



AI Predictive Defect Detection System

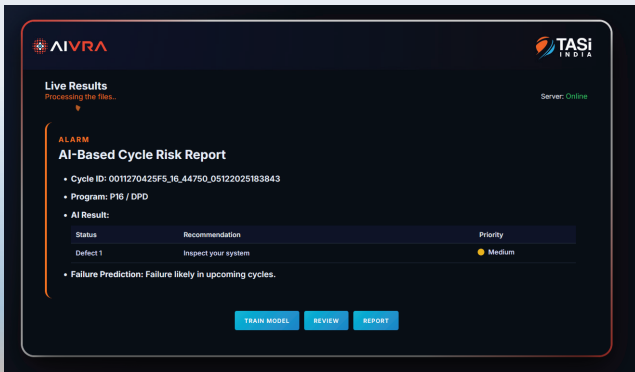
This is a predictive defect detection system made for early failure identification to avoid system down-time



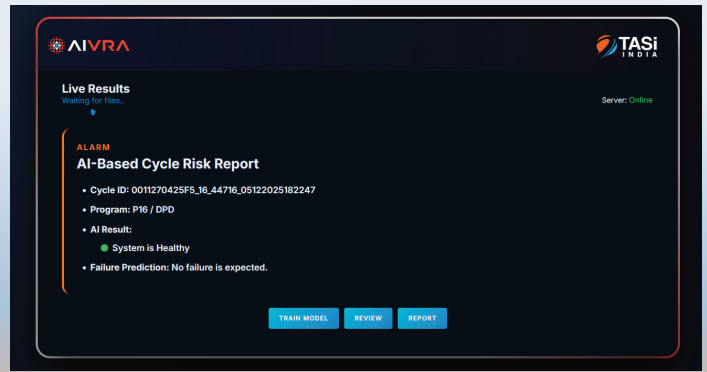
Product Overview

The AI Predictive Defect Detection System enables manufacturers to predict upcoming failures after N test cycles, along with the root cause of failure and severity priority. By analyzing Pressure/flow sensor behaviour and historical trends across cycles, the system forecasts whether a failure is likely to occur in future cycles and classifies it into actionable categories such as fixturing issues, sealing issues, Pressure/flow instability, hose/connector degradation or sensor-related problems.

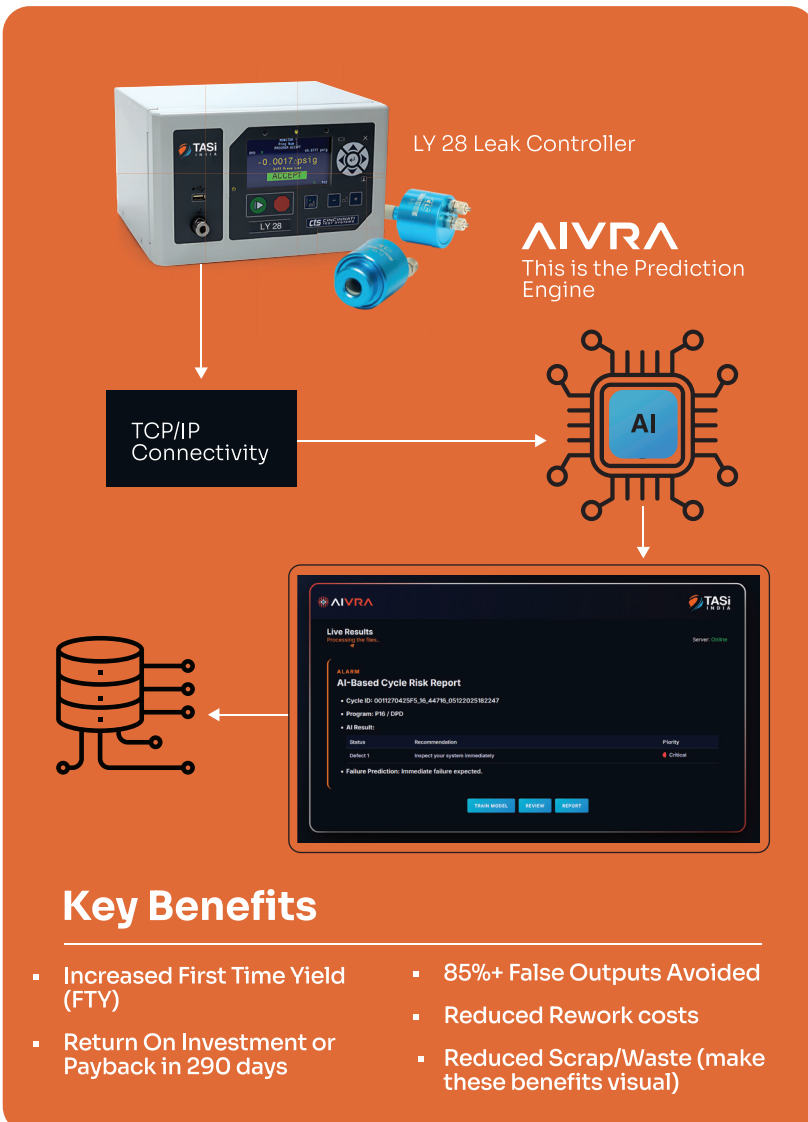
This transforms leak testing from simple pass/fail inspection into predictive, root-cause-aware quality intelligence, enabling proactive maintenance planning, faster corrective action and higher production reliability.



Live failure detection status and alert dashboard



Live healthy system dashboard screen



Key Benefits

- Increased First Time Yield (FTY)
- Return On Investment or Payback in 290 days
- 85%+ False Outputs Avoided
- Reduced Rework costs
- Reduced Scrap/Waste (make these benefits visual)

Key Value Proposition

- Predicts upcoming failures after N cycles
- Assigns severity priority: Low/Medium/High
- Reduces false failures and unnecessary retesting
- Improves reliability of Pressure/flow-based leak testing
- Integrates seamlessly with existing leak-testing setups
- Enables data-driven, predictive quality control

Core Capabilities



Pressure/flow Data Acquisition



AI-Based Predictive Analytics



Cycle-Level Failure Prediction



Intelligent Alerts, Review & Reporting



Customized Automatic Machine Stoppage

Failure Prediction Outputs

The system provides clear, actionable prediction results focused on future failure type and severity:

Predicted Failure Type:

- Fixturing issue
- Sealing issue
- Pressure/flow instability
- Hose / connector degradation
- Sensor-related anomaly

Failure Priority Classification:

- **High:** Failure highly likely within the next few cycles
- **Medium:** Degrading condition likely to cause failure in upcoming cycles
- **Low:** Early abnormal trends, monitoring recommended

Prediction Horizon:

- Configurable N cycles ahead

Visualisation & User Interface

The system includes an operator- and engineer-friendly interface for day-to-day monitoring and deeper analysis:

- Live monitoring of cycle status and server/health status
- **AI-Based Cycle Risk Report** view with:
 - Cycle ID / Program
 - AI result status
 - Failure prediction summary
- Review screen to inspect deviation table and deviation graphs
- Clear display of **risk priority (Low / Medium /High) and predicted failure type**

Integration & Deployment Options

- Non-intrusive integration with existing leak-test machines
- Works alongside current PLC logic
- Data integration with MES / QMS / CMMS (manufacturing, quality and maintenance software)
- **Deployment options:**
 - **On-machine (Edge):** runs near the leak-test station for fast local analysis
 - **Line-level:** monitors multiple stations on a production line
 - **Plant-level centralized monitoring:** consolidated view across the plant

Technical Problems Addressed



Leak detection is limited to post-test pass/fail decisions



Inability to differentiate between fixturing, sealing or setup-related issues



High false failure rates caused by unstable Pressure/flow or noisy signals

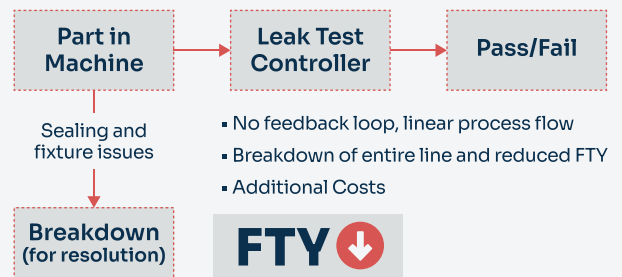


No advance warning of setup degradation before testing

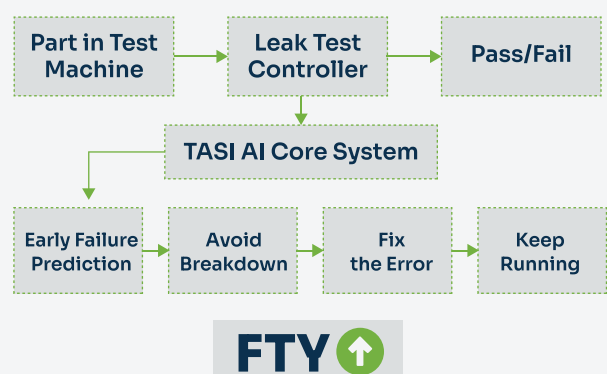
Key Advantages Over Traditional Systems

- Predictive, not reactive leak intelligence (forecasts failures after N cycles)
- Detects setup issues such as fixturing/sealing degradation, unstable supply Pressure/flow and sensor drift
- Reduces false failures and unnecessary retesting
- Improves test efficiency and operator decision-making through review, reporting and exports

Traditional Process (Without AI)



AI-Enhanced Process (With TASI AI Core)



Comparison with Traditional Leak Testing

Feature	Traditional Systems	AI Predictive Defect Prediction
Detection Timing	After test completion	Across test cycles (predictive)
Failure Prediction	Not available	Available
False Failures	High	Reduced
Setup Fault Detection	Limited	Advanced
Intelligence Level	Reactive	Predictive

Use Cases

- Automotive fuel lines, EV coolant systems, braking components
- Aerospace hydraulic fittings and pressurized assemblies
- Medical devices requiring sealed integrity
- Industrial pneumatic systems and valves
- Manufacturing quality stations and leak-test fixtures

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