AVEVAWORLD

ACCELERATE INDUSTRIAL INTELLIGENCE

AVEVA WORLD MILAN, MAY 2026

Community Group

Extending the value of AVEVA PI System across operations

10:00-12:00

- **Extending PI System value with applications for reliability, operations, and supply chain decisions**

  Sean Gregerson, VP APM & MES

- **Beyond Monitoring: Using AVEVA Process Simulation to unlock PI System data value**

  Ryan Muir, Senior Product Manager, AVEVA Process Simulation

- **Deploy and scale predictive maintenance faster with asset-based AI and reusable model templates**

  Luca Bruni, Business Development APM, AVEVA

  Christian-Marc Pouyez, Director APM Advanced Analytics, AVEVA

AVEVA WORLD MILAN, MAY 2026

Extending PI System value with applications for reliability, operations, and supply chain decisions

Presented By: Sean Gregerson - VP APM & MES

Industry challenges

Asset performance management can enable **10-20% reduction in OPEX**

Maintenance and performance optimization

70%

Operators are unaware of when to replace, upgrade or maintain assets [3]

Asset failures

82%

82% of asset failures are random[1]

Unscheduled downtime avoidance

$260K

Average cost of industrial asset downtime/hour [2]

Safety risk management

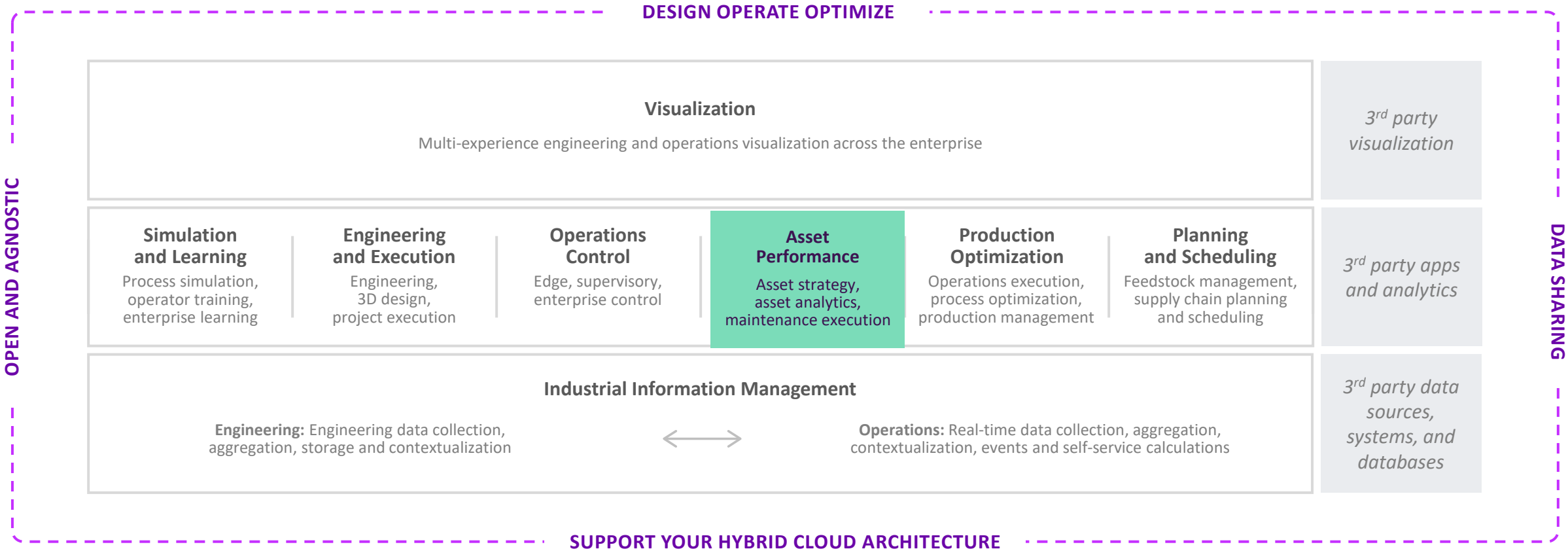
Major accident hazards

Failure to address major accident hazards leads to injury, loss of profits and reputational damage

Sources: 1. Arcweb.com, 2.Aberdeen 3. Vanson Bourne

Delivering digitally enabled reliability, purpose-built for industry

Accelerate time to value with flexible, scalable, and trusted industrial solutions



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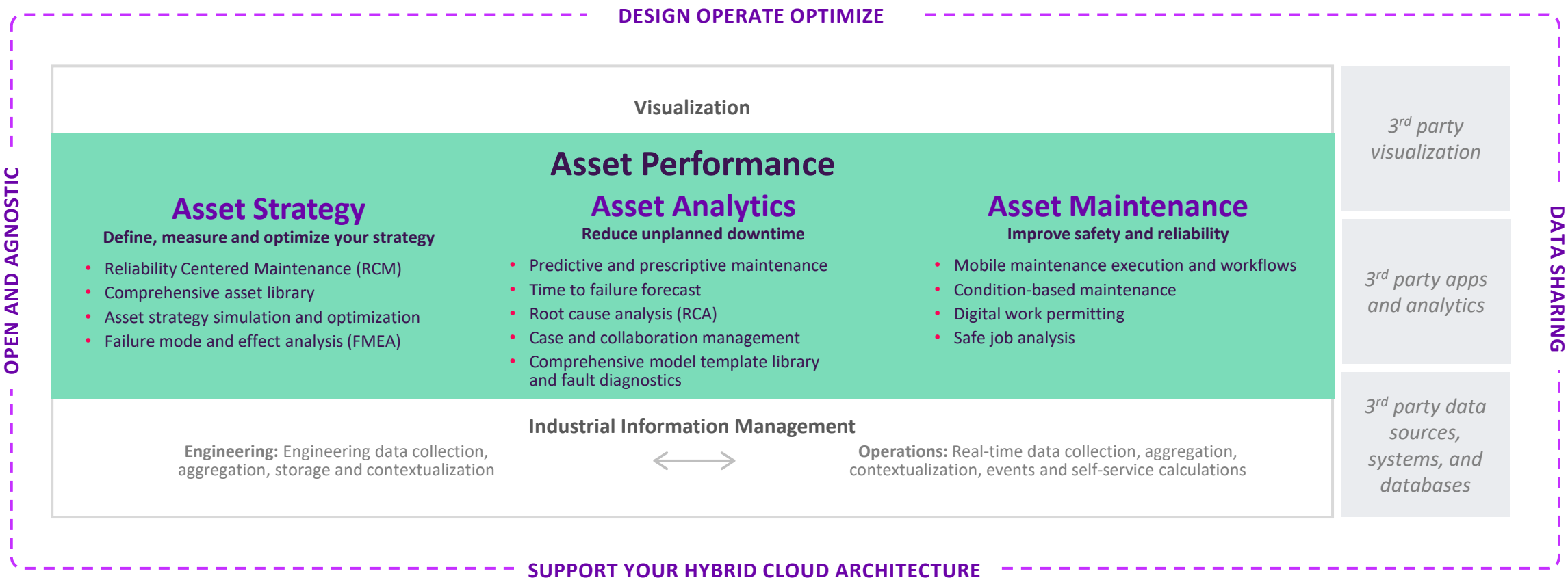
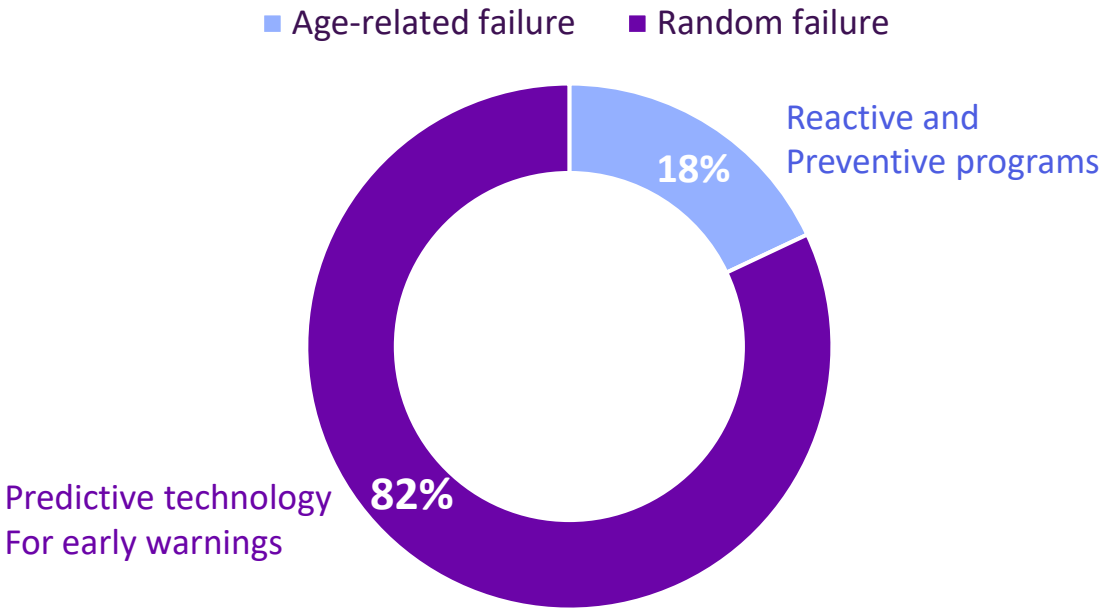


Optimize your asset reliability, maintenance and performance

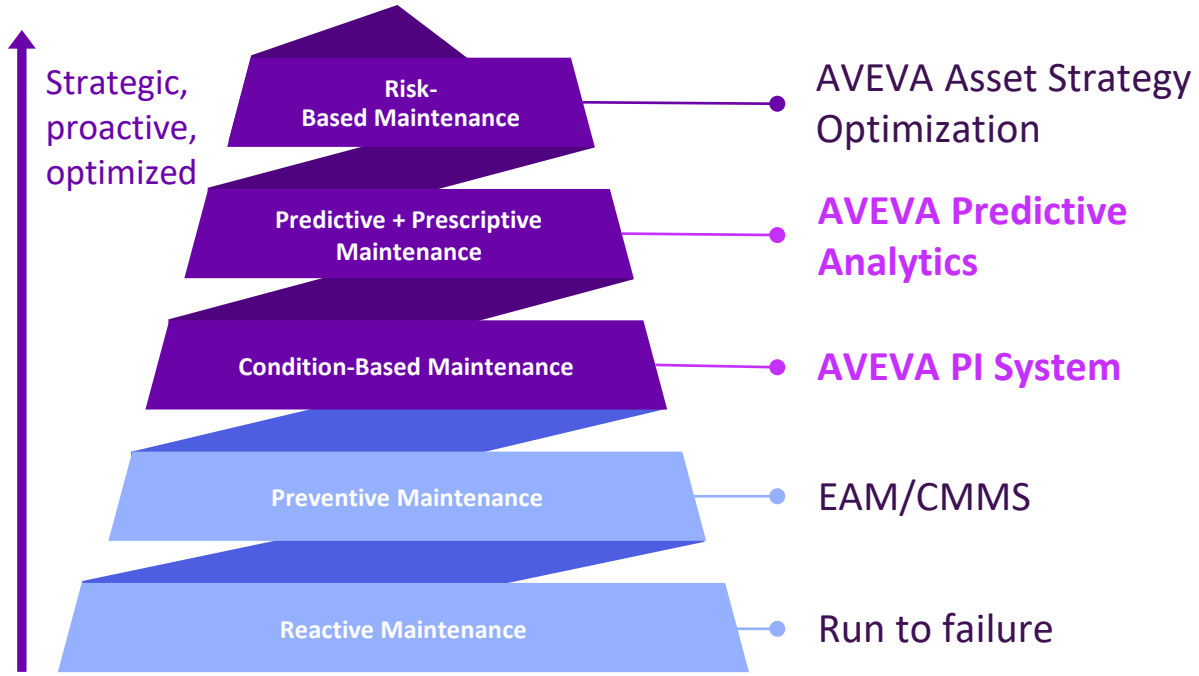
A journey in operational reliability with AVEVA PI System and AVEVA Predictive Analytics

Failure patterns



▲ARC studies show only 18% of asset failure is age-related. Based on these data, preventive maintenance provides a benefit for just 18 percent of assets, and monitoring for predictive maintenance is a recommended option for the rest.
www.arcweb.com/lists/posts/post.aspx?Id=260

It's a journey



Industry is Evolving

The evolving industrial data landscape

From complexity to connected intelligence

The landscape is evolving

- Industrial data volumes growing fast across ET, OT + IT
- Advancing AI capabilities enable new data driven opportunities
- Focus shifting from system performance to business outcomes

The challenge

- Data remains fragmented across legacy and enterprise systems
- Complexity limits scalability and insight generation
- Value trapped in disconnected silos

What industry wants

- A unified data foundation spanning edge to cloud
- Scalable, governed data management with context
- Open, interoperable systems connecting old and new
- A clear path to AI-driven, autonomous operations

AVEVA's perspective

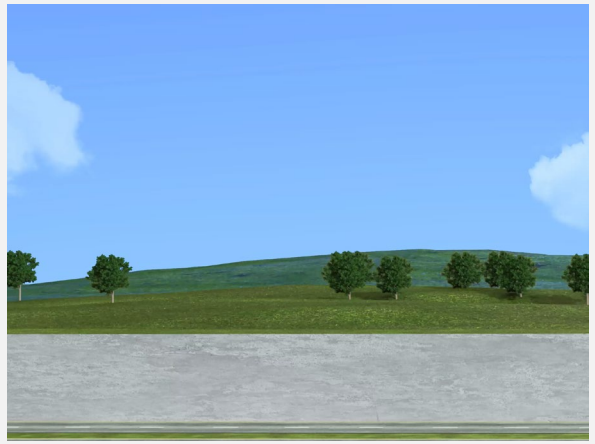
- Breadth: Unified integration from engineering to performance
- Depth: AI, digital twins, and analytics for predictive outcomes
- Built on: Open, hybrid cloud, interoperable data foundation

AVEVA – 160 years of experience

“Data is a unique resource, one that actually increases in value the more that it is used.”

— Dr. J. Patrick Kennedy

AVEVA digital reliability



Design **Build** **Operate** **Optimize**

Design **Build** **Operate** **Optimize**

CONNECT Industrial intelligence

Seamless experience

Applications & analytics

Design | Build | Operate | Optimize

Information

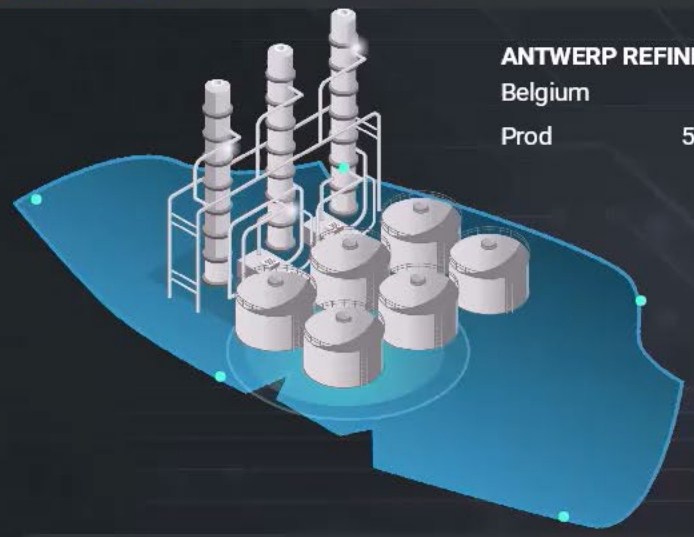
Engineering + IT information ⟷ Operations information

Assets and devices

All enabled by an ecosystem of developers and partners

Let’s look at a Demonstration


CONNECT
intellavi
94
%
TARGET 92
Upstream Production
82
%
TARGET 81
Midstream Utilization
7
%
TARGET 4
Downstream Profit Margin
GAS PIPELINE
LNG EXPORT
LNG LIQUIFICATION
GAS GATHERING
OFFSHORE PRODUCTION
186 KDB
86 MMSCFD
NGL EXPORT
NGL FRACTIONATION
PRODUCT EXPORT
ONSHORE PRODUCTION
202 KDB
86 MMSCFD
REFINING
CRUDE EXPORT
CRUDE OIL GATHERING
GAS
LNG
NGL
REFINING
CRUDE EXPORT
Home
Map
Operations
Maintenance
Forecasting
Revenue
Collaboration
HSE
Activities

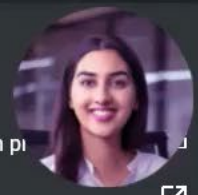


ANTWERP REFINERY
Belgium
Prod 513 kbpd

HSE

Days Since Last Injury
47
Average Time to Report (mins)
90
Total Injuries this month
0
Lost Time to Injuries (hr/month)
70

EVENTS



- High Vibration Alarm Detected - Asset J-9002A
- Maintenance work 145 In Progress. Staff assignmnet in pl
- High Bearing Temperature - Pump Trip - Asset J-9002A

PERFORMANCE

Unplanned Downtime (past month)

Actual	Predicted	
70 hours	69 hours	+1.5%

PROCESS UNIT PERFORMANCE (Target quarterly utilization all units = 100%)

SUSTAINABILITY

Energy Consumption (Billion KWh)

Actual	Predicted	
2.11	2.093	+1%

Monthly Carbon Emissions (t CO2)

Actual	Predicted	
37,000	35,520	+4%

Monthly Nitrogen Emissions (t NO2)

Actual	Predicted	
26,000	26,780	-3%

EFFICIENCY

MAINTENANCE

Mean Time to failure

Actual	Target	
45	60 hr	-25%

Mean Time Between Failures

Actual	Target	
430	500 mins	-14%

Maint Cost

Actual	Target	
360	500 $K	-28%

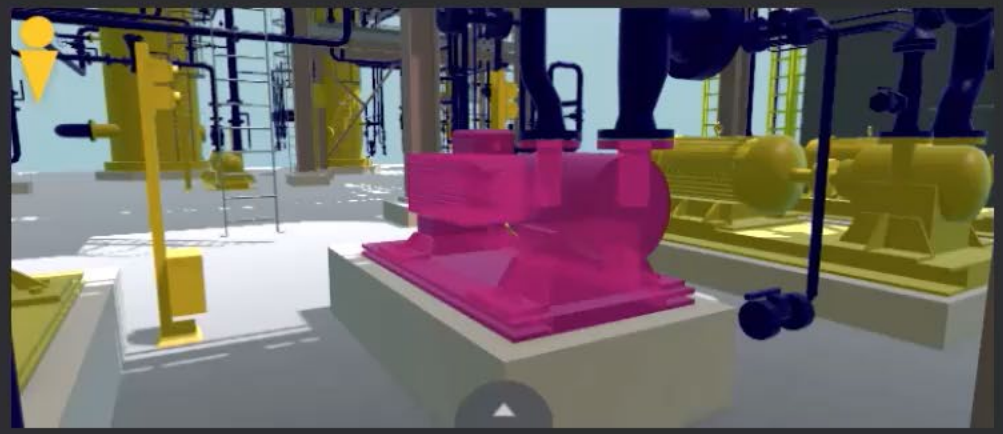
REFINERY PRODUCTION

	Plan (KBD)	Actual MTD (KBD)	vs Plan	vs Plan %
Crude Train 1	206.9	207.7	0.8	0.4
Crude Train 2	148.5	146.8	-1.7	-1.2
LPG	12.1	12.9	0.8	0.4
Naphtha	20.1	28.1	8.0	39.8
Gasoline	132.7	141.8	9.1	6.8
Kerosene	50.0	53.1	3.1	6.2
Diesel	95.3	88.6	-6.7	-7.6
Gas oil	13.8	15.2	1.4	1.1
Fuel oil	16.3	14.7	-1.7	-9.9

J-9002A-Dashboard

3D Model

IED Model



Asset Properties

Commissioning (3)

Commissioning Completion Date	25-Mar-21
Commissioning Completion Status	SH1 Complete
Commissioning System	System 0-71-AO-D0

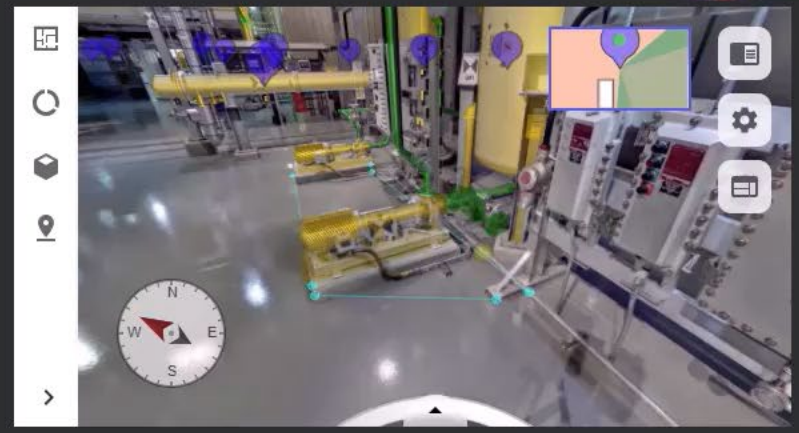
Piping Data (2)

Compressibility Factor	0.839
Insulation Code	IED

Physical Data (13)

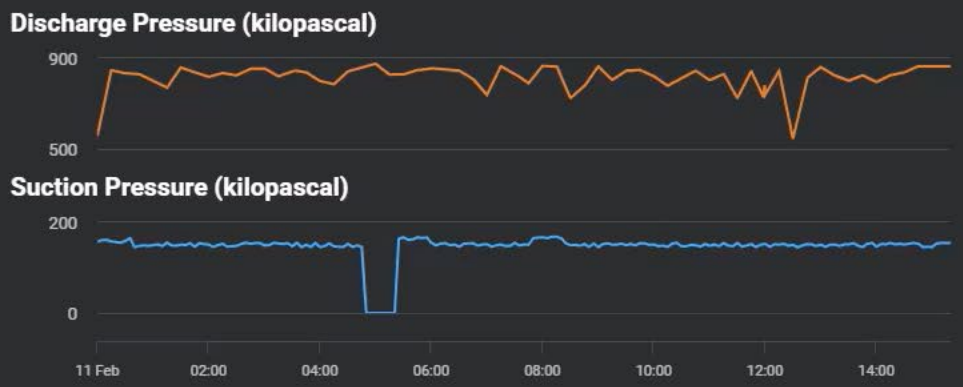
Dry Weight	249 kg
Height	388 mm
Inner Diameter	435
Installation Date	02-Nov-16 21:47
Length	935 mm
Manufacturer	AVEVA Equipment
Model	M3HP 160 MLE 4
PO Number	ER300
Rated Power	3.5 kW

Asset Point Cloud Viewer



Suction and Discharge Pressures

11/02/2025 00:00:00 - 11/02/2025 15:20:08



Status Board

11/02/2025 00:00:00 - 11/02/2025 15:20:08

	CURRENT VALUE	TREND
J-9002A.Energy Consumed Daily	939.97 kilowatt hour	
J-9002A.Energy Cost Daily	122.2	
J-9002A.Amps - Motor	445,851 ampere	
J-9002A.Motor Power	214,008 kilowatt	

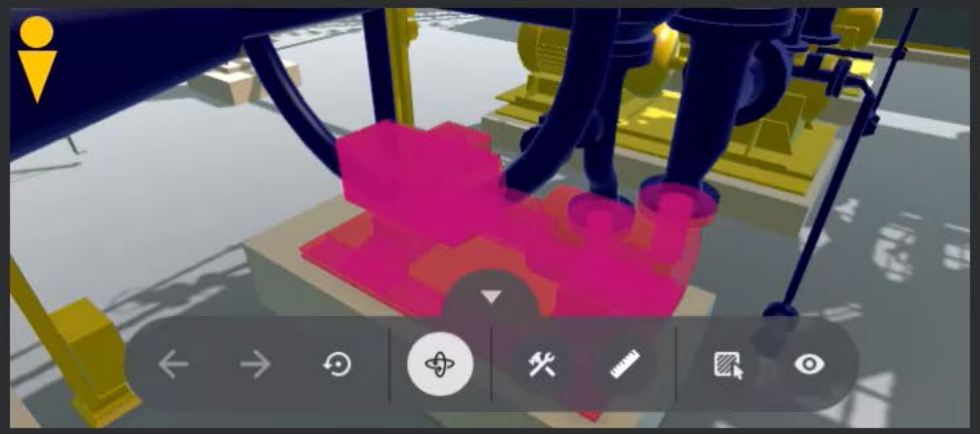
Anomaly Score J-9002A

J-9002A Ops Dashboard

Edit

3D Model

IED Model



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Installation Date	02-Nov-16 21:47
Length	935 mm
Manufacturer	AVEVA Equipment
Model	M3HP 160 MLE 4
PO Number	ER300

Status Board

03/13/2025 2:29:58 PM - 03/14/2025 7:30:27 AM

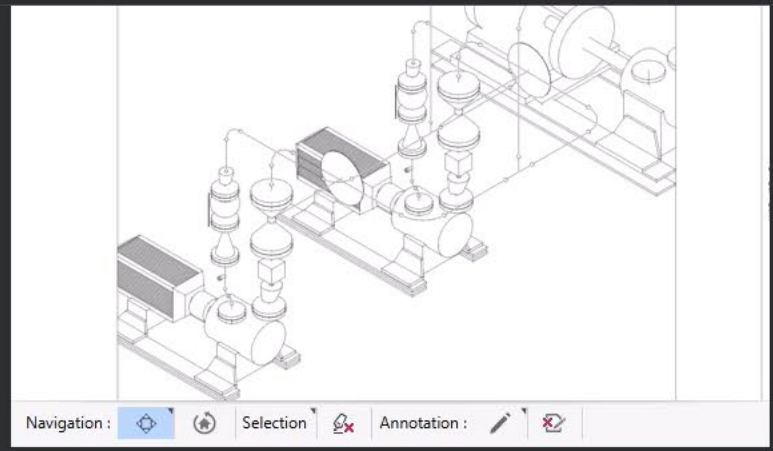
	CURRENT VALUE	TREND
Energy Consumed Daily	21,342 kilowatt hour	
Energy Cost Daily	3,211.5	
Amps - Motor	451,843 ampere	
Motor Power	216,885 kilowatt	

Suction and Discharge Pressures

03/13/2025 2:29:58 PM - 03/14/2025 7:30:27 AM

Documents

GA-IED-Piping



Anomaly Score J-9002A

01/15/2025 1:00:00 AM - 01/16/2025 1:00:00 AM

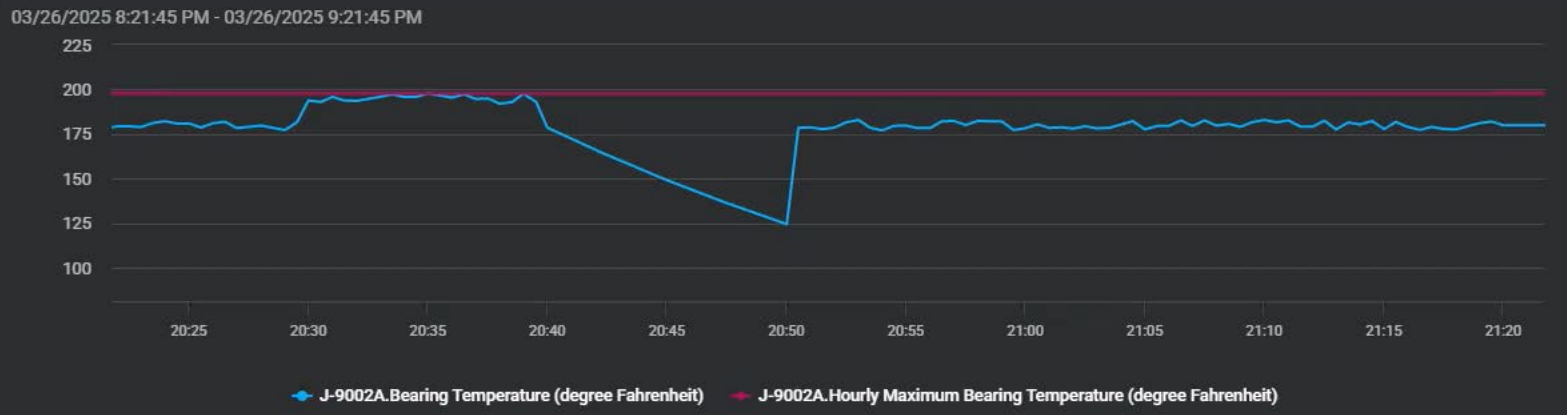
300

CONNECT

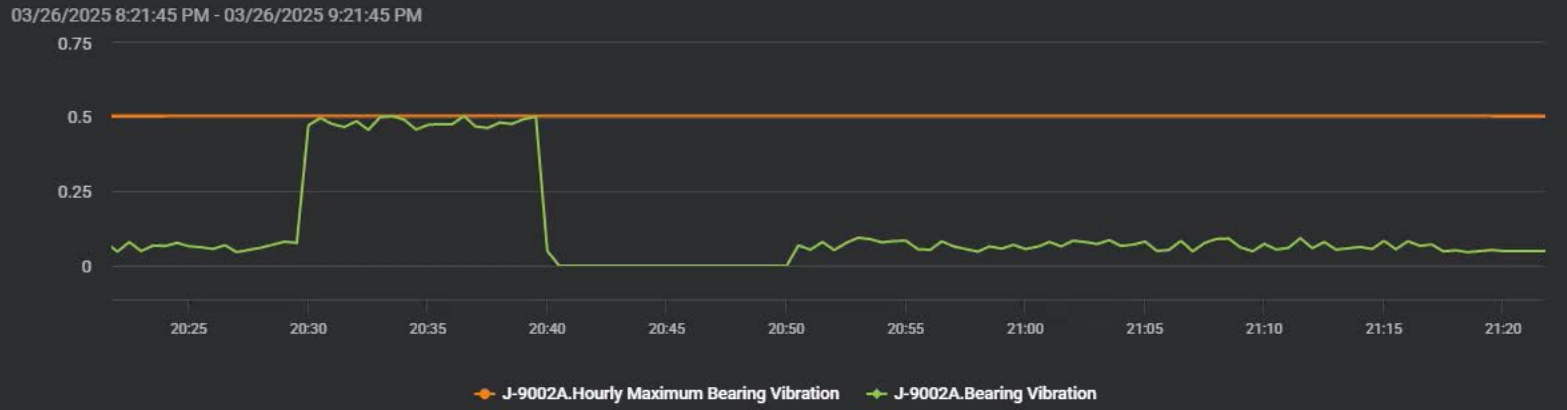
J-9002A Bearing Temperatures and Vibrations

Edit

Bearing Temperatures for J-9002A



Vibrations for J-9002A



Industrial AI Assistant (Preview)

Advanced Mode

Industrial Assistant 9:21:49 pm

Hi Lori Brossard-Warda. How can I help you?

What can you help me with?

How are some of my operations performing?

What are some assets in this system?

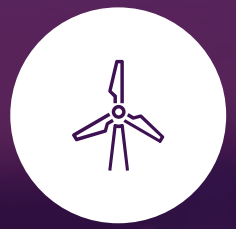
Enter your message...

Send

0 / 500

Integrated digital twin and AI for every industry

Energy



Power

Food & bev

Consumer goods

Life science

Chemicals

Infrastructure

Mining

Manufacturing

Marine

Asset Performance Management

Defining your asset performance improvement journey

Create a strategy to maximize return on investment

Corporate Objectives
Business Imperatives

Overall Asset Strategy
Manage Risk, Cost, Performance

APM Framework
People, Process, Data & Technology

SCG Chemicals, Thailand

Asset Performance infused with Artificial Intelligence

Malaysia | F

Background Design Options: Dark 3

HSEQ & ESG

HSE Performance

0	Fatalities
2	LTI
1	Medical
0	Restricted
2	First-Aid

LTIFR vs TRIFR (YTD)

Loss Time Injury FR (LTIFR)
Total Recorded Injury FR (TRIFR)

Environmental

GHG Emission by Production (kg CO2e/boe)	11
GHG Emission by Generation (kg CO2e/MWh)	300
Hydrocarbon Spills (Cases)	0

Maintenance

Overdue Tasks Count vs Overdue Manhours

Operation / Production

85.0 % Fleet Utilisation

90.0 % Production Efficiency

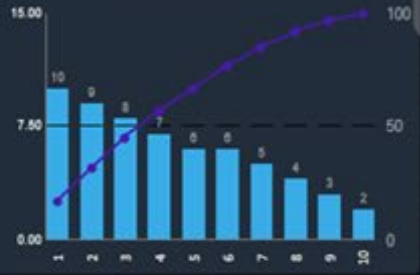
	Actual	Target	
Crude Oil (BOPD)	700	1,000	70 %
Water (BWPD)	500	1,000	50 %
Gas (MMSCFD)	800	1,000	80 %
Liquids (BPD)	600	1,000	60 %

Reliability

85.0 % Avg Technical Uptime

Equipment	Availability (%)
Equipment 1	80
Equipment 2	82
Equipment 3	85
Equipment 4	88
Equipment 5	90

Number of Trips Pareto Chart

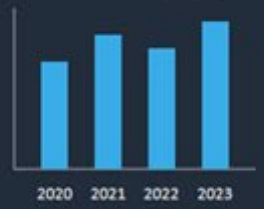


Supply Chain

Inventory Summary

Equipment Spares 1	1,000
Surplus Spares 1	20%
Equipment Spares 2	1,200
Surplus Spares 2	10%
Equipment Spares 3	800
Surplus Spares 3	15%

Procurement (MYR$)



Sunny

Pressure #### mbar

Temperature ## °F Wind Speed ## m/s

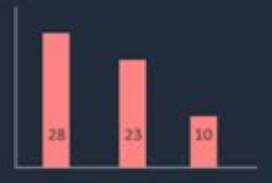
	Mon	Tue	Wed	Thu	Fri
Avg Temp	## °F	## °F	## °F	## °F	## °F
Avg Wind Speed	10 m/s	13 m/s	12 m/s	12 m/s	14 m/s
Wind Direction					

Predictive Analytics

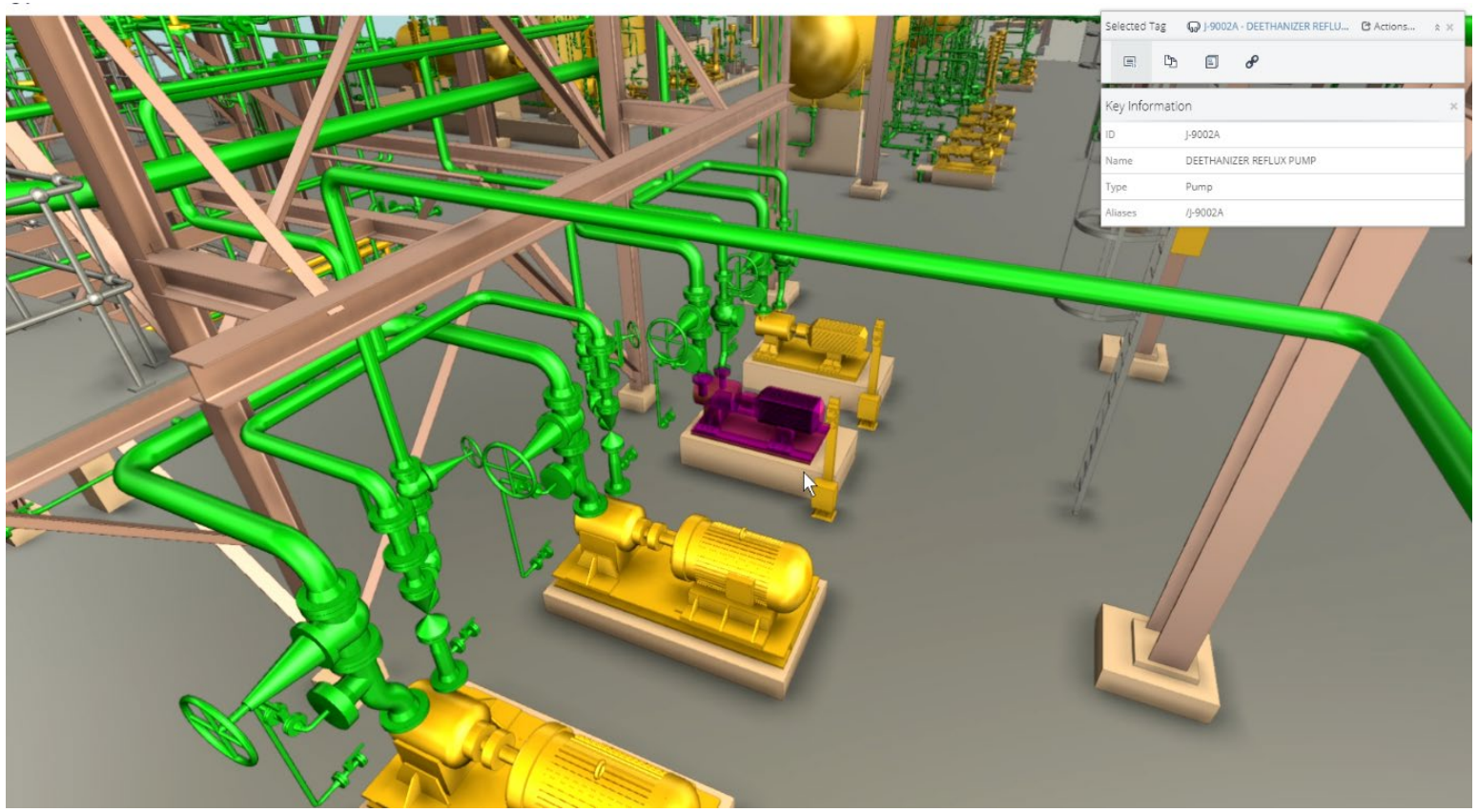
Total 10

Open Cases 4 (40%)
Closed Cases 6 (60%)

Total Cases (MTD)



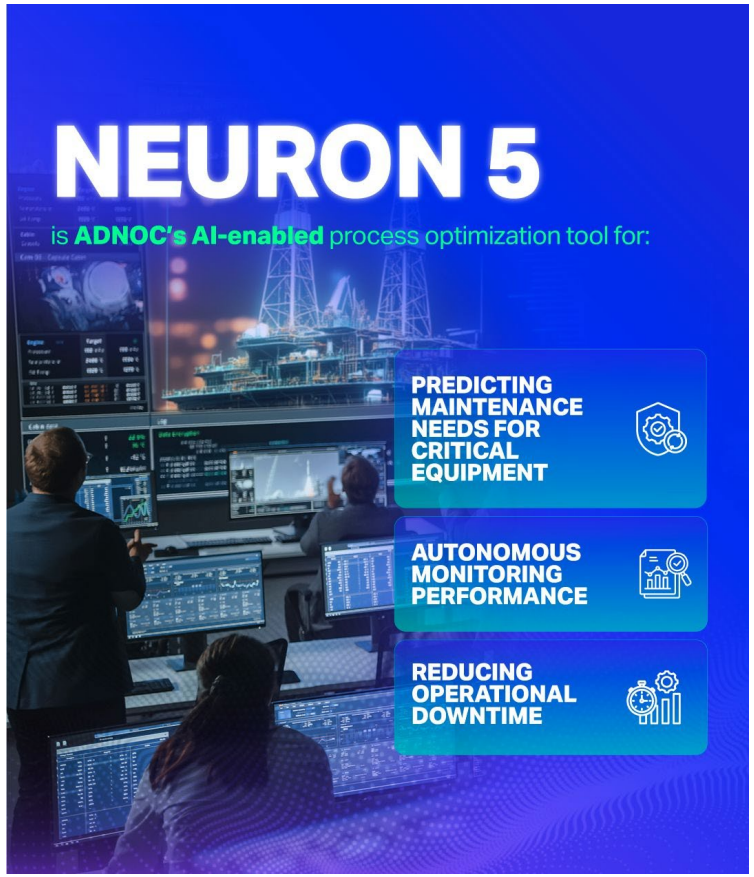
Information contextualization - 360° digital representation

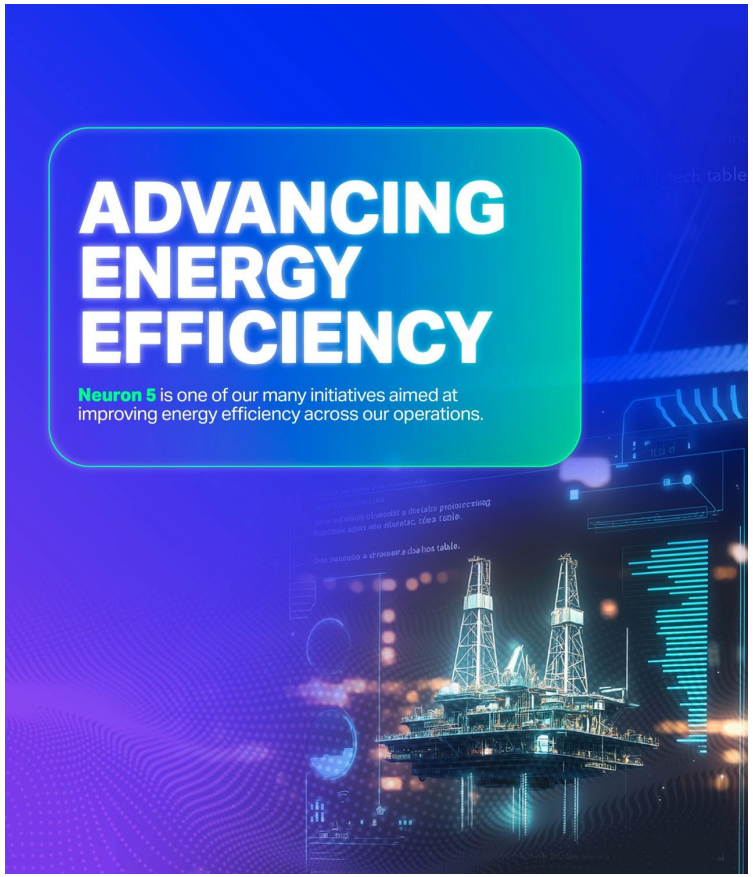


Manage risk, diagnose reliability and performance problems and optimize work planning and execution with visual APM

- Problem diagnosis
- Remote work planning
- Risk assessment
- Safe job analysis
- Isolation plan assessment

ADNOC Neuron 5 – AI-Enabled Process Optimization





https://youtu.be/Zkaa6NPPEUE

AVEVA Predictive Analytics

Predictive/Prescriptive Maintenance (PdM)

Real AI, real results

Predictive failure detection for business-critical equipment

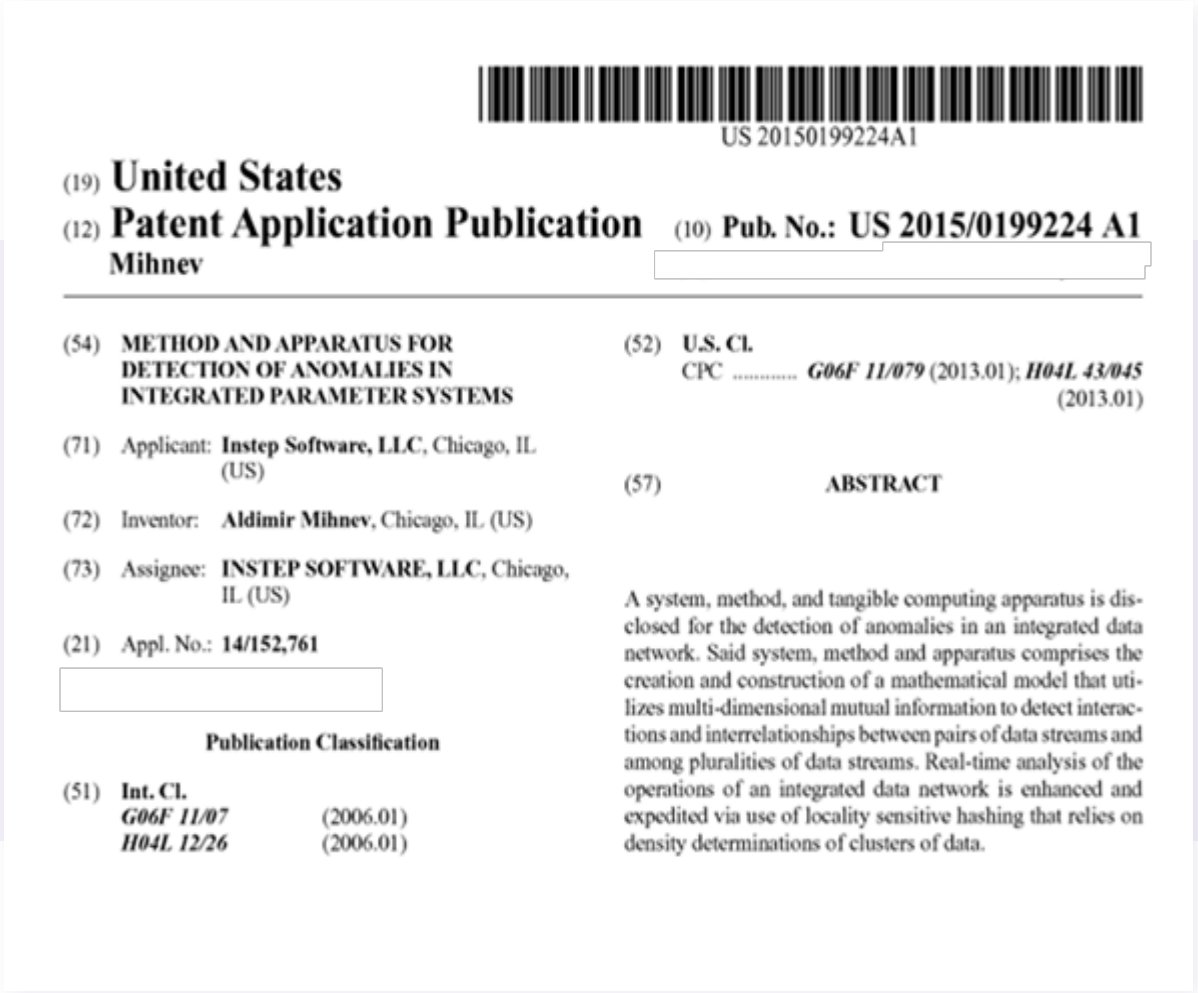
- No code AI and machine learning
- Advanced alert and case management for knowledge capture and reporting
- Data playback capability for testing models
- Templates accelerate configuration, deployment and scale-up

It’s the way you operationalize and scale AI for industrial operations

OPTiCS

Algorithm – Industry Leading

- Automatically classifies model inputs in correlated subgroups
- Makes creation of models for assets without templates much easier



US 20150199224A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2015/0199224 A1**

Mihnev

(54) **METHOD AND APPARATUS FOR DETECTION OF ANOMALIES IN INTEGRATED PARAMETER SYSTEMS**

(71) Applicant: **Instep Software, LLC**, Chicago, IL (US)

(72) Inventor: **Aldimir Mihnev**, Chicago, IL (US)

(73) Assignee: **INSTEP SOFTWARE, LLC**, Chicago, IL (US)

(21) Appl. No.: **14/152,761**

Publication Classification

(51) **Int. Cl.**
G06F 11/07 (2006.01)
H04L 12/26 (2006.01)

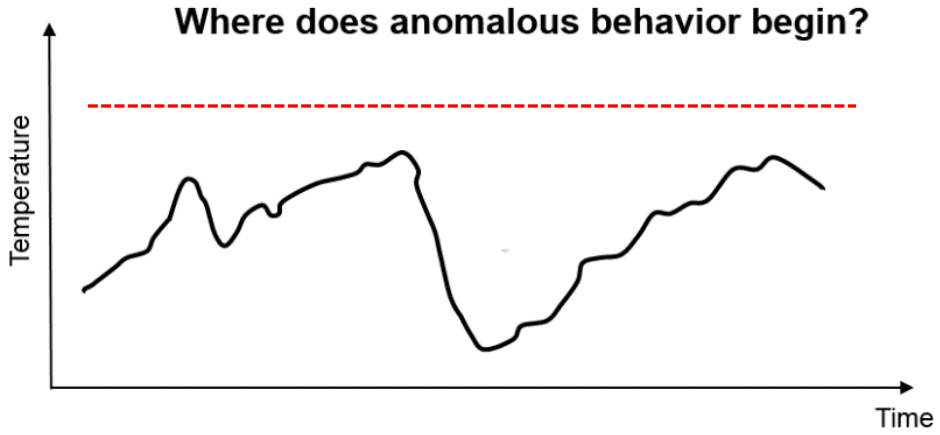
(52) **U.S. Cl.**
CPC ***G06F 11/079*** (2013.01); ***H04L 43/045*** (2013.01)

(57) **ABSTRACT**

A system, method, and tangible computing apparatus is disclosed for the detection of anomalies in an integrated data network. Said system, method and apparatus comprises the creation and construction of a mathematical model that utilizes multi-dimensional mutual information to detect interactions and interrelationships between pairs of data streams and among pluralities of data streams. Real-time analysis of the operations of an integrated data network is enhanced and expedited via use of locality sensitive hashing that relies on density determinations of clusters of data.

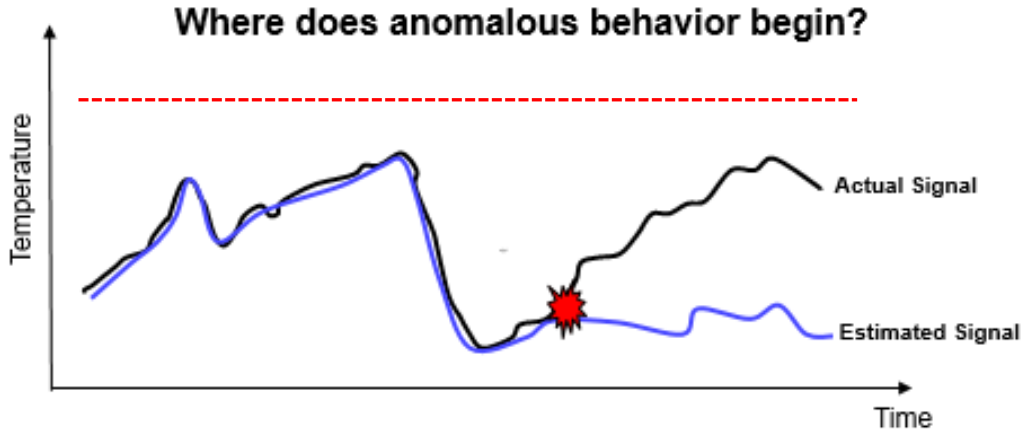
Monitoring Approach

Traditional Monitoring



- Constant alert/alarm limits are typical
- Damage accumulates prior to reaching limit

Predictive Asset Monitoring



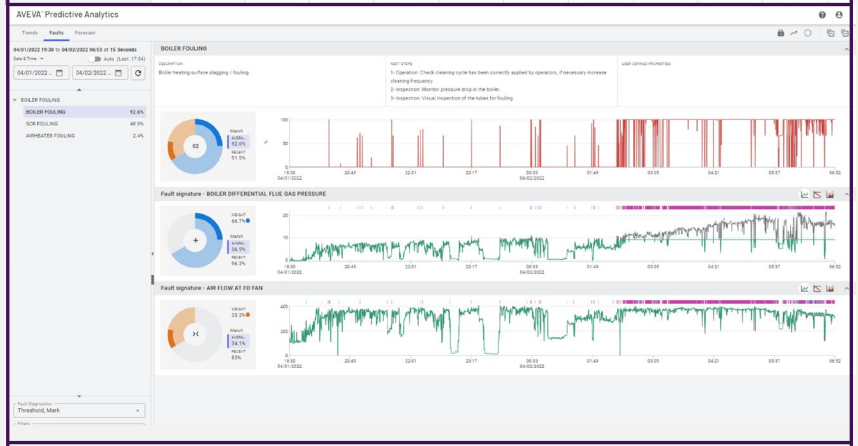
- Actual minus estimated (residual) signal detects anomaly as-soon-as-possible

Deep predictive analysis

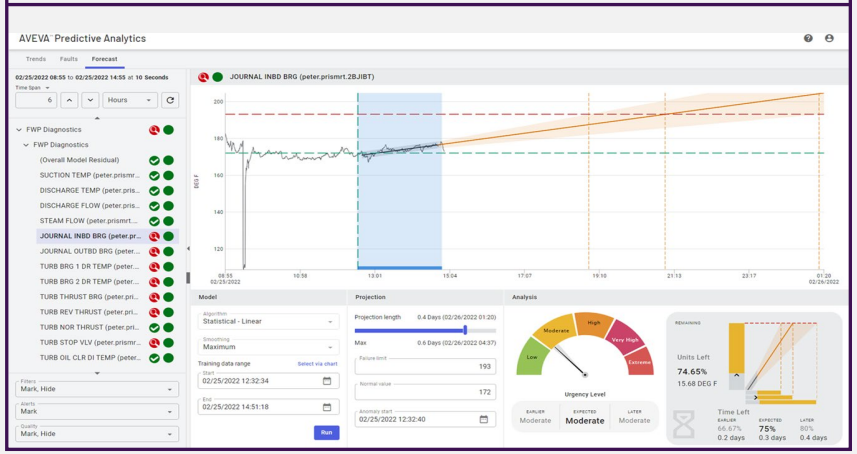
An anomaly was detected.
What are the next steps?

- Overall anomaly score trending
- Individual sensor deviations trending
- Sensor contribution score to anomaly
- Diagnostics based on sensor deviation signature
- Ranking of potential faults
- Fault match trending
- Prescriptive guidance for remediation
- Forecasting for time until failure
- Case tracking from alert inception until remediation

Which sensors are contributing to the anomaly?

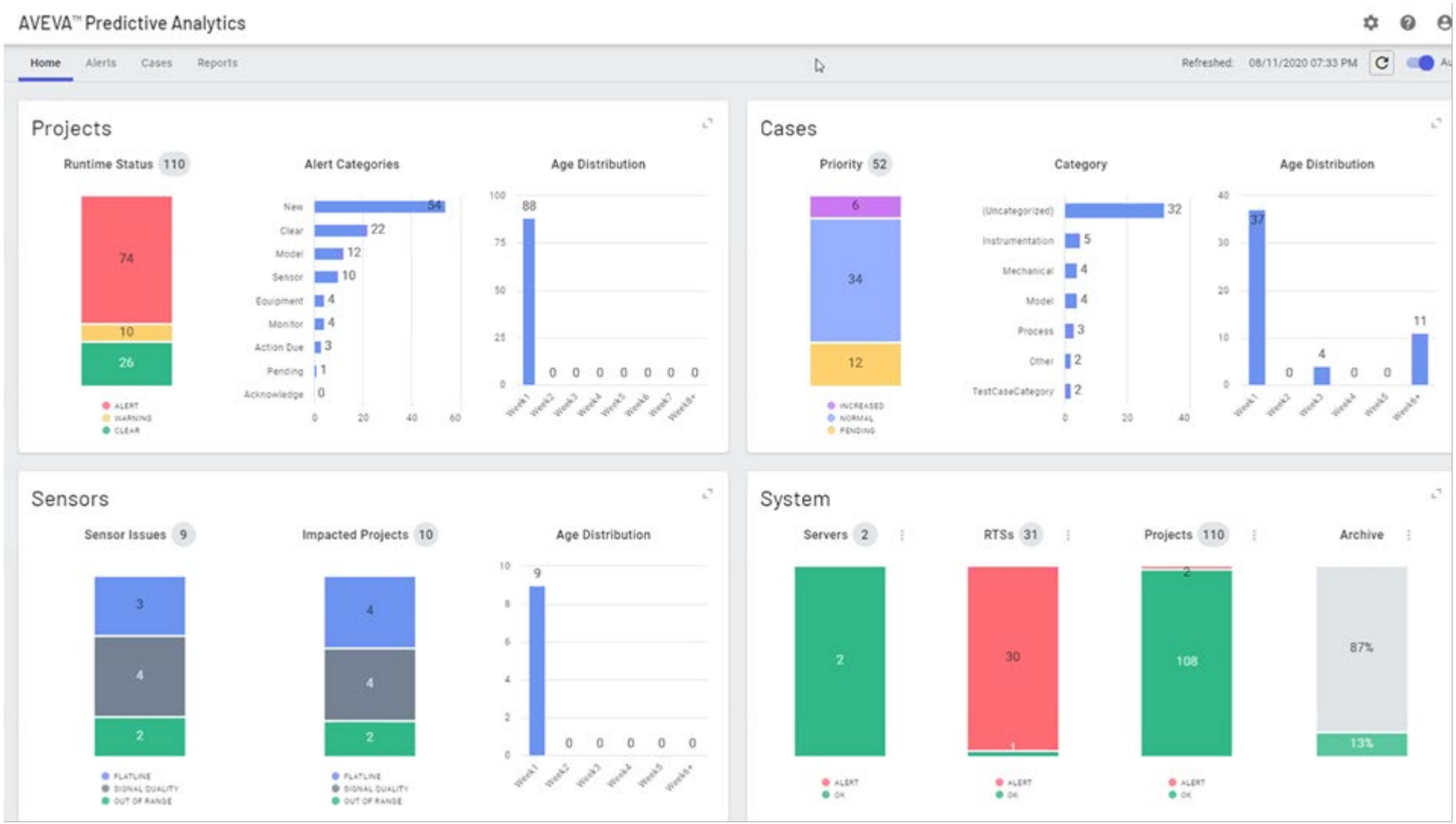


What are the potential faults and related inspections?



What is the urgency level before breakpoint?

System level monitoring



AVEVA Predictive Analytics

AIR LIQUIDE

Air Liquide uses AVEVA for SIO Predict digital transformation program.

AI based predictive analytics for early warning notification and diagnosis of equipment and process problems

ArcelorMittal

ArcelorMittal uses AVEVA Predictive Analytics to optimize steel production and reliability

AI based predictive analytics for early warning notification and diagnosis of equipment and process problems

SUEZ

SUEZ uses AVEVA Predictive Analytics to turn waste into renewable energy

- Digital models for key assets and processes
- Centralized monitoring across UK sites
- Detected failures 18 months earlier than traditional tools

RIO TINTO

AVEVA Predictive Analytics is deployed to monitor 327 assets across 8 plants

- SAG mill motor failure averted saving $12M US
- SAG mill maintenance cost averted saving $234K US and 72 hours of downtime
- Ball mill maintenance cost averted saving $146K US

ENEL

AI-infused AVEVA Predictive Analytics is driving autonomous plant vision - streamlining operations and boosting performance

Optimized performance across 23GW of power generation
220+ early detections prevented failures in a 18 month period

Business resilience and agility assured during COVID-19

INTERNATIONAL PAPER

CEO: We will "redesign processes to increase efficiency and reduce costs in maintenance reliability..."

CEO directive: $300M in structural cost reduction

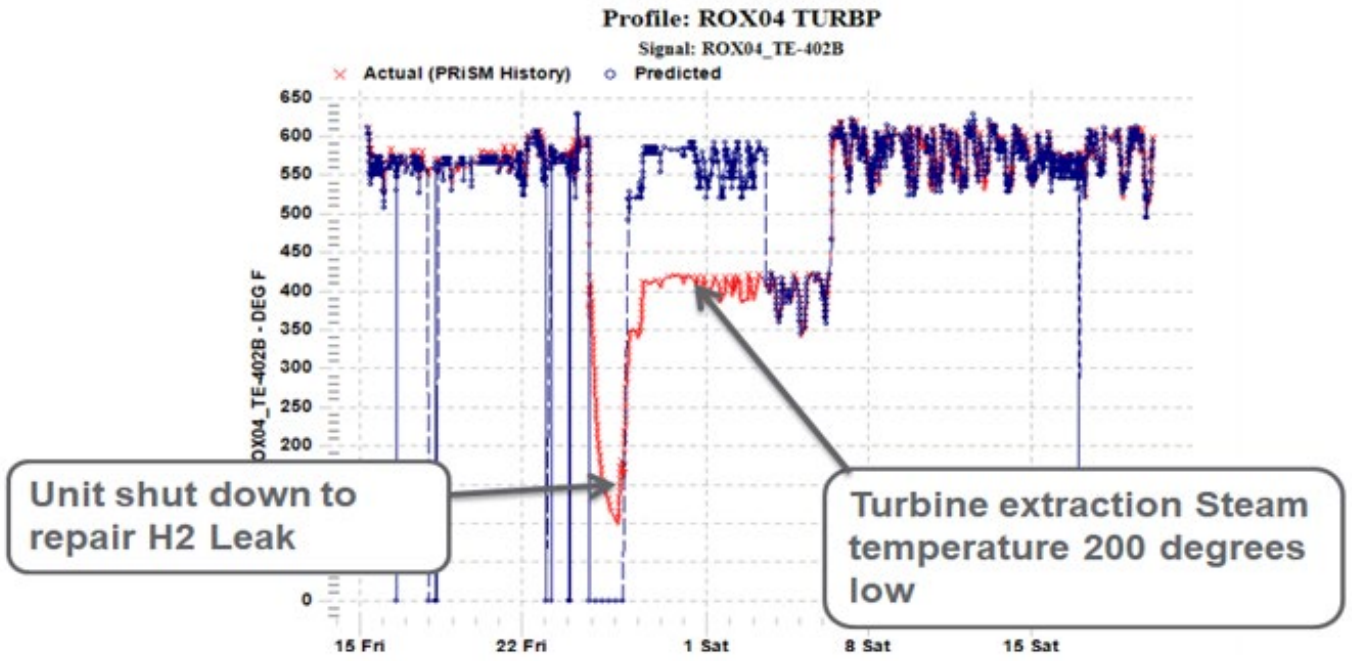
Goal: building the mill of the future

Technology and data analytics to create greater visibility and actionable insights

Duke Energy Case Example
Predictive/Prescriptive Maintenance (PdM)

Steam turbine efficiency loss

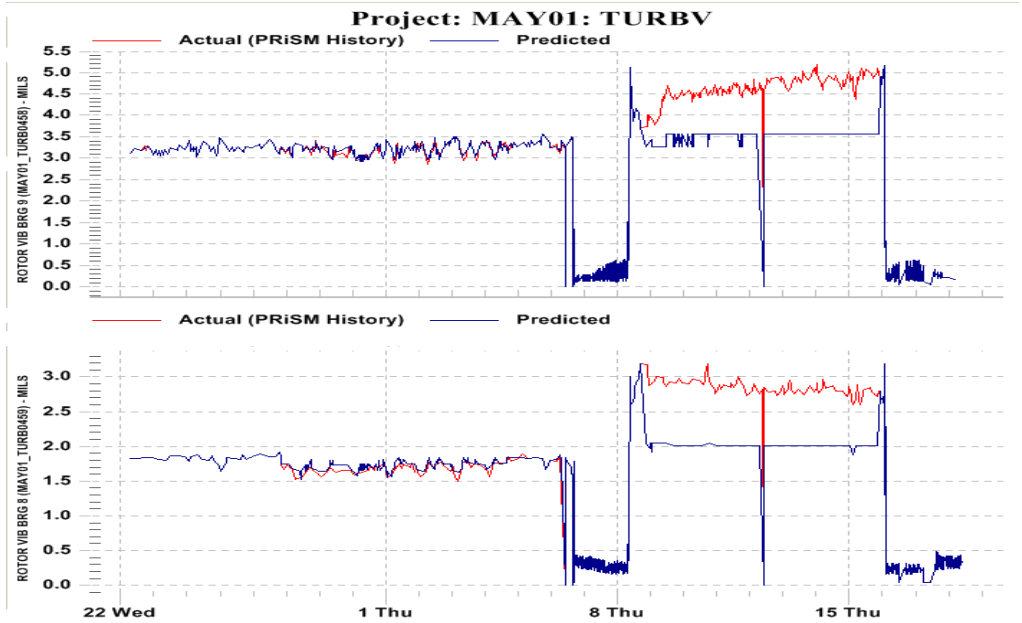
- Received alarm on low extraction steam temp
- $$$$ additional fuel burned over 8 days
- Could have gone a week or more before plant found it



LP Rotor - L-0 blade problem

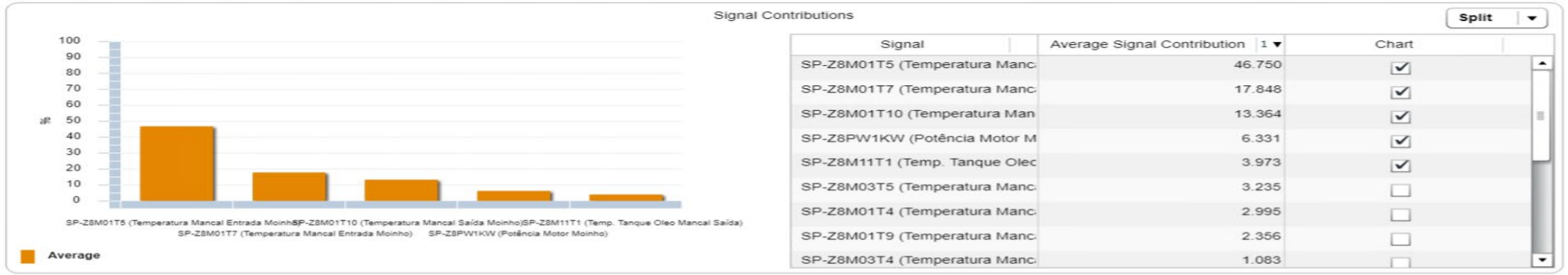
- Unit was started after an outage and there was a vibration step change on one of the LP turbines (Vibration levels were well below the alarm level)
- Engineering and the plant were notified
- Vibration data was collected and unit was retired for an inspection
- Bolts on lower half of flow sleeve had broke and flow sleeve contacted L- 0 blades

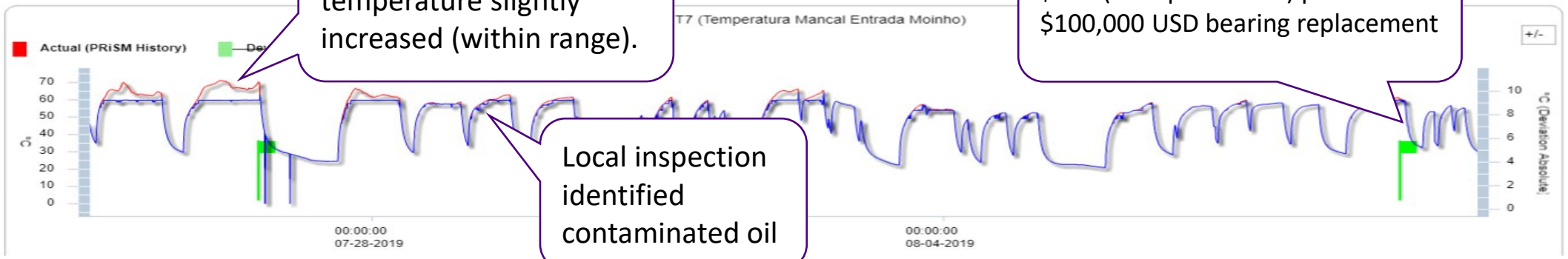
- Upper half of flow sleeve was no longer supported by lower half
- Although we had minor damage to the LP blades, we avoided damaging multiple stages of blades, packing, and diaphragms if we had a severe blade liberation.
- Estimated avoided cost - $4.1M



Votorantim Case Example
Predictive/Prescriptive Maintenance (PdM)

Ball mill





Ball mil´s bearing temperature slightly increased (within range).

Local inspection identified contaminated oil

$100 (oil replacement) prevented $100,000 USD bearing replacement

Kiln

OMR indicating a significant issue

But not increasing much in time (20 days range)

Bearing replacement

Closer look to the predictive values + real values + OMR allowed the maintenance team to wait for the schedule maintenance.

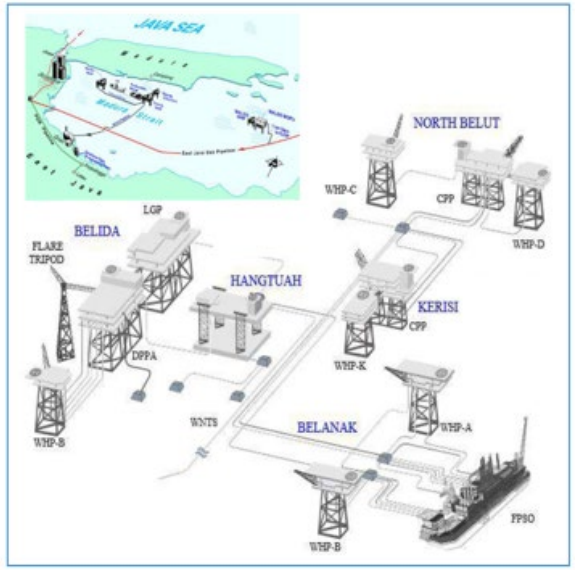
Avoided Production loss = 7000 tons (estimated)
Total Cost of maintenance = 3k USD (bearing replacement)

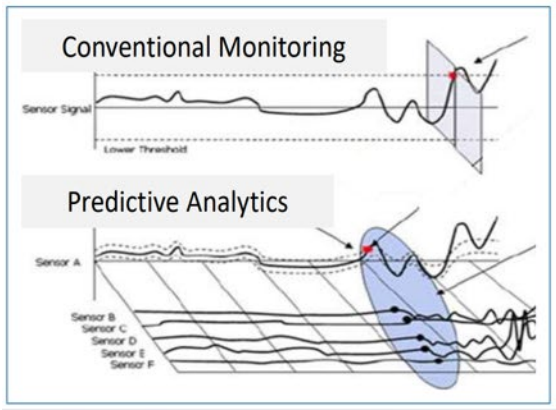
Medco Case Example
Predictive/Prescriptive Maintenance (PdM)

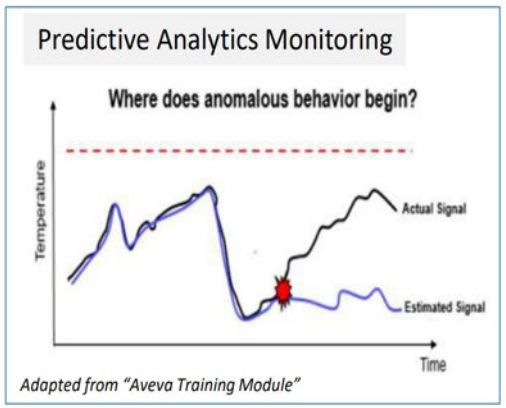
Sustaining reliability across a large turbomachinery fleet

Predictive analytics replacing conventional monitoring to control risk and cost

- Large number of major turbomachinery (33 units – GTC and GTG)
- Challenges:
  - High reliability and availability expectation
  - Mature fields (5 platforms, 1 FPSO, 1 OPF, first installation in 1992)
  - Maintenance cost optimization (gas turbine TBO (Time Between Overhaul) extension)







Adapted from "Aveva Training Module"

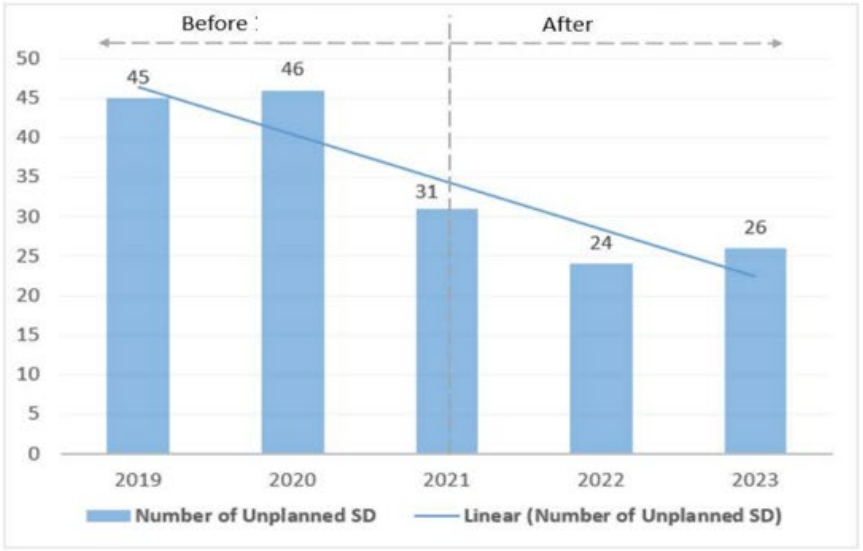
E&P Offshore Assets

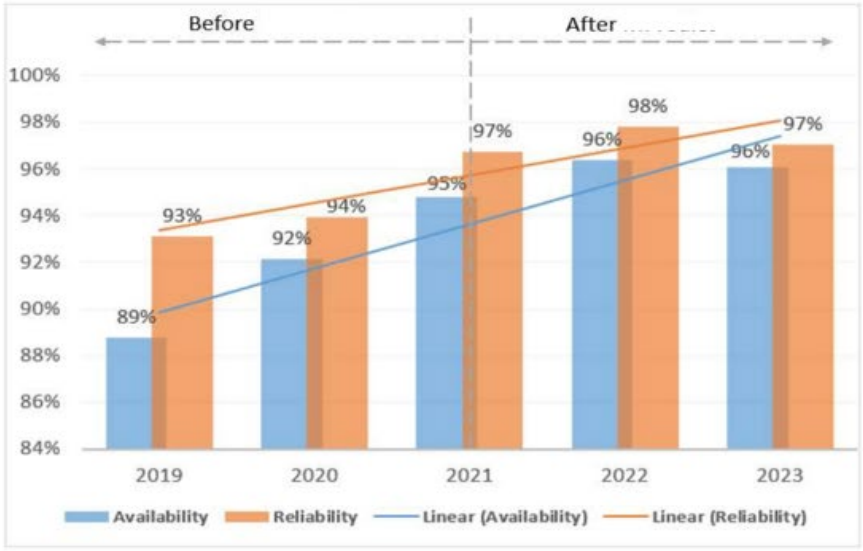
Gas turbine engine package

Measured impact on turbomachinery performance

Reliability, availability, emissions, and maintenance planning improvements at fleet scale

- Unplanned shutdowns **reduced** by ~45% from 45-46 to 24-26 per year
- Reliability **increased** from 93-94% to 97-98% and availability from 89-92% to 96%
- Gas blowdown and engine start stop cycles **reduced**, lowering GHG emissions and HSE risk
- Maintenance planning **improved** through RUL predictions
- Platform **expanded** across facilities and disciplines





Asset Performance - Future Proofed

AVEVA Industrial Intelligence

DATA INGESTION

Industrial data pipelines

IIoT
(PI System, OPC UA, Modbus, DNP 3, MQTT, ICCP, events, …)

Engineering
(3D, 2D, point cloud, documents, structured, unstructured, meta data, …)

IT
(Databases, documents, structured, unstructured, meta data, …)

Edge data processing
(Data collection, aggregation, contextualization transformation, transport/delivery ...)

Standards
CFIHOS, ISO 14224, ISA-95, CIM IEC 61970, CIM IEC 61968, OPC UA, ICCP, MQTT, …)

Data Types
Time series, events, structured, unstructured, meta data

DATA PROCESSING & TRANSFORMATION

Data modeling

Data Standard

Transformation

Entity-relationship modeling

Industrial data knowledge graph

Data pipelines

Restful

GraphQL

Vectorized search

Databricks

Snowflake

Microsoft Fabric

DATA CONSUMERS

Core platform applications

Visualization

AI/ML Analytics

Workflow/AI Agents

Data access

SDS API | Vectorized search | GraphQL

Applications

Predictive maintenance	Asset strategy optimization	MES
Predictive quality	Unified engineering	Value chain optimization
Process simulation	Real-time optimization	Production loss accounting

Ecosystem

CONNECT marketplace | Third party partner apps

GENERATIVE AI, AGENTIC AI, AI AGENTS

DATA GOVERNANCE & SECURITY

TRUSTED INTELLIGENCE | ACTIONABLE INSIGHT | UNIFIED EXPERIENCE | EMPOWERED ECOSYSTEM

Data standards | Data quality | Security | Audit trail | Monitoring & logging

One digital experience

CONNECT

Questions?

Please wait for the microphone.

State your name and company.

Please remember to…

Navigate to this session in the mobile app to complete the survey.

Speak to an expert at the booth: Maximize reliability and performance through data intelligence and AI

Thank you!

Sean Gregerson

Vice President, Advanced Applications APM and MES

AVEVA

- Sean.Gregerson@aveva.com

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