

RAM

INSIDER

MAINTENANCE, RELIABILITY & ASSET MANAGEMENT INSIDER

STRATEGIC INSIGHTS	FUTURE PERSPECTIVES	INDUSTRY INTELLIGENCE
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“Collecting data and creating value from data are two very different things.”

Industrial reliability is moving beyond simply collecting data to turning it into actionable maintenance intelligence. Mark Paul highlights the growing importance of electrical reliability within broader asset-management strategies and the need to connect inspection data with clear maintenance decisions. He discusses how risk-based monitoring, combined with technologies such as infrared, ultrasound and partial discharge, can provide a more complete picture of asset health. At the same time, the evolving role of reliability professionals remains central, with technology supporting rather than replacing human expertise. For Paul, the future lies in bringing data, technology and people together to create safer, more reliable operations and enable maintenance teams to act before failures occur.

Mark Paul
Global Director, Sales & Marketing
IRISS



MRAM
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October

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**Maintenance,
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Hemant Makhija, CMO, ImageGrafix, explores how connected technologies, AI and predictive maintenance are reshaping industrial operations, enabling smarter decisions, proactive interventions and a more data-driven maintenance workforce.

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Rahul Bisht, Vice President, CoE(II), RIL, explains why instrumentation reliability begins with engineering, lifecycle planning and architecture, while data, digitalisation and human judgement strengthen reliability decisions.

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From the Publisher's Desk

Over the years, Virgo has been committed to creating platforms that bring industries, businesses and professionals together around ideas that matter. MRAM Insider is a natural extension of that journey, created not simply as a publication, but as a platform for an industry that has an increasingly important role in the future of manufacturing and infrastructure.

The response to our inaugural issue has been encouraging. The conversations, insights and perspectives shared through the first edition found resonance with professionals across the maintenance, reliability and asset management ecosystem. It reaffirmed something we strongly believe: there is a need for industry conversations to continue beyond the boundaries of an event, a conference or an organisation.

That belief becomes even more relevant as we move closer to the MRAM Expo, Conference and Workshops, taking place from October 7-9, 2026, at BEC, Mumbai. The event will bring together the wider ecosystem: professionals, technology providers, solution partners, experts and industry leaders, under one roof. MRAM Insider is intended to build that connection before the industry meets in person, and to carry the conversations forward afterwards.

This is therefore more than the second issue of a newsletter. It is another step towards building a continuous knowledge and engagement platform for the MRAM community.

The MRAM Expo will bring the ecosystem under one roof. MRAM Insider gives that ecosystem a voice beyond it. Together, they are two sides of the same vision: bringing the industry together, giving it a platform, and keeping the conversation alive.

Welcome to the second issue of the MRAM Insider

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EXHIBITIONS (P) LTD

About MRAM Insider

When we launched MRAM Insider, the vision was simple: to create a dedicated editorial platform where the maintenance, reliability and asset management community could share knowledge, exchange perspectives and stay connected beyond exhibitions and conferences.

The response to our inaugural issue has been an encouraging affirmation of that vision. Volume 1, Issue 1 brought together voices from across the MRAM ecosystem, with conversations spanning the many dimensions of maintenance, reliability and asset management. From Ramesh Gulati's perspective on building reliability-led organisations to Dr. Harvinder Singh Gambhir's insights into the evolving reliability landscape, the issue explored how the industry is approaching some of its most important challenges. Perspectives from Dr. Kartik Fojdar and Dr. Navil Shetty further brought technical expertise and practical industry experience into the conversation, alongside the wider range of voices featured in the inaugural edition.

The response from industry professionals and stakeholders has been encouraging, with the first issue receiving positive

engagement and interest across the ecosystem. More importantly, it reinforced the need for a platform where these conversations can continue beyond a single event or conference.

That remains at the heart of MRAM Insider.

Our philosophy is simple: For the Industry. By the Industry. Of the Industry.

Every edition is therefore built around the people and ideas shaping the ecosystem, from reliability engineering and predictive maintenance to asset performance, technology adoption, operational practices and the experiences of professionals working on the ground.

The first issue opened the conversation. The editions that follow will take it further: bringing in more voices, exploring more perspectives and documenting an industry that continues to evolve.

Because the conversation around MRAM should not end when the event does. It should continue throughout the year.



“The Workforce is No Longer Reactive”: Hemant Makhija, CMO, ImageGrafix, on the Shift to Predictive Maintenance

As industrial organisations accelerate the adoption of predictive maintenance, IIoT, AI, and connected technologies, the focus is shifting from deploying individual digital solutions to building an integrated view of assets, operations, and maintenance. For industries managing increasingly complex infrastructure, this transition is influencing how equipment health is monitored, maintenance decisions are made, and workforce responsibilities are structured.

Hemant Makhija, CMO, ImageGrafix, points to connectivity as a critical component of this shift. According to him, adding technology without ensuring that different systems can communicate with each other can create complexity rather than operational value.

“Bring technologies, as long as these technologies are talking to each other, they are coherent, they’re looking at the problem at a holistic level, and not at an individual level,” Makhija said.

This connected approach is particularly relevant as industrial organisations move from reactive maintenance towards predictive and condition-based models. By combining IIoT devices, SCADA systems, mobile access, cloud platforms, and AI, maintenance teams can increasingly identify potential failures in advance, prepare the required spares and personnel, and plan interventions around asset conditions.

Makhija noted that this is also changing the role of maintenance personnel. Rather than responding at a preset time or only after equipment failure, technicians can receive advance information about potential issues and access digital tools to support troubleshooting. Augmented reality, for instance, can enable remote experts to see what an on-site technician is seeing and provide guidance without physically travelling to the asset.

At the same time, the growing volume of industrial data is creating a stronger role for artificial intelligence in maintenance and reliability. The objective, however, is

not simply to generate recommendations but to make those recommendations understandable and actionable.

“Oftentimes AI recommends, and we don’t know why it recommended,” Makhija said. He added that systems should provide the reasoning behind a recommendation and also learning from what users choose to do.

This becomes particularly important when reliability, asset integrity, maintenance, and operational decisions are viewed together. A connected ecosystem can bring asset history, maintenance frequency, spare-part availability, operating conditions, workforce availability, and other variables into a single decision-making framework.

For industrial assets operating across different environments, such context can influence maintenance requirements significantly. Factors such as heat, moisture, corrosive conditions, operating practices, and the time required to mobilise personnel or spare parts can all affect how maintenance interventions are planned.

Looking ahead, Makhija sees AI increasingly functioning as a decision layer over connected industrial systems. Rather than treating every data point independently, organisations can use information from assets to identify patterns, establish performance bands and support decisions around reliability, energy consumption, sustainability, and maintenance planning.

“The difference between me too versus I really do it well is in the utilisation of that data that is coming along,” he said, pointing to AI as an increasingly important layer in translating industrial data into actionable decisions.

For the maintenance and reliability ecosystem, the direction points towards greater integration between people, assets, systems, and data. As predictive technologies become more widely adopted, the value will increasingly depend not only on the technology deployed, but on how effectively organisations connect it to operational processes and decision-making.



“Bring technologies, as long as these technologies are talking to each other, they are coherent, they’re looking at the problem at a holistic level, and not at an individual level.”



Mr. Hemant Makhija is a global marketing leader and CMO with 30 years of experience spanning India, the Middle East, and the United States. Beginning his career in software development, he transitioned into product marketing and strategic leadership, working with organisations including Yahoo, Plex by Rockwell Automation, Newgen Software, Absorb Software, and Model N. His expertise spans AI-driven marketing, product launches, customer-centric storytelling, and KPI-led strategies that align sales, product, and marketing to drive measurable business growth.



Mr. Prashant Kapadia is the Chief Growth Officer at MachineAstro, with over 24 years of experience spanning industrial automation, embedded products, industrial software, and global business development. He has contributed to digital transformation initiatives for Fortune 500 organisations through roles associated with GE Digital, Hitachi, and CIMCON Digital. His expertise includes Industrial IoT, AI/ML, predictive and prescriptive maintenance, asset reliability, and digital transformation, helping organisations turn connected asset data into actionable insights for improved uptime and operational performance.

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From Data to Decisions: Why Predictive Maintenance Needs People, Process and Context An Exclusive with Mr. Prashant Kapadia, Chief Growth Officer, MachineAstro

Manufacturing has spent years investing in sensors, automation systems and predictive maintenance technologies, but the next phase of industrial reliability may depend less on generating more data and more on making existing data meaningful. For Prashant Kapadia, Chief Growth Officer, MachineAstro, the challenge begins with the reality of industrial infrastructure itself: unlike newer digital industries, manufacturing continues to operate large numbers of machines and automation systems that can be 20–30 years old.

While sensorisation has become increasingly affordable, extracting usable information from legacy SCADA, DCS and automation systems remains a significant challenge. Yet collecting data is only part of the problem. The larger opportunity lies in connecting that data with operational and process context so that it can support decisions.

“There is a lot of raw data, but putting the right context to convert into the actionable information, is where a lot of domain knowledge is required,” Prashant explains.

This shift from data to actionable intelligence is also central to the evolution of predictive maintenance. Prashant notes that a large majority of manufacturing organisations still rely on preventive, time-based or OEM-prescribed maintenance rather than systems capable of providing early warnings of emerging failures. But technology alone does not transform maintenance practices. Once an anomaly is detected, organisations must change how they plan interventions: using early warnings to schedule repairs during planned windows and convert unplanned downtime into planned downtime.

The same principle applies to how organisations define asset criticality. A small motor, gearbox or conveyor component can create a major production constraint if its failure interrupts an automated line.

Rather than assessing reliability asset by asset, manufacturers need to understand how the failure of any component can affect production, quality, efficiency and safety across the operation.

That wider lens also changes how maintenance effectiveness should be measured. Downtime, MTBF and MTTR remain important, but they need to be connected to business outcomes such as energy consumption, production efficiency, product quality and operational safety. Inefficient equipment can create costs long before it fails.

This broader focus on people, safety and operational resilience is highly relevant to manufacturers today. For Prashant, successful predictive maintenance therefore requires alignment across the organisation.

“Success comes from integrating people, process and technology, not from any one of them alone,” he says, arguing that change management and programme management are as important as the technology itself.

Looking ahead, Prashant sees IoT-enabled predictive maintenance becoming part of the modern manufacturing operating model, not simply as a tool for preventing breakdowns, but as an enabler of safer operations, lower energy consumption, improved efficiency and longer asset life. These priorities align closely with the Industry 5.0 approach, where technology is increasingly connected to human involvement, resilience and sustainability.

The final piece, Prashant adds, is choosing the right technology, sensors and implementation partner. As manufacturers move deeper into Industry 5.0, the value of reliability will increasingly depend not on how much data they collect, but on how accurately and effectively they turn that data into actionable information.



The Reliability Shift in a Data-Driven Industrial Era: Insights from Mr. Rajshekhar Uchil, Josts Engineering and Mr. Vinod, Fluke India

Condition monitoring has become increasingly accessible across industrial facilities, with technologies such as wireless sensors, vibration monitoring, thermal imaging, analytics platforms and remote monitoring systems now more widely available. Yet the presence of technology alone has not necessarily translated into more proactive maintenance practices.

The larger challenge, according to Mr. Rajshekhar Uchil, Dgm Technical, Josts Engineering, and Mr Vinod, Director, Business Development, Fluke India, lies in organisational adoption and execution. Many plants collect condition data without establishing clear processes for reviewing it, prioritising alarms and translating findings into maintenance actions.

“The challenge is moving from data collection to decision making. Successful reliability programmes combine technology, asset criticality analysis, skilled people, work processes, and management commitment.” says Mr. Uchil.

The shift towards continuous monitoring has also transformed how machine health is understood. While continuous data provides greater visibility and can identify developing failures earlier than periodic inspections, it can also create information overload. The value of AI and advanced analytics, therefore, lies not in generating more data, but in identifying exceptions, emerging failure patterns and areas requiring intervention.

This shift is also changing the role of maintenance and reliability professionals. With connected systems increasingly handling routine data collection, engineers are expected to interpret machine health information, identify failure mechanisms, prioritise maintenance activities and drive reliability improvement. Skills such as failure-

mode analysis, data interpretation, asset criticality assessment, root-cause analysis and communication are consequently becoming increasingly important.

Asset criticality remains central to this approach. Rather than monitoring every asset with equal intensity, organisations need to determine which failures could have the greatest consequences for safety, production, quality, environment and cost. Reliability investments should similarly be evaluated through the lens of risk reduction rather than simply as equipment purchases. Lost production, emergency repairs, safety incidents, quality losses and customer commitments can make the cost of an unplanned failure substantially greater than the initial monitoring investment.

For India, the next challenge is to ensure that reliability practices advance alongside industrial digitisation. Gaps remain in reliability culture, specialist skills and the integration of condition data with CMMS, EAM and maintenance-planning systems.

As Mr. Vinod says “The future is not about more data. It is about better decisions from the right data.”

Looking ahead, the industry is moving towards what the experts describe as autonomous reliability, where systems can detect anomalies, recommend corrective actions, generate work orders and optimise maintenance schedules. Yet the fundamentals remain unchanged: understanding asset criticality, identifying failure mechanisms and converting information into timely action. A seemingly minor issue such as machine misalignment, for instance, can progress into increased vibration, bearing and seal damage, higher energy consumption, shaft stress and ultimately an unplanned shutdown.



Mr. Rajshekhar Uchil is DGM – Technical at Josts Engineering Company, where he has been associated since 2007. With over 40 years of industry experience, he specialises in acoustic and vibration measurement and analysis systems, with additional expertise in process control and motion control. A BTech in Electronics and Communication from KREC, Surathkal, he also holds postgraduate qualifications in Advanced Management and Marketing Management. He is a Life Member of CVS, ISA, and the Acoustical Society of India.



Mr. Vinod Velayudhan is Director – Business Development at Fluke, with over 23 years of experience in business development, strategic sales, key account management and solution-based selling. He has played an instrumental role in establishing Fluke’s Integrated Solutions business and has led the introduction of technology solutions across public and private-sector markets. His expertise spans condition monitoring, asset reliability, predictive maintenance, industrial digitalisation and strategic account development. He currently leads Business Development, Fluke Integrated Solutions, and Condition Monitoring and Alignment.





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AI is like a kid. You start as an apprentice, and then you, you know, get to the top level where you are a reliability head or somewhere in that position.

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Mr. Ankit Dave is CEO of the AI Technology Division at Arix EnergiX Limited, with over 19 years of experience in enterprise software, industrial digitalisation and business leadership. A technology entrepreneur, he focuses on applying AI, IoT and enterprise platforms to maintenance, asset reliability and operational decision-making. He has co-founded technology ventures and developed solutions spanning preventive maintenance, inspections, asset management, condition monitoring and operational dashboards. Ankit holds an MBA in Finance and a DOEACC A Level qualification in Information Technology.

“AI Should Be Suggestive, Not Prescriptive”

Says Mr. Ankit Dave, CEO, Arix AI Technology Division, Arix EnergiX Limited, on AI-Driven Maintenance

As maintenance and reliability teams move towards connected asset management, artificial intelligence is emerging as a decision-support layer across maintenance history, condition monitoring, root cause analysis (RCA), failure mode and effects analysis (FMEA) and operational data. But before AI can improve reliability decisions, organisations need to address a fundamental challenge: whether their existing asset and maintenance knowledge is structured, contextualised and accessible.

Across industrial plants, years of equipment histories, inspection reports, work orders and sensor readings often remain distributed across ERP systems, spreadsheets, IoT platforms and other operational systems. This fragmentation makes it difficult for maintenance teams to turn existing information into actionable reliability insights.

According to Ankit Dave, CEO, Arix AI Technology Division, Arix EnergiX Limited, the starting point for AI-led maintenance is not simply deploying another technology, but building the right foundation around information generated on the shop floor.

“AI is like a kid. You start as an apprentice, and then you, you know, get to the top level where you are a reliability head or somewhere in that position,” Dave said, explaining how AI could potentially compress years of accumulated engineering knowledge if that knowledge is captured in a usable form.

A key challenge is the quality and context of maintenance data. Equipment records may show that a bearing was replaced or a feeder calibrated, without capturing the symptoms observed, corrective action taken or root cause behind the intervention. For AI to generate meaningful insights, information needs to be captured closer to the point where maintenance events occur, particularly from technicians and engineers who directly understand equipment behaviour.

This also requires connecting information across the asset management ecosystem. ERP and maintenance systems, DCS platforms, condition-monitoring technologies, IoT sensors

and process parameters can collectively provide the context required to understand asset behaviour. Rather than replacing these systems, an integration layer can bring their information together and help maintenance planners prioritise work based on risk, equipment condition and potential production impact.

The same principle applies to RCA and reliability improvement. Failure investigations often generate valuable knowledge, but the lessons can remain confined to individual teams, spreadsheets or reports. Structuring this information allows insights from one failure to be applied to similar equipment across plants.

“Unless you have got institutionalised knowledge, you won’t be able to bring in the reliability of the equipment or plant as a whole,” Dave said.

Generative AI could further extend these capabilities to the shop floor by allowing operators to report equipment issues in natural language while AI combines their observations with operating parameters, historical alerts and relevant follow-up questions. This could improve the quality of maintenance information while reducing the administrative burden on technicians.

However, AI-generated recommendations still need to be evaluated against actual plant conditions, safety requirements and engineering experience. “People should be treating AI as a suggestion, not a prescriptive tool,” Dave said, emphasising the importance of keeping engineers involved in maintenance and reliability decisions.

For the MRAM ecosystem, the opportunity therefore extends beyond predictive failure detection. AI can help connect maintenance history with current asset conditions, strengthen RCA and FMEA practices, make institutional knowledge accessible and support faster maintenance prioritisation. The transition, however, will depend on stronger data foundations and a structured implementation roadmap that connects digital tools to measurable maintenance, reliability and asset-performance outcomes.



“Collecting data and creating value from data are two very different things.” says Mr. Mark Paul, Global Director, Sales & Marketing, IRISS, Inc. on the Future of Data-Driven Industrial Reliability

Industrial reliability is entering a period in which the challenge is no longer simply detecting equipment problems. Industries now have access to sensors, predictive technologies, connected assets and increasingly sophisticated diagnostic tools. Yet the ability to translate all that information into timely maintenance decisions remains a significant challenge.

According to Mark Paul, Global Director, Sales & Marketing, IRISS, Inc., electrical reliability needs to become a much more integral part of the broader asset-reliability strategy. Electrical systems underpin almost every critical industrial process, meaning deterioration in an electrical asset can quickly extend into production losses, equipment damage, safety exposure and wider operational disruption.

This makes the distinction between collecting information and using it particularly important. “If the data does not lead to a clear maintenance decision, it becomes noise rather than intelligence,” Paul explains. The focus, he argues, should be on establishing meaningful baselines, identifying changes in asset condition and providing maintenance teams with information they can act upon.

This shift is also changing how organisations approach inspection. Rather than treating continuous condition monitoring as a universal replacement for periodic inspection, Paul advocates a risk-based approach. Asset criticality, likelihood and consequence of failure, accessibility, operating conditions and historical performance should determine the appropriate monitoring strategy. For critical assets, understanding what happens between inspection intervals can provide a significant advantage.

Technology is also enabling a more complete understanding of asset

conditions. Infrared, ultrasound and partial-discharge technologies can reveal different failure signatures, and combining these sources can provide greater context than relying on a single measurement.

At the same time, the industry faces a growing skills challenge. Technology can automate data collection and highlight developing problems, but it cannot eliminate the need for skilled reliability professionals. Instead, it changes where their expertise is most valuable, from manually collecting measurements toward interpreting information, validating conditions and making maintenance decisions.

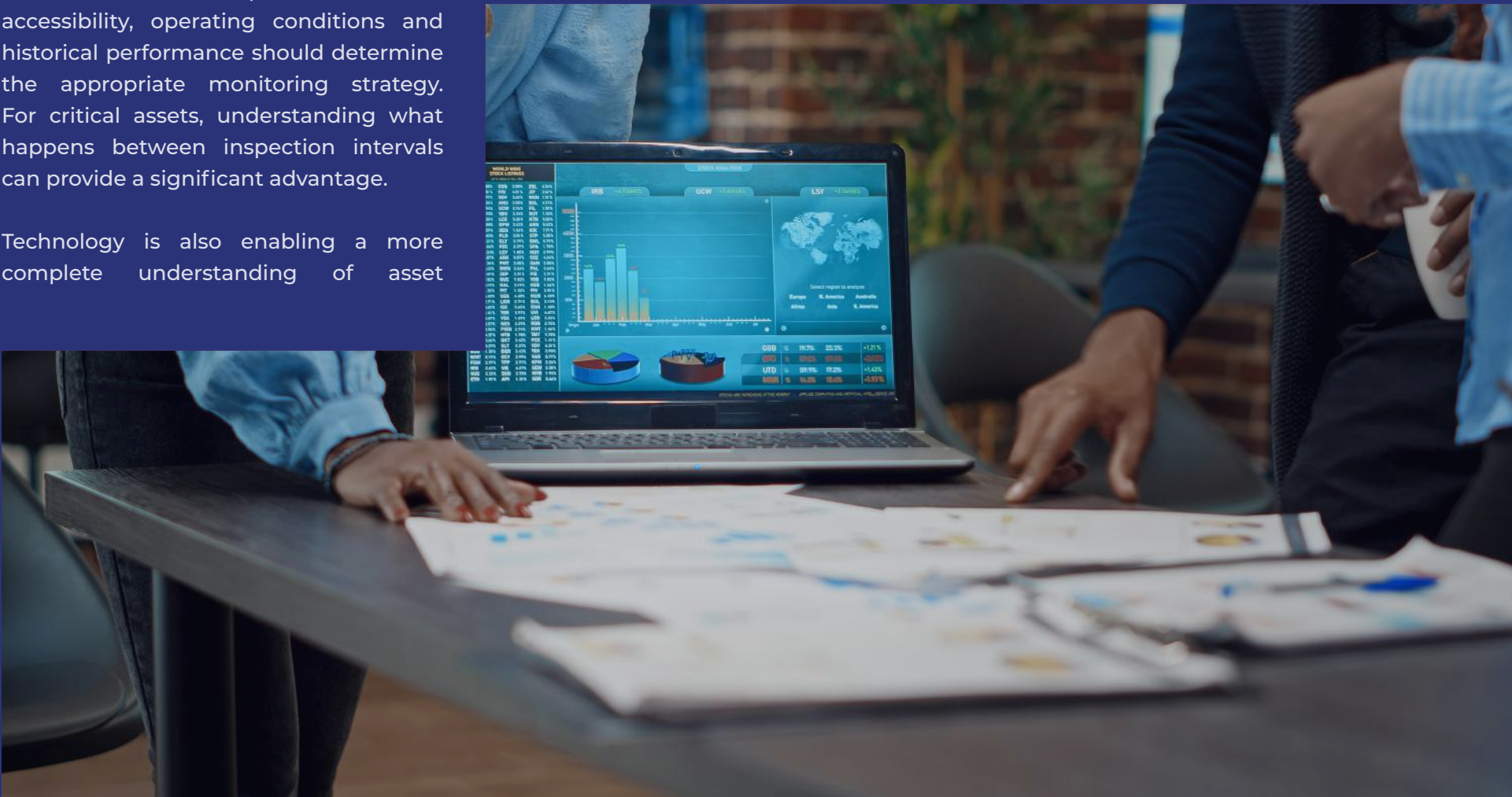
For Paul, the future of reliability ultimately depends on bringing technology, data and people together within the right organisational culture. “The ultimate objective is not predictive maintenance for the sake of predictive maintenance,” he says. “It is creating safer, more reliable operations and giving people the information they need to make better decisions.”

As industrial systems become more connected and increasingly dependent on electrical infrastructure, the next stage of reliability will therefore be less about acquiring more technology and more about using the right information, at the right time, to manage risk before failure occurs.



Mr. Mark Paul is Global Director, Sales & Marketing at IRISS, Inc., with extensive experience spanning electrical engineering, strategic sales, entrepreneurship and business leadership. His career includes roles with General Motors, GE and Siemens, providing a strong foundation in industrial engineering and reliability. At IRISS, he focuses on electrical safety, condition-based maintenance and asset reliability, helping organisations adopt proactive approaches to maintenance. A passionate educator and industry communicator, Mark regularly contributes to conferences, webinars, interviews and technical discussions.

“If the data does not lead to a clear maintenance decision, it becomes noise rather than intelligence”





“The differentiator isn’t the software — it’s whether site teams actually trust and use it.” says Mr. Mahesh Jadhav, CEO, SKYBRIDGE, on Driving Digitalisation in Energy Operations

The energy sector is entering a period in which operational excellence is being defined by more than availability and efficiency. Decarbonisation, digitalisation, changing demand patterns and growing expectations around resilience are pushing power and industrial operators to rethink how assets are designed, maintained and managed. Mr. Mahesh Jadhav, CEO, SKYBRIDGE, argues that the next phase will depend on how effectively organisations bring safety, technology and people together within a single operating model.

For existing industrial assets, the energy transition is less about replacing infrastructure and more about adapting what is already in place. Assets face changing fuel mixes, renewable integration and tightening emissions requirements, making flexibility and retrofit-readiness increasingly important. Asset-by-asset assessment is becoming critical, particularly as organisations weigh remaining operating life, retrofit potential, efficiency gains and capital requirements before committing to major investments.

Operational and maintenance practices are also becoming an important part of this transition. Improvements in combustion tuning, heat integration, leak management and predictive maintenance can address performance gaps without immediately requiring large-scale capital expenditure. At the same time, retrofits and fuel switching introduce new failure modes, making shutdown, turnaround and commissioning planning increasingly important to maintaining reliability.

Digital technologies are becoming central to this shift, with predictive maintenance platforms, digital twins, AI and advanced analytics being deployed across industrial operations. However, the value of these technologies increasingly depends on whether they solve clearly defined operational problems and generate measurable improvements.

As Jadhav puts it, “The differentiator isn’t the software — it’s whether site teams actually trust and use it.” This places workforce adoption alongside technology deployment as a key consideration. Digital tools need to fit existing workflows, while site teams need to understand and trust the insights they generate. Organisations are consequently shifting towards approaches where operations teams have ownership of the performance outcomes, rather than measuring success simply through system deployment or user numbers.

The definition of asset performance is also broadening. Alongside availability and efficiency, organisations are now considering emissions, resilience, supply-chain exposure, water use and long-term asset value. This

is changing asset management from a predominantly engineering-led function into a more integrated business discipline involving engineering, finance, risk, sustainability and external stakeholders.

Resilience, in particular, is moving further upstream. Rather than being treated solely as a response to disruption, it is increasingly being incorporated into asset design through redundancy, diversified supply arrangements and digital monitoring. Meanwhile, the growing importance of sustainability reporting is placing greater emphasis on data capture, traceability and site-level governance.

The workforce remains another critical element. Existing plants carry decades of operational knowledge, much of it held by experienced engineers and operators. Capturing and transferring that knowledge is becoming increasingly important as assets become more complex and experienced personnel move on.

Looking ahead, the industry is therefore moving towards predictive, condition-based maintenance, adaptable asset architectures, resilience by design and closer integration between engineering, finance and sustainability. For Jadhav, the underlying challenge is ensuring that these investments survive short-term pressures and become embedded in how organisations operate.

As he notes, “Build the governance and culture that protects long-term investment decisions from short-term pressure, because that discipline is what actually compounds into resilient infrastructure.”

The future of energy infrastructure will consequently depend not on any single technology, but on the industry’s ability to connect digital capabilities, asset strategy, workforce knowledge and long-term decision-making into a more integrated approach to operational performance.



Mr. Mahesh Jadhav is a project management professional with over 19 years of experience in the energy sector, specialising in complex project planning, execution, cost control and operational excellence. With an MBA in Oil and Gas Management and PMP certification from PMI, USA, he has served as Business Head of the Mechanical Service Division, leading project delivery and business operations. His expertise spans mechanical construction, shutdown and turnaround management, commissioning, subcontracting, capacity planning and continuous improvement across the energy industry.

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The bigger challenge is undoubtedly ensuring engineers can convert data into the right reliability decisions.

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Mr. Rahul Bisht is Vice President and Head – Reliability, Instrumentation at the Centre of Excellence, Reliance Industries Limited, with 36 years of experience across instrumentation, plant maintenance, project engineering, design and reliability engineering. An Instrumentation & Control engineer, he has expertise in DCS, ESD, PLC, analysers, Fire & Gas systems, anti-surge systems and SIL. His leadership has driven reliability strategies, obsolescence planning, standardisation and engineering best practices across RIL sites, alongside mentoring engineers and developing technical training programmes.

“The Reliability Conversation Has Moved Beyond Predictive Maintenance” says Mr. Rahul Bisht, Vice President, CoE(I), RIL, on Engineering, Data and Field Reliability

For large process industries, instrumentation reliability cannot be treated as a maintenance outcome alone. The reliability of an instrument system is shaped much earlier, during design, engineering and project execution, and decisions made at these stages can determine how effectively an asset performs throughout its lifecycle.

According to Rahul Bisht, Vice President, Centre of Excellence – Reliability Head (Instrumentation), Reliance Industries Ltd, more than 75% of an instrument system’s eventual reliability is determined during design and engineering stage. Maintenance teams can sustain the inherent reliability of a system but cannot compensate for weaknesses embedded in its original design & engineering.

Engineering specifications, equipment selection, control valve sizing, system architecture, grounding philosophy, type of cables segregation and routing etc all have a direct bearing on long-term reliability. Poor decisions in these areas can subsequently surface as recurring maintenance problems, making reliability an issue that extends well beyond the maintenance function.

The challenge becomes more complex as instrumentation systems remain in service for decades while technologies, software platforms and OEM support cycles move much faster. Rather than replacing systems prematurely or waiting until they become unsupported, lifecycle planning needs to be based on the obsolescence stage of individual subsystems/components. A multi-year life cycle approach can allow hardware, software, technology and cybersecurity upgrades to be undertaken with less disruption to plant operations.

The growing volume of plant data presents another shift in the reliability landscape. Smart instruments and connected systems have made data collection increasingly accessible, but the challenge is now converting that information

into meaningful reliability decisions. As Mr. Bisht noted, “the bigger challenge is undoubtedly ensuring engineers can convert data into the right reliability decisions.” Alarm overload, data silos and poorly rationalised notifications/alerts during engineering can prevent critical diagnostics reaching the right reliability decision.

This places greater emphasis on alarm rationalisation, diagnostic interpretation and engineering capability. Digital protocols such as Fieldbus and Ethernet-APL can accelerate data collection, but the ability to interpret the information remains critical to reliability decision-making.

At the architecture level, future-ready instrumentation is also moving towards universal I/O, open standards and decoupled systems regarding hardware & software, and sub-systems. Technologies and approaches such as Universal I/O, OPAF, NAMUR Open Architecture, Ethernet-APL and OPC UA can help plants address the gap between long asset lifecycles and much shorter technology cycles to some extent. Cybersecurity also needs to be incorporated into the architecture rather than treated as a later addition.

Yet, despite the expansion of analytics and predictive technologies, physical reliability remains a fundamental concern. “The industry treats instruments like software nodes, forgetting that an instrument is also a physical bridge between a harsh, volatile process environment and the automation layer,” Mr. Bisht said.

The physical interface introduces complex process and mechanical variables to the asset reliability framework, including friction, valve cavitation/flashing, thermal expansion, and mechanical failures in addition to utilities related issues of these instruments i.e instrument air quality, hydraulic oil integrity etc. Although advanced diagnostics

may identify electrical or software related anomalies, system reliability also relies on physical inspections, best practices, and field expertise.

Even though automation becomes increasingly sophisticated, human judgement remains central to connecting digital information with what is actually happening in the plant. Human judgement is more critical than ever because it bridges the vital gap between the HMI, digital logic, and the physical reality of the plant.

The broader implication for the maintenance, reliability and asset management ecosystem is clear: digitalisation needs to complement—not replace—engineering fundamentals. As Mr. Bisht said “Reliability has to be designed into instrumentation systems, supported through lifecycle planning, strengthened through appropriate architecture and ultimately validated against the physical realities of the process.”



Building a Smarter Approach to Asset Lifecycle Management: Q&A with Mr. N. P. Sundar, Fellow & Member – Governing Council, Council of Vibration Specialists (CVS)

N. P. Sundar, Member - GC, CVS and Independent Consultant, brings over 43 years of cross-functional industry experience, including 36 years with leading asset-intensive manufacturing organisations and subsequent consulting expertise. A Mechanical Engineer, Chartered Engineer and CMRP, he specialises in maintenance, reliability, asset integrity, process safety and digital transformation. He contributes to SMRP, IAM, BIS and ISO asset management standards. In an exclusive interview with Team MRAM, Mr. Sundar spoke about the evolution of maintenance and asset management, the role of digitalisation and predictive maintenance, the importance of integrated asset lifecycle management, and the capabilities that will shape the next generation of high-performing industrial organisations.

Q. Why do some organisations build systems that continuously improve, while others remain stuck despite investing in the same technologies and tools?

Sundar:

There are many differentiating factors for this and I would discuss a few. Today technology has become one of the primary organisational levers as well as business drivers and terms like digital transformation are used by many for their initiatives. In my view, while technology and tools are available to everyone and affordable to many, it's the approach and strategy of the organisations that matter. One needs to stop seeing technology as the solution for all their problems and opportunities and start with specific business areas that one wants to build and specific capabilities to be acquired leveraging technology.

Further adoption of technology and tools need to be based on a robust and appropriately mature management system (e.g. maintenance management, asset management) and aligned to an organisation's business strategy and digital strategy. In addition, developing a strategic and tactical approach to digitalisation of maintenance, reliability and asset management, implementing pilots and scaling up the implementation in the organisations significantly matter.

I would also consider effectively adopting the proven approach of people, process, technology and data, and most importantly, providing organisational change leadership and change management at all levels is critical.

Q: As organisations strive to improve asset performance, how important is it to align maintenance, operations, engineering and

leadership under a common governance framework rather than optimising each function independently?

Sundar:

Today asset performance management is a much-discussed topic across industries. For assets, asset systems and asset portfolios to deliver sustainable value for the organisation, it is very important to align maintenance, operations, and engineering functions and bring them under a common framework. I would rather extend this to the complete asset life cycle, from asset creation to disposal. Effective asset life cycle management, focused on an integrated approach to life cycle activities and life cycle value delivery, that are based on best practices, as suitable and appropriate for the organisation is the need. Life cycle value focuses on the optimisation of the balance between costs, risks, opportunities and performance of assets and asset systems at all life cycle stages. For example, asset performance measures such as safety, integrity and reliability are to be considered right from the asset creation (e.g. design and engineering) stage and managed across the life cycle.

Towards this, in my view, organisational leadership needs to consider bringing their asset life cycle management under an established framework of asset management with an effective asset management system focused on life cycle value. This requires both vertical alignment and horizontal alignment across the organisation. Horizontal alignment is not only across the functions of engineering, operations and maintenance but also the related functions like finance, procurement and contracting, HSE etc. Similarly, all these functions need to be vertically aligned by the leadership, what we call the

About MRAM Expo 2026

MRAM Expo 2026, taking place from 7-9 October at the Bombay Exhibition Centre, Mumbai, brings the Maintenance, Reliability and Asset Management ecosystem together around the technologies and practices shaping modern industrial operations. The exhibition will feature solutions spanning predictive and prescriptive maintenance, AI/ML-based diagnostics, digital twins, remote condition monitoring, IIoT, vibration, inspection and asset management, with exhibitors including ABB, IRISS Inc. and SPM Instrument India.

Beyond the exhibition floor, MRAM 2026 extends into two knowledge-driven platforms: the Conference and Workshops, giving visitors the



Mr. N. P. Sundar has 43 years of cross-functional experience, including 36 years with leading asset-intensive manufacturing organisations in India, followed by consulting. A Mechanical and Chartered Engineer, CMRP and business consultant, his expertise spans asset lifecycle management, maintenance, reliability, asset integrity, process safety, digitalisation and enterprise transformation. He is a member of SMRP and IAM, a Fellow of CVS and IIE, and a Life Member of AIMA and ISTD. He also serves on BIS MSD-12 and ISO Technical Committee 251 groups working on the development and adoption of international asset management standards.



line of sight, to asset management plans, asset management strategy, objectives, policy and organisational plans and objectives.

opportunity to engage with industry leaders, explore emerging ideas and gain practical insights. The MRAM Conference, to be held on 7-8 October, will feature leaders including Martin Robinson, Founder & CEO, IRISS Inc.; Amit Gupta, Division President, Motion Services, ABB India; Libu Mathew, Executive Director, HPCL; and Dr. Navil Shetty, President, IAM India, with discussions spanning asset lifecycle value, AI, digital twins, predictive technologies, risk-based strategies and operational excellence.

The expert-led workshops add a practical dimension, with sessions from CVS on vibration analysis and condition monitoring, IRISS on reliability development, ABB on digitalisation and smart maintenance, and IAM India on ISO 55000 and strategic asset management.

“Going Digital Is Not the Same as Being Digital” Mr. Manojkumar Chandrakumar, Founder, Principal Consultant, MaintAssets on Adoption Challenges Shaping Maintenance Digitalisation

Digital transformation is not about moving from paper to screen, upgrading technology or achieving go-live. None of these, by themselves, measure true digitalisation. The real question is: are we generating reliable, actionable data that can be used to make better decisions?

Maintenance digitalisation has moved beyond whether organisations should adopt technology. With ERP systems now established, attention is shifting towards enterprise operational technologies such as Enterprise Asset Management (EAM), Asset Performance Management (APM), IoT and AI. Yet implementing technology is not the same as making it work. The real measure lies in how deeply technology is embedded in maintenance processes, how effectively people use it, and whether the resulting data improves decision-making.

Preventive maintenance compliance is one example. A system may report 90% or higher compliance while technicians complete work in the field and update work orders days later. On paper, the KPI looks strong. In reality, there can be a gap between reported performance, captured data and actual maintenance activity. The KPI itself, therefore, is not enough. The more important question is whether PM data is trustworthy and reflects what happened in the field. When work is performed offline and recorded later, the system may show high compliance while the underlying data is delayed, incomplete or disconnected from the maintenance process. Decisions based on unreliable data can limit an organisation's ability to improve and respond effectively.

As Manojkumar Chandrakumar of MaintAssets observes, “I measure digital transformation by the richness and reliability of the data it produces. And that data quality comes from adoption, not from the technology itself.”

This becomes particularly important when migrating from legacy EAM platforms. Simply transferring existing asset hierarchies and databases can reproduce old problems in a new system. Migration instead provides an opportunity to prioritise critical assets, remove obsolete information and align data structures with current user requirements.

The same principle applies to preventive maintenance. OEM recommendations provide a starting point, but maintenance strategies also need to reflect the asset's actual operating context. Load, environmental conditions, maintenance history, probability and consequence of failure, and other operating factors can influence asset life and failure risk. This can help organisations move from generic maintenance schedules towards more contextualised strategies.

PM ultimately needs to reduce failure risk while supporting longer asset life and organisational goals. When an asset fails despite repeated PM, failure history should feed back into task content, frequency, operating conditions and monitoring strategies.

Technology alone, however, cannot ensure better asset performance. As organisations introduce AI, digital twins, prescriptive models, connected technologies and automation, training and change management can become secondary to implementation. Without preparing people for new processes and tools, even sophisticated systems may deliver limited value.

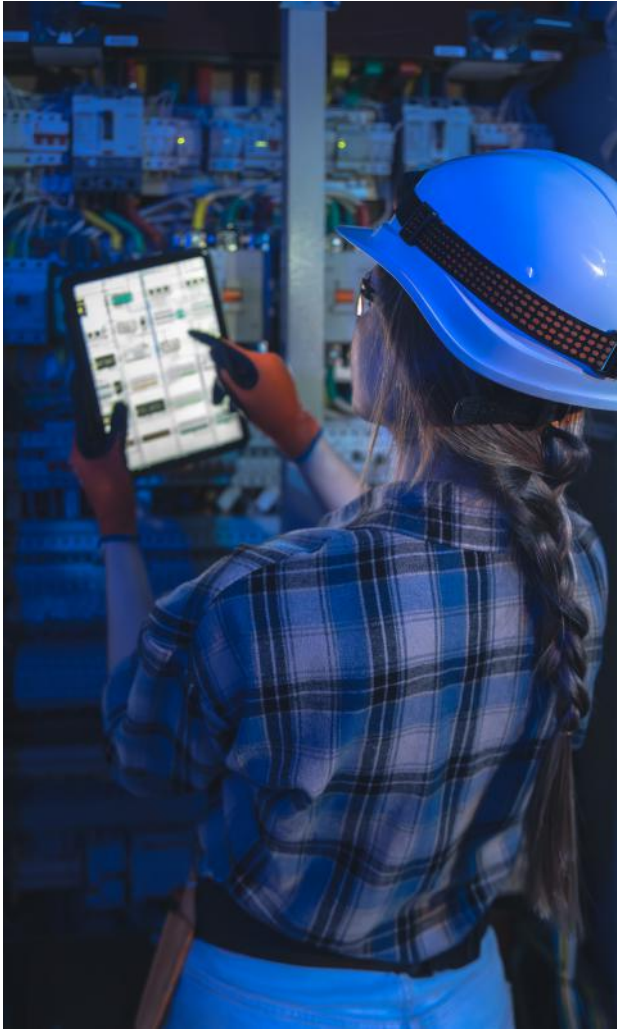
Governance is equally important when transformation involves multiple system integrators, technology providers and internal stakeholders. Clear responsibilities can help

bridge the gap between what users require and what technology teams deliver.

Leadership also needs visibility into how systems are being used on the ground. If a digital form is reduced to a simple yes-or-no response, an organisation may technically have gone digital without actually becoming digitalised.

As AI and connected technologies generate more information, organisations will need to determine which data actually matters. The future of maintenance digitalisation may not be defined by how much technology an organisation adopts, but by how effectively it takes decisions with integrated technology, people, processes and data.

Go-live is only the beginning. The real value emerges afterwards: through consistent adoption, continuous improvement, and the ability to turn maintenance data into better decisions.



Mr. Manojkumar Chandrakumar is Founder and Principal Consultant at MaintAssets, an independent client-side advisory firm focused on maintenance and asset-management digital transformation. With over 12 years of experience across TCS, Ramco Systems and Amazon, he has worked across EAM/APM transformation, functional consulting, product management, programme management and client-side PMO. His expertise spans IBM Maximo/MAS, Infor EAM/APM, asset data quality, digital maintenance and implementation governance. He holds a Master's in Advanced Manufacturing and is an APICS-certified CSCP.



“I measure digital transformation by the richness and reliability of the data it produces. And that data quality comes from adoption, not from the technology itself.”

Connecting Asset Health to Asset Performance: The Council of Vibration Specialists on knowing the condition of an asset to making better business decisions

In today's industrial environment, managing physical assets is no longer simply about maintaining equipment. The real objective is to ensure that assets consistently deliver the required function, reliability, safety, productivity and economic value throughout their life cycle. This calls for a fundamental shift from an equipment-focused approach to a system-oriented approach; from independent views to integrated views; and from conventional maintenance KPIs to reliability- and life-cycle-cost-focused performance.

The knowledge and technology required for this transition already exist. Reliability engineering has developed a rich knowledge base, while Industry 4.0/5.0 has brought powerful capabilities in sensing, connectivity, analytics, machine learning, cloud computing and predictive technologies. The challenge is no longer simply what technology is available, but how effectively knowledge, technology and people are brought together at the plant level.

For a plant, knowing the health of its critical assets is fundamental to managing reliability. Machinery vibration is one of the important windows into asset health, particularly for rotating equipment. But measurement alone does not create value. The real bridge is diagnostics, converting data into information, information into knowledge, and knowledge into an appropriate decision. This is where Asset Reliability & Diagnostics becomes strategically important.

Modern plants generate enormous volumes of data from machinery, processes, instrumentation and control systems, maintenance systems, supply chains, OEMs and service providers. IIoT, smart sensing, online surveillance, cloud platforms and advanced analytics can help capture, transmit and process this information at unprecedented speed. Machine-learning algorithms can support predictive maintenance and identify developing abnormalities. Remote monitoring can extend surveillance to inaccessible assets. Online diagnosis and knowledge-based auto-diagnostics can accelerate decision-making. But there is an important caution: technology does not automatically create reliability.

The industry already possesses sophisticated technologies. What is often missing is the mechanism to transfer and apply the associated knowledge effectively. Experienced plant personnel understand

machine anatomy, process behaviour, recurring "bad actors" and the practical consequences of failures. At the same time, modern asset management requires the integration of multiple disciplines maintenance, operations, reliability, instrumentation, process, engineering and management.

The need, therefore, is for supportive management, interdisciplinary collaboration and competent knowledge workers who can connect the digital information with physical asset behaviour and business priorities. This is particularly important because new technology can also introduce new risks. Data quality, data security, inappropriate algorithms, fragmented systems and misconceptions about technology can undermine the very decisions that digitalisation is expected to improve.

The evolution from business analytics to asset analytics represents an important opportunity. The question should not simply be 'What does the data show?' but rather What does this information mean for the health of the asset, the reliability of the system, and ultimately the performance of the business?

A streamlined maintenance strategy therefore needs a balanced approach combining IIoT, AI, Reliability-Centered Maintenance (RCM), Condition-Based Maintenance (CBM), Predictive Maintenance (PdM) and sound reliability engineering principles. The objective is not to replace human expertise with technology, but to augment human capability with better information and faster decision support.

The industrial world continues to face several challenges: gaps in reliability and maintenance knowledge, inadequate reliability culture, simultaneous technology initiatives, uncertainty about immediate versus future needs, and a persistent gap between academic knowledge and industrial application. The way forward is therefore not simply 'jump into digitalisation'.

It is- "Look before you leap. Jump, but ensure a safe landing"

CVS's journey, although rooted in vibration science, naturally extends into condition monitoring, diagnostics, predictive maintenance and reliability engineering. Vibration is one window into asset health; diagnostics is the bridge connecting





Dr. Tarapada Pyne is Founder Secretary & Director General of the Council of Vibration Specialists (CVS) and Director, Center for Reliability and Diagnostics, with over 45 years of experience across process plants, petrochemicals, refineries, metals and defence. A Mechanical Engineer, Chartered Engineer and PhD in Reliability Knowledge Management, his expertise spans asset and reliability management, machinery diagnostics, condition monitoring, vibration, asset integrity and operational excellence. He is also a Certified Reliability Professional, Energy Auditor and Vibration Specialist, and an author of 25+ technical publications.



asset condition to plant reliability and business performance. The larger opportunity is to create an ecosystem in which the right technology, the right competence and the right decision-making come together to deliver sustainable asset performance. That is the real purpose of connecting Asset Health to Asset Performance.

“The Transformation Is Not Just About Sensors, It Is About New Structures, New Processes, New Capabilities,” Say Mr. Leo Guan, Vice President, FOTRIC, and Mr. Manohar Chidurala, Business Unit Head, Renviro Systems, on the Evolution of Data-Driven Maintenance

Industrial maintenance is undergoing a fundamental shift from periodic inspection and reactive interventions towards continuous monitoring, predictive strategies and data-driven asset reliability. As sensing technologies, digitalisation, AI and advanced analytics become more accessible, industries are increasingly looking beyond individual technologies towards integrated systems that can support faster and more informed maintenance decisions.

A key development in this transition is the growing adoption of continuous condition monitoring. Rather than relying solely on scheduled inspections, industries are increasingly collecting data from assets over extended periods to identify trends, deviations and developing failure modes. This is expanding the role of sensing technologies across applications including thermal monitoring, vibration analysis, ultrasound, partial discharge and other non-destructive testing methods.

Leo Guan, Vice President, FOTRIC, noted that this transition is also changing how organisations structure their maintenance functions. Continuous monitoring requires skilled personnel capable of interpreting the resulting data, alongside new processes for data handling and implementation.

“The transformation is not just about sensors, it is about new structures, new processes, new capabilities,” Guan said.

At the same time, condition monitoring is increasingly being integrated with CMMS, enterprise asset management and production systems. Manohar Chidurala, Business Unit Head, Renviro Systems, pointed to the growing use of multiple technologies together rather than relying on a single condition monitoring technique. Vibration, ultrasound, oil analysis, thermography, electrical signature analysis, partial discharge, NDT and process information can collectively provide a more comprehensive view of asset condition.

This integration is becoming particularly important as industries seek to move from predictive towards proactive and prescriptive maintenance. Data from multiple sources can be evaluated to support maintenance decisions, identify abnormal trends and detect developing failures earlier. Digital and edge technologies are also helping reduce the cost of monitoring individual assets, making continuous monitoring increasingly viable across a wider asset base.

However, technology adoption continues to depend heavily on organisational readiness. Chidurala identified organisational culture, skilled resources, technology integration and management commitment as important factors in building effective reliability programmes. Fragmented data and limited knowledge across different maintenance technologies can restrict the ability of teams to interpret asset conditions accurately.

“Overall, the condition monitoring maintenance requires a combination of the technologies, engineering expertise, process knowledge, skillful human resources, data integration, culture of continuous improvement,” Mr. Manohar said.

AI and advanced analytics are adding another layer to this evolution by helping engineers process large volumes of asset data, identify patterns and highlight critical deviations. Both speakers emphasised that these technologies are emerging primarily as decision-support mechanisms rather than replacements for engineering expertise. Human validation remains essential in translating analytical outputs into appropriate maintenance actions. Manohar Chidurala has strongly recommended that industries build Reliability Leaders to the extent possible to mitigate the risk of talent and brain drain.

The next phase of industrial reliability is therefore likely to be shaped by the convergence of affordable sensing, continuous monitoring, integrated data, AI-driven analytics and stronger reliability practices. The focus is shifting from simply detecting faults to understanding asset behaviour, anticipating failures and continuously improving maintenance and operational performance.



Mr. Leo Guan is Vice President at FOTRIC, with over 20 years of experience in the Test & Measurement industry. Having held leadership roles at Fluke and Teledyne LeCroy, he combines expertise in thermal, acoustic, signal and vibration technologies with strong sales and business development experience. At FOTRIC, he has driven significant growth across China, APAC, the Middle East, Africa and Oceania, while developing industrial applications in predictive maintenance, leakage detection and energy efficiency.



Mr. Manohar Chidurala is a Reliability and Condition Monitoring professional with over 35 years of experience in Condition Monitoring, Predictive Maintenance and Asset Reliability across India, the Middle East and North Africa. A Mechanical Engineer, MBA in Technology Management and Chartered Engineer, he holds certifications in vibration analysis, ultrasound, thermography, partial discharge and asset reliability. His expertise spans predictive and condition-based maintenance, NDT, oil analysis and reliability engineering, helping organisations improve asset performance and operational excellence.



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MRAM CONFERENCE AGENDA

7 OCTOBER 2026, WEDNESDAY

- ◆ 12:30 PM - 1:30 PM From Efficiency to Excellence: Delivering More Value from Asset-Intensive Operations
- ◆ 2:30 PM - 3:00 PM Fireside Chat - The Future of Work in Maintenance, Reliability and Asset Management: Building Skills and Competencies that Matter
- ◆ 3:00 PM - 3:20 PM Presentation by SPM Instrument India Pvt. Ltd.
- ◆ 3:20 PM - 4:20 PM Building High Reliability and High-Performance Organization

8 OCTOBER 2026, THURSDAY

- ◆ 11:00 AM - 11:15 AM Industry Address - Reimagining Asset Management: Integrating Intelligence, Reliability & Safety
- ◆ 11:15 AM - 11:30 AM Presentation by ImageGrafix
- ◆ 11:30 AM - 12:30 PM Intelligent Assets : Scaling AI, Digital Twins & Predictive Technologies
- ◆ 12:30 PM - 1:30 PM Risk-Based & Reliability - Centred Asset Strategies (RCM/RBI) for Operational Excellence
- ◆ 2:30 PM - 3:00 PM Fireside Chat - Leading Organizational Transformation in Maintenance, Reliability and Asset Management
- ◆ 3:00 PM - 4:00 PM Asset Integrity, Reliability & Safety: A Unified Approach for Operational Excellence
- ◆ 4:00 PM - 5:00 PM Next-Gen Asset Management: Integrated Strategies for Sustainable Value Creation & High-Performance Operations

Scan to Attend



MRAM WORKSHOP AGENDA

7 OCTOBER 2026, WEDNESDAY

- ◆ 2:30 PM - 5:30 PM Council of Vibration Specialists

Vibration Analysis : Connecting the Asset Health to Business Performance

8 OCTOBER 2026, THURSDAY

- ◆ 10:30 AM - 1:30 PM Iriss Asia Pacific Private Limited

Operations Driven Safety & Sustainability and Reliability: The Future of Reliability Development
- ◆ 2:30 PM - 5:30 PM ABB

Modernizing Industrial Assets for Reliability, Efficiency & Sustainable Performance

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9 OCTOBER 2026, FRIDAY

- ◆ 10:30 AM - 1:30 PM Institute of Asset Management, India

Asset Management : A Strategic Framework for Enhancing Value from Maintenance and Reliability