



NiriX

Structural Health Monitoring System

Continuous Structural Health Monitoring
for Data-Driven Infrastructure



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Images are for representation purposes only.



Structural Health Monitoring System

Precision Sensing. Intelligent Acquisition. Continuous Infrastructure Intelligence.

Critical infrastructure such as bridges, flyovers, and industrial structures operate under constant dynamic loads, environmental stress, and material fatigue. Despite this, most monitoring practices still rely on periodic inspections, offering only limited snapshots of structural condition.

Over time, this creates a dangerous blind spot, where damage develops silently and progresses unnoticed between inspection cycles.

The Hidden Risk

Structural deterioration is not sudden; it is gradual, cumulative, and often invisible until it becomes critical.

- Fatigue cracks initiate and propagate between inspections
- Corrosion and stress accumulation remain undetected
- Structural behaviour under real loads is never continuously observed
- Minor defects evolve into major risks without early signals

By the time damage becomes visible, intervention is often reactive, costly, and high-risk.

Why Traditional Inspection Falls Short

Conventional inspection and NDT methods were never designed for continuous visibility. They provide isolated data points, not a complete picture of structural health.

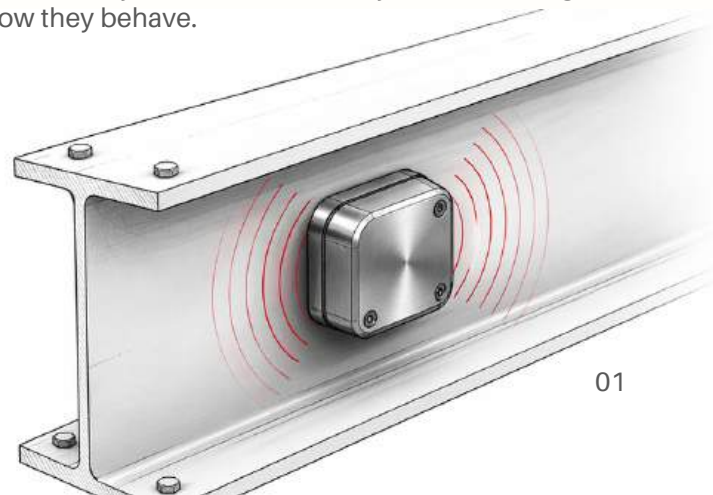
- Inspections capture moments, not trends
- No tracking of defect evolution over time
- Heavy dependence on manual interpretation
- Maintenance triggered only after visible deterioration

The Shift: From Inspection to Continuous Intelligence

The industry is moving toward a more advanced approach, condition-based, data-driven monitoring.

Traditional Approach	NiriX Approach
Periodic inspections	Continuous monitoring
Snapshot-based data	Time-series insights
Reactive maintenance	Predictive intervention
Manual processes	Automated intelligence

The focus is no longer on checking structures occasionally, but on continuously understanding how they behave.





Precision Sensing. Intelligent Acquisition. Continuous Infrastructure Intelligence.

NiriX is designed to bridge the gap between inspection and insight by enabling real-time, continuous monitoring of structural behavior. It acts as a 24/7 intelligent monitoring system, providing engineers and asset owners with actionable data to make informed decisions.

1. Technology

On-Demand Monitoring for Smarter Decision

From Inspection to Continuous Intelligence

Remotely control when data is recorded, start or stop acquisition based on events, test windows, or inspection schedules.

This approach significantly extends battery life while avoiding the storage and processing of non-actionable data, ensuring efficient and targeted monitoring.

2. Built-in Sensor Fusion & Modal Analysis

Embedded analytics combine data from multiple sensors to deliver system-level structural insights.

Each module is a self-contained monitoring unit:

- **Dynamic** (Vibration + strain)
- **Deformation** (Displacement + tilt)
- **Environmental** (Temperature, humidity, wind)

All with inbuilt DAQ + wireless transmission + multi sensor module. No additional hardware. No complex wiring.

Supports modal parameter identification, response correlation, and behavior analysis; reducing dependence on external processing tools and accelerating decision-making.

3. Integrated IoT Dashboard for short-term and long-term SHM

A unified interface for short-term monitoring deployments, providing live data access, historical trends, and system status in real time. Includes one-click report generation for instant documentation and enables on-the-fly decision-making during critical testing and assessment scenarios.

Eliminates fragmented workflows and ensures faster interpretation, quicker insights, and immediate action when it matters most.

4. Data Reliability

Architecture ensures both range and performance: Designed to ensure data integrity under all conditions:

- Multiple wireless communication options for reliable transmission
- Onboard SD card storage for local data backup

This multi-layer redundancy minimizes the risk of data loss, ensuring continuous and dependable monitoring.

5. Dual Power Operation (Battery + Charger)

Flexible power configuration enables a single node to adapt across use cases:

- Battery-powered mode for short-term SHM (rapid deployment, no wiring)
- Provision for connecting charger on-site for continuous operation for long-term SHM

Enables seamless transition between temporary and permanent monitoring setups using the same hardware platform.

Built in accordance to Policy Circular No.18.118/2026





Sensor and Measurement Capabilities

NiriX sensor modules are specified for infrastructure-grade performance; high sensitivity, wide dynamic range, and reliable signal fidelity in the electrically noisy, thermally variable, and mechanically demanding conditions of live structural deployment.

Module type	Sensor type	Parameter	Specification
Module 1 (Dynamic)	Strain Gauge	Measurement range	$\pm 1000 \mu\epsilon$
		Measurement precision	$1 \mu\epsilon$
		Accuracy	$\pm 2 \%$
	Vibration	Measurement range	$\pm 2g, 4g$
		Resolution	20bit, $50\mu g$
Module 2 (Deformation)	Displacement	Measurement range	$\pm 25 \text{ mm}$
		Accuracy	$\pm 0.1 \text{ mm}$
		Resolution	0.01 mm
	Tilt	Measurement range	$\pm 10^\circ$
		Accuracy	$\pm 0.05^\circ$
		Resolution	$\pm 0.001^\circ$
		Linearity	2% of full scale
		Repeatability	$\pm 0.01^\circ$ (static)
Module 3 (Environmental)	Temperature	Measurement range	-55°C to 150°C
		Accuracy	$\pm 0.2^\circ\text{C}$ (maximum)
		Resolution	$\pm 0.0078^\circ\text{C}$
	Humidity	Measurement range	0% to 100%
		Accuracy	$\pm 3\%$ (maximum)
		Resolution	± 0.01 (static)
	Anemometer	Measurement range	0-70 m/s
		Accuracy	$\pm(0.2+0.03V)\text{m/s}$, @ (0~30m/s, 25°C) V indicates wind speed
		Resolution	0.0875 m/s



Why Choose NiriX?

NiriX follows a structured monitoring lifecycle that ensures continuous visibility and actionable insights:

Designed for Real Infrastructure

By enabling continuous monitoring, NiriX transforms how infrastructure is managed:

- **Reduced Risk**
 - Early detection of structural issues
 - Prevention of catastrophic failures
- **Optimized Maintenance**
 - Shift from schedule-based to condition-based maintenance
 - Better planning of interventions
- **Cost Efficiency**
 - Reduced emergency repair costs
 - Lower inspection frequency
- **Extended Asset Life**
 - Data-driven lifecycle management
 - Improved long-term performance
- **Enhanced Safety**
 - Real-time awareness of structural condition
 - Informed, timely decision-making

Deployment Advantages

NiriX is engineered for real-world infrastructure constraints:

- Wireless-first architecture, no cabling complexity
- Rapid installation on live structures
- Non-destructive and reversible mounting
- Scalable across multiple sites
- Remote monitoring and diagnostics

Applications

NiriX is suited for a wide range of infrastructure environments:

- Bridges and flyovers
- Elevated corridors and metro systems
- Industrial structures
- Remote or inaccessible assets
- Load testing and rehabilitation monitoring

NiriX: Condition-Based Infrastructure Intelligence

Infrastructure does not fail without warning, it fails without being observed.

NiriX enables continuous visibility into structural behavior, allowing stakeholders to act early, reduce risk, and make confident, data-driven decisions.

Book a technical consultation to understand your infrastructure monitoring needs.

Nirixense X



Go-to solution provider for asset health monitoring

Solutions for a Better Tomorrow

2026



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