

Predict-It

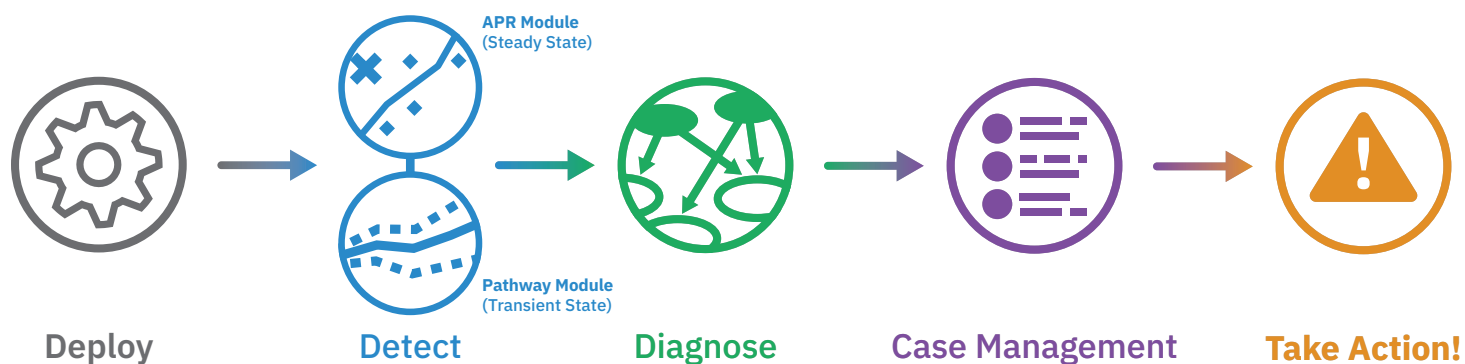
Anomaly Detection and Diagnostics Solution

Part of the ECG Asset Monitoring Suite





Manage, Optimize, and Achieve your Equipment Reliability Goals.



Challenged to maximize profitability with tight operating budgets?

Industrial asset owners are under mounting pressure to make their operations nimble, cost predictable and reliable. To tackle this challenge, advanced Condition Based Maintenance programs are being adopted to handle a new wave of available, real-time instrumentation data. Advanced CBM allows operators to actively preserve equipment integrity at the lowest operating cost.

Condition Based Maintenance Plant Outcomes...

- Reduce unplanned equipment downtime and reactive maintenance
- Repair equipment issues while they are small and cost less
- Reduce inefficient use of manpower
- Bottom Line: Improves Equipment Reliability and Cost Control

Detect and Diagnose to Save

Predict-It serves as the core application enabling this advanced CBM process for asset owners. Built to cohesively merge real time operating data and technical exam results, Predict-It delivers real time equipment health monitoring and diagnosis. Allowing industrial customers to achieve CBM objectives with limited personnel and budgets.



“Predict-It greatly reduced the Human Resources required to achieve our goals and greatly increased the return on investment.”

David B.
Head of Operational Systems & Technology at AGL

About AGL

AGL Energy is Australia’s largest producer of electricity with a portfolio of assets totaling 10,000 MWs. AGL’s fleet of assets grew rapidly between 2005 and 2015, creating a significant data management challenge and rendering the AGL team “data blind”.

The ROI of Digital Transformation

Between 2020 and 2024, direct investments into digital transformation are projected to reach a total of 7.8 trillion globally. The gains in efficiency and cost savings that occur through implementation of digitization and data analysis are significant. For process industries, such as power generation, oil and gas, chemical and manufacturing, the Industrial Internet of Things is transforming the way production teams collect and analyze their process data to achieve new performance levels. Adopters of such processes are creating a predictive environment where unplanned downtime is avoided and maintenance is based on actionable asset data.

The Challenges

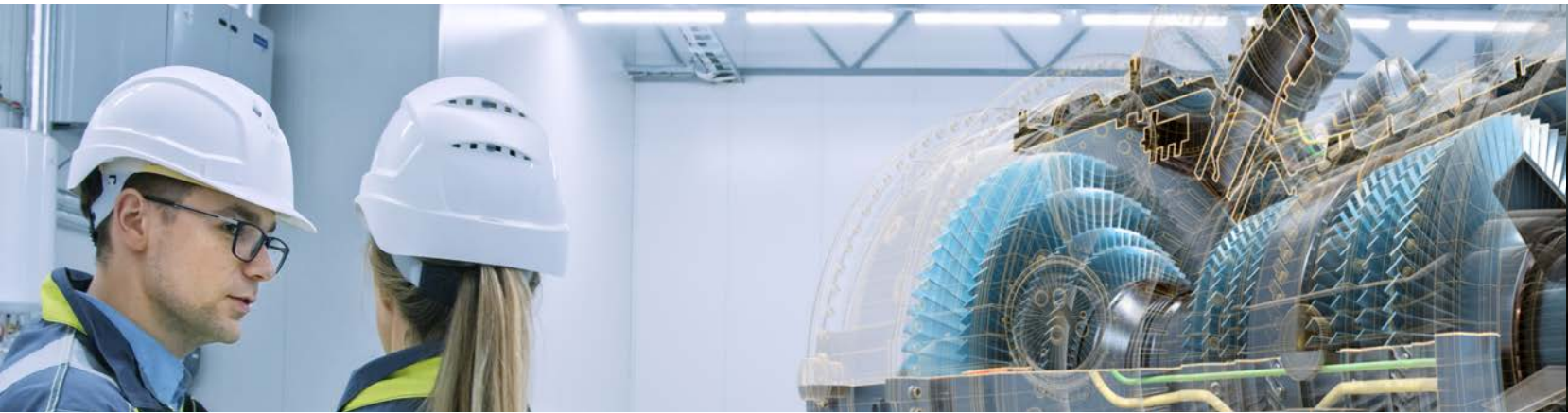
- System engineers operating with live read-only SCADA screens
- Data skillsets that were not transferable
- High reliance on human data champions at each site to provide data
- Data holes or black spots that reduced the ability to investigate asset performance

The Solution

Predict-It was chosen as the key OSIsoft PI system application to monitor critical assets in AGL’s Operational Diagnostics Center. Through deploying the OSIsoft PI system and Predict-It, assets health and performance could be tracked, monitored in a real-time data infrastructure.

Results

Through their digital transformation, AGL reported savings of \$15.2 million USD through reduced downtime, early fault detection and saved expenses. Return on the initial investment was achieved in the first 9 months of adoption. A single anomaly detected by Predict-It allowed AGL to avoid 14 weeks of unplanned downtime and save an estimated \$37 million USD.



Predict Issues Before They Become Problems

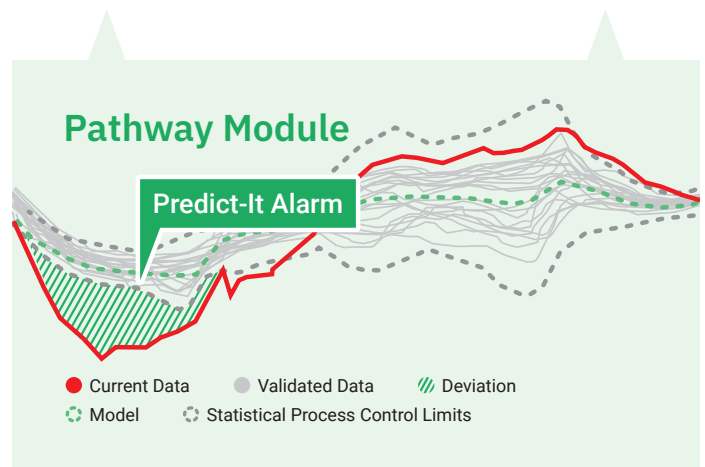
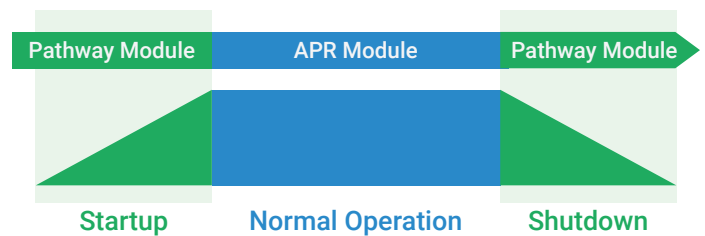
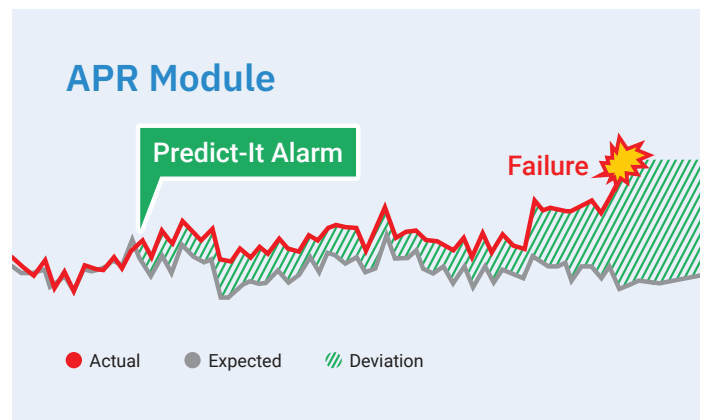
Predict-It is a powerful analytical solution for OSIsoft PI users that monitors the health of critical process equipment. Predict-It's anomaly detection modules cover all modes of operation, from start-up, through normal load, and shut-down. Highly accurate anomaly detection and correction of equipment degradation earlier in the development of faults help to keep your assets operating at higher availability, reducing ancillary damage, minimizing cost to repair while avoiding failures and lost revenue.

Advanced Pattern Recognition Module

Unlike products that monitor equipment using a first-principles approach, Predict-It employs Advanced Pattern Recognition for early detection of significant events. Modeling algorithms track trends in process variables on a continuous basis and compare them to historical operation. This Digital Twin Technology acts as a virtual model of an asset, creating a predicted trend that runs simultaneously with real-time equipment data.

Pathway Module

Quickly changing conditions can cause deterioration of mechanical assets, which will require additional a different type of monitoring. Predict-It's Batch Module uses Multivariant Data Analysis. MVDA provides a summary of key variable influences, allowing faster interpretation and interrogation of start-up, shut-downs, or batch processes. Flaggering batches, start-ups and shut-down that exceed statistical limits shines a light on developing issues that may not be seen during normal operation.





Diagnose Faults with Expertise

Once Predict-It detects an asset anomaly, engineers are tasked with putting a plan in place for addressing that situation. From compiling information on the anomaly behavior to diagnosing a potential fault, Predict-It has streamlined this process with the Diagnostic Reasoner Module. The Diagnostic Reasoner unites the knowledge of the Subject Matter Experts with a database of equipment specific faults in a Bayesian framework, allowing differentiation and bringing clarity in scenarios that involve uncertainty as an equipment issue evolves.

Diagnostic Reasoner Module

The Diagnostic Reasoner module capitalizes on the use of Causal Asset Networks (CANs). CANs are designed for the specific make and model of the assets they evaluate – resulting in more precise diagnostic results. The Diagnostic Reasoner suggests multiple root causes for failures and assigns exact probabilities for each outcome. CANs can be configured by ECG, your reliability consultant, or by your own subject matter experts, as well as purchased

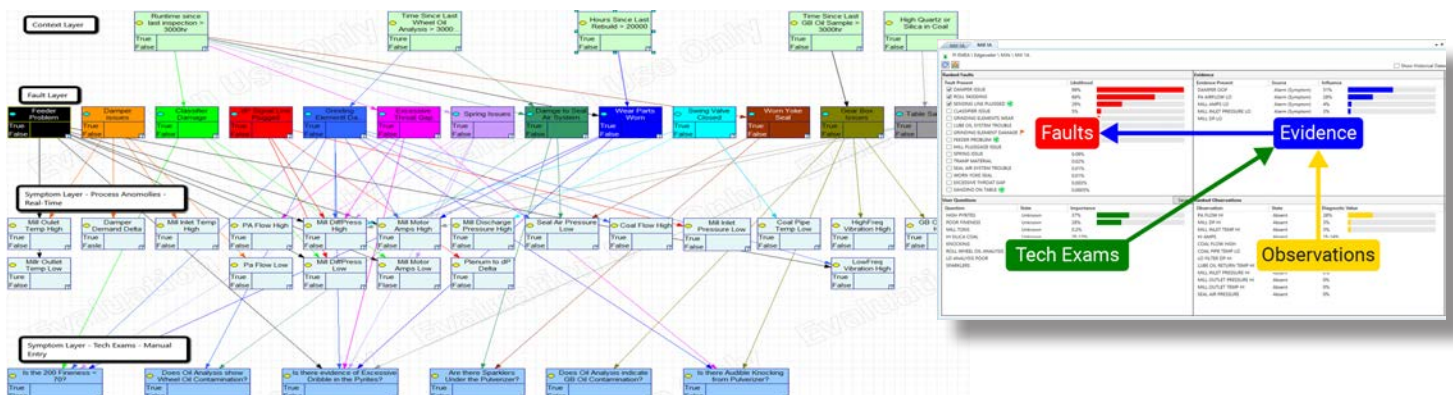
from the ECG Fault Library. Capture the knowledge of an SME within the Diagnostic Reasoner and never lose the expertise of your most seasoned employees.

High Level Use Case

- Real Time Diagnosis
- Play out “What-If” Scenarios to support decision-making
- Differential Diagnosis helps to pinpoint equipment faults

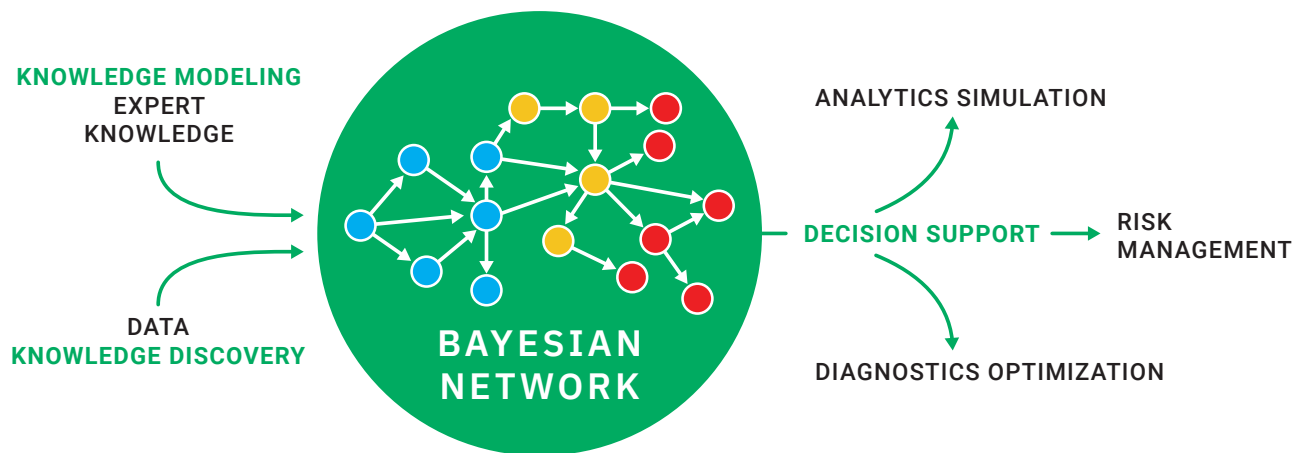
Benefits

- Shorten troubleshooting time
- Tailored Diagnostics for each asset manufacturer and model
- Ability to assess multiple faults simultaneously
- ECG Fault Library provides quick time to value





The Diagnostic Reasoner Technology



Bayesian Network Technology

Bayesian technology uses efficient algorithms to perform inference and learning using casual asset networks. These networks model sequences of variables, tracing symptoms to faults, and use probabilistic reasoning to determine the likelihood that any one of several possible known fault modes was the source of an asset anomaly. The networks can be thought of as dynamic due to their ability to adjust the probabilistic output when new evidence is introduced into the model.

Keep the Knowledge of Your Most Seasoned Employees

As the workforce ages, management faces the challenge of operating under higher expectations with limited experienced personnel. The Diagnostic Reasoner's CANs allow for knowledge transfer and storing of operational intelligence gained through decades of experience. By configuring the CANs with their specific understanding of assets, SMEs store their expertise, which can then be applied across a plant or an entire fleet of assets.

How a Bayesian Approach is Different

Traditional root cause analysis relies on a deterministic cause and effect logic. This type of deductive reasoning can purposefully or inadvertently omit possible root causes to arrive at a single outcome. Although this cause may be most likely, it is not probabilistically the only possible reason for a fault. Bayesian Networked diagnostics allow asset owners to know all possible causes of an asset fault, leading to more thorough troubleshooting and avoiding errors in deduction.



ECG's Fault Library

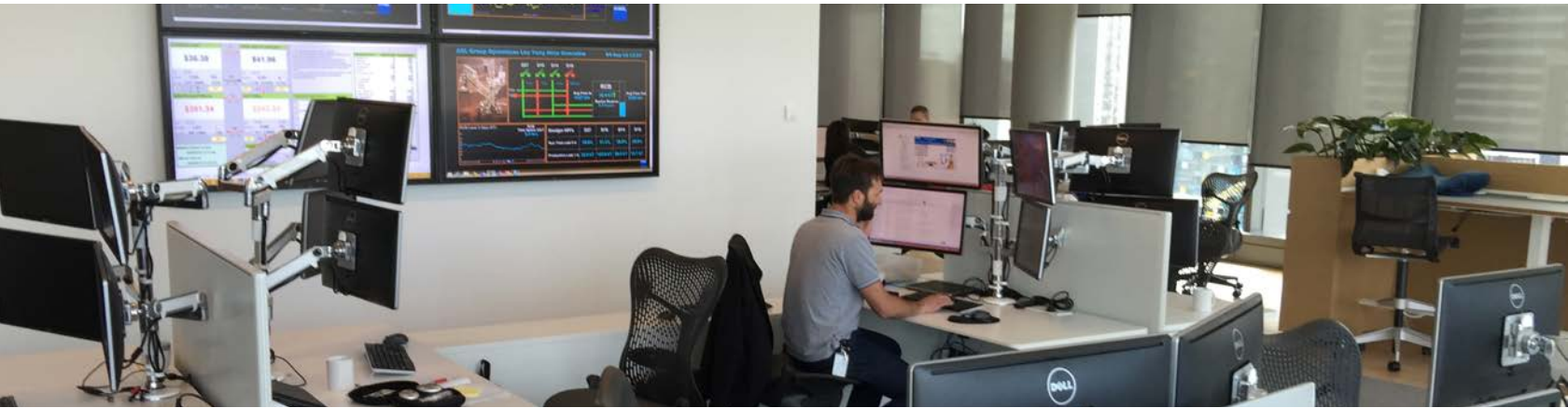


The Diagnostic Engine

Predict-It's Diagnostic Reasoner is powered by asset-specific Causal Asset Networks. ECG has developed the CAN Library to optimize equipment performance. Subject Matter Experts add experiential, first-hand knowledge about the asset and plant conditions, which reinforce the reasoner's predictions- Making the Reasoner a technology grounded in experience.

Expertly Preconfigured CANs

ECG's Fault Library contains 26 unique asset types with 844 faults encountered by these various assets. CANs can be purchased for critical assets and are instantly usable within the Diagnostic Reasoner Module. ECG's experts have decades of first-hand plant experience and are available to build and configure CANs for any industrial asset that Predict-It monitors.

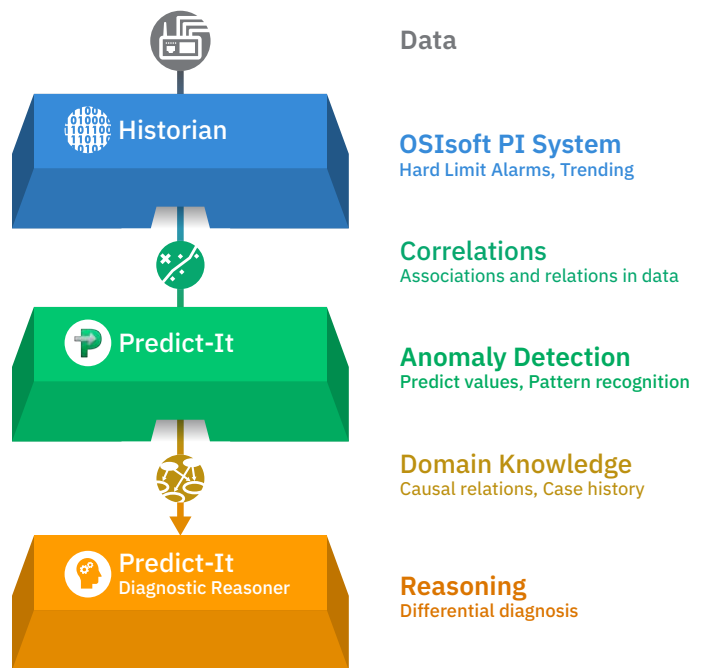


ECG's Remote Monitoring Service with Predict-It

**APR gives you advanced warning.
Diagnostics pinpoints the problem.**

With remote monitoring, ECG takes the guess work out of addressing equipment issues and maximizing your operational efforts.

Remote Monitoring of critical process equipment is conducted by experts in the industry using Predict-It's advanced analytics and diagnostics. Critical assets are protected by having the information you need, when you need it most. Our team is composed of subject matter experts with backgrounds in operations and monitoring who will act as an extension of your on-sight team. Our solution is a cost-effective alternative to expensive and difficult to staff O&M centers.



Schedule a demo today

Let us show you how our software can help

Visit www.ecg-inc.com/letstalk



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