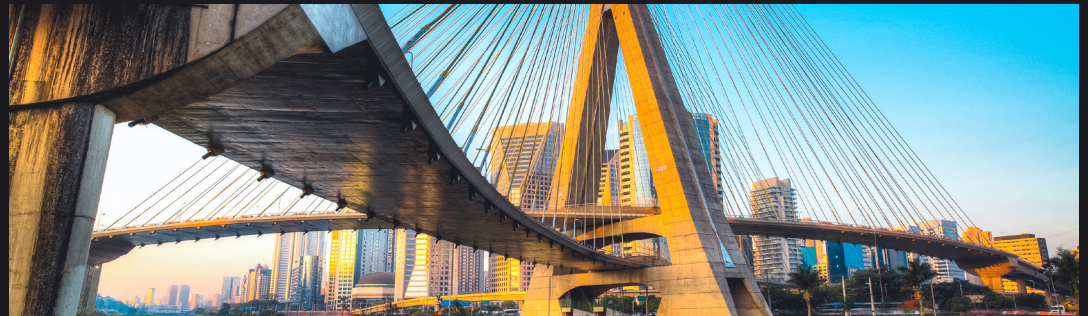




## CASE STUDY

# Transforming urban infrastructure management with advanced monitoring

Municipal Secretariat of Urban Infrastructure and Works (SIURB) | *Brazil*



## Industry

- Government & Public Sector

## Solutions

- Octave Alto, Octave Alto Enterprise, Octave Alto Data Management, Octave OnCall

## Challenges

- No systematic infrastructure management approach
- 1K-plus mapped infrastructure projects
- Remote monitoring and preventative maintenance

## Results

- Early stage issue detection
- Incidents avoided; risks mitigated
- Reduction in emergency maintenance costs

Sao Paulo, the largest city in South America, is often referred to as the economic engine of Brazil. The city is home to more than 12 million residents and approximately 1,100 mapped infrastructure projects, including bridges, viaducts, tunnels and walkways.

Many of these structures were built in the 1950s and 1960s, and until a catastrophic event happened, preventive maintenance was not a priority.

**The Municipal Secretariat of Urban Infrastructure and Works (SIURB)**, the agency responsible for managing the city's infrastructure, is now carrying out monitoring, inspection and maintenance with the help of Octave technologies.

## The conservation of urban infrastructure requires a proactive, technology-driven approach

For decades, Sao Paulo lacked a systematic approach to maintaining its infrastructure. Following a viaduct collapse on the banks of

the Pinheiros River, the city launched an inspection and maintenance program.

The initial phase laid the groundwork for systematic inspections and recovery. Within five years, SIURB initiated or completed more than 300 structural recovery projects and conducted approximately 1,000 inspections.

To continue making progress, SIURB contracted ARC Mobilidade to create a more technology-driven process for infrastructure monitoring and maintenance. The solution includes a wide range of Octave technologies.

## How it works

Surveys conducted with drones and RTC360 laser scanners, GNSS receivers and Leica Total Stations collect inputs such as orthomosaics and point clouds to create digital twins of structures in the form of georeferenced BIM models. These models are enriched with contextual layers, such as traffic flow, urban zoning, soil type and utility networks to provide a holistic understanding of the structures and their surroundings.

*“The new management and situational awareness solution built on Octave technology has transformed Sao Paulo’s approach to infrastructure management.”*

**Marcos Monteiro**

Secretary of Urban Infrastructure and Works  
City of Sao Paulo

When spatialized in Octave Alto Enterprise (formerly M.App Enterprise), this data comes to life with the Octave Alto (formerly Luciad) platform’s 3D visualization capabilities, providing high-fidelity images of the structures and allowing users to perform spatial analyses and visualize all types of geographic data, including BIM models in .rvt format, without the need for file conversion. Files such as point clouds, orthomosaics, BIM models and even business files like PDF documents are cataloged and published in Octave Alto Data Management (formerly ERDAS APOLLO) to facilitate data searching and management.

Through Rheticus Safeway software from Planetek, a longtime Octave partner, satellite images are processed monthly to detect ground movements as well as instabilities and deformation in the structures’ surfaces and surroundings — while cameras equipped with AI-based analytics monitor anomalies such as cracks, corrosion and variations in clearance at expansion joints.

Customized validations and business rules automatically generate alerts in Octave OnCall (formerly HxGN OnCall). After an alarm is validated, an automated workflow triggers a standard operating procedure that allows for the immediate dispatch of services or the scheduling of inspections. The solution also includes automated monitoring of news and social media, generating alerts based on keywords that indicate situations relevant for analysis. All technologies are integrated into a Monitoring Center equipped with a video wall, operating stations and a situation room, adapting best practices in public safety to ensure the city’s mobility.

Field inspection teams play a critical role in documenting anomalies, such as exposed rebar, cracks, delamination, rust stains, carbonation and concrete disaggregation. With Octave’s mobile app, these observations are compiled into technical reports, which include structural, functional and durability assessments, along with recommendations for remediation and cost estimates. The reports also leverage GeoBIM models to precisely locate anomalies within the structures and are made available in a web-based portal, providing contractors, managers and authorities insights on project completions and other KPIs.

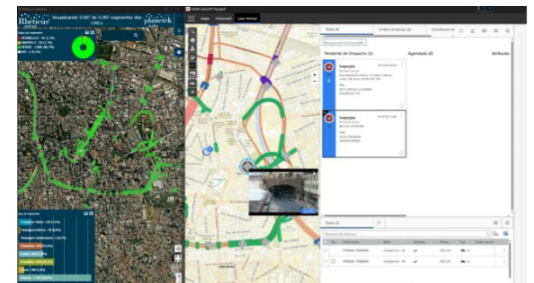
When necessary, reality capture teams are dispatched to collect detailed georeferenced data using drones, terrestrial scanners and GNSS receivers.

“The use of GeoBIM allowed inspection teams to gain a clearer, more detailed understanding of structural conditions by visualizing data in 3D through our customized web portal,” said Marcos Monteiro, secretary of urban infrastructure and works for the City of Sao Paulo. “These models not only represent the geometry of structures, but also include comprehensive data about their components, materials and spatial context, making it easier to pinpoint issues and plan repairs effectively.”

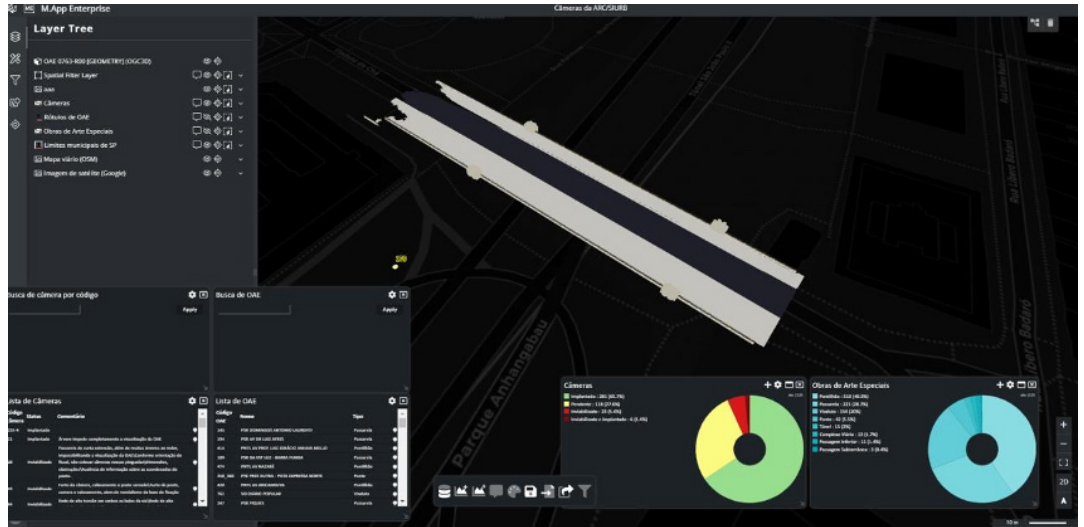
## Transformational results

Sao Paulo is recognizing tangible benefits that exceeded expectations. The comprehensive solution detects early-stage structural issues, enabling preventive measures. Safety incidents and catastrophic failures can be avoided, and the lifespans of these structures extended. At the same time, emergency maintenance costs are reduced, minimizing potential impacts to the city’s economy.

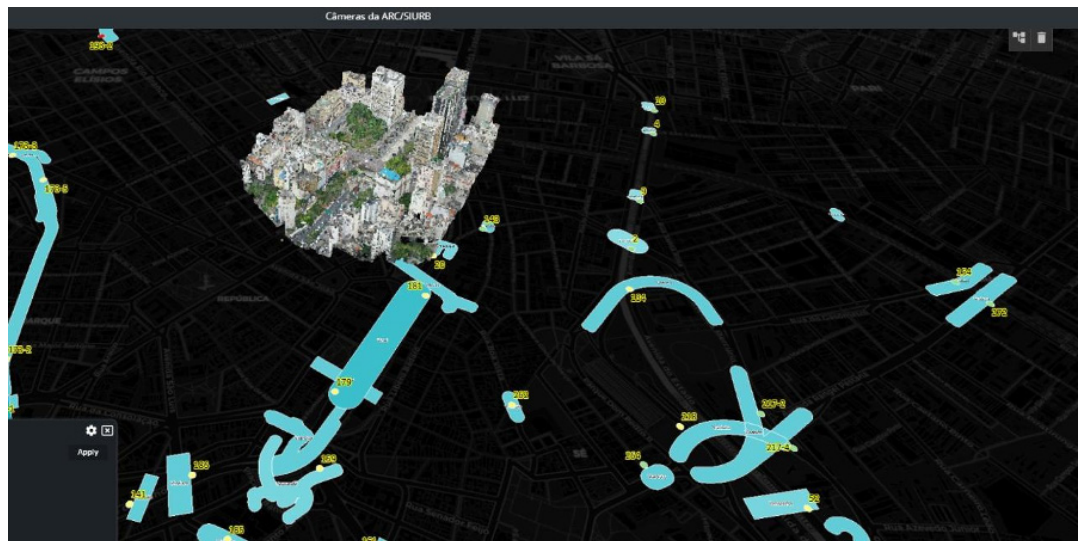
“The new management and situational awareness solution built on Octave technology has transformed Sao Paulo’s approach to infrastructure management. It not only extends the lifespan of critical structures, but also reduces the risk of accidents, minimizes traffic disruptions and ensures compliance with current technical standards,” said Monteiro. “Ultimately, these enhancements contribute to safer, more reliable urban mobility.”



A web-based view of satellite monitoring of structures and integrated management of work orders in OnCall



This 3D representation of structures with different filters in Alto Enterprise supports inspection activities.



A point cloud created with laser scanning is visualized in Alto Enterprise with Alto's 3D capabilities. It supports inspections and 3D modeling.

## About Octave

Octave is a leader in enterprise software, turning data into decisive action and intelligence into your edge. Our software solves for and simplifies complexity, from the design and build to operations and protection of people, property and assets – for any scope, at any scale. For decades, we've partnered with customers to sharpen performance, elevate efficiency and amplify results. From factory floors to entire cities, our solutions are tuned to scale up what's possible from day one onward.

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