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C3 AI Reliability

Take Early Action to Improve Asset Performance

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The Reliability Challenge

Enterprises managing complex systems of industrial assets have two key objectives: productivity and efficiency. Software should support these objectives by identifying and addressing costly problems, like unplanned downtime and asset failure, before they occur.

Legacy, on-premise solutions have allowed many companies to adopt scheduled maintenance and diagnostic programs for industrial assets. However, these time and routine-based approaches often fall short due to siloed data, time-intensive manual processes, and the need for manual interpretation of system alerts.

Operators are flooded with false alerts and must spend time piecing together data from multiple disparate systems to monitor asset health. New operators, meanwhile, rely on lengthy operational manuals and peer-to-peer training to respond to risk alerts.

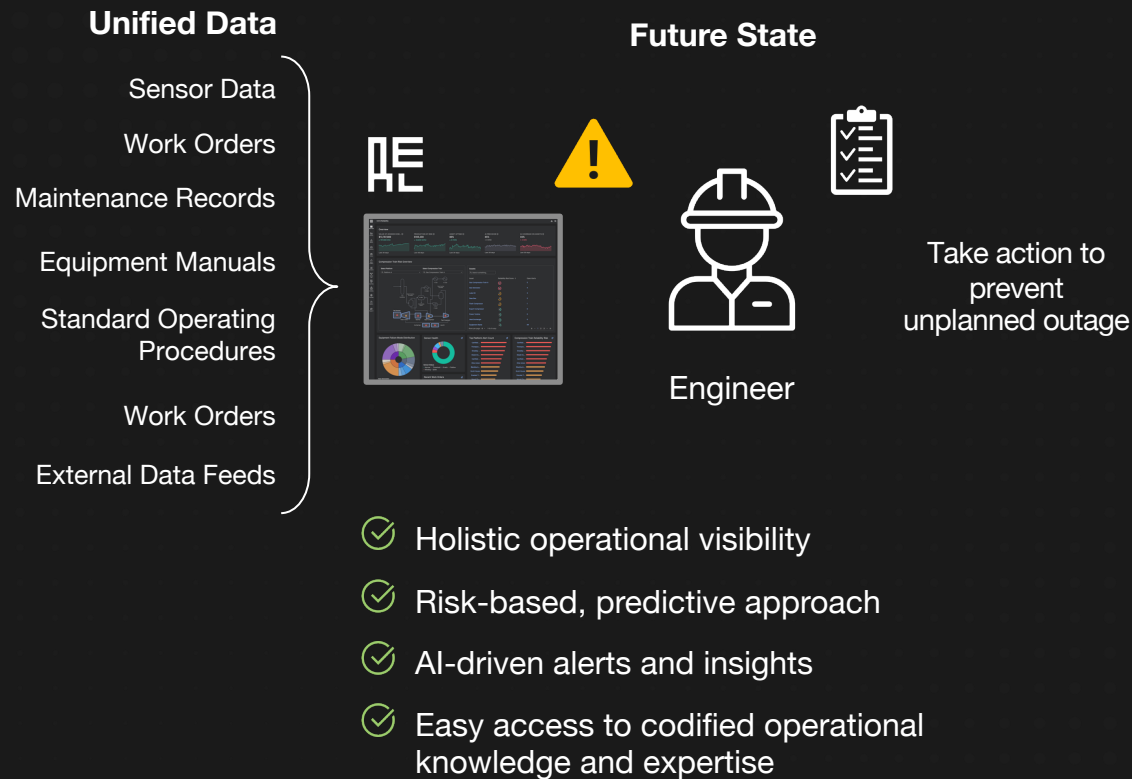Source: Vanson Bourne: The Costs, Causes & Consequences of Unplanned Downtime

⚠️

82%
of manufacturers hit
by unplanned outages

$1M
average cost per outage

AI-Driven Asset and System Monitoring

Unified Data

- Sensor Data
- Work Orders
- Maintenance Records
- Equipment Manuals
- Standard Operating Procedures
- Work Orders
- External Data Feeds

Future State

Engineer

Take action to prevent unplanned outage

- ⊘ Holistic operational visibility
- ⊘ Risk-based, predictive approach
- ⊘ AI-driven alerts and insights
- ⊘ Easy access to codified operational knowledge and expertise

Enterprise artificial intelligence (AI) software unifies siloed data and integrates with existing systems, enabling operators to move from a threshold-based approach to a more proactive, risk-based maintenance strategy.

Recent advances in AI-driven predictive maintenance for reliability and asset health management allow operators to peer into the future. Unlike threshold-based monitoring systems, which often raise alarms for individual variables, AI systems use a data-driven approach to monitor all relevant process variables for a system or asset. Anomaly detection algorithms use those signals to learn the system's normal operating behavior and provide actionable insights when an abnormal pattern is identified. These capabilities allow AI systems to not only detect issues more precisely, but also to dramatically reduce the number of false alerts that plague operators.

Generative AI, meanwhile, allows operators to efficiently respond to alerts and maximize uptime. Natural language summaries of operational manuals and pre-filled work orders, among other use cases, are poised to significantly streamline industrial asset management.

C3 AI Reliability to Reduce Unplanned Downtime

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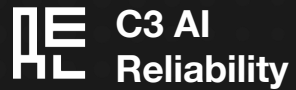
C3 AI Reliability

C3 AI Reliability identifies anomalous behaviors across industrial systems and assets, detects risks ahead of time, and provides prioritized alerts and recommended actions to avoid unplanned downtime. The application provides engineers, plant management, and operations executives with the AI-based risk predictions and early warnings they need to maximize uptime.

C3 AI Reliability integrates data from disparate sources – including data historians and sensors, operational systems, and maintenance records – into a unified data layer. The application allows users to create and configure a digital representation of physical asset hierarchies and operational dependencies.

The application comes pre-integrated with C3 Generative AI, equipping users with natural language search to access, locate, and retrieve information across enterprise systems.

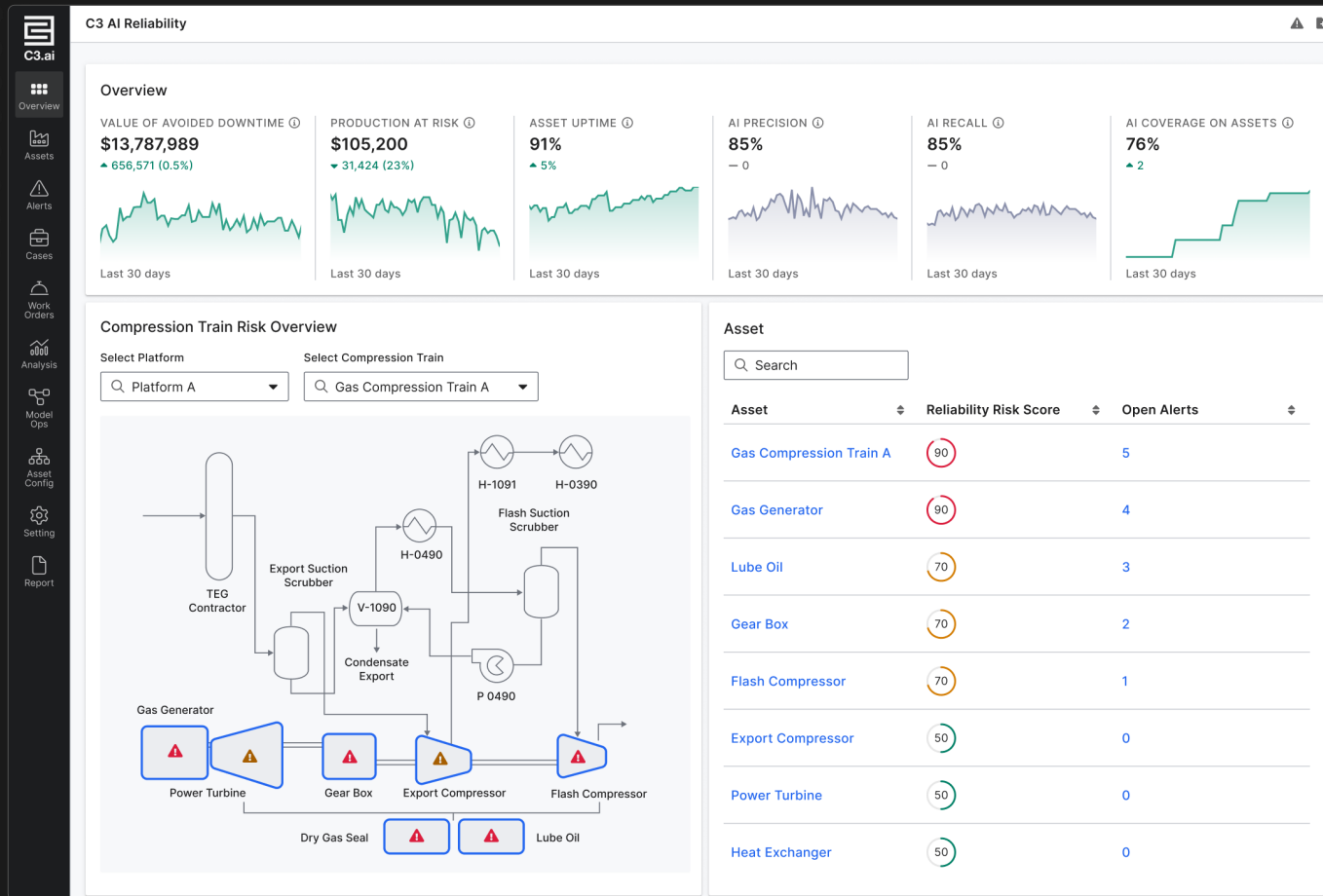## Business Outcomes with C3 AI Reliability

↓ **20-50%**
Reduction in unplanned downtime

↑ **5%**
Increase in operational productivity

↓ **99%**
Reduction in false alarms

↓ **90%**
**Reduction** in alert triage time

Anticipate and Resolve Asset Risks in Advance

C3 AI Reliability

- ✓ **Holistic view** of asset health and availability
- ✓ **Robust monitoring** with AI and sensor health capabilities
- ✓ **No black-box AI** with explainable alerts, failure modes, and recommended actions
- ✓ Digitize and **easily access institutional knowledge**
- ✓ **Scale quickly** across the enterprise

# Uncover Reliability Insights with C3 Generative AI
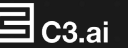
Generative AI Embedded in C3 AI Reliability

C3 AI Reliability comes pre-integrated with C3 Generative AI capabilities, which enables rapid access to information from enterprise and external systems.

Generative AI integration allows operators to leverage natural language search to retrieve information from disparate sources, such as operational manuals. Results are ranked and summarized for users, who can then pose follow-up questions through context-aware chat. Feedback is incorporated into generative models to improve performance over time.

C3 Generative AI also equips operators to respond to alerts through enhanced natural language summaries of alert details, retrieval of relevant failure modes and recommended actions, and the creation of pre-filled cases or work orders.
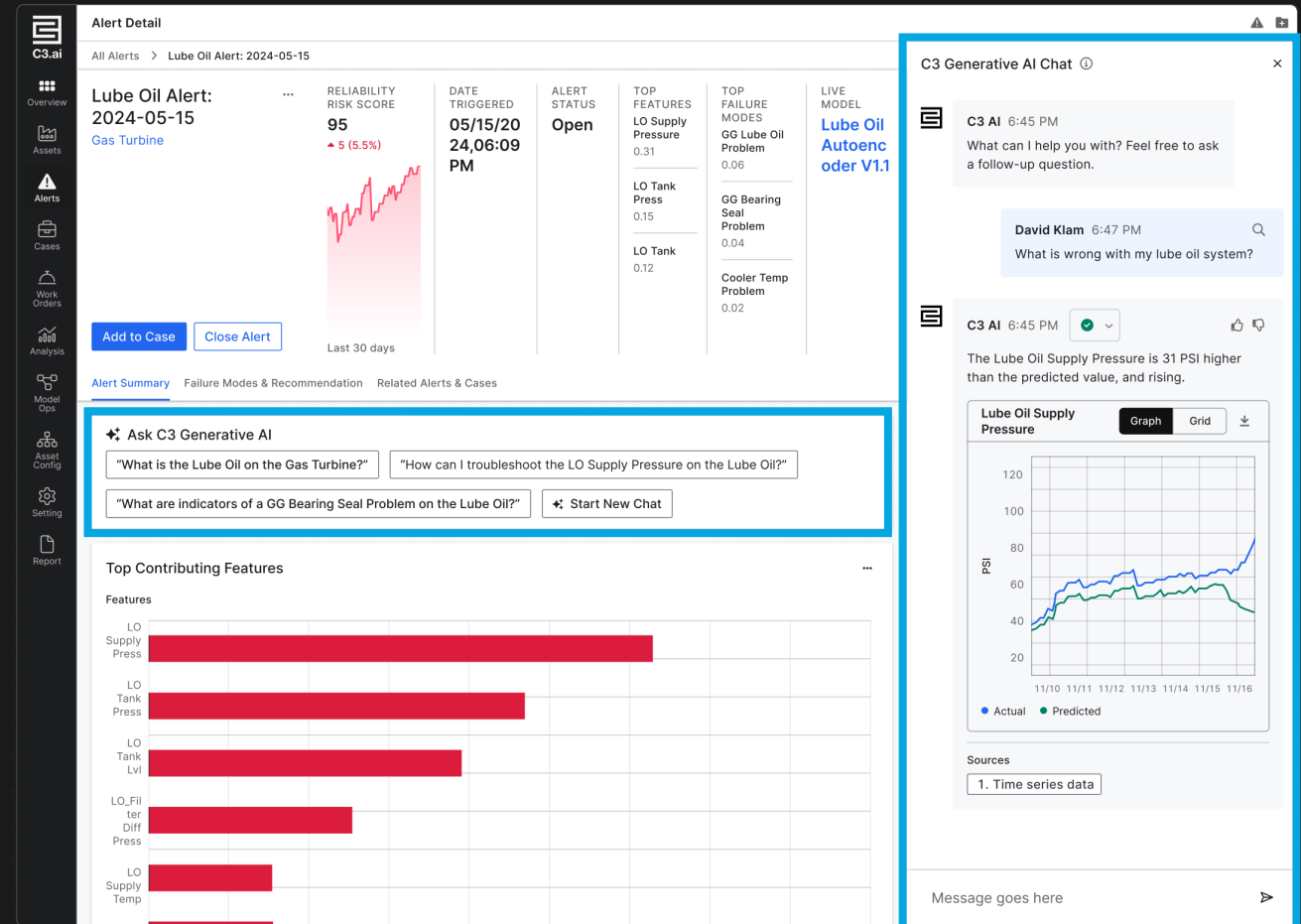
Configure Workflows for Different End Users

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Reliability Engineers

- Monitor key KPIs at-a-glance with configurable dashboard
- Quickly visualize system health with digital asset hierarchy
- Investigate prioritized AI alerts via detailed evidence packages
- Review likely failure modes and recommended actions
- Create cases and work orders to initiate maintenance
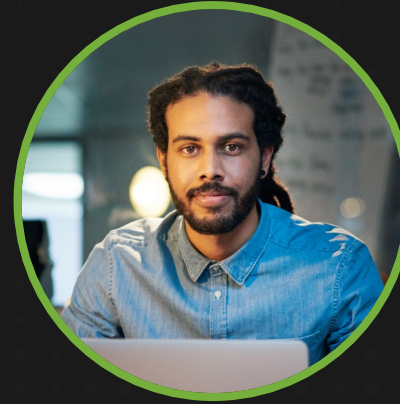
Data Scientists

- Collaborate with reliability engineers to develop AI models
- Configure key model performance metrics
- Configure, train, deploy, and manage AI models in the application
- Review and investigate model feedback from engineers
- Leverage templates to rapidly scale AI models across assets

Proven Results Across Industries

Manufacturing

Improve Operational Productivity

5%

Overall Equipment Effectiveness Improvement

Energy

Improve Worker Efficiency

99%

Reduction in False Alarms

Chemicals

Increase Asset Availability

1.4%

Increase in Asset Utilization

Mining

Detect Risks Early

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14 Days

Lead Time to Event

Utilities

Predict and Prevent Failures

98%

Prediction Accuracy

Healthcare

Reduce Unplanned Downtime

$60M

Annual Economic Value

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Scaling Enterprise AI at Georgia-Pacific

Georgia-Pacific (GP), a subsidiary of Koch Industries and one of the world's leading makers of tissue, pulp, packaging, and building products, has over 100 manufacturing facilities across North America.

Since 2018, GP had used rules and machine learning-based models to monitor individual sensor readings and generate alerts. However, as it looked to scale up its efforts, the company found that existing software platforms fell short.

In 2020, GP embarked on a multi-year partnership with C3 AI, with the initial goal of using the C3 AI Reliability application to reduce unplanned downtime. GP saw significant improvement in monitoring performance and, building on this success, GP plans to expand the application to 8 additional asset classes.

Project Highlights

- 200+ assets monitored across 13 paper mills
- 1 live ML model per asset, plus continuously deployed challenger models
- 2,816 ML model features
- 6 disparate data sources integrated

Results

5% increase in overall equipment effectiveness (OEE)

100s of unplanned downtime hours avoided

>$100M in annual economic value

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Enterprise AI for Predictive Maintenance at Shell

Royal Dutch Shell plc (Shell), one of the world's largest multinational oil and gas companies, started developing and deploying AI in 2013.

In 2018, Shell selected C3 AI as its artificial intelligence platform to enable and accelerate its digital transformation on a global scale, with the goal of rapidly scaling AI and machine learning applications to improve operational performance. In 2021, building on early successes, Shell and C3 AI announced a 5-year renewal of the strategic partnership.

Today, with C3 AI, Shell has scaled its predictive maintenance program to over 10,000 pieces of equipment in upstream, manufacturing, and integrated gas assets, representing one of the largest such deployments in the energy industry.

Project Highlights

- 20 billion rows of data from 3 million sensors ingested weekly
- 16,000 machine learning models in production
- Over 15 million predictions every day

Results

20K+ pieces of critical equipment monitored globally

$28M per year in avoided shutdowns

14+ Shell assets in production

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Improving Uptime and Asset Reliability in Biopharma

A Fortune 500 biotechnology company, with a wide portfolio of medicines and diagnostics for chronic and life-threatening conditions, made it a priority to leverage AI solutions to improve asset reliability and optimize maintenance costs.

Before engaging C3 AI, production sites relied on conventional systems to monitor centrifuges. However, operators were inundated with false alarms with only minutes of lead time prior to failure events, resulting in millions of dollars in losses.

In 12 weeks, C3 AI partnered with the company to configure C3 AI Reliability to monitor and predict impending failures. With the application, the company can now predict potential failures at a much higher rate and with significantly more lead time, reducing downtime and improving production margins.

Project Highlights

- Integrated 6+ years of historical data from 6 enterprise IT systems
- Developed over 300 reusable analytics
- Tested over 500 machine learning models
- Configured C3 AI Reliability application user interface

Results

$60M annual impact potential at scale

93% shutdowns predicted in advance

80% reduction in false system alerts

Ready to Get Started?

Learn how you can identify and prevent reliability risks with Enterprise AI.

① **Contact C3 AI**

② **Introductory Call with C3 AI**

③ **Receive a Personalized Demo**

Get started: c3.ai/reliability

C3 AI Pilot Timeline: Deliver a production AI application in 4-6 months

| Pre-pilot | Month 1 | Month 2 | Month 3 | Month 4 | Month 5 | Month 6 |

- Project Preparation
- Design & Analysis — 4 to 8 weeks
- Configuration — 5 to 8 weeks
- Validation — 4 to 8 weeks
- Deploy & Train
- Ongoing Development Training, Guided Development, and Coursework