

Lenovo Manufacturing Solutions

Robotic Inspection



- › Intelligent Inspection & Monitoring
- › Customized Robot Tailored For Industrial Tasks
- › Integrated Inspection & Patrol
- › Simulation Driven Robot Deployment & Digital Twin

Smarter
technology
for all

Lenovo

Intelligent Robotic Inspection Redefined

The Robotic Inspection Solution is an enterprise-grade, AI-driven platform designed to modernize industrial inspection across complex and high-risk environments. By integrating advanced robotics, edge AI, and multi-modal sensing, the solution enables continuous monitoring of assets, infrastructure, and operating conditions while minimizing human intervention. Its modular and adaptable architecture supports a wide range of mobility, sensor, and compute configurations, making it suitable for diverse use cases including manufacturing facilities, energy infrastructure, and utilities. To accelerate deployment and reduce operational risk, the solution incorporates simulation-based robot training to digitally model facilities, inspection workflows, and operating conditions prior to field rollout. This approach enables robot behaviors and inspection processes to be validated and optimized for site-specific requirements, significantly reducing commissioning time and ensuring strong alignment with real-world operational needs.



Once deployed, the solution processes multi-modal sensor data in real time to deliver advanced inspection capabilities, including anomaly detection, condition assessment, and enhanced situational awareness. Inspection outputs integrate seamlessly with enterprise IT and OT systems, transforming raw sensor data into actionable intelligence while maintaining low latency, high system reliability, and robust data security. Advanced AI-driven automation further improves operational efficiency through intelligent workflow orchestration, supporting capabilities such as automated decision making, root-cause analysis, predictive diagnostics, and guided or autonomous execution of corrective actions, with minimal human supervision. Designed for scalability and industrial-grade reliability, the platform facilitates fleet-level operations and continuous monitoring across distributed sites. By combining configurable robotic systems, advanced analytics, and simulation-driven deployment, the Robotic Inspection solution enables organizations to transfer from manual, reactive inspections to intelligent, proactive operations—delivering measurable improvements in safety, asset availability, and operational efficiency.



Leading features



Enterprise Robotic Inspection

Provides scalable, automated inspection workflows across complex industrial environments, improving inspection coverage, consistency, and reliability while reducing dependence on manual processes.



Workforce Safety and Operational Sustainability

Eliminate personnel exposure to hazardous, repetitive, and high-risk inspection activities, supporting safer working conditions and more sustainable operations.



Intelligent Mobility for Complex Environments

Utilizes advanced navigation, localization, and intelligent path planning to enable dependable, mission-critical inspections in dynamic, constrained, and unstructured environments.



AI-Enabled Multi-Modal Sensing and Analytics

Processes data from visual, thermal, and environmental sensors using flexible AI analytics to detect anomalies, support timely insights, and meet latency, reliability, and security requirements.



Simulation-Driven Deployment and Validation

Applies physics-based simulation and robot training to model facilities and inspection workflows, enabling site-specific optimization as well as faster and lower-risk deployment.



Integrated Inspection and Patrol Operations

Unifies routine patrols with detailed inspections to deliver comprehensive situational awareness, higher-quality data collection, and improved response efficiency.



Enterprise IT and OT System Integration

Integrates seamlessly with existing enterprise IT and OT systems, converting inspection data into actionable intelligence that supports data-driven decision-making and automated workflows.



Flexible Task Assignment



Routine Tasks

Support configurable routine inspections across multiple execution modes, including scheduled cycles, fixed intervals, and rule-based triggers based on task attributes and priority.



Emergency Tasks

Enable operators to define inspection points directly within a 3D map. The robot automatically generates an inspection plan, optimizes routing, adjusts PTZ parameters as needed, and executes emergency inspections with minimal manual intervention.



Linked Tasks

Provide seamless integration with internal systems (e.g., SIS). When connected devices or equipment issue anomaly alarms, the platform initiates a coordinated response and dispatches the robot to perform on-site inspection.

Use Cases — Utility



Over 80% inspection efficiency improved

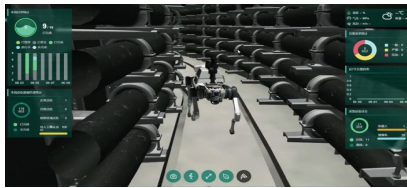
"FeiWin Robotic Dog", the Robotic Inspection solution jointly developed with Lenovo, has become a milestone achievement in the intelligent upgrade of substations. This product is the first in China to achieve 100% coverage of all inspection points within a substation using a single intelligent device. It has now been upgraded to an integrated "inspection and operation" version, improving daily inspection efficiency by over 80%. It provides a comprehensive, efficient, and safe intelligent management and control solution for power stations.

Technology Expert, China Southern Power Grid.

Core Technical Capabilities



Exceptional adaptability to various terrains.



Advanced capabilities for intelligent perception and detection.



Smart capabilities for seamless collaboration and deployment.



Remote management and efficient connectivity features.

Proven Business Outcome

Defect detection rate

>95%

Optimize O&M management processes and improve **equipment reliability** and **operational stability**.

Inspection time reduced by

90%

Enhances safety and risk management, improve operational efficiency, reducing task completion time by

65%





Return on investment in

1.36 years

70% more efficient outcomes result from intelligent and remote monitoring



Robot Spec

	6-Legged Model		4 Leg-Wheeled Model	
Product Model				
	Bot IS 2.0	Bot GS 3.0	Bot MC	Bot MX
Dimension (mm)	980 × 484 × 480	1160 × 660 × 610	630 × 360 × 465	(860-1000) × 500 × 600
Weight (kg)	37	68	20	40
Max Payload (kg)	30	100	15	75
Step Height (cm)	20	22	16	22
Slope (deg)	45	45	30	45
Walking Speed (m/s)	2	1.6	3.7 (Customizable 5)	6
Battery Life (hr)	2.5-3	2.5-4	1-2	2-4
IP Rating	IP67	IP67	IP54	IP67
Positioning Comparison	Inspection, Patrol	Payload operations	Education, Inspection, Patrol	Inspection, Patrol
Primary Application	Extreme-terrain industrial-grade	Extreme-terrain	Entry-level lightweight	All-terrain industrial-grade
Customized Sensor Selection	✔ Advanced Dual light camera		✔ PD module	✔ Panoramic camera
	✔ Robot protective clothing		✔ Gas sensor	✔ Acoustic camera

*** How to choose?**

6 legged robots extreme terrain, high-stability robot optimized for heavy payloads, complex tooling, and harsh environments where reliability and capability matter more than speed.
(Payload and stability are the key points)

4 legged wheeled robots are for High-speed, all-terrain inspection and patrol optimized for coverage, response time.
(Locomotion Performance and Efficiency are the key points)



Intelligent Inspection Categories

Cutting-Edge Algorithms

Delivers top performance in intelligent inspection algorithms, with a proven track record of success among industry clients.

Power equipment monitoring

Equipment Defects



Silicone cartridge damage



Oil seal damage



Silicone discoloration



Blurry dial surface

Equipment Status



Pressure plate



Indicator light



Isolation switch



Energy storage indicator

Meter reading



SF6 pressure gauge



Double-Pointer Surge Arrester Meter



JCQ series surge arrester meter

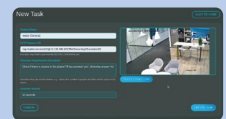


Pointer type oil level gauge

Dynamic instruction extension



Template instructions



Custom instructions

Unmatched Industrial Data Advantage

A robust database with over 500,000 entries in the power industry, enriched with expert annotations to establish a significant data advantage in the sector.

Environment and personnel monitoring

Operational Control



Smoking



Crowd



Fallen



Not wearing safety helmet

Environmental Safety



Small animal intrusion



Fire and smoke



Hanging suspended objects



Indoor water accumulation

Engineering Safety



Drainage ditch blockage



Curb damage



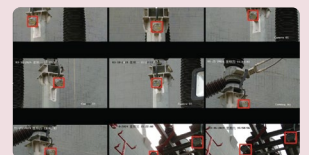
Floating oil on the water surface



Missing manhole cover

Few-shot and anomaly detection

Few-shot Detection



Detect the target based on the reference image

Anomaly Detection



Detect abnormal objects based on normal samples



System Overview

Inspection Platform Features

1

Simulation and Robot Training

Enables virtual environment modeling and robot training directly on the platform, allowing users to optimize inspection workflows and behaviors before deployment.

2

Flexible Task Management

Assign and manage robot tasks with ease using an intuitive graphical user interface for viewing, editing, and modifying tasks.

3

2D and 3D Inspection Point Editing

Create and edit inspection points with precision through a user-friendly interface that supports both 2D and 3D point editing.

4

Advanced Image and Hazard Analysis

Leverages state-of-the-art algorithms for meter reading, equipment defect detection, status monitoring, personnel behavior violation analysis, and identifying environmental hazards like floods, fires, and smoke.

5

Predictive Maintenance Analytics

Combines equipment defect reports, historical data, and operational conditions to analyze fault patterns and accurately predict equipment failures.

6

Automated and Customizable Reporting

Generates detailed, tailored inspection reports through automated analysis of multidimensional data, meeting specific operational and reporting requirements.

Network Deployment Architecture Features



Robot Scheduling Management:

Optimize task assignments and schedules for efficient robot operations.



Inspection Workflow Management:

Manage and streamline inspection tasks for consistent and reliable operations.



Integration with External Systems:

Connect seamlessly with external platforms for enhanced data sharing and coordination.

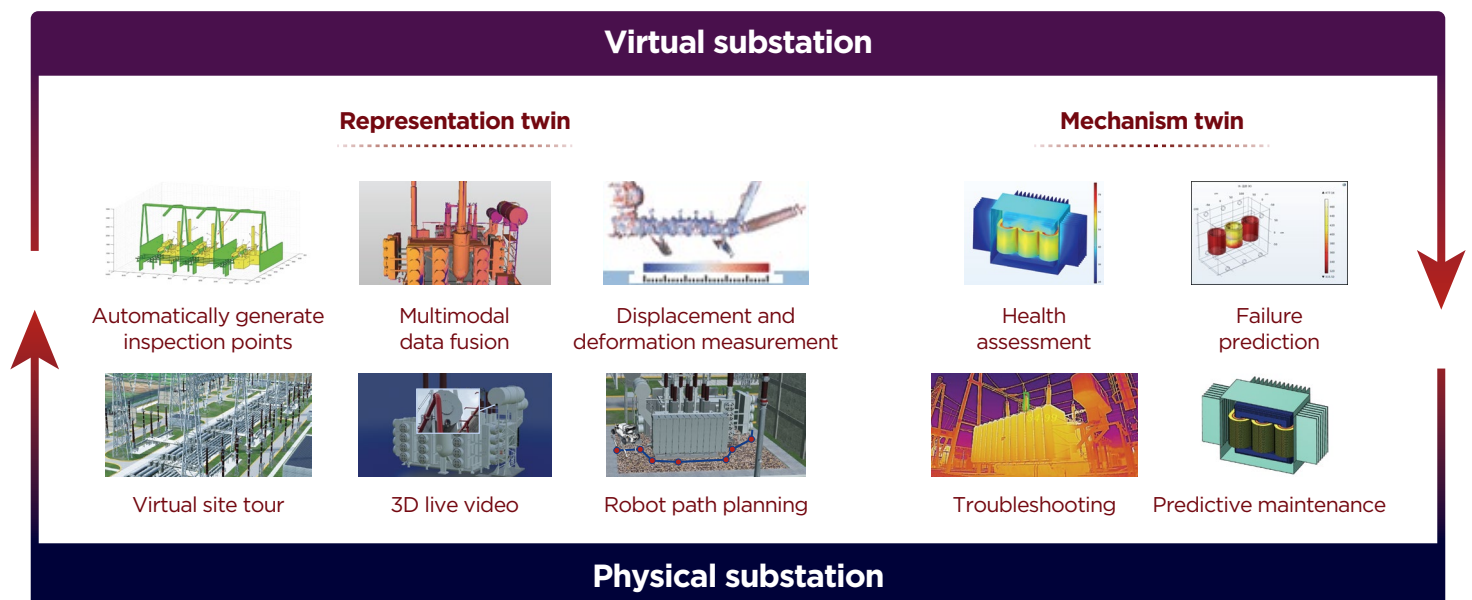


Revolutionizing Inspection with Digital Twin

Extend automated inspection to applications within the metaverse and digital twin scenarios. The metaverse offers powerful capabilities such as data visualization and analysis, remote collaboration, virtual prototyping, efficient maintenance and operations, and resource optimization.

Equipment model	Power Equipment Digital Twin	External	Appearance and texture properties		
		Internal	Internal temperature field	Component stress	Fluid movement
	Electrical equipment		Natural light	Array vibration sensing	Voltage and current sensing
			Infrared	Array sound sensing	Array temperature sensing
Station model	Virtual Field Station	Transformer GIS Casing			
	Actual station	Substation Photovoltaic station Robot Drone			

Specialized patrol / Daily patrol	Intelligent linkage / One key control	Safe work management	Status assessment / Fault diagnosis	Higher-level system collaboration
Patrol	Operation	Safety supervision	Operation and maintenance	Centralized control



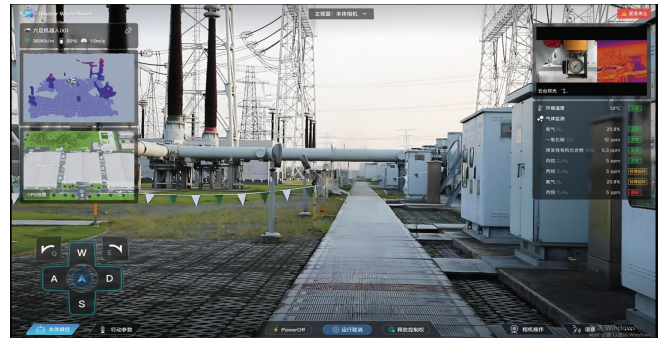
Multi-sensor connectivity and access						
Voiceprint	Partial discharge	Camera	Suspended Rail/Wheeled Robot	Robotic dog	Drone	PDA/AR
Voice	UHF	Ultrasound	Natural light	Infrared		Laser



Patrol Missions: Supports Multi-Mode and Combination

Remote Control Mode

- ✓ Supports dedicated remote controllers:
 - Short distance: uses direct WiFi connection
 - Long distance: supports long-distance transmission via 4G/5G networks
- ⊗ **Applicable scenarios:** emergency response, temporary task scheduling



Autonomous Mode



- ⊗ **Applicable Scenarios:** Fixed-route patrols, nighttime security patrols, and unattended tasks.

- ✓ **Intelligent Autonomous Patrol:** Executes predefined routes and schedules autonomously, with real-time path feedback and HD video monitoring.
- ✓ **AI-Powered Recognition and Alerts:** Detects anomalies, equipment malfunctions, and intrusions, sending instant alerts for proactive responses.
- ✓ **Intelligent Voice Broadcasting:** Delivers customizable safety messages and emergency announcements tailored to specific needs.

Companion Mode

- ✓ **Automatic Follow:** Activated through a wristband, the system seamlessly matches the user's walking speed in real time.
- ✓ **Customizable Settings:** Allows adjustment of follow position and distance, with a range of up to 50 meters in open areas.



Lenovo's global strength

180

Markets

10M+

Order lines per year

1B+

Global customers

120M+

Shipments

30+

Global manufacturing sites

2000+

Suppliers

>\$160M

Digital transformation
investment

18

R&D locations worldwide

69.5K

People



Global supply chain ranked
8th by Gartner®



World Economic Forum
Global Industry 4.0
Lighthouse Recognition



AAA-rated for ESG by MSCI

Empowering Next Level Inspection: 24/7 Intelligence from Robot Dogs Beyond Human Capabilities

Contact us today to discover how Lenovo Manufacturing
Solutions can bring the future of manufacturing to you.

Learn more: <http://lenovo.com/manufacturing>