Building technologies that save assets and lives

ESTRUCTURA

San Juan – Miami – Lima

Platinum Partner and Distributor of GeoSIG swiss made to measure

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A subsidiary of Dorado Services, an engineering firm and federal contractor to the Army Corps of Engineers and FEMA, offering emergency response and disaster management solutions for a more sustainable, resilient and efficient built environment. Since 1999. Other solutions include environmental services, facilities administration and waste management.

For more, please visit estructura.tech, including the Content tab where you'll find relevant news and videos.

Florida

DORADO SERVICES

Puerto Rico

DORADO SERVICES OF PR

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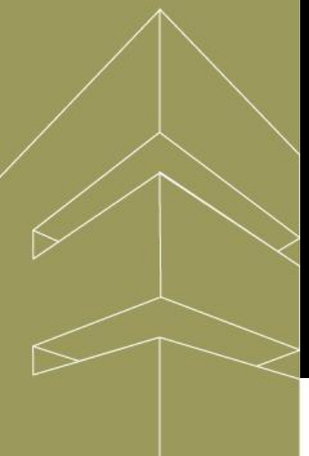
About GeoSIG

The world's best Structural Health Monitoring solution.

Maintenance, safety and disaster-resilience technology for mission-critical structures, such as:

- Bridges and key roads
- Hospitals
- Power plants, including Nuclear
- Water plants
- Telecom towers
- Military bases
- Convention centers
- Office/High-rise towers
- Transportation systems
- Airports
- Ports
- Hotels, resorts & hospitality facilities
- Sports stadiums/complexes
- Apartment complexes
- Mixed-use facilities
- Shopping malls
- School/University campuses
- Scientific facilities



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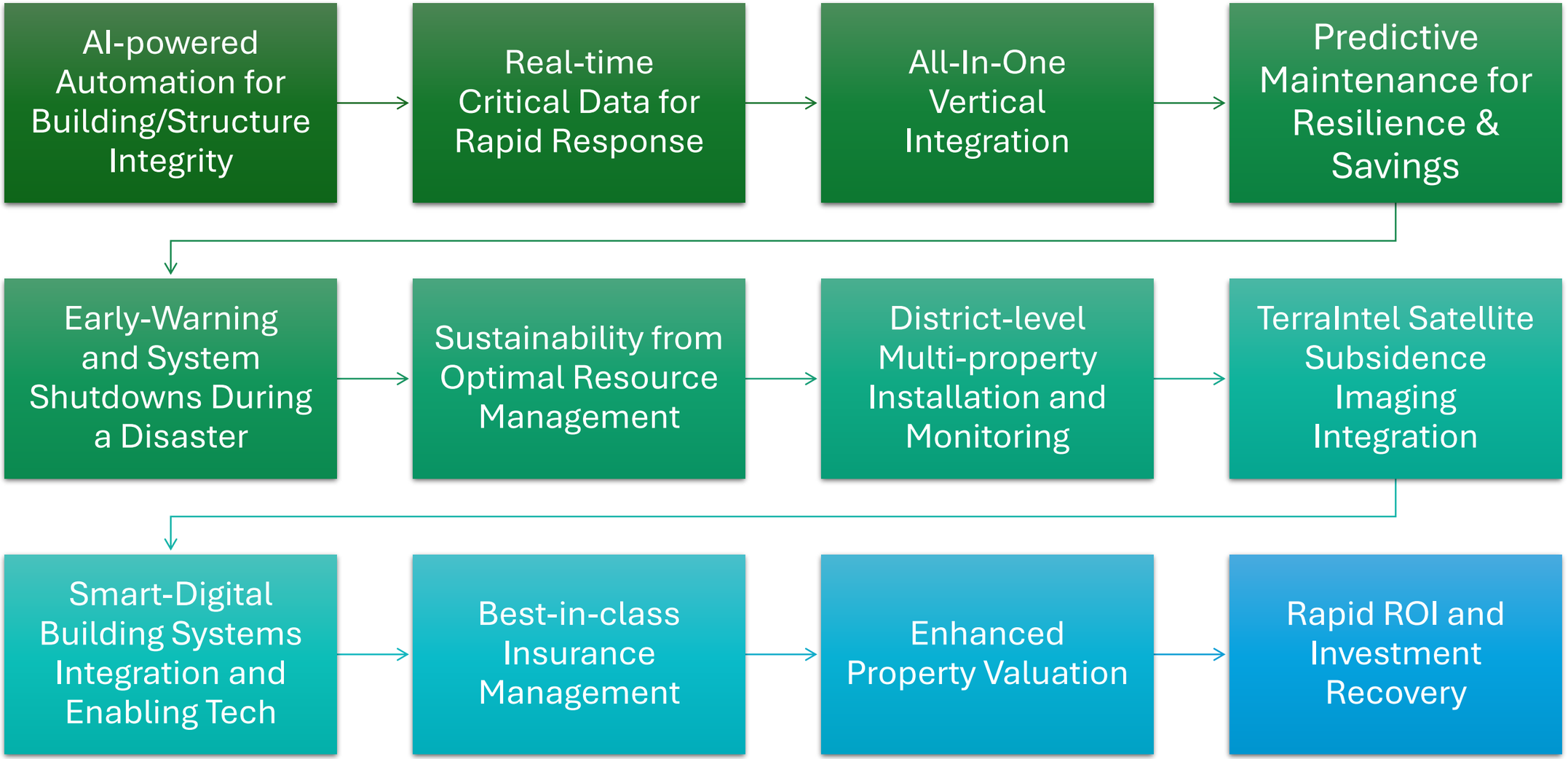
At the leading edge of global SHM

Only Estructura & GeoSIG offer these 12 advantages integrated in a single solution



ROI Analysis: five key drivers

Predictive Maintenance

Early detection of issues, exceedances and AI-flagged anomalies, to prevent costly major repairs, extend asset lifespan, & keep it stronger and therefore more resilient against shocks.

Reduced downtime: SHM can reduce unexpected equipment downtime by 25-70%.

Lifecycle cost optimization: Enables shift from reactive to condition-based maintenance strategies.

Mitigation During a Disaster

Automated shutdowns: prevents costly secondary damages by automatically shutting down electrical, and elevator systems, as well as critical sprinkler systems during an event.

Fire prevention: reduces risk of post-event fires from gas leaks and other consequences.

Early warning: in the case of an earthquake, provides a warning upon detection of early vibrations, which enables timely evacuation and saves lives.

Accelerated Post-Disaster Recovery

Faster re-occupancy: reduces assessment time from days/weeks to hours, dramatically reducing business interruption costs.

Partial facility usage: enables targeted closures rather than complete facility shutdown.

Optimized repairs: identifies specific damage locations, reducing exploratory demolition costs.

Lower Insurance Cost

Potential premium reductions: demonstrates proactive risk management to underwriters, as well as actually reduced risks.

Improved COPE factors: positively impacts Construction, Occupancy, Protection, and Exposure ratings.

Lower total cost of risk: Reduces retained losses and risk transfer costs.

Streamlined insurance claims: provides objective data to speed processing and payouts.

Higher Property Valuation

Reduced risk perception: buildings with SHM systems are viewed as safer.

Higher net operating income: from lower maintenance and insurance costs.

Tenant confidence: Attracts and retains quality tenants concerned with continuity.

Future-proofing: showcases commitment to exceeding basic safety standards.

Competitive differentiation: Creates a resilience premium particularly in seismic and climate-vulnerable regions.

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Overview of Risks 1 - Aging & Seismic

A Growing Concern: Aging Structures

Structures worldwide are deteriorating, facing increased stress from operational demands and environmental factors.

Seismic Threats

Earthquakes pose a significant risk, especially in seismically active zones. Events constantly in the news underscore the devastating potential.

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Overview of Risks 2 - Climate & Other Hazards

In 2024 saw a record 27 billion-dollar events in the United States alone, with an astonishing $380 billion in losses as a result.

Diverse Hazards in every location

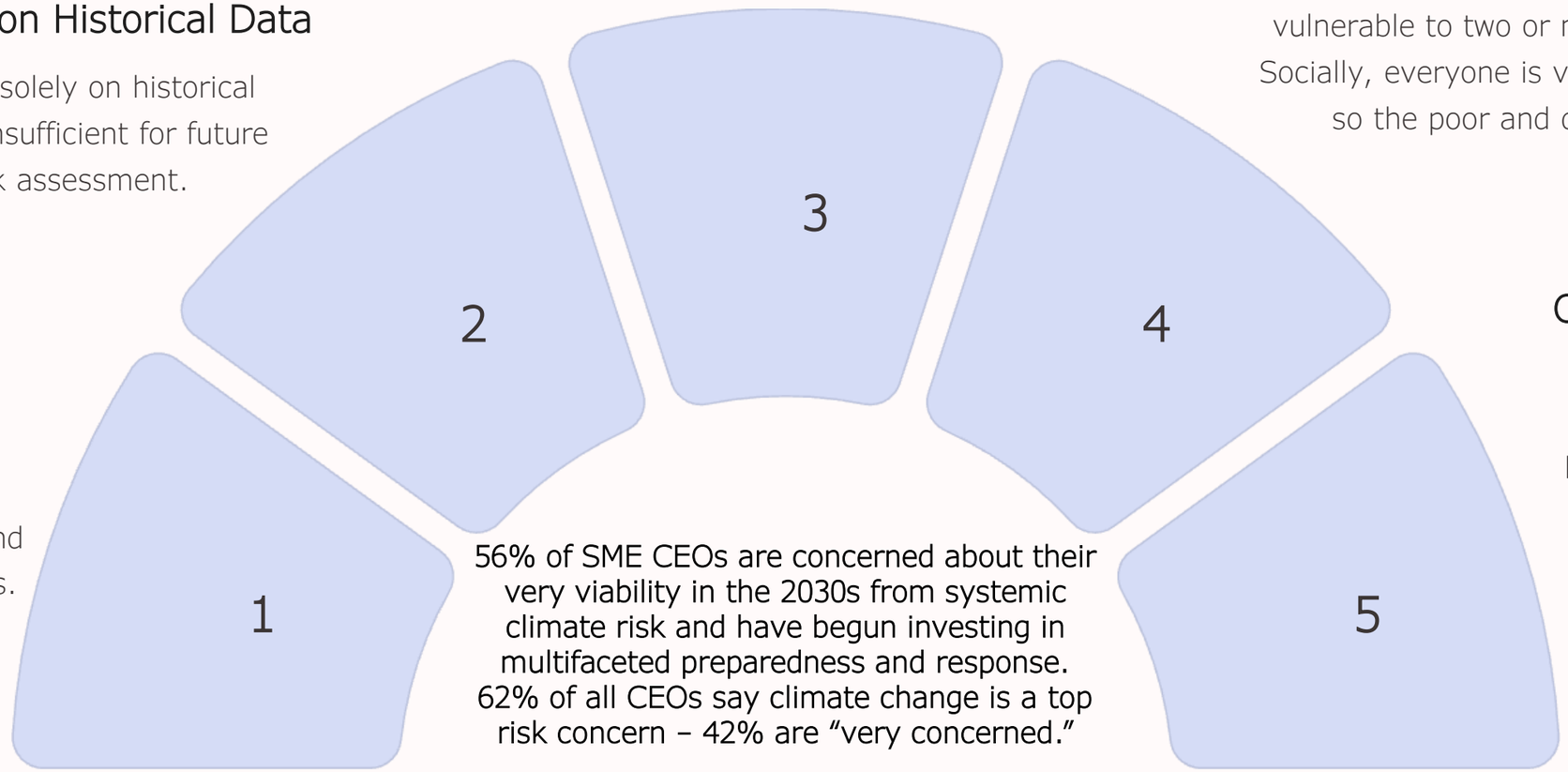
Hurricanes, flooding, droughts, heat, landslides, volcanos, sea-level rise.

Economic & Social Vulnerabilities

Structures in most jurisdictions are vulnerable to two or more hazard types. Socially, everyone is vulnerable, but more so the poor and disadvantaged.

Reliance on Historical Data

Relying solely on historical data is insufficient for future risk assessment.



Climate Change Amplification

Global climate change is increasing the frequency and intensity of related hazards.

Operational Stresses

A structure's exposure depends on its design, location, maintenance and emergency practices.

56% of SME CEOs are concerned about their very viability in the 2030s from systemic climate risk and have begun investing in multifaceted preparedness and response. 62% of all CEOs say climate change is a top risk concern – 42% are "very concerned."

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SHM Imperative: Managing Intensifying Risks

The Need

With increasing climate volatility, aging, earthquakes, landslides, erosion, and other events, the risk of catastrophic structural failures has never been more urgent, demanding immediate and comprehensive risk mitigation strategies.

Traditional Methods

Periodic visual inspections are critically limited—unable to detect subtle, progressive damage, missing early warning signs, and often occurring too infrequently to prevent potential disasters.

The Solution

Structural Health Monitoring (SHM) delivers continuous data in real time for predictive year-round maintenance to keep a structure strong at less expense, warnings and building-system shutdowns during an event to save lives and minimize damages, and immediate post-event analytics to pinpoint damages, minimize interruption, and reduce repair costs.

Paradigm Shift

From reactive damage control to predictive resilience, SHM represents a fundamental transformation in how we conceptualize and manage structural integrity, safety and resilience.

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The Insurance Perspective

Structural Health Monitoring (SHM) technology offers significant advantages from an insurance standpoint, transforming risk assessment and management.

Reduced Risk Profile

Proactive & Predictive monitoring and maintenance lower liability exposure and therefore the severity of claims.

Insurance companies want to see innovation and technology like GeoSIG & SHM to mitigate risks and build structural resilience.

Improved Underwriting

Objective data provides insurers with a clearer picture of structural health and risk, potentially leading to better insurance terms or reduced premiums.

Faster Claims Processing

Verified data on event impact and structural response can accelerate post-event claims settlements.

Enhanced Collaboration

Climate and Seismic disasters happen to entire cities and sites at the same time.

Those with a collective, collaborative response and recovery strategy are better positioned to manage risks and reduce damages and claims.

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SHM and Sustainability

Fortify Your Sustainability Goals

Predictive maintenance through SHM enables early issue detection, allowing minor repairs that extend structural lifespans and thereby reduce environmental impacts.

Lower purchasing and less waste

Minimizes resource consumption and waste by preventing extensive refurbishments or complete demolition and reconstruction.

Optimized Resource Use

Condition-based maintenance focuses resources precisely where and when needed, reducing unnecessary material and energy expenditure.

Enhanced Resilience

Safeguarding structures against hazards directly supports community and economic resilience, a fundamental principle of sustainable development.

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Urgency Highlighted: Recent Property Collapses

Surfside Condominium Collapse (Miami, 2021)

Investigations pointed to long-term degradation of reinforced concrete structural support due to water penetration and corrosion, highlighting failures in maintenance and timely repair despite earlier warnings. This underscores the need for continuous monitoring beyond visual checks.

Jet Set Discotheque (Santo Domingo, 2025)

The roof collapse is attributed to flawed construction practices, leading to more than 200 deaths and a people now in search of solutions to make sure this preventable tragedy never happens again.

Urgency Highlighted: Recent Property Collapses - Peru

Real Plaza Trujillo Shopping Mall (2025)

The collapse of the food-court roof resulted in 8 dead and 84 injured as the investigation continues as of this writing.

Costly and avoidable immediate consequences

Mall owners forced to shut down all their malls for some time. Passing grade by recent inspections shows limitations of reliance only on a human process. High reputational and monetary impact.

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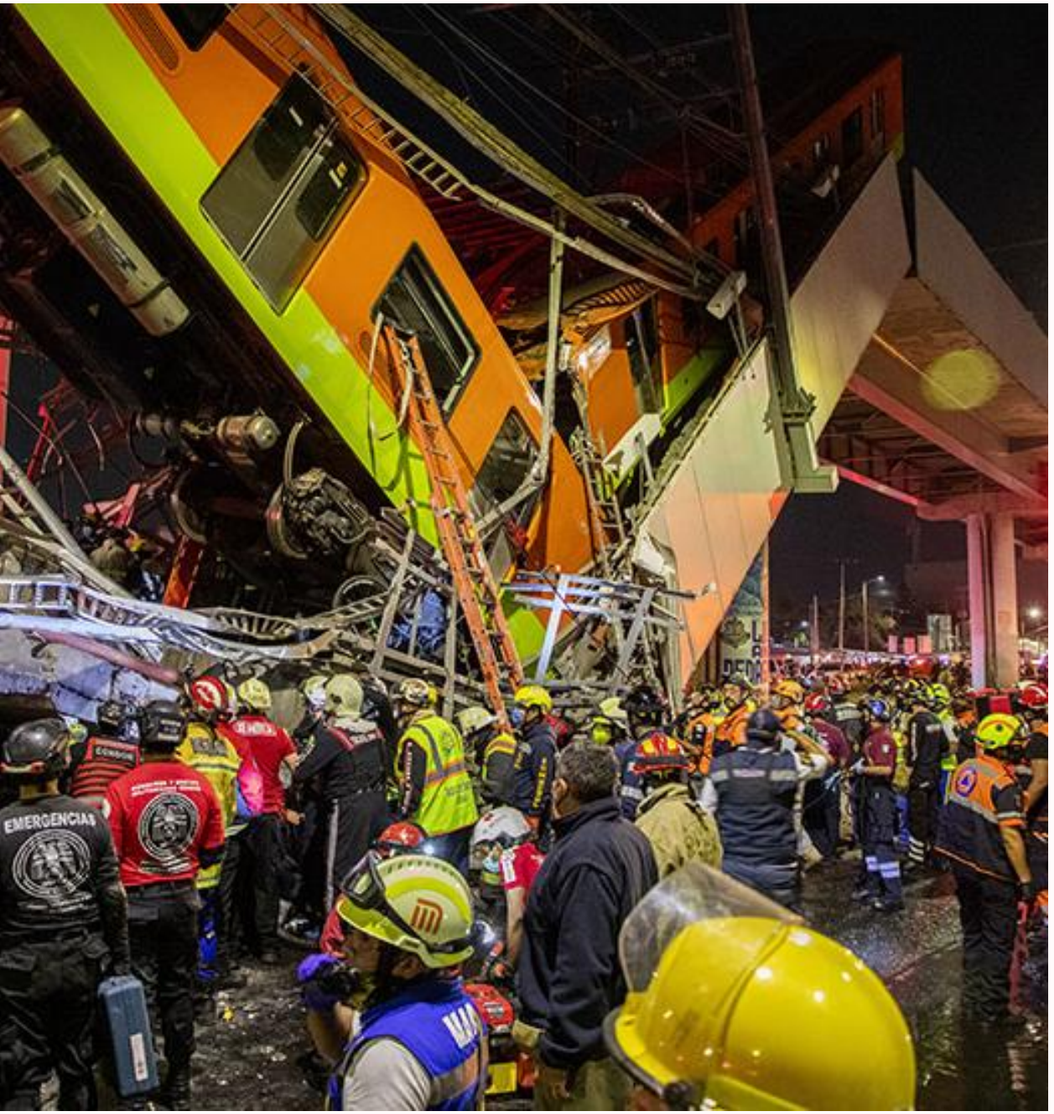

Urgency Highlighted: Recent Property Collapses - Mexico

Mexico City Metro Overpass Collapse (2021)

The collapse of Line 12, resulting in fatalities and injuries, was linked to structural flaws and potential maintenance deficiencies.

Impact on Public Perception

This event brought intense scrutiny on infrastructure safety and inspection practices within Mexico City, reinforcing the need for reliable monitoring systems on critical public infrastructure.

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Urgency Highlighted: Recent Property Collapses - Mexico

Enrique Rebsamen School (2017)

The result of a 7.1 earthquake on September 19. The 26 people who passed included 19 children

Liability impact

The school’s owner was convicted of manslaughter and sentenced to prison, demonstrating the severe legal and reputational consequences of insufficient monitoring and preparedness.

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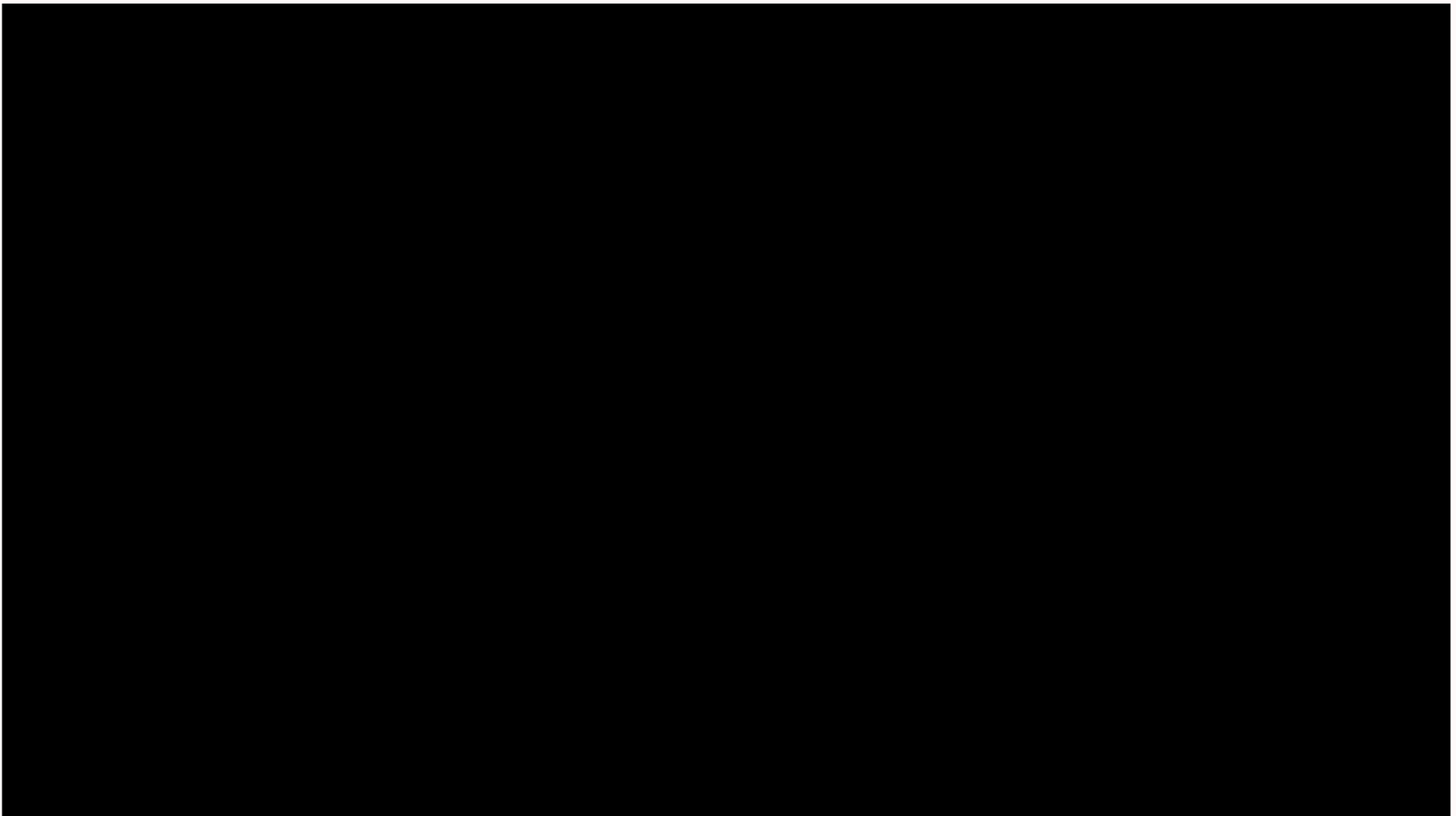
Here’s how Estructura can help

With our world-leading cutting-edge Structural Health Monitoring technology

Strategic sensor placement

Vibration and Impact from sports events and concerts, in addition to disasters.



As in this video clip of the Puerto Rico Coliseum, motion and vibration sensors are placed throughout the stadium and detect movements and structural faults before they become critical.

As shown by the simulator, the sensors create a comprehensive network that continuously monitors the integrity of the property, providing real-time data on structural performance and early warning of any concerns.

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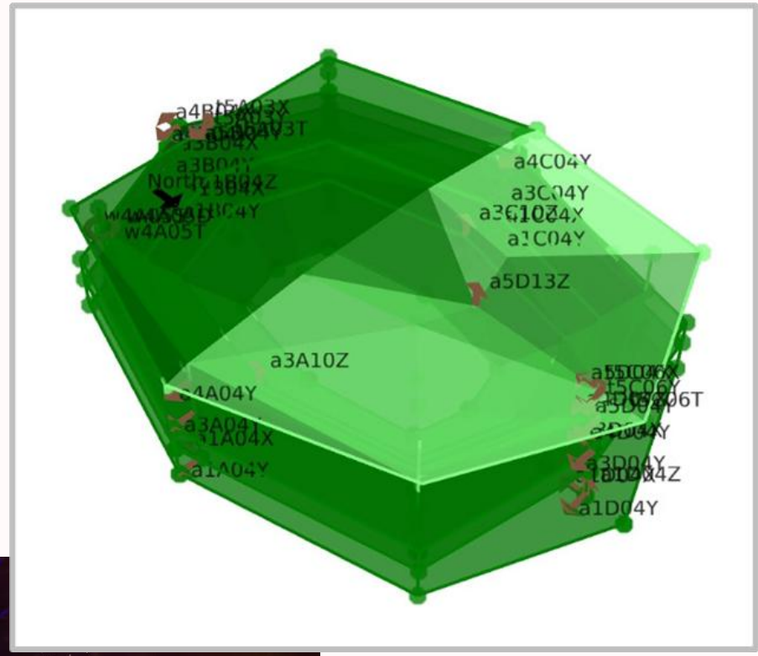
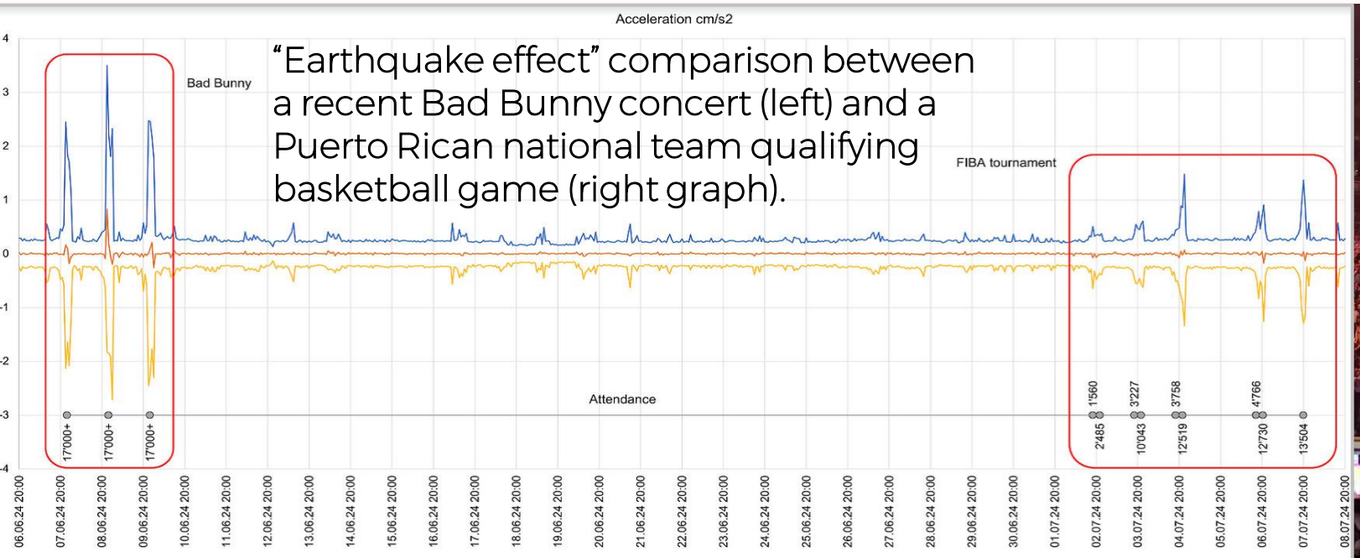
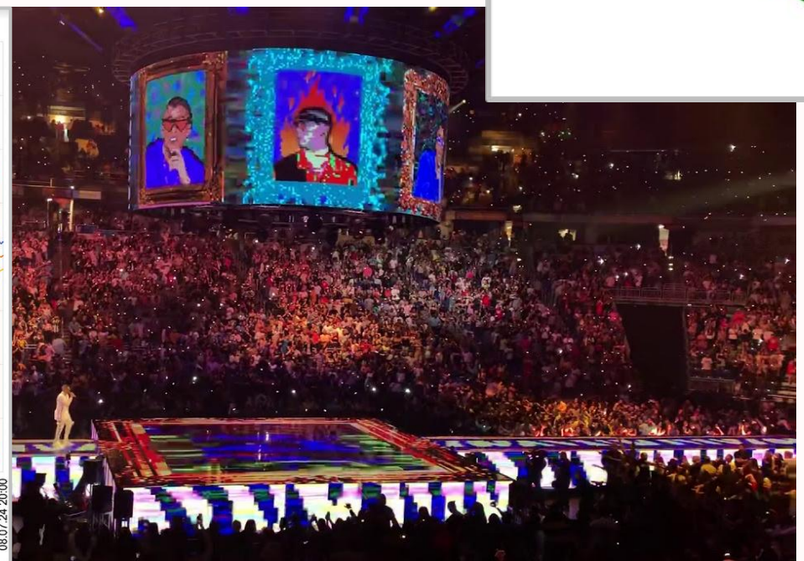
Real-time data for significant savings

- During a recent 3-day Bad Bunny concert at the Puerto Rico Coliseum, this GeoSIG graph shows that the dancing crowd had an impact similar to a magnitude 3.7 earthquake!
- GeoSIG's real-time data allows Facility Managers to know immediately whether the stadium is safe to use for the next event, given the nature of sports and entertainment and the high cost of interruptions and delays.
- You also know if any localized damages occurred and repair them quickly at a far lower expense than if the damage goes unnoticed and is caught later.
- A value of the technology is then measured as the ratio between installation costs vs. continuity of revenue generation and usability.





"Earthquake effect" comparison between a recent Bad Bunny concert (left) and a Puerto Rican national team qualifying basketball game (right graph).



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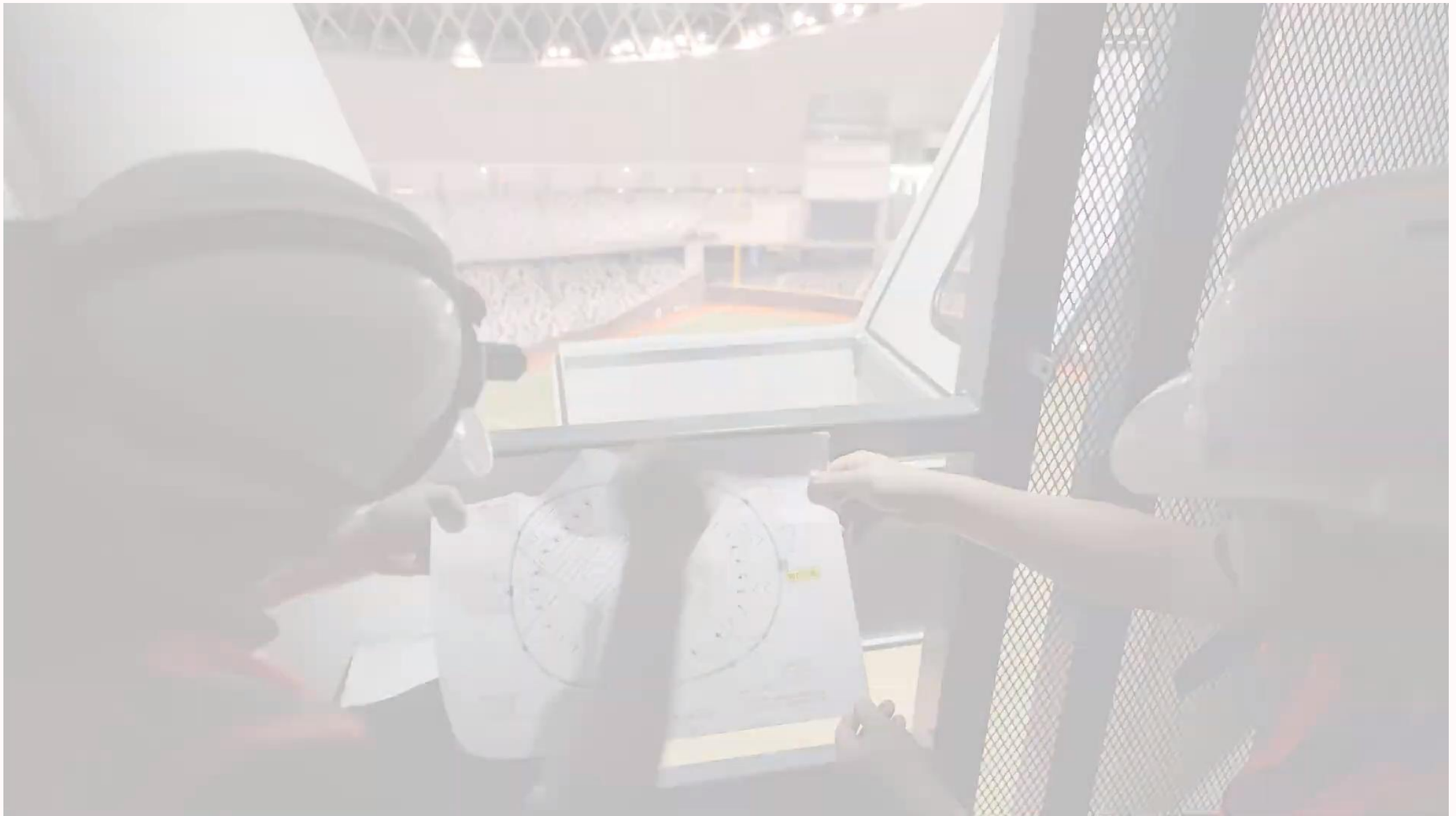
A District solution

In Taipei, we also installed in surrounding buildings connected to the coliseum



District-level risk mitigation and management is fast becoming a global trend.

Whether you’re a single facility manager in charge of multiple properties or a collective of managers in an area or zone, a centralized coordinated strategy may be the way to go.

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GeoSIG
swiss made to measure

World Leader in Monitoring Solutions

Swiss Excellence

Swiss-based, ISO-certified world leader in vibration and earthquake monitoring solutions with over 30 years of deployment experience.

Comprehensive Systems

GeoSIG provides complete, field-proven SHM systems, including sensors, data acquisition units, and intelligent software.

Critical Applications

Trusted for monitoring sports stadiums, high-rise buildings, dams, nuclear power plants, bridges, and other mission-critical structures worldwide.

UN Recognition

Classified by the UN as Humanitarian Equipment. Certified vendor for Nuclear institutions and USGS (over 5,000 units installed).

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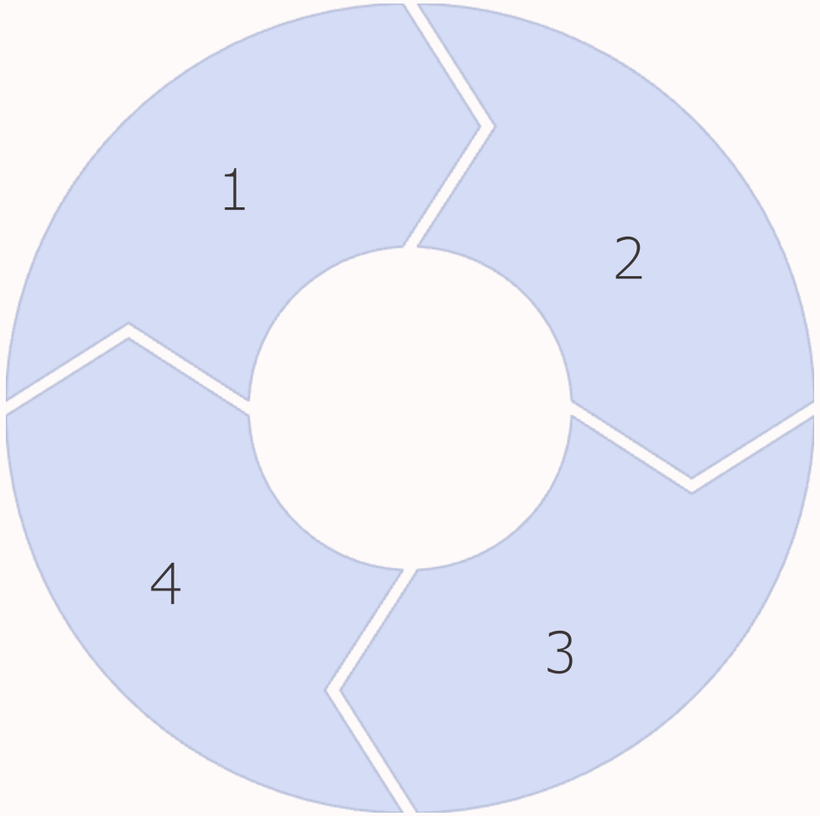
Vertical Integration:
A critical differentiator

The In-house Difference

Unlike providers assembling systems from third-party components, GeoSIG designs and manufactures **all** core elements (sensors, hardware, software) in-house.

Risk Mitigation

Avoids risks of instability and complex support common in multi-vendor assemblies.



Benefits of Integration

Deep, intrinsic system synergy ensuring stability and data fidelity. Proven long-term reliability in demanding environments.

Streamlined Support

Single point of contact for streamlined support, maintenance, and upgrades. High flexibility for customization.

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GeoSIG
swiss made to measure

Value Proposition:

Maintenance, Safety, Resilience

Risk Mitigation

Proactively identifies structural issues and quantifies event impacts, reducing failure risk.

Operational Continuity

Accelerates post-event safety assessments, minimizing costly business interruptions and unnecessary evacuations.

Optimized Maintenance

Enables predictive, condition-based maintenance, reducing lifecycle costs and extending asset lifespan.

Enhanced Asset Value

Demonstrates commitment to safety and resilience, potentially increasing property value and insurability.

Life Safety

Provides crucial data for occupant safety and automated responses (e.g., elevator and gas shutoff).

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GeoSMART Software

Advanced Platform

GeoSMART is GeoSIG's flagship software for real-time monitoring and analysis.

Comprehensive Features

Includes 3D structural modeling, high-frequency data capture, multi-threshold event detection, customized alerts, and AI-based trend analysis

Rapid Assessment

Facilitates rapid post-event assessment (e.g., safety "semaphore"), predictive maintenance insights, and potential automated responses via relays (e.g., shutting down utilities during events).

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Integration of TerraIntel:
Ground Truth Meets Satellite Intelligence

By Manoochehr Shirzaei,
Virginia Tech, Lead, Land Subsidence Analytics at
United Nations University

Multi-Source Environmental Intelligence

Estructura leverages TerraIntel's advanced satellite monitoring to provide unprecedented infrastructure insights.

Utilizes cutting-edge satellite technologies (InSAR, optical, and thermal imaging) to capture comprehensive environmental data, tracking critical parameters such as ground deformation, subsidence patterns, water stress indicators, thermal anomalies, and potential infrastructure encroachment risks.

Integrated Risk Assessment

By fusing GeoSIG's precision sensor data with TerraIntel's broad-scale satellite monitoring, we create a robust, multi-layered risk assessment framework.

This synergistic approach enables detection of subtle ground settlement affecting structural foundations, providing a holistic view of infrastructure vulnerabilities that traditional monitoring methods might miss.

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TerraIntel report: Jet Set collapse Santo Domingo

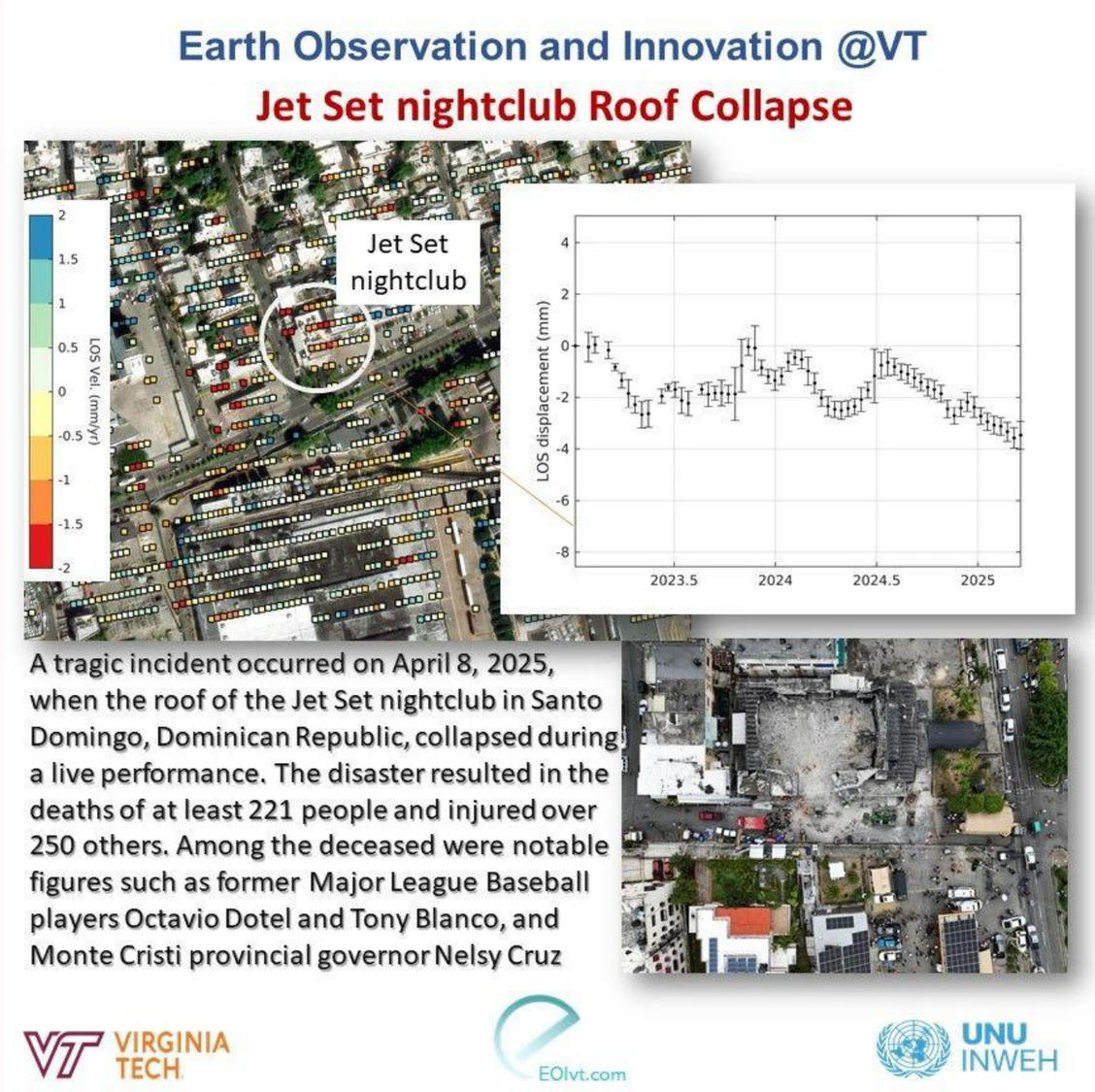
By Manoochehr Shirzaei,

Virginia Tech, Lead, Land Subsidence Analytics at United Nations University

Structural risk could have been detected on time

From Dr. Shirzaei's LinkedIn post, April 2025

Using satellite data, Earth Observation and Innovation Lab at Virginia Tech detected ground settlement of –2 mm/yr affecting the building, which accelerated in mid-2024—an early warning sign of potential structural failure, which tragically came to pass in 2025.



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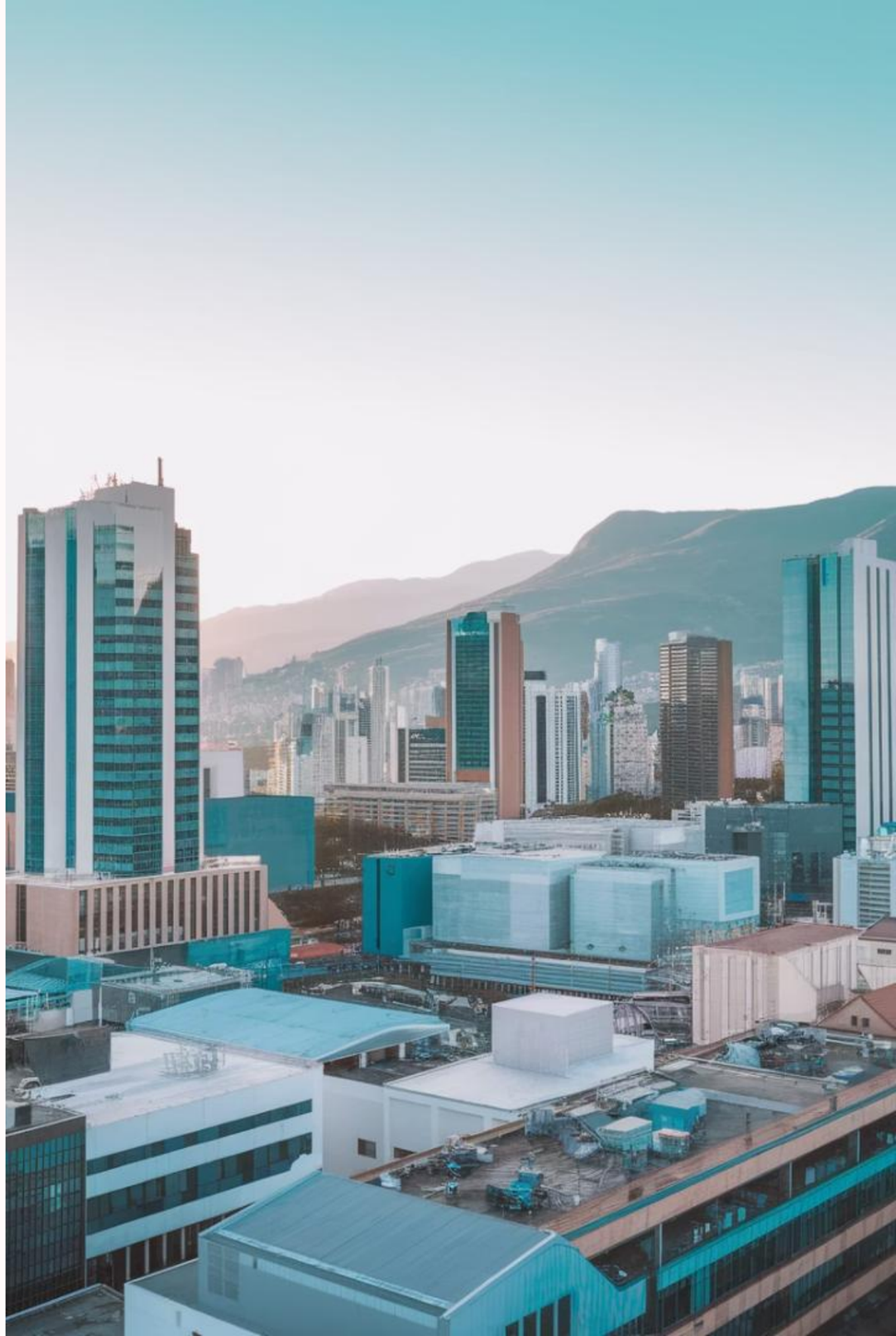
Regulatory Landscape: Navigating the Codes

Explicit Mandates are Limited

Current regulations in most markets emphasize seismic design, safety inspections (especially post-event), and professional responsibility, but generally lack explicit mandates for **permanent** SHM system installation across most structure types.

Implicit Drivers

The above-mentioned realities of climate, seismic and other events, therefore, create an implicit high-ROI need for SHM data, with or without legal mandates.



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Case studies – more (many more!) in estructura.tech

Puerto Rico Coliseum

Case studies

Urban Train

Case studies

Chubb Tower

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