CASE STUDY

Protecting Rio de Janeiro with real-time city monitoring and automation

Rio Operations Center | *Brazil*

Industry

- Security

Solutions

- Octave OnCall Security, Octave Alto Enterprise

Challenges

- Climate instabilities and extreme natural events
- Coordination of public services for 6M-plus people
- Gaps in collaboration among public and private agencies

Results

- Data integrated in a single incident management platform
- Automatically generated alarms
- Rio Dashboard – map-based, real-time view of city with georeferenced data

With a semihumid tropical climate and surrounded by the Atlantic Ocean and Mantiqueira mountain range, Rio de Janeiro is subject to climatic instabilities and extreme natural events. These environmental factors put the city's safety, infrastructure and mobility at risk, affecting more than six million people. Plus, Rio is a global tourist hub, hosting dozens of large events every year, including Carnival, which makes the coordination of public services an even greater challenge.

At the beginning of the last decade, Rio suffered the largest climate and geotechnical catastrophe in Brazil's history, enduring landslides and floods that devastated the city and surrounding areas. These events uncovered gaps in the coordination between public and private agencies during such disasters, which motivated the creation of an integrated management center.

In response, the city launched the **Rio Operations Center (COR)**, which initially used a proprietary incident management system. But, while robust, it had limitations. COR needed a solution that could systematize and automate a wide variety of processes and workflows, as well as integrate and centralize information from different data sources into a single platform for real-time city monitoring. It achieved this with several Octave technologies.

Launch and modernization

COR was launched in 2010 as a crisis management entity to anticipate disasters and enable faster responses. COR monitors the city in real time and coordinates public actions to reduce the impact of an array of incidents, although weather events and urban mobility continue to demand greater attention. More than 50 entities operate out of the center, including municipal and state secretariats and public safety agencies such as the military police and fire department, as well as the traffic authority and utility companies, among others.

While reaching organizational and operational maturity, COR used a proprietary incident management system. Although robust, it had limited automation and integration capabilities. Furthermore, key indicators were calculated using spreadsheets, and on-demand reports were generated manually, slowing analysis, decision-making and action.

"The Octave platform helped us address data integration challenges and automate complex business rules, making COR operations even more agile and efficient."

Marcus Belchior
CEO, Rio Operations Center (COR)

In addition, disparate systems and information distributed in different locations did not allow COR to have an integrated view of the four main critical aspects of the city: ocean-atmospheric data, incidents and disasters, mobility and planned events. The legacy system also did not generate or handle alarms, and depended on users for the creation, categorization, assignment and monitoring of events.

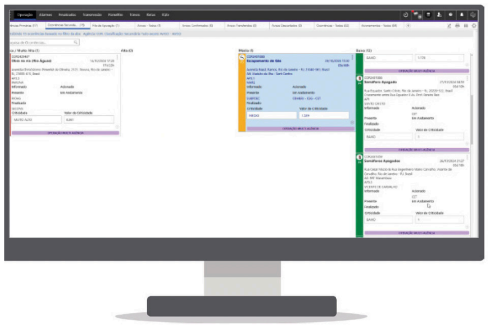
The volume of data managed by COR was so great that city leaders decided to invest in and put data science at the heart of its processes. This was a turning point toward exponential gains in efficiency and quality. COR needed a new software solution that could systematize and automate a wide variety of processes and workflows, as well as integrate and centralize information from different data sources into a single platform for real-time city monitoring.

It selected Octave's solution for city operations management, combining the event and incident management capabilities of Octave OnCall Security (formerly HxGN OnCall Security | Guardian) with a geospatial business intelligence tool created with Octave Alto Enterprise (formerly M.App Enterprise). The configuration of rules, workflows and automations was implemented with Octave OnCall Dispatch Customer Rules Engine (formerly HxGN OnCall Dispatch | Customer Rules Engine), a tool that a Octave implementation team can use to help customers customize OnCall Dispatch. Integrations were accomplished with Hexagon's Xalt | Integration, a no-code integration framework that accelerates implementations.

"One of the key factors for the successful implementation of the Octave solution was the trust and close collaboration between COR managers and teams and the Octave services team," said Marcus Belchior, CEO of COR. "The main challenges for this project were mapping the requirements and expectations of different agencies and user profiles, as well as the specification of complex rules and processes that did not happen through the system. Once this stage was completed, a prototype of the solution was developed and submitted to a demanding testing and approval process by our stakeholders."

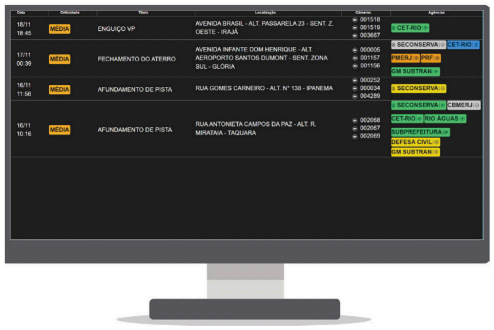
How it works

OnCall Security integrates data from different sensors, systems, applications, cameras and other data sources into a single platform. Several types of alarms are automatically generated and categorized according to the type of event and level of impact, considering factors such as location, time, blocked roads, victims, fatalities, impacted agencies and even media exposure.

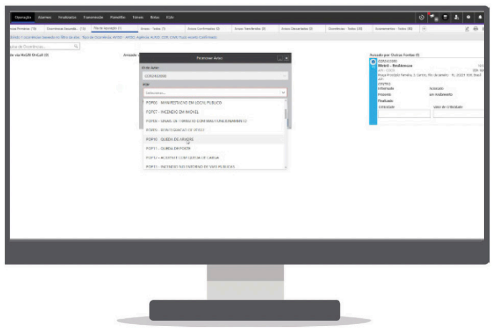


The OnCall Security user interface provides an organized, detailed visualization of incidents.

Alarms are also created manually, or through a chatbot that integrates with the main messaging app used by COR users, supervisors and field agents. When an alarm is created in the system, COR coordinators are automatically notified. Depending on the case, agency supervisors are immediately involved. Once validated, the alarm is converted into a warning or event and, depending on each situation (e.g., vehicle collision with a victim), a standard operating procedure is triggered and notifications are immediately sent to the appropriate agencies.



COR's incident monitoring tool allows users to keep an eye on what matters most.



Standard operating procedures triggered by automated workflows are based on the type of event.

Examples of existing integrations

- Weather forecast data
- Weather radar, rain gauge and anemometer
- Temperature, heat level and air quality in real time
- Water bodies and containment tanks
- Civil defense sirens
- Cameras with video analytics for road monitoring (e.g., vehicles stopped or moving in the wrong way or an object left on the road)
- Real-time monitoring of public transportation (e.g., trains, subways, VLT (light vehicle on rails) and BRT (bus rapid transit))
- Monitoring of traffic situation and incidents in real time (partnership with Waze)

Painel RIO: Real-time, georeferenced event data allows COR to monitor conditions and operational stages.

Real-time operational intelligence

Georeferenced data plays a key role in city monitoring and management. To this end, a map-based operational intelligence tool was built using Alto Enterprise to provide COR, its agencies and government authorities with a map-based, real-time view of Rio de Janeiro.

Known as the Painel Rio (Rio Dashboard), the tool displays georeferenced data from alerts and events that are managed through OnCall Security, allowing COR to monitor four main conditions throughout the city: ocean-atmospheric data, incidents and disasters, mobility and planned events. According to the number and seriousness of the events related to each of these conditions, an operational stage is defined, which indicates how heavily city infrastructure and logistics are being impacted. Such information is made available by COR to authorities and the media and shared with the population through social media.

Painel RIO: A pop-up notification alerts users about an accident with a victim, assigned agencies and city operational stage.

"The Octave platform helped us address data integration challenges and automate complex business rules, making COR operations even more agile and efficient," said Belchior. "The robust combination of the platform's event and incident management capabilities and the map-based, real-time view of the city through the Painel Rio helps us keep a watchful eye on the safety of Rio de Janeiro's residents and visitors. That is the greatest outcome."

Setting the standard for operations centers

In addition to being a milestone for Rio, COR is a pioneer in Latin America. In 2024, it was certified by the Brazilian Association of Technical Standards (ABNT) as a national reference for operations centers in the country.

COR by the numbers

- 500 professionals working in 24-hour shifts
- 2,000 incidents registered per month
- 3,800 cameras monitoring the city
- 80 major events mapped per month
- 1.7 million followers on social networks
- 100 m² (125 55-inch screens) – the largest video wall in Latin America
- 84 servers housed in a safe room

Up-to-date, pregonfigured reports with key operational indicators can be downloaded in a few seconds.

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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