

# Achieving Resilient Operations through AI, Digitalization and Sustainability

ARC INDUSTRY LEADERSHIP FORUM 2026

NOVEMBER 10-12, RIO DE JANEIRO, BRAZIL

*“The evolving geopolitical framework is reshaping trade and investment across North America, South America, Europe, the Middle East, India, and the Far East.”*

For established economies this means broader access to global growth markets.

For emerging economies this means manufacturing capacity and investment in up-to-date manufacturing technologies may continue to expand.”




© ARC Advisory Group

# INTRODUCTION

## November 10-12, 2026 - Rio de Janeiro, Brazil

- ARC organizes forums worldwide focused on thought-leading concepts that will affect your future. For over 25 years, ARC Forums have attracted leaders in user and supplier communities for a concentrated networking and learning event.
- The Forum 2026 will be held in Rio de Janeiro, the 2027 event is planned to take place in Uberlândia.
- Around the globe, ARC Forums have become the “must attend” event for leaders and decision makers in the industry. Here, asset owners and operators meet their peers and inform themselves about the latest technology trends. Our events are established in US, Europe, Singapore, Japan, and India. ARC Forums are designed to deliver value to C-level and strategic thinkers in our technology supplier and end user communities.
- Forum presentations and workshops give sponsors the opportunity to discuss the needs and challenges of user companies and present solutions and developments.
- Sponsoring ARC’s upcoming Brazil Forum provides your company with premier access to a unique, high-quality audience. This includes a balanced share of supplier and end user attendees, as well as a significant representation from industry organizations, adding the opportunity for brand development, relationship building and success story publication.

## Attendee Testimonials from Previous Forums

> The ARC European Industry Forum in Barcelona **was a success!** It truly revealed where process control is heading. The event was not just about discussing new topics and themes in the automation industry. It also had **great content showing how users can make the change.**
>
> **Shell**

> … **fantastic presentations!** Kind of a mix of future ideas with tensional delivery of them now. Really nice Forum and I think you got a **great mix of expertise** here.
>
> MILACRON

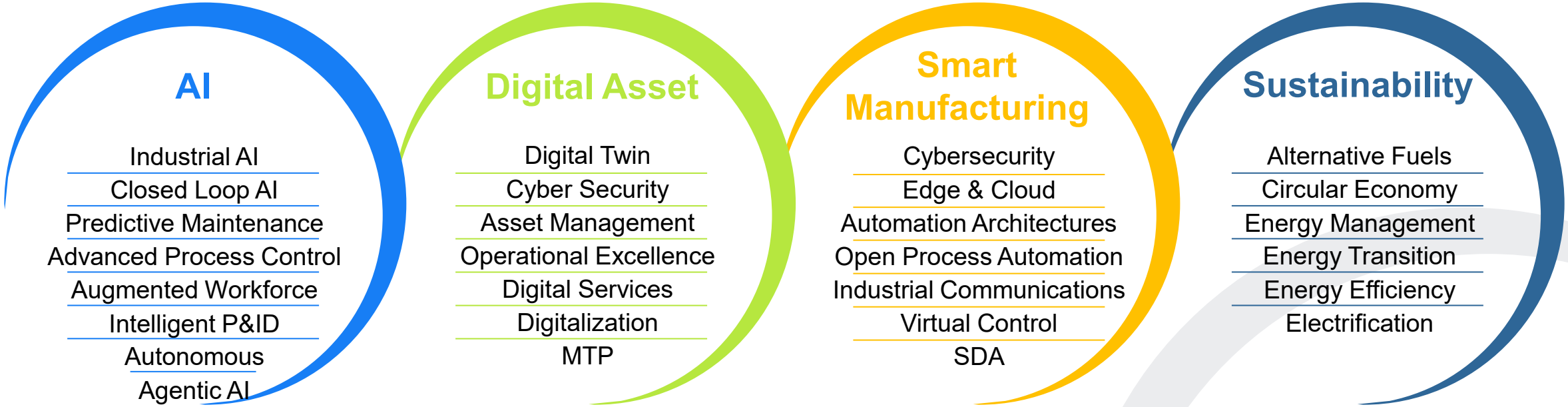
> Day 2 at the ARC Advisory Group Europe Leadership Forum with Renato Pacheco Silva from the UniversalAutomation.org member **Aimirim explaining how Software-Defined Autonomous Operations are rising** supported by Open Software Defined Automation. **Great insights!**
>
> UAO **UniversalAutomation.org**

## European Industry Forum Highlights

**Scan the code**
to explore highlights from our recent European forums.

# AREAS WE COVER

**Our forum features the most interesting topics for all industries.  This is backed by ARC research and experts in their domains.**





© ARC Advisory Group

# KEY INDUSTRIES

## ARC is at home in the manufacturing world

At our event, we typically have people representing the following industries:

- Aerospace & Defense
- Automotive
- Cement & Glass
- Chemical
- CPG, Food & Beverage
- Electric Power & Smart Grid
- Energy Transition & Sustainability
- Life Sciences
- Metals & Mining
- Oil & Gas
- Pulp & Paper
- Water & Wastewater




© ARC Advisory Group

# AGENDA

**ARC Industry Forum Brazil** · Rio · November 10–12, 2026

Plenary & Keynotes | Workshops | Networking & Meals

## Day 0 · Arrival

**18:00** Arrival, Registration, and Reception

**19:00** ARC Hosted Dinner

## Day 1 · Main Day

**09:00** Welcome (ARC)

**09:20** Keynote: Aimirim & ADM

**09:50** SMAR + Customer

**10: 20** Coffee Break

**11:00** Plenary Discussion: Brazil's Role in the Global AI Race

**11:40** Plenary Presentation

**12:00** Lunch

**13:00** Energy Transition
Moderator: ARC
Presenters: Acelen, Nestle

**13:00** Hackaton
Moderator: Aimirim

**15:00** Coffee Break

**16:00** AI
Moderator: ARC
Presenters: Acelen, BAT, Vivix,

**16:00** Cybersecurity
Moderator: ARC & ISA
Presenters/Panel: ABB, CEDAE, Petrobras, Radix

**18:00** Plenary Discussion
Autonomous operation and resilience. What is it and how do we get there?

**19:00** Dinner sponsored by ARC & Partner

## Day 2 · Closing

**09:00** Welcome (ARC)

**09:10** Keynote: Siemens & Vale

**09:30** OPC UA Use Case

**10: 00** Coffee Break

**10:30** Digital Asset
Moderator: ARC
Presenters: Acelen, Petrobras, Vale

**10:30** Smart Manufacturing
Moderator: ARC
Presenters: Braskem, EY

**12:30** What is ODE (Petrobras)
Forum Wrap Up and Closing (ARC)

**13:30** OPAF Workshop
Moderator: OPAF
Presenters: Aimirim, Petrobras




# PLENARY HIGHLIGHTS

© ARC Advisory Group

# ADM CASE STUDY: AN INTELLIGENCE LAYER OVER THE PLC ADVANCED ADAPTIVE CONTROL WITHOUT REPLACING EXISTING AUTOMATION



Caio Augusto de Souza Silva

Senior Continuous Improvement Engineer

Senior Continuous Improvement Engineer at ADM, part of the Manufacturing Data Intelligence team responsible for digital transformation and innovation in industrial operations. Brings 12 years of experience in artificial intelligence and has provided AI consulting to more than 90 companies. Has managed dozens of technology projects, including industrial applications of AI, automation, process simulation, and digital twins. Holds bachelor's degrees in Science and Technology and in Automation and Control Engineering, as well as an MBA in Leadership and Innovation.

Modernizing control systems in existing industrial facilities (brownfield) often presents a tough dilemma: replacing legacy automation requires high capital expenditure and extended downtime, while relying on conventional control (PID) limits efficiency and maintains high variability in steam generation.

In this plenary session, ADM shows how it added an upper layer of intelligence on top of the plant's existing automation infrastructure, eliminating the need to "rip and replace" PLCs or supervisory systems.

By applying Industrial AI and closed-loop Advanced Adaptive Control, the solution overlays predictive algorithms that dynamically adjust process parameters to anticipate disturbances in the biomass boiler, ensuring complete operational integrity without altering the system's safety interlocks.

ADM

Aimrim

# PLENARY DISCUSSION

- Our plenary discussions aim to bring multiple perspectives at a table and discuss topics in front of the big plenary.
- ARC Forum audience is often highly engaged and, if possible, will have the chance to engage as well.
- While the rough topic is defined by ARC in front of the forum, the pre-discussion with the participants will shape the final form of the discussion. If you want an impression, https://www.arcweb-europe.com/wp-content/uploads/2026/06/D2_Digital-Twin-Unchained.mp4
- **Brazil's Role in the Global AI Race**
  US and China have the lead in top end models. Europe is leading in selected industrial AI applications. But where is Brazil? Will Latin America be totally dependent on SW and HW from partners in China and USA? And what consequences will this have? Are there still areas, where Brazil can lead the AI Race?

  Participating companies: Siemens, EY, VIVIX

- **Autonomous operation and resilience. What is it and how do we get there?**
  Autonomous operation, self optimizing, self controlling plants, the dream of many engineers. With AI, this dream may become true at last. The discussion will involve questions such as: Can we achieve full autonomy? If yes, who will remain in the driving seat and how? How much autonomy is "good"? How are autonomous operations and resilience – the ability to withstand in turbulent times – related?

  Participating companies: Acelen, Aimirim, Petrobras, Siemens



# WORKSHOPS

ARC Advisory Group

# ENERGY TRANSITION

## Responsible at ARC



Luciano Narcisi

Director of Research at ARC

“The era of abundant, predictable energy is over. Success now depends on mastering complexity through integrated data, AI-driven optimization, and resilient energy ecosystems.. ”

## Sponsors and Partners

Nestlé

acelen

Energy transition is becoming a central pillar of the industry. From a world, where energy supply was taken for granted, we have arrived in today’s world, where the supply and demand side are changing.

As companies diversify energy sources, operational resilience depends on integrating plants, energy systems, and data, enabling AI to optimize performance, profitability, and supply security.

This session explores how industrial companies are navigating in this field, the role of technologies (edge computing, artificial intelligence), and the chance to convert the current complexity into a competitive advantage.

The session offers a forward-looking yet pragmatic view of how technology and energy strategies together are enabling a more sustainable industrial future.


© ARC Advisory Group

# AI

## Responsible at ARC



Florian Güldner

Managing Director, Europe

“We cannot effort to not do it and we cannot effort to be slower in adoption than our competitors. AI will support us in addressing the big challenges in manufacturing in the 21st century.”

## Sponsors and Partners

vivix vidros planos

British American Tobacco

acelen

Industrial AI is reshaping the competitive landscape, triggering a race across industry to adopt and scale AI-enabled operations. While the hype surrounding AI is significant, leading organizations are already capturing measurable value through improved efficiency, productivity, reliability, and decision-making.

This session will explore how AI is transforming the way industrial companies operate, manage assets, and optimize business performance, setting new benchmarks for operational excellence.

Attendees will learn about practical AI applications, from intelligent agents and predictive analytics to autonomous operations, and the critical role of data foundations, system integration, user adoption, and scalability in turning AI ambition into sustainable business results.

As AI becomes a strategic differentiator, organizations that establish trusted data ecosystems and scale AI effectively will be best positioned to drive profitability, resilience, and long-term competitive advantage.


© ARC Advisory Group

# SMART MANUFACTURING

## Responsible at ARC



Florian Güldner

Managing Director, Europe

“When I started at ARC, presentations features PLC and IO module diagrams. We have gone a long way to now discuss virtual controllers, but adoption is slower than it could be.”

## Sponsors and Partners

Braskem

EY

smar Technology Company

The convergence of Information Technology (IT) and Operational Technology (OT) is reshaping industrial architectures. As organizations adopt edge-to-cloud strategies and software-defined automation, control systems are increasingly being deployed through virtualized platforms, containers, and cloud-native technologies. These developments promise greater flexibility, scalability, interoperability, and faster innovation cycles, while enabling more agile and data-driven operations.

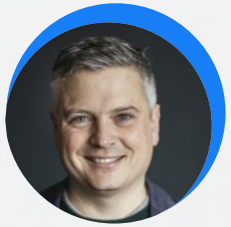
However, the transition is not without challenges. Many organizations must strengthen IT capabilities, modernize infrastructure, and address the performance, cybersecurity, and reliability requirements of industrial environments. At the same time, the industry is working to balance the benefits of virtualization with the deterministic performance needed for mission-critical and real-time control applications.

This session will explore the future of industrial control architectures, examining the technologies, strategies, and best practices that are enabling the next generation of connected, software-defined, and autonomous operations. Industry leaders will share lessons learned, emerging trends, and practical approaches for accelerating the digital transformation of control systems while maintaining operational resilience and performance.


© ARC Advisory Group

# DIGITAL ASSET

## Responsible at ARC



Luciano Narcisi,

Research Director at ARC

“My work in the ARC user groups showed me that the digital asset is necessary to gain the next level of productivity but it can only be reach through an eco-system approach”

## Sponsors and Partners

SIEMENS

BR PETROBRAS

VALE

acelen

Digital twins are evolving from engineering and visualization tools into strategic platforms that enable organizations to optimize assets, processes, and entire operations.

By creating dynamic, real-time representations of industrial environments, they support better decision-making, improved operational performance, and accelerated innovation. However, many companies struggle to move beyond isolated use cases and pilots.

Unlocking the full value of digital twins requires more than technology, it demands strong data foundations, seamless integration across OT and IT systems, and an open ecosystem approach that enables information to flow across assets, applications, and business functions. Only through openness, interoperability, and scalability can organizations create connected digital twins that deliver enterprise-wide value.

This session will explore the architectures, technologies, and best practices that are enabling the next generation of digital twins and helping organizations drive efficiency, resilience, sustainability, and business performance at scale.


© ARC Advisory Group



# SELECTED SPEAKERS

# BIOFUEL TRACEABILITY SOLUTION: DIGITAL CHAIN OF CUSTODY FOR SUSTAINABILITY AND CERTIFICATION




Maurício Rodrigues Capela Júnior

Digital Solutions Specialist

Acelen



Nicolas Glanzmann

Senior Regulatory Analyst for Decarbonization

Acelen Renewables


Mauricio Capela is a Digital Solutions Specialist at Acelen specializing in digital transformation across IT and OT environments. His background combines telecommunications engineering, IT governance, project management, and agile leadership in industrial software and digital solution deployments.

Nicolas Glanzmann holds a PhD in Chemistry and works as Senior Regulatory Analyst for Decarbonization at Acelen Renewables, focusing on sustainability certification, regulatory frameworks, and carbon accounting for renewable fuels.

In renewable fuels, a sustainability claim is only as strong as the evidence behind it. At Acelen Renewables, we plan to operate across the full SAF and HVO value chain, from farming and logistics through milling and HEFA processing. This requires robust documentation, chain of custody, emissions calculations and auditable evidence to support ISCC certification and the U.S. EPA's Renewable Fuel Standard (RFS)

Spreadsheets, scattered documents and manual consolidation complicate traceability, version control and data reliability. Digitalization addresses these gaps by placing data in context, automating workflows and preserving a traceable history of sustainability information across the value chain. We translated sustainability and certification requirements into business rules, workflows, emissions calculations and a traceable data structure.

The first implementation covers the farm stage. It manages documents and data from multiple farms, integrates operational data sources and supports blockchain-based transaction recording to create an immutable and independently verifiable record of critical sustainability and carbon-related information throughout the chain of custody. Blockchain is used as a trust layer rather than as the primary data repository. Relevant transactions, certifications, sustainability attributes and carbon-related records can be cryptographically registered, creating an immutable history.

The platform calculates emissions using EU RED rules and GREET-based methods, while its workflows structure the evidence required for certification and audit preparation. The operations team already uses the platform to monitor and calculate emissions from farm operational data. Farm workflows standardize how minimum certification requirements are addressed. Audits conducted outside the platform are helping consolidate these requirements and guide final adjustments so that subsequent audits can be supported within the platform, with a progressively more complete and auditable digital record.

The farm implementation lays the foundation for a sustainability digital thread across the value chain. As SAF and HVO production expands, the architecture can extend the same principles of traceability, data integrity and chain-of-custody assurance across farming, logistics, milling, processing and final product certification.

# INCREASING ENERGY EFFICIENCY THROUGH ADVANCED AUTOMATION



Danilo de Faria

Global Digital & Automation Leader

Nestle

Leading the global Digital and Automation at Nestle, Danilo has more than 30 years of experience in F&B industry in different areas and leading positions in technical assistance, project management and corporate strategic groups in market and lately in the global team.

He is passionate for challenges and the exploration of new technologies, bringing all potential from Industry 4.0 solutions, identifying and leveraging their benefits to our needs while contributing to the company ambitions and objectives.

Facing growing pressure to improve energy efficiency, reduce engineering complexity, and overcome vendor lock-in, Nestlé is exploring open automation technologies based on IEC 61499 and Universal Automation principles. This presentation shares how Nestlé standardized Air Handling Unit (AHU) control using a software-centric, hardware-independent architecture that combines virtualization, edge computing, advanced control, and AI-ready connectivity.

The solution has delivered significant energy savings, improved environmental control, and ROI within one to two years. Attendees will learn how open automation and Generative AI can accelerate engineering, simplify deployment, and create a scalable foundation for the Factory of the Future.

# HANDS-ON WORKSHOP: OT/IT DATA CONVERGENCE AND ADAPTIVE CONTROL UNDER REAL-TIME DISTURBANCE


Felipe Adriano da Silva Gonçalves
CTO
Aimirim STI

Camila Pereira Borges
COO
Aimirim STI



Priscila Alves Nunes
Product Owner
Aimirim STI


Felipe Adriano da Silva Gonçalves is the CTO of Aimirim and an Electrical Engineer specializing in Control and Automation. He holds a Master's degree in Electrical Machines Control and has a strong background in driving technological innovation.

He has further enhanced his expertise through specialized advanced courses in Advanced Process Control and Real-Time Process Optimization and Decision Making.

Industrial operators face a persistent gap between OT and IT environments (vendor lock-in), inconsistent data models across PLC brands, and reluctance to apply advanced algorithms to closed-loop control. This session addresses that gap through a hands-on, practitioner-led exercise.

Participants work in small groups (20) with their own laptops, using a pre-configured environment connected to a simulated industrial process (boiler/turbine). **In three stages: (1)** ingest and unify heterogeneous OT data under physical network segregation **(2)** build a real-time observability baseline from raw sensor data **(3)** respond to an injected process disturbance, comparing standard control against an adaptive control strategy, with measurable impact on process variability and energy efficiency.

The workshop is grounded in a real deployment architecture: an edge device, OT-side control, and an IT-side gateway with strict data-visualization-only access, illustrating a practical interoperability pattern without re-architecting legacy systems.

Intended for: automation engineers, OT/IT architects, and technical decision-makers evaluating open, multi-vendor approaches to industrial control and observability. Format: interactive workshop, small groups (~15–20 participants), duration to be coordinated with ARC.

# ADVANCED PROCESS CONTROL EXPERT: A GENERATIVE AI INDUSTRIAL COPILOT FOR TURNING PLANT DATA INTO ACTIONABLE INSIGHTS FOR SAFER AND MORE EFFICIENT OPERATIONS




Rafael Ribeiro Sencio

AI Engineer

Acelen



Aureliano Coelho Proença Guedes

Lead Data Scientist

Acelen Refinaria de Mataripe


Rafael Ribeiro Sencio is a Chemical Engineer with extensive experience in Advanced Process Control, process optimization, and Industrial AI applications in the oil & gas industry. He holds an M.Sc. and a Ph.D. in Chemical Engineering, with a focus on Model Predictive Control (MPC), as well as an MBA in Data Science.

His multidisciplinary background combines deep process engineering expertise with data-driven and machine learning approaches applied to complex industrial and Generative AI to improve operational efficiency.

Refineries run on data. The challenge is accessing it and putting it in context. Process historians, APC systems, engineering documents, lab results, maintenance records and shift logs hold valuable information across isolated systems. Finding answers often means searching multiple sources and consulting specialists, slowing decisions.

Acelen built AcelIA to address this challenge. AcelIA is an industrial copilot powered by generative AI. Operators and engineers ask questions in natural language and receive answers grounded in real plant data, traceable to their sources and auditable.

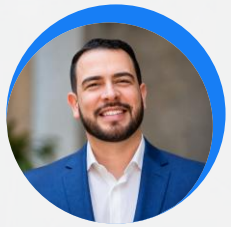
Opportunities include detecting critical deviations earlier, recommending process adjustments, anticipating process safety and field risks, and sharing operational knowledge across shifts and teams.

A supervisor agent interprets each question's intent and context, calls on one or more specialist agents and synthesizes their findings into one clear answer. Each specialist draws on the data and knowledge relevant to its domain. The roadmap includes agents already developed, under development or planned, and expands with business and operational needs.

Three examples show how this works in practice. The Virtual Engineer answers operational questions by querying and contextualizing process historian data. The APC Expert recommends adjustments that help sustain the benefits of advanced process control. In a plant trial, one recommendation led to an operating adjustment that increased hydrotreated diesel production. If sustained, the observed gain would represent an estimated annual economic benefit of USD 1.5 million. The Logbook Agent generates management summaries, retrieves information on shift crews, key events and equipment issues, and briefs operators returning from extended leave or vacation.

These examples demonstrate how a single application can bring multiple specialties together to create operational value from plant data and generative AI. AcelIA provides information and recommendations. Decisions and actions remain entirely with people.

# THE CONNECTED AGENTIC WORKER: FROM INDUSTRIAL AI PILOTS TO PRESCRIPTIVE OPERATIONS



Aristoteles Terceiro Neto

Head of Industrial Transformation

Vivix Vidros Planos

Aristóteles Terceiro Neto is Head of Industrial Transformation at Vivix Vidros Planos, leading industrial AI, OT/IT convergence, data strategy and a VMO with 200+ innovation projects delivered. With 15+ years in engineering, innovation and digital transformation, he turns AI, data and digital technologies into scalable industrial capabilities and measurable operational value, advancing smart manufacturing, digital twins and resilient operations.

His work has been recognized by the National Innovation Award 2026 (CNI), Siemens Techcellence (2024 and 2026), AWS Gamechanger and ABINC IoT Award.

In a 24/7 process industry, moving Industrial AI from pilots to production requires more than a good model. It requires trusted data, integration with operational systems, clear governance, human oversight, and the ability to turn insights into action.

This presentation shares Vivix Vidros Planos' journey toward the Connected Agentic Worker: an evolution of the connected worker model in which AI agents support frontline teams by interpreting equipment signals, prioritizing alarms, recommending actions, supporting diagnosis, creating and enriching work orders, checking spare-parts availability, and helping technicians execute maintenance activities more effectively.

Vivix already has 25+ agentic AI solutions in production, with a roadmap to surpass 100 by early 2027. This scale is helping the company move from isolated experiments toward an integrated agentic operating model across maintenance, logistics and industrial operations.

The session will show how Vivix is evolving from condition monitoring and predictive maintenance toward prescriptive operations, connecting industrial data, AI, low-code applications, enterprise systems and frontline workflows. The architecture combines OT/IT convergence, a unified industrial data foundation, AI agents and mobile applications, while keeping human operators in control of critical decisions through human-in-the-loop approval.

Beyond the technology, the presentation will address the practical challenges of scaling AI in a critical industrial environment: governance, reliability, context quality, integration, user adoption, cybersecurity, agent observability, and defining where autonomy should and should not be applied. Using real maintenance and operational use cases, Vivix will share lessons from moving beyond pilots toward prescriptive, AI-supported operations designed to reduce downtime, improve wrench time and productivity, accelerate troubleshooting, and support improvements in MTTR, MTBF and maintenance cost.

The key message is simple: the future of industrial AI is not about replacing the worker, but about creating a new operating model where connected workers, industrial data and AI agents collaborate to make faster, safer and more informed decisions.

# ENHANCING OPERATIONAL RESILIENCE THROUGH DIGITAL AUTOMATION ASSET MANAGEMENT: THE AUTOMATION RELIABILITY CENTER




Cintia Leal Carneiro Sampaio

Automation Engineer

Acelen


Cintia is a Control and Automation Engineer with over four years of experience at Acelen, focused on strengthening operational resilience through industrial automation, reliability, and digitalization.

She works on initiatives related to automation system availability, technology modernization, asset reliability, and data-driven decision support, collaborating closely with Process Safety, Optimization, Digital Solutions, Maintenance, and Operations teams. Previously, she worked at Yokogawa, contributing to the development and implementation of automation solutions for complex industrial projects.

This project presents the Automation Reliability Center (ARC), a digital solution developed by Acelen's Automation team to strengthen the resilience and reliability of operations at the Mataripe Refinery. Following Acelen's acquisition of the refinery in 2021, the team faced the challenge of managing a highly heterogeneous automation infrastructure comprising more than 1,000 assets, with a significant portion of the installed base approaching the end of its operational lifecycle.

To address this scenario, the ARC was developed using Power BI and PI Vision as an integrated digital environment for automation asset management, reliability monitoring, and decision support. The platform consolidates information that was previously distributed across different systems and sources, providing centralized access to asset inventories, lifecycle status, health indicators, preventive maintenance planning, spareparts availability, system vulnerabilities, failure events, and real-time availability information.

Beyond visualization, the ARC supports data-driven decision-making by combining asset condition, failure history, lifecycle status, and potential production impact to help prioritize maintenance strategies and technology modernization investments. Real-time monitoring and automated alerts also enable earlier identification of abnormal conditions, improving response to failures and supporting operational continuity.

The ARC demonstrates how digitalization can enhance operational resilience by transforming fragmented automation data into actionable information. By supporting lifecycle-based decisions, improving maintenance planning, optimizing the use of spare parts, and enabling structured management of obsolete systems, the solution contributes to more efficient use of existing assets while reducing operational risks and supporting long-term sustainable performance.

# BEYOND LOCAL OPTIMIZATION: INSTITUTIONALIZING CONTROL & OPTIMIZATION AS A STRATEGIC MINING CAPABILITY




Gabriel Vantil Garioli

Technology Coordinator

Vale


Gabriel is a regional coordinator in Process Control Engineering and Optimization, connecting technology, operations, and strategy to improve industrial safety, stability, and productivity. His experience includes industrial automation, regulatory and advanced control, HLS, data analysis, virtual sensors, and autonomous operations.

He leads initiatives across the Northern Corridor, driving team development, operational integration, and scalable optimization solutions with measurable business impact.

As mining operations become increasingly complex, isolated optimization initiatives are no longer sufficient to unlock and sustain long-term value. Organizations must develop the ability to manage control and optimization as strategic assets, ensuring they continuously evolve alongside operational needs.

This presentation presents Vale's experience in establishing a dedicated Control and Optimization of Processes (COP) organization focused on the governance, sustainability, and expansion of advanced control solutions across its mining portfolio.

Through examples such as Autonomous Crushing and the High-Level System (HLS), an integrated supervisory control system capable of coordinating an entire processing plant, the session will demonstrate the benefits of adopting a systemic approach to process control. Particular emphasis will be given to technical governance, solution replication, operational adoption, lifecycle management, and long-term benefit preservation.

The presentation will argue that the true differentiator is not the implementation of individual technologies, but the institutionalization of control and optimization practices as a core organizational capability that supports operational excellence, scalability, and continuous value creation.

# INDUSTRIAL MLOPS: SCALING ENGINEERING MODELS FOR SUSTAINED VALUE THROUGH RELIABLE DEPLOYMENT, MONITORING, AND CONTINUOUS IMPROVEMENT




Aureliano Coelho Proença Guedes

Lead Data Scientist

Acelen Refinaria de Mataripe



Rafael Ribeiro Sencio

AI Engineer

Acelen



Maurício Rodrigues Capela Júnior

Digital Solutions Expert

Acelen


Aureliano Guedes holds an M.Sc. in Bioinformatics from IME-USP and is Lead Data Scientist at Acelen's Mataripe Refinery, where he leads Machine Learning and AI initiatives for industrial operations. Working with data since 2007, his career spans predictive modeling, computational biotechnology research, analytics, and AI solutions across services, facilities, energy, and refining.

At Acelen, he has contributed to implemente an Industrial MLOps process, Catalyze AI, a catalyst deactivation prediction model, Soft Sensors for operational support and process optimization, and AcelIA, a generative AI initiative that contextualizes industrial data from multiple sources to support operational decision-making.

An industrial model must remain useful as operating regimes, feedstocks, and equipment conditions change. Predictive accuracy alone is insufficient: sustained value also depends on data quality, validation grounded in process knowledge, and the ability to deploy, monitor, and maintain the model in operation.
At Acelen's Mataripe Refinery, we implemented Industrial MLOps, a structured pipeline designed to support this lifecycle and scale engineering models across industrial applications. Its industrial focus connects model performance with process conditions, measurement limitations, and the requirements of the decisions it supports.

This presentation explains how this industrial focus guides model validation, deployment, monitoring, and updates. It highlights key challenges such as shifting operating regimes, sensor reliability, and laboratory measurements that are available only periodically. These conditions affect how performance should be evaluated, where predictions can be applied with confidence, and when engineering review is required.

CatalyzeAI and virtual analyzers (soft sensors) are presented as application cases for evaluating the pipeline. CatalyzeAI combines first-principles modeling and machine learning to estimate catalyst deactivation indicators. Soft sensors estimate quality variables between laboratory analyses. These cases bring different modeling approaches into a common lifecycle, while retaining validation criteria appropriate to each application.

The session examines the value of a shared pipeline: standardizing recurring activities, supporting collaboration between data scientists and process engineers, and making solutions easier to deploy and maintain as the portfolio grows. It shares implementation lessons and a practical approach to scaling engineering models with reliability and sustained operational value as explicit objectives.

# FROM DATA TO DECISIONS: BUILDING SMART MANUFACTURING OPERATIONS WITH MES 4.0 AND AI




Neander Alessandro da Silva Paula

MOM/Smart Factory Specialist

Braskem

Fabricio da Silva Costa

Sr. Manager Digital Operations - OT Leader

EY


Neander is a MOM and Smart Factory Specialist in developing and advocating viable industrial transformation roadmaps, as well as implementing initiatives focused on Operational Technology and I4.0 solutions in production planning and execution area.

Fabricio is an EY LATAM Operational Technology Leader with extensive experience leading multidisciplinary teams to deliver high-value Industry 4.0 solutions integrating ET, OT, and IT. Throughout his career, he has worked on projects involving MES, PIMS, APC and Industrial AI.

The chemical and petrochemical industry faces increasing competitive pressure, characterized by high raw material and logistics costs, shrinking margins, and global overcapacity. In this context, the pursuit of more resilient, agile, and data-driven operations has become a strategic imperative for maintaining competitiveness.

To address these challenges, we defined a digital transformation strategy based on the vision of the Factory of the Future, combining both foundational and transformational Industry 4.0 approaches. Within this strategy, we developed the Integrated Manufacturing Management 4.0 Program to transform the way industrial operations are monitored, analyzed, and managed. The program is based on the proposal of initiatives with short-, medium-, and long-term investment horizons aimed at structuring industrial data according to internationally recognized standards such as ISA-95 and ISA-88, while incorporating Industry 4.0 concepts, including Artificial Intelligence (AI) and advanced analytics technologies.

The main initiative of the Integrated Manufacturing Management 4.0 Program is the proposal of a MES 4.0 (Manufacturing Execution System) for Polypropylene (PP) and Polyethylene (PE) production units. The solution encompasses functional modules that support the entire operational workflow, from production planning and execution to near real-time operational performance management.

The main expected benefits of MES 4.0 include enhanced operational resilience and faster decision-making enabled by foundational digital technologies, proactive deviation detection, intelligent alert generation, and AI-driven operational recommendations.

Beyond the deployment of a new technology platform, the Integrated Manufacturing Management 4.0 Program represents a key milestone in the development of smarter, more connected, and more resilient operations. By addressing real operational challenges, it accelerates the transformation of data into actionable insights and insights into sustainable business outcomes for the future of the industry.

# BEYOND THE BLACK BOX: SCALING SOFTWARE-DEFINED AUTONOMOUS CONTROL VIA O-PAS AND IEC 61499



Felipe Adriano da Silva Gonçalves

CTO

Aimirim STI

Felipe Adriano da Silva Gonçalves is the CTO of Aimirim and an Electrical Engineer specializing in Control and Automation. He holds a Master's degree in Electrical Machines Control and has a strong background in driving technological innovation.

He has further enhanced his expertise through specialized advanced courses in Advanced Process Control and Real-Time Process Optimization and Decision Making.

Industrial operations face a persistent bottleneck when moving from legacy, centralized architectures (based on IEC 61131-3) to software-defined automation: most advanced control projects get trapped in "pilot purgatory" because of vendor lock-in, high latency, and limited scalability. While compliance with the Open Process Automation Standard (O-PAS) is widely recognized as essential, the real challenge is execution: how to seamlessly decouple software from proprietary hardware without re-architecting legacy plant assets.

This session explores how leveraging O-PAS alongside event-driven IEC 61499 architectures provides the missing link for scalable, closed-loop industrial control. By executing native runtimes at the edge, operators can deploy Advanced Process Control (APC/MPC) algorithms and digital twins that interface directly with existing PLCs, resolving integration friction, reducing latency, and ensuring continuous operational stability.

Grounded in real-world deployment data from the ExxonMobil OPA Testbed, Aimirim demonstrates how its development partnership addressed these challenges at the function block level. We will detail the engineering journey of achieving true software portability across toolchains (e.g., Eclipse 4diac to Schneider EAE), executing real-time disturbance rejection, and laying the practical foundation for moving from standard automated control to fully autonomous operations.

Intended for: Automation leaders, OT architects, systems integrators, and plant engineers evaluating the transition from legacy DCS/PLCs to open, software-defined control.

Hotel:

Windsor Marapedi

Av. Lúcio Costa, 5400 - Barra da Tijuca,
Rio de Janeiro - RJ, 22630-012,
Brazil





© ARC Advisory Group

# THANK YOU!

# AND

# SEE YOU IN RIO!

Register Here

More Information @ arcweb.com



**Ann-Kathrin Blech**
Marketing Manager
E-Mail: ablech@arcweb.com



**Sandra Cornejo**
Solution Sales
E-Mail: scornejo@arcweb.com



**Mario Backus**
Executive Client Manager
E-Mail: mbackus@arcweb.com



ARC Advisory Group