances has the group failed to maintain this programme. Meetings are usually held in Spring, Summer and December (incorporating the AGM). Well over 50 different venues have hosted meetings, including leading sensor manufacturing sites, major technical research centres, university departments, a hospital, a naval



Original committee members celebrating the GASG 20th anniversary. The Institute of Materials, Minerals and Mining, London, December 2013.

dockyard and a brewery. The Institution of Engineering and Technology in London has been the location for several successful December meetings. These events usually feature a full programme of technical presentations from leading experts, lively discussions and tours of facilities wherever possible.

The unprecedented Covid pandemic of 2020-21 demanded that face to face gatherings were temporarily curtailed, but events moved online immediately with only one having to be cancelled. However, the new landscape drove the development of GASG online capabilities and subsequently a hybrid meeting approach. Although most members still prefer the traditional face to face format, which was reinstated as quickly as possible, the ability to attend meetings remotely is now an attractive additional option. Increased online participation has also enabled a significant expansion in the range of speakers who are now able to address meetings from afar, and experts in different locations and time zones have added greatly to the value of meetings.

GASG meetings continue to address wide-ranging topics dealing with technology and applications in environmental, industrial, medical and other fields where gas detection plays an important role. There have been over 500 presentations in total, dealing with subjects as diverse as the olfactory capabilities of dogs and bees, spectroscopic detection of gases in exoplanet atmospheres and the role of gas analysis in the early diagnosis and management of disease. Proceedings of the technical meetings are distributed to all members and the GASG now has a significant archive of presentations which speakers have generously shared.

Joint meetings have been held with other professional organisations having parallel interests, so enhancing further the benefits to attendees. These have included the Sensors for Water Interest Group (SWIG), the Optical Sensors Collaborative Association (OSCA), the Institute of Physics, the Royal Society of Chemistry and the National Physical Laboratory.

A regular and popular part of the programme in recent years

has been the Early Career Researcher meetings. These allow the upcoming generation of developers and researchers in gas, volatiles and particulate detection to showcase an eclectic mix of short talks or posters with prizes awarded for the best presentations. The GASG also supports students engaged in gas detection research and development who wish to present their work at relevant international conferences by the provision of travel grants. In return, recipients give a synopsis of their work at a GASG meeting.

The GASG has an ever-expanding online presence and has sought to embrace appropriate social media tools to improve engagement with existing affiliates and to attract new members. As the group enters its 4th decade, an improved website will be launched to simplify many of the member interactions and allow a streamlined access to the groups' archives.

Future

The UK gas detection community has a long and highly successful heritage. The technical and commercial successes of the industry are recognised at an international level, and it continues to be well served by trade groups such as the Council of Gas Detection and Environmental Monitoring (CoGDEM), and non-commercial organisations such as the GASG.

The enduring strength of the GASG is a testament to the vision of the founders and the engagement of the members over the past 30 years. Looking ahead, the group will continue to offer a unique environment for discussion and for the dissemination of information covering all aspects of gas and particulate detection and measurement across the widest possible range of applications. Efforts to expand the membership will place particular emphasis on attracting individuals and organisations who have not previously been well-represented, to the broader benefit of the increasingly diverse gas detection community.



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