

A trio of trends in gas analysis instrumentation

By Stephen B. Harrison

All good things come in threes. Digital solutions, innovative services, and step-changes in hardware are teaming up to transform the world of gas analysis instrumentation. This trio of trends is resulting in three significant benefits: simpler operations, lower CAPEX and a reduction in the cost of owning gas analysis instrumentation.

Augmented reality, cloud computing and QR Codes are three digital developments which are helping service teams keep gas analysis hardware in tip-top condition. Let's explore these trends in gas analysis instrumentation with the help of three experts from ABB's Measurement and Analytics business line.

1. Digital solutions

Modern gas analysis instrumentation incorporates cutting-edge analytical chemistry. The miniaturisation that has been achieved in building rapid response and highly accurate gas analysers is staggering.

The technology that is wrapped up inside these instruments has immediate parallels to the electronics sector. With this background, it is no surprise that gas analysers are leveraging digitalisation.

David Lincoln, Global Digital Lead at ABB's Measurement & Analytics business line goes one step further to explain why digital solutions matter. "The trio of digital solutions, great services and excellent hardware means we are working in the sweet spot and providing unrivalled value for money to our customers."

Augmented reality is one of the latest digital trends to be applied to gas analysers. As part of the ABB Ability™ suite of digital solutions, 'Remote Insights' allows an operator's instrument technician to communicate directly with an ABB expert remotely. It is a two-way video and voice

augmented reality interaction enabled by a handheld device such as a tablet computer. It means that the technician can share what they are seeing directly with their counterpart at ABB and get instant feedback about the best course of action. In the past, training, maintenance, troubleshooting and repairs all meant a service call-out. With Remote Insights, there will be many fewer airplane tickets required.

Another piece of bad news across the airlines is ABB's new 'Remote Assistance' collaborative cloud-enabled operations concept. Many industrial gases companies have implemented 'Remote Operations Centres' or ROCs. These are like the 'Remote Assistance' model. The concept relies on Condition Monitoring sensors in the gas analysers which can be interrogated to let the operator, or the service team at ABB, know the status of the gas analyser. This data can be shared with ABB experts who can diagnose consumable replacement requirements or equipment faults and guide the local operations team towards a speedy resolution.

Lincoln says that, "our Collaborative Operations centres are vibrant hubs of

"...we are working in the sweet spot and providing unrivalled value for money to our customers"

activity dotted around the world. Rows of computer screens and teams of experts reacting instantly to incoming requests for advice, they are amazing places to work."

Dynamic QR codes are a digital innovation that is being integrated into the ABB Measurement Care service offers to help operators get closer to 100% uptime availability for their gas analysis instrumentation. This uptime target is important for all users, but has special significance in regulated continuous emissions monitoring systems (CEMS) for environmental compliance. Measurement data must be reported 98% of the time to avoid shutdowns and penalties. The Dynamic QR code displays the latest system configuration data and the real-time analyser status. It communicates with a proprietary ABB App called ▶



► ‘my Installed Base (myIB)’ and can be scanned using a smartphone. The instrument owner can send the ABB service team real-time information so that an engineer can offer advice immediately or follow up with a site visit to fix the issue.

Picking up on another megatrend, Lincoln adds that “data privacy and data security are key topics in this digital age.”

“The Dynamic QR code technology is sensitive to this issue because there is no physical connection between an operator’s gas analyser to our systems and yet we can securely transfer the key data,” he says.

2. Innovative services

Maintenance can be avoided if it can be shown to be redundant. That saves time, cost and improves safety.

Digitalised services, such as the ABB Ability™ Condition Monitoring solution, have enabled ABB’s service teams to work with operators of gas analysis instrumentation to review the health of their analysers, onsite or remotely, to predict failures before they occur. For the first time, we are using historical data to begin the first steps in ‘predictive maintenance’. Essentially fixing little glitches before they escalate.

Adrian Heaton, Global Service Sales Manager for the Measurement & Analytics business line at ABB, outlines a recent case where the trio of ABB gas analysers, digital solutions and field service teams teamed up to support a major operating company in Italy. “Our customer was targeting immediate cost-savings and looking for a reliable service provider to

“Maintenance can be avoided if it can be shown to be redundant. That saves time, cost and improves safety”

support their installed CEMS gas analyser base across their 13 sites. To meet the cost-saving target, ABB offered a holistic approach including a standardised maintenance strategy across their sites with rapid response and optimised routine services.”

ABB Ability™ Condition Monitoring was implemented and the monthly review of the CEMS devices resulted in a maximised emissions data

reporting uptime and lower on-site service costs.”

Heaton continues, “At the same time our remote support capability has highlighted real savings to the customer because we can often reduce the number of scheduled site service visits. It’s through case studies like this that we have become certain that we deliver unrivalled value for money.”

‘Gold credit cards’ or ‘business class travel’ are examples from daily life where premium services are bundled together for those who value them. Offering a tiered range of services to gas analyser operators so that they can get what they most need whilst working within a budget, also seems to make sense. Following this trend, ABB offers Measurement Care packages which include a full

range of lifecycle services in a single service agreement.

Services are not new, but the trends when applied to gas analysis instrumentation are to offer more, to integrate them more closely with digital solutions, and to offer more flexibility about how they are consumed. “We will be there during the full lifecycle of a gas analysis instrument,” says Heaton. “Our services begin with product selection proposals, equipment installation, commissioning and training. In the operational phase the focus shifts to spare parts, consumables, maintenance, technical support and repairs. As time moves on, extensions, upgrades and retrofits are the order of the day. And, when twilight finally comes, it’s time to consider replacement and end-of-life services.”

“Our Measurement Care packages are a modular framework which allows each operator to customise a service package that meets their needs.”

3. Step-changes in hardware

The right gas analysis hardware can make a big difference. “The kit inside the box really matters and our product ►





► range is continuously evolving to ensure that our gas analysers are ideally suited to the application.” That’s how Stephen Gibbons, Head of Product Management for the Continuous Gas Analysers product range at ABB Measurement & Analytics, sees things.

“Take the example of combustion optimisation and CEMS from a steam methane reformer. The IGC Document 155/09/E highlights the

importance of oxygen, CO and NOx measurement in the stack emissions as best available technology. Our EasyLine product range can bundle together all the gas analysers that an SMR operator would need in one box for maximum simplicity and cost-effectiveness.”

Diving down one layer deeper, analysis of the total oxides of nitrogen (NOx) in the steam methane reformer (SMR) emissions is an area

where a major trend for gas analyser hardware is simplification. It has been common in the past to use the chemiluminescence analytical technique to measure NOx. The instrument needs an ozone generator and a catalytic converter operating at 300°C to oxidise NO to NO₂. That’s a lot of technology to pack into an instrument intended for use in rugged industrial applications.

Furthermore, the CLD technique cannot differentiate between NO and NO₂. On the other hand, the Limas gas analysers which ABB offers for NOx measurement are simple and robust UV gas analysers that can speciate between NO and NO₂. That’s a real step-change in performance, in this author’s experience.

At present, this gives an even greater level of environmental emissions visibility than is generally required, but as legislation shifts, the purchase of a gas analyser which can perform at this level can be considered as future-proofing the CAPEX investment.

Gibbons adds that, “On the oceans, gas analysers get the roughest possible treatment. Cruise ships on the Caribbean confront 10m waves during the hurricane season. That’s why we build our Limas UV NOx gas analysers into our GAA330-M marine CEMS system. We are on a mission to control our customer’s costs, cut complexity and make their CAPEX go further. That’s why we work tirelessly to continuously improve our comprehensive CEMS product range and all our gas analysers.” 

ABOUT THE AUTHOR

Stephen B. Harrison is celebrating 30 years involvement in industrial gases this year. He was previously global head of Specialty Gases & Equipment at Linde Gas, and spent more than 15 years with BOC Gases. He is now a consultant.