



Stable and **wireless**

Louise Davis speaks with leading industry specialists to discover the latest technical trends in condition monitoring and how they tie into maintenance strategies, the drive for greater automation, and everything else that combines to keep plants running efficiently

According to Michael DeMaria, director of product management, Fluke Reliability, the current major trends in condition monitoring centre around overcoming skills and resource constraints as plants push for near-continuous production. "There's a clear demand for simple, automated and low-cost solutions that enable continuous machine monitoring," states DeMaria.

"Many plants now adopt basic wireless sensors for real-time tracking, favouring ease of installation and functionality over complexity. AI-driven insights are also key, providing actionable outputs that streamline decision-making.

"However, skilled personnel remain essential for addressing issues when they

understanding the challenges: whether it is skill constraints, frequent machine failures, or inefficiencies in continuous operations.

"By delivering high-quality, frequently monitored data, we help identify faults at their earliest stages, moving beyond the simplistic 'green, yellow, red' model to provide actionable insights," he says.

"This method enables customers to operate efficiently, manage risks and make informed decisions. For reliability engineers and plant managers, it is not just about fixing a fault but understanding risks, improving production and aligning technical insights with business goals.

"Early fault detection and clear reporting



"By delivering high-quality, frequently monitored data, we help identify faults at their earliest stages, moving beyond the simplistic 'green, yellow, red' model to provide actionable insights"

Michael DeMaria, director of product management, Fluke Reliability

arise. With maintenance teams often understaffed, the focus is on solutions that balance simplicity, automation and effectiveness to keep production running smoothly."

Naturally, these solutions are all about the data. Fluke's own offerings, including its condition maintenance programme, Fluke Reliability, are both software- and hardware-based.

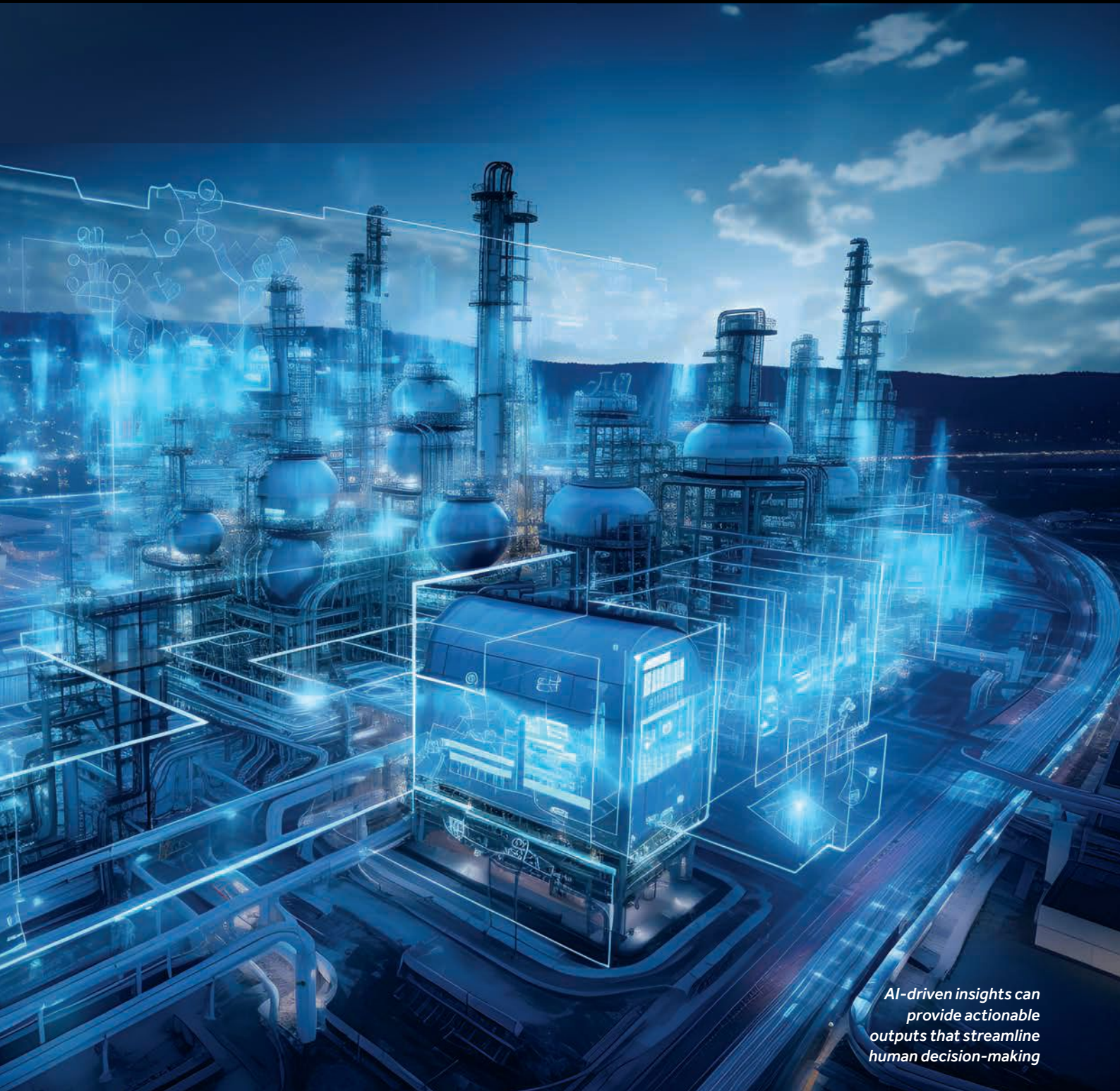
DeMaria explains that the firm targets operational efficiency, sustainability and reliability: "Our approach starts with

ensure optimised performance, reduced downtime and a stronger connection between technical data and organisational strategy."

ADVANCES IN AI

When asked about AI within the condition monitoring landscape, DeMaria says he believes that AI usage is about transforming data into meaningful insights. "What excites me about AI's evolution is its adaptability to users' skills and needs," he comments.





AI-driven insights can provide actionable outputs that streamline human decision-making



▶ “The same data can be interpreted differently by individuals with varying expertise, guided by AI. It also has the potential to train newcomers in maintenance tasks. Ultimately, AI excels at managing vast data sets and delivering insights that drive efficiency in ways tailored to both individuals and organisations.”

And for those concerned about ‘the rise of the machines’, DeMaria points out: “AI is not about replacing jobs but enhancing efficiency and empowering workers. Traditionally, automation focused on eliminating repetitive, low-skill tasks.

“Now, AI is advancing to support high-skill roles by processing large volumes of data, delivering accurate insights and presenting actionable information in plain language. This adaptability allows AI to cater to different skill levels, making data meaningful and usable for a variety of users.”

He also notes that AI has the potential to play a valuable role in training, guiding less experienced workers by presenting information tailored to their skill level and helping them grow. “By turning vast amounts of data into clear, actionable insights, AI complements human expertise, driving efficiency and skill development rather than replacing it,” feels DeMaria.

Enabling plants to make better use of machine data forms the heart of

Fluke Reliability’s ethos: “What sets our condition maintenance programme apart is its ability to provide a clear understanding of machine health and faults, translating that insight into actionable business value – all at scale,” explains DeMaria.

“Unlike many systems that are limited to specific hardware or monitoring approaches, our adaptable programme integrates seamlessly across a full suite of tools. Whether it is wireless, portable, or permanently installed systems, we deliver a unified platform that simplifies data acquisition and interpretation.”

Expanding on the advantages of Fluke Reliability, DeMaria notes that users do not have to juggle multiple platforms or reports: “Our single solution ensures consistent diagnostics, actionable insights and streamlined workflows across all data sources. By combining hardware from Fluke and Prüftechnik, advanced software and services from Azima, and workflow execution through eMaint, we offer an end-to-end solution.

“This approach not only validates repairs with data but also ensures work orders are completed with confidence, helping customers achieve a truly

Below: Fluke Reliability offers the Azima Trio brand of vibration analytics and condition monitoring tools



Left: Ryan Roaldson, director, product management, Baker Hughes

Right: AI tools can be used not to replace human personnel but to enhance their decision-making processes

efficient and reliable maintenance programme.”

QUALITY PROGRAMMING

Reliability is also the biggest driver of the work being done by Cordant Asset Health (a brand of Baker Hughes). Ryan Roaldson, director, product management, explains: “Condition monitoring is enabling operators to keep equipment running efficiently, reliably and safely. As workforce dynamics shift and there is an appetite for operators to reduce the level of staff in potentially dangerous roles, heavy industrial operators are increasingly shifting towards centralising and standardising their condition monitoring programmes.”

Roaldson details: “With this macro backdrop, some of the major trends that Baker Hughes is currently supporting customers with include: monitoring at scale (using AI to monitor a vast quantity of assets and detect meaningful change paired with first-principal failure mode detection that enables efficient corrective action planning); and professional support (service offerings designed to pair with software and hardware technology capabilities to augment client condition monitoring programs where resourcing gaps exist.)

Centralisation of data and workflow is also a key trend, where seamless and cyber secure connectivity of OT systems to the IT domain enables interconnectivity between asset health, work execution and other enabling business systems. Finally, scalable and



Below: Teledyne FLIR's thermography solutions form an increasingly popular part of the condition monitoring landscape



THE HOT TOPIC

Darrell Taylor at Teledyne FLIR is keen to highlight the merits of thermography as a valuable part of the condition monitoring toolbox. "Thermography is a powerful tool for preventative maintenance in manufacturing. By simply pointing an infrared camera at a piece of equipment, heat patterns and anomalies in equipment can be quickly detected," explains Taylor.

"For example, when a bearing exhibits excessive wear in a gear box, frictional forces rise and heat is generated. A thermal camera is capable of detecting this heat and thus specific components can be identified, and the appropriate remedial action undertaken."

In addition to being non-invasive, thermal imaging can also be carried out at a distance, meaning those difficult to access areas are all within reach. "And of course, all the analysis can be carried out whilst the machinery is still in operation, meaning production is not disrupted," observes Taylor.

Ultimately, if analysis is carried out at regular frequencies, valuable data can be obtained that can be used to track the condition of equipment over time.

Taylor comments: "This data-driven approach enables more informed decision-making and better planning of maintenance activities. Overall, thermography is an essential component of a robust preventative maintenance strategy, ensuring operational continuity and safety."

within expected outage window, or many other possibilities.

Favouring performant equipment is another example: where applicable, select equipment with the most efficient energy consumption profile while replacing assets experiencing


degradation that could impact performance."

And Roaldson says that 'maintain what needs to be maintained' is another key recommendation: "We take an 'always-on' approach to equipment maintenance, ensuring assets are fit-for-purpose. Optimising this process enables operators to focus on the

areas most in need of investment and repair, improving plant efficiency."

Like Michael DeMaria, Roaldson feels that condition monitoring can only benefit from the increasing application of AI-based solutions. "The sheer volume of data that is being generated by the sensors installed on equipment for process control and condition monitoring is staggering. With the shifting workforce dynamics previously mentioned, advancements in AI are fundamental to helping operators maintain the reliability of their equipment fleet with fewer (and distributed) condition monitoring practitioners," he comments.

Indeed, it is fair to describe Baker Hughes as an early adopter of AI as a technology enabler (both internally and for its customers through products and services, Roaldson points out).

Roaldson states: "As an engineering technology company with rich domain expertise and robust first-principle analytical models, we see considerable opportunities to combine the strengths of AI modelling technology to detect meaningful change with precise automated identification of failure modes based on our domain expertise. We refer to this as a 'hybrid' approach and we believe this is what will shape the future of condition monitoring." 

automated data collection is another trend here, where cost-effective, plug & play solutions enable more efficient and scalable data collection across the digital ecosystem."

Roaldson says that Baker Hughes' software applications enable operators to identify and profile areas of risk and opportunity, helping to manage equipment health and the optimisation of maintenance.

He explains: "We use data-informed objective recommendations to help customers focus on areas with the highest potential risk to safety, cost and production." What sort of areas does this cover, then?

"Orderly planning is one: early identification of equipment failure, meaning corrective responses are efficient whether it be for spare part sourcing or planning of maintenance