business@nearthlab.com | www.nearthlab.com
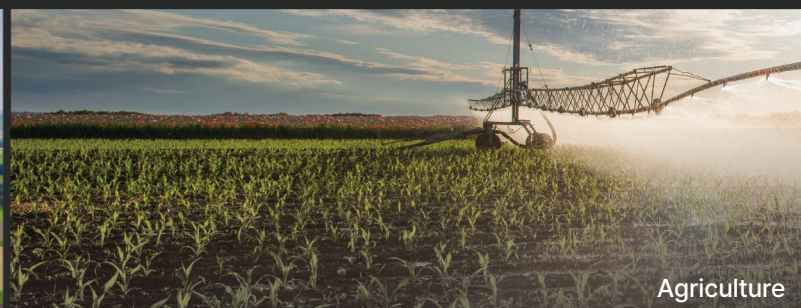
zoomable™
NEARTHLAB
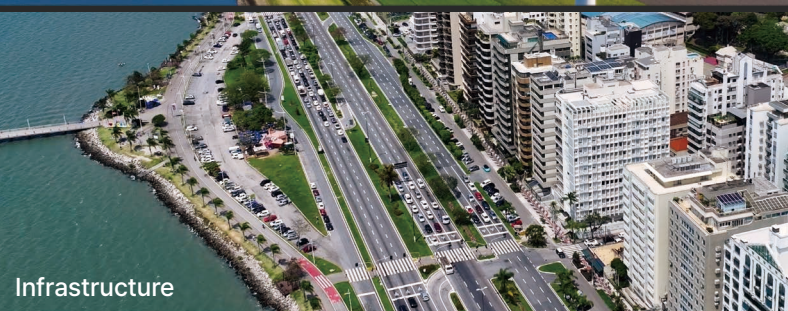Linked in

NEARTHLAB

zoomable™
Enterprise

Energy

Agriculture

Infrastructure

Public Facilities

Enterprise-Grade
AI Inspection Management Platform

NEARTHLAB

zoomable™ Capabilities
Powering Smart Inspection and Asset to Smart Inspections

AI-Powered Infrastructure Inspection Platform

Zoomable streamlines the entire inspection lifecycle—from asset identification to defect detection and lifecycle management—by integrating multi-source sensor data into a unified, intelligent system optimized for complex infrastructure environments.

Multisource Data Ingestion
- CCTV Imagery
- Drone Imagery
- Aerial Imagery
- Satellite Imagery

Intelligent Asset Management
zoomable™

Full-Lifecycle Automation
- GIS
- API/SDK
- EAM/ERP

Flexible Data Alignment
Cross-Platform Sensor Compatibility

Zoomable supports ingestion of unstructured imagery across a wide range of formats, including data from fixed industrial cameras, CCTV, UAVs(Unmanned Aerial Vehicles), satellites, and aerial platforms.
It automatically aligns and classifies assets using source metadata, independent of fixed or legacy equipment.
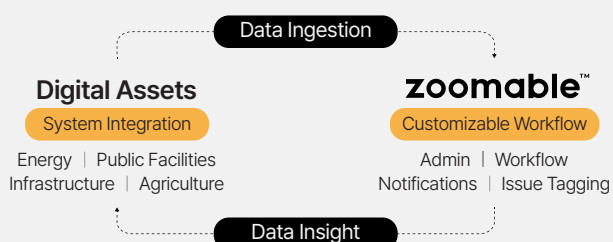
Accuracy and Efficiency
Intelligent Defect Detection and Predictive Risk Assessment

Zoomable's cloud-based AI engine automatically detects defects and classifies risk levels with fine precision. By applying machine learning to high-resolution imagery, it captures even the smallest anomalies and prioritizes them with automated response guidance. Deep learning capabilities enable geolocation of defects and time-series tracking of structural changes, eliminating inspection blind spots and supporting proactive response strategies for high-risk zones. This enhances safety and predictability while minimizing time and cost.
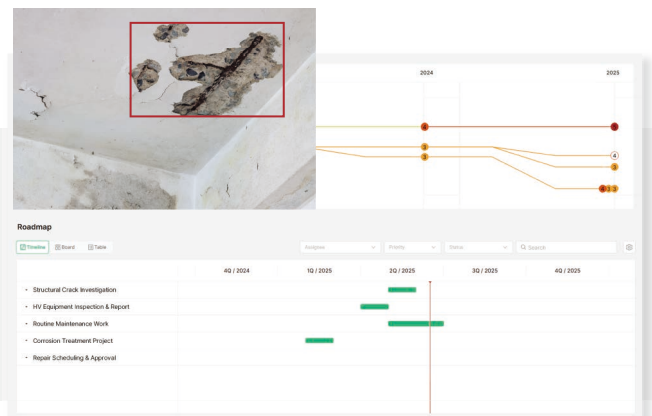
Scalability
Scalable Architecture with Custom API Integration

Zoomable is built on a modular SaaS architecture, enabling streamlined management of complex assets—from single facilities to large-scale infrastructure systems. Its API/SDK framework facilitates seamless integration with existing systems and supports data-level interoperability with platforms such as ERP and EAM. Clients can tailor user permissions, workflows, notifications, and issue tagging to fit internal operations, enabling full-cycle automation from inspection to maintenance.

Digital Assets
System Integration
Energy | Public Facilities
Infrastructure | Agriculture

zoomable™
Customizable Workflow
Admin | Workflow
Notifications | Issue Tagging

Data Ingestion

Data Insight

zoomable™ Features

Integrated Digital Inspection Platform for Infrastructure Industries

High-Precision Visualization with AI-Driven Defect Management

Zoomable combines AI stitching and 3D visualization to deliver complete structural overviews, enabling automated defect detection and time-series degradation tracking for accurate and efficient maintenance.

Visual Intelligence for Structural Assessment

AI Stitching Algorithm
- Automated image registration
- Multi-angle data integration
- High-precision orthophoto generation

3D Modeling Viewer
- Supports .fbx, .obj, and BIM(Building Information Modeling) formats

Metadata Integration
- Visualizes geolocation of inspection targets

Proactive Defect Tracking

AI Defect Detection Engine
- Automated defect type classification
- Quantitative logging of shape and size attributes

Defect Severity Classification
- Defect impact assessment
- Automated severity classification

Defect History Tracking
- Defect pattern analysis by location and time

AI Stitching & Integrated Visualization

Centralized Defect Data Management

3D Model-Based Defect Diagnosis

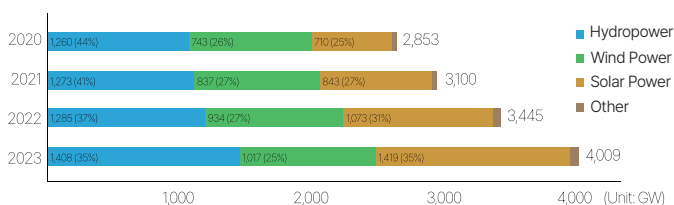Defect Severity Classification

Defect History Tracking

Energy

Smart Inspection Solutions for Efficient and Sustainable Energy Asset Operations

Rising Demand for Smart Inspections in Renewable Energy

As renewable energy infrastructure scales globally, there is growing demand for cost-effective, reliable inspection to manage expanding O&M(Operation & Maintenance) needs. Larger facility footprints and increasing asset complexity are adding to the operational burden. Smart inspections, powered by asset condition data, support early fault detection and production forecasting—making them critical to enhancing operational efficiency. Additionally, accurate asset diagnostics are becoming essential to meet ESG expectations and long-term sustainability goals.

<Renewable Capacity Growth by Type[1]>

Year				Total
2020	1,260 (44%)	743 (26%)	710 (25%)	2,853
2021	1,273 (41%)	837 (27%)	843 (27%)	3,100
2022	1,285 (37%)	934 (27%)	1,073 (31%)	3,445
2023	1,408 (35%)	1,017 (25%)	1,419 (35%)	4,009

■ Hydropower ■ Wind Power ■ Solar Power ■ Other

1,000   2,000   3,000   4,000   (Unit: GW)

<Key Drivers of O&M Cost Growth in Renewable Energy>

Expansion of facility scale and system complexity	Accessibility challenges across wide and remote sites	Labor shortages and rising personnel costs

Challenges in Energy Asset Inspection

Localized Defects in High-Power Equipment Can Affect Overall Output
Damage to blades, loosened bolts, or even minor cracks in critical components can reduce total power generation. Immediate detection and response are essential.

Frequent Degradation from Harsh Environmental Exposure
Large-scale assets are continuously exposed to wind, dust, and moisture, leading to recurring corrosion and surface defects, especially at exposed or jointed sections.

Insufficient Post-Failure Inspection and Recurrence Risk
Reactive maintenance often fails to prevent similar failures from reoccurring, particularly when shutdowns for full inspection are difficult to schedule.

Access Limitations Pose Inspection and Safety Challenges
Elevated structures like wind turbines or remote-mounted solar panels are difficult to access, making manual inspection labor-intensive and prone to safety risks.

1) IRENA, Renewable Capacity Statistics 2024

zoomable™

From Asset Condition Diagnosis to Strategic Operation, Realizing Data-Driven APM(Asset Performance Management)

Zoomable leverages structural diagnostics and O&M expertise to build risk profiles for energy assets. By using accurate indicators, it forecasts RUL(Remaining Useful Life) and identifies performance degradation factors in advance. It also supports ROI-based maintenance planning for each asset unit, enhancing both operational efficiency and policy responsiveness in energy management.

Integrated Asset Management

Consolidated data management across facilities —from single sites to full energy portfolios.

Production Forecasting

Predicts short- and mid-term generation based on failure patterns and maintenance trends.

Cost Optimization

Supports ESG-aligned budgeting and calculates maintenance ROI using LCOE*
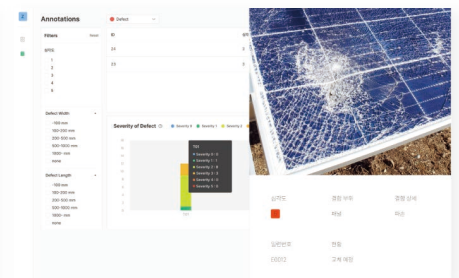*Levelized Cost of Energy
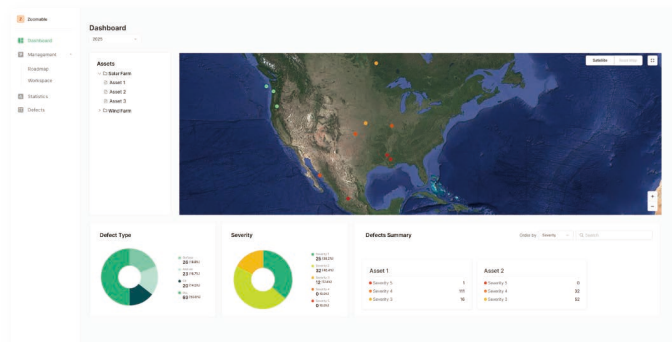
Dashboard

Defect Tracking
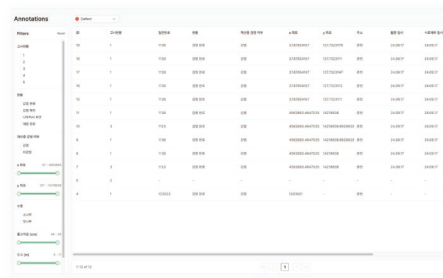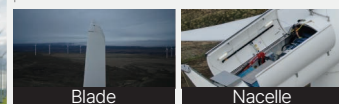

Defect Management
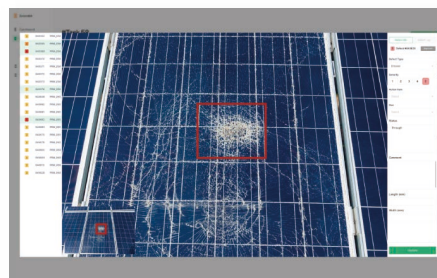
Defect Severity Classification 1

Defect Severity Classification 2

Applicable Industries

Wind Farm

Blade
Nacelle

Visualizes surface cracks, lightning damage, edge delamination, and corrosion on blades and nacelle —common external defects that can reduce performance.

Zoomable converts visual anomalies into structured data to assess damage severity and prioritize maintenance.

Solar Farm

Cell
Panel

Detects faults such as microcracks, connector failures, and internal hotspots that reduce power output and pose fire risks.

Zoomable uses multispectral and thermal data to identify surface defects and support integrated O&M.

Hydroelectric Power Plant

Structural
Flow Rate

Assesses cracks, discoloration, and seepage around dam walls and spillways. Flow irregularities can signal loss of structural integrity and control risks.
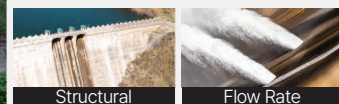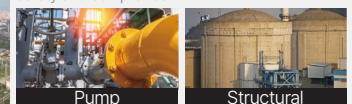
Zoomable tracks surface leakage and flow trends to support early detection and mitigation.

Nuclear Power Plant

Pump
Structural

Monitors cracks, corrosion, and seepage in cooling towers, pump systems, and reinforced concrete. Structural degradation may impact safety and compliance.

Zoomable delivers high-resolution visual data in restricted-access zones for preventive maintenance and regulatory response.

Public Facilities
Improving Cost Efficiency and Safety Management of Aging Public Infrastructure
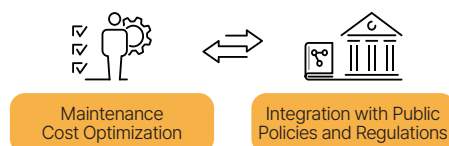
Toward Smarter Public Asset Management Through Digital Administration

Aging infrastructure is driving public policy focus toward improving safety oversight and performance efficiency. This has led to growing demand for operational data and inspection data & resource management. In response, governments and public institutions are actively exploring the adoption of facility management platforms that align with PBB(performance-linked budgeting), KPI-based assessments, and integrated PMS(Performance Management System).

<Need for Inspection in Public Infrastructure>

Lifecycle-based Asset Management

Performance Condition Evaluation

Optimized Budget Allocation

<Building a Sustainable Inspection Framework>

Maintenance Cost Optimization

Integration with Public Policies and Regulations

Challenges in Public Infrastructure Inspection

Limited Access and On-Site Safety Risks
Inspection of elevated, confined, or structurally degraded areas poses high physical risk, especially in aging facilities with restricted access.

Weak Link Between Reporting and Maintenance Execution
Inspection data often remains siloed in documents, leading to delays or gaps in mainte- nance planning and quality improvement.

Delayed Response in Emergencies
Without integrated pre-failure diagnostics, it is difficult to assess damage scope, prioritize response, and act swiftly when failures or accidents occur.

zoomable™

An Integrated Inspection Infrastructure for Enabling Digital Maintenance of Public Facilities

Zoomable enables AI-based recognition of structural defects through 3D visualization, supporting large-scale facility condition monitoring via IFM(Integrated Facility Monitoring). It builds a unified inspection and reporting system across multiple assets, linking with public-sector KPIs and performance-based budgeting to improve operational response. The system also supports damage assessment during disasters and early detection of structural risk factors.

Integrated Monitoring
Standardized inspection across multi-site public infrastructure with centralized control.

Policy Reporting
Structured, policy-aligned reporting with measurable performance indicators.
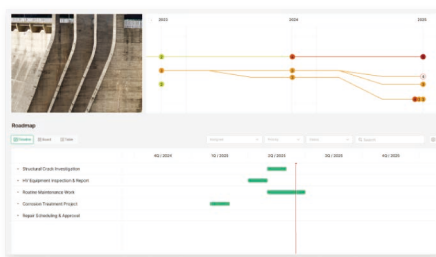
Performance-Based Budgeting
Data-driven resource planning and funding allocation aligned with outcome-based goals.
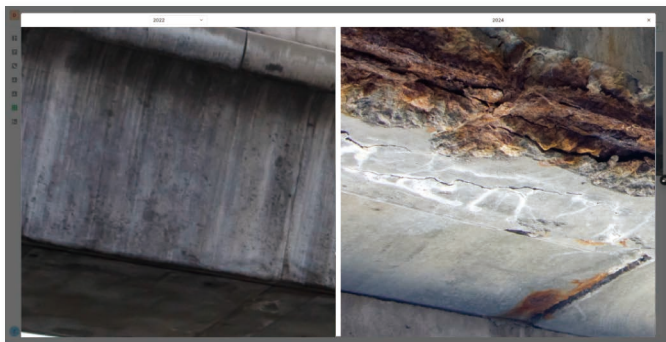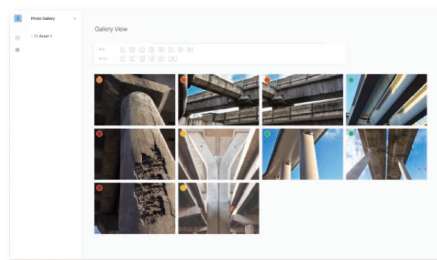

Defect Comparison
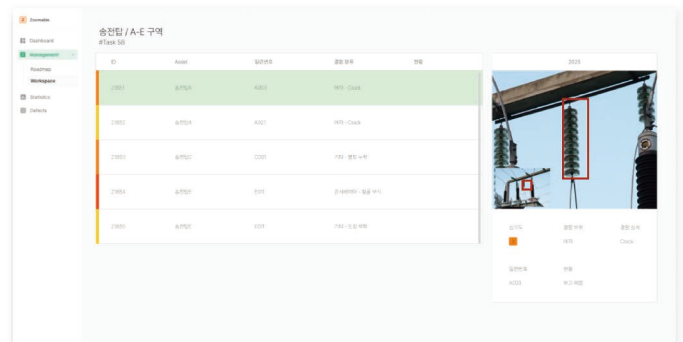
Defect Management 1
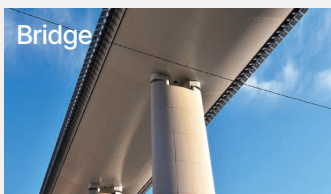

Defect Tracking & Project Management

Assets Gallery View

Defect Management 2

Applicable Industries

Bridge
Structural issues such as concrete spalling, steel corrosion, and cable tension loss often occur in hard-to-reach areas of bridge undersides and supports.

Structural   Wire

Zoomable analyzes critical high-risk zones and provides baseline data for aging assessment and maintenance prioritization.

Power Grid
Transmission towers and substations accumulate damage from mechanical stress, contamination, which leads to such as Partial Discharge.
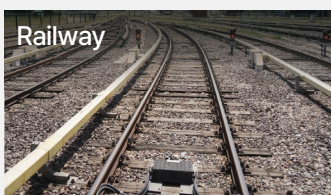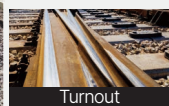
Insulator   Transformer

Zoomable supports precise defect detection and inspection standardization using imaging and visual data.
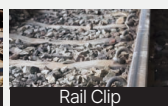
Railway
Track components frequently experience wear, misalignment, fastener failure, and foundation cracks—posing risks to high-speed operations.

Turnout   Rail Clip

Zoomable identifies micro-defects and deformation trends to support predictive railway maintenance systems.

Stadium & Large Facilities
Common defects include external cracking, joint deformation, and failures in safety installations like fences and access panels.

Structural   Security

Zoomable enhances visibility and structural traceability to standardize facility inspection and risk prevention frameworks.
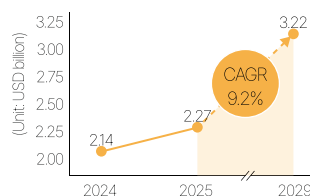
Infrastructure
Boosting Infrastructure Asset Efficiency Through Automated, Digitalized Evaluation

Aging Infrastructure Demands Smarter Diagnostics

As global infrastructure ages, demand is surging for accurate, data-driven assessments using NDE/NDT (Non-Destructive Evaluation/Testing). Manual methods are slow, risky, and limit inspection efficiency.
Digitized inspections offer higher accuracy and streamlined reporting, yet traditional workflows still face fragmentation. To overcome this, public and private sectors are rapidly adopting AIM (Asset Integrity Management), digital asset platforms, and PBB (performance-based budgeting) to drive predictive maintenance.

<Global Inspection Market on the Rise[2]>

(Unit: USD billion)

3.25
3.00
2.75
2.50
2.25
2.00

2.14
2.27
CAGR 9.2%
3.22

2024   2025   2029

<Key Drivers of Market Transformation>

Evolving Regulatory Standards

Operational Efficiency and Cost Optimization

Advanced Data Analytics and Reporting Needs

Proactive Risk Management Imperatives

Challenges in Industrial Infrastructure Inspection

Limited Access to Hazardous Structures
Environments such as cranes, high-voltage lines, aircraft fuselages, and industrial stacks pose significant safety risks. Physical access is often restricted due to height, confined spaces, vibration, or electromagnetic interference—especially in sectors requiring inspection of complex internal structures or elevated components.

Inconsistent Standards Due to Variable Site Conditions
Each facility presents unique conditions based on industry type, structure, and operational context. This leads to non-standardized inspection protocols and data inconsistency, undermining diagnostic accuracy.

Difficulties in Scheduling Preventive Maintenance
Frequent shutdowns for inspection are often infeasible in facilities with continuous operations. As a result, preventive maintenance is delayed, increasing reliance on reactive, large-scale repairs.

2) The Business Research Company, Infrastructure Inspection Global Market Report 2024

zoomable™

Strategic Use of Inspection Data for Industrial Asset Safety

Zoomable supports inspection planning and maintenance based on cumulative inspection data. By analyzing repeated failure patterns and standardizing defect codes, it improves inspection efficiency and safety, especially in areas with limited access or high risk.

Predictive Maintenance
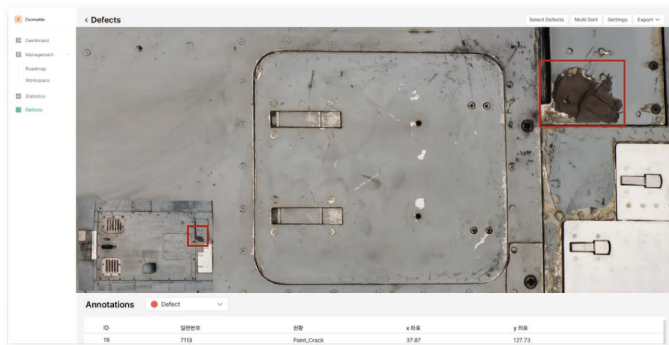Predicts faults and optimizes maintenance using historical inspection data

Risk-Based Inspection Optimization
Targets high-risk areas to enhance safety and reduce unnecessary inspections

Failure Pattern Analytics
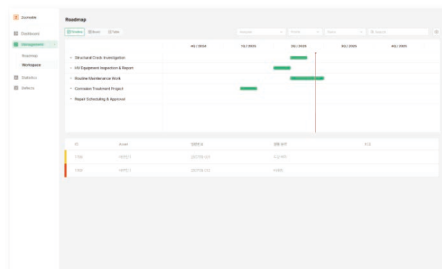Identifies root causes by comparing defect trends across similar assets
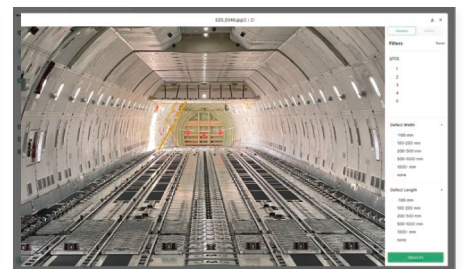

Defect Tracking
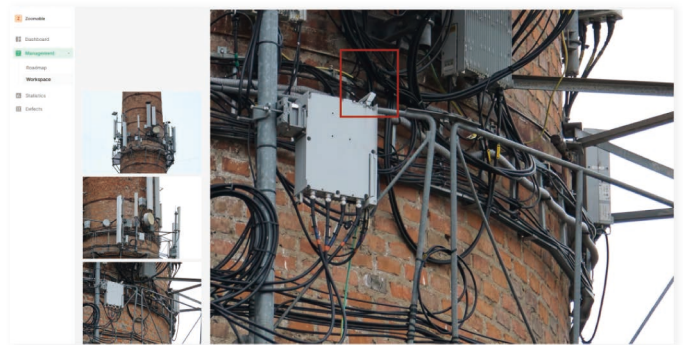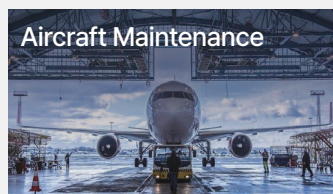

Defect Management 1
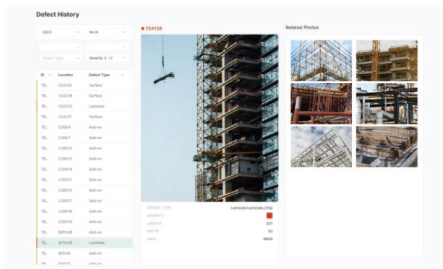
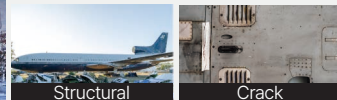Defect History Management

Project Management

Defect Management 2

Applicable Industries

Aircraft Maintenance
Inspects fuselage surfaces, control surfaces, landing gear housings, and engine inlets for cracks, corrosion and seal degradation—especially in hard-to-access or confined areas.
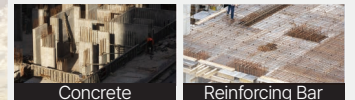
Structural | Crack

Zoomable enables non-contact visual inspection to support maintenance planning and reduce turnaround time.
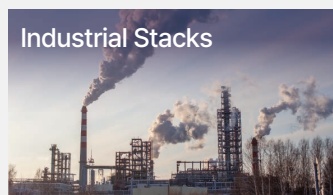
Construction Sites
Detects cracks, delamination, corrosion, and surface damage on concrete and rebar during construction. Enables early identification of structural flaws through regular imaging.
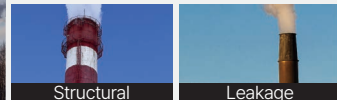
Concrete | Reinforcing Bar

Zoomable enables time-based visual monitoring to assess structural conditions and prevent defects before handover.
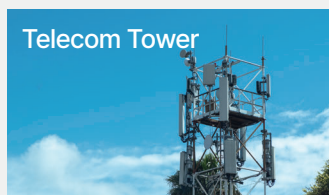
Industrial Stacks
Assesses external damage, deformation, and leakage caused by heat and pressure. Supports stable monitoring of elevated and hard-to-reach areas using high-resolution imagery.
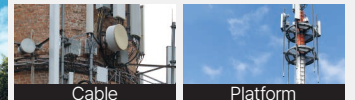
Structural | Leakage

Zoomable captures full-stack visuals without blind spots to track degradation trends over time.

Telecom Tower
Inspects cable tension, connector wear, and structural displacement on towers and platforms where access is limited.

Cable | Platform

Zoomable provides remote inspection through multi-angle imaging and 3D visualization.
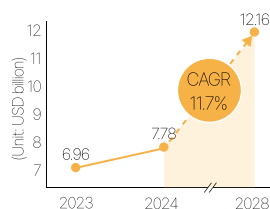
Agriculture

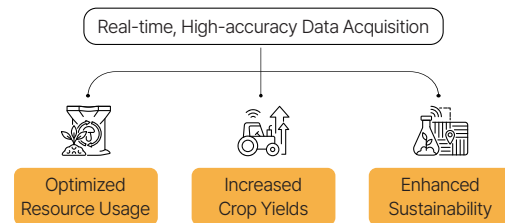Smart Crop Health Monitoring and Farm Asset Management through Drone and AI Technologies

Accelerating the Shift to Data-Driven Precision Agriculture

To address growing instability in crop growth and the limits of agricultural productivity caused by climate change, global adoption of data-centric decision-making systems grounded in precision agriculture is accelerating. The need to automate labor-intensive tasks and implement actionable inspection solutions is driving this shift. As a result, the digital transformation of agricultural infrastructure is gaining momentum as a core strategy for sustainable operations.

<Global Inspection Market on the Rise[2])>

(Unit: USD billion)

6.96 — 2023
7.78 — 2024
CAGR 11.7%
12.16 — 2028

<Key Drivers of Market Transformation>

Real-time, High-accuracy Data Acquisition

Optimized Resource Usage | Increased Crop Yields | Enhanced Sustainability

Challenges in Agricultural Inspections

Structural Limitations from Large-Scale and Irregular Assets
Standardized inspections are difficult to apply due to the vast scale and non-uniform nature of farmlands and irrigation infrastructure. Visual or hand-held inspections lack the precision required for meaningful diagnostics.

Complex Bio-Environmental Anomalies Hinder Early Detection
Issues such as pests, water imbalance, and soil erosion emerge in irregular patterns and combinations. In the absence of historical data, early detection is limited and requires continuous monitoring.

Lack of Systematic Historical Management of Infrastructure
Facilities like irrigation systems, reservoirs, and drainage pumps are often inspected irregularly and qualitatively, making it difficult to analyze maintenance history, defect cycles, or repair details in a structured way.

Rising Automation Demand Amid Labor Shortages and Aging Workforce
In aging agricultural workforces with low digital literacy, demand is growing not just for task automation, but for intelligent systems capable of diagnosing asset conditions.

3) The Business Research Company, Global Precision Agriculture Market Size Forecast 2024-2033, 2024

zoomable™

Integrated Agricultural Asset Management Platform for Crop and Infrastructure Monitoring

Zoomable automates AI-based disease detection, anomaly recognition, and time-series analysis using crop growth data at the sectional level. It centralizes defect diagnostics and maintenance history for key agricultural infrastructure—including irrigation channels, piping systems, storage units, and agrivoltaic facilities—within a single platform. With high-precision visualization, change tracking over time, and defect localization, the platform supports strategic decision-making for preventive maintenance and harvest forecasting.

Facility-Wide Management
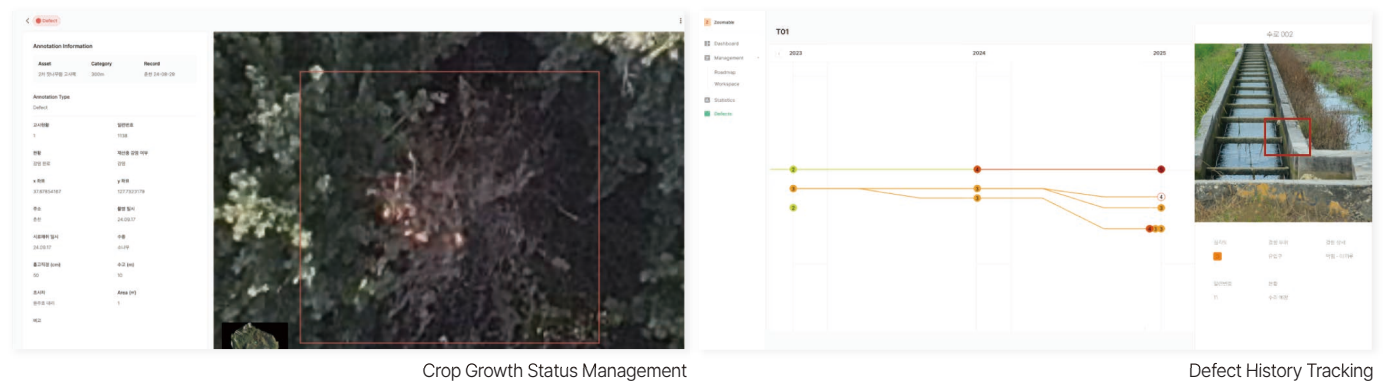Unified defect monitoring
across crops and infrastructure

Change Tracking
Growth monitoring through historical
data storage and comparative analysis

Automated AI Diagnostics
Real-time detection and analysis
of crop health and environmental anomalies

Crop Growth Status Management
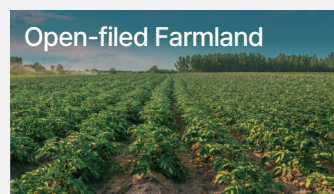

Defect History Tracking
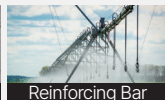

Assets Gallery View

Project Management

Defect Management

Applicable Industries

Open-filed Farmland

In large farmland, visual anomalies such as weed clusters, ground subsidence, boundary collapse, and uneven growth are externally observable.

NDVI

Reinforcing Bar

Zoomable analyzes vegetation patterns to detect growth imbalances and early signs of pests or weather stress, supporting precision agriculture.

Irrigation Facility

Concrete irrigation channels often show cracks, erosion, and spalling, along with flow distortion and sediment buildup from decreased water volume.

Canal Lining

Flow Rate

Zoomable quantifies flow disruption, wall damage, and contamination in irrigation channels to optimize efficiency and predict maintenance needs.
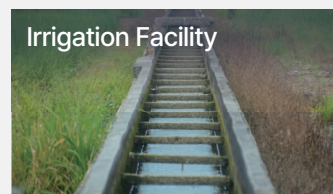
Silo & Storage Warehouse

Storage and warehouse exteriors exhibit roof sagging, cracks, corrosion, and insulation damage, affecting internal temperature and humidity stability.

Structural

Insulation

Zoomable assesses exterior deterioration to manage structural integrity and storage risks based on image data.

Agrivoltatics Field

Under solar panels, issues include structural vibration, mounting damage, shading from debris, surface contamination, panel warping, and cable sagging.

Panel

Cable

Zoomable analyzes impact traces and surface defects, quantifies power-loss patterns, and supports both crop productivity and energy efficiency.