Smart site situational awareness in Belgium

BASF | *Belgium*

Industry

- Chemicals & Petrochemicals

Solutions

- Octave Alto, Octave Alto Twin

Challenges

- Critical data in disparate, disconnected systems
- Inadequate situational awareness and poor visualization
- Optimization of employee safety

Results

- Digital twin of 600-hectacre (1,483-acre) production facility
- Dynamic common operating picture
- Operational- and role-based access

BASF is the largest chemical producer in the world. Its plant located at the Port of Antwerp – home to Europe's biggest integrated cluster of petrochemical companies – is the largest chemical production site in Belgium and the second largest BASF site in the world. With 360 miles of underground pipelines, the Antwerp facility has 3,500 employees with 50 production installations, and produces basic and specialty chemicals, plastics and precursors, as well as refined products and inorganics.

BASF's Antwerp site produces large amounts of critical data during its 24/7 operations. The site must also manage 25 years' worth of CAD schematics and other facilities information. However, all these important datasets were stored in disparate, disconnected systems, making it difficult for various BASF site managers and operations teams to have adequate situational awareness, visualize infrastructure and assets and improve employee safety.

To address these challenges, BASF needed a solution to transform its 600-hectacre (1,483-acre) Antwerp production facility into a smart site. BASF needed integrated systems and connected data to improve shared situational and operational awareness.

Transforming site operations with a digital twin

From fire brigades to drilling contractors, BASF Antwerp's site is a dynamic, complex operation with many moving pieces and data points. Traditional GIS solutions could not manage the high volume of data produced daily from its various databases, aerial imagery, LiDAR and thousands of real-time sensors.

A longtime Octave customer, BASF implemented a solution that integrates all its critical infrastructure and operations data into a single platform. Powered by the Octave Alto portfolio (formerly the Luciad portfolio), the foundation of Octave Alto Twin (formerly HxGN Smart Sites), BASF was able to create a digital twin of its Antwerp production site. It provides a dynamic common operating picture that allows different users to view data types depending on their operational environment and role.

For example, it tracks critical assets, including the real-time visualization of refueling activities and real-time weather information for the on-site fire brigade. The finance department uses the solution to calculate the actual floor area covered by carpet to correct invoices of the cleaning crew, which reduces cleaning costs.

It also helps external contractors get detailed site maps. The solution allows users to visualize where and when all daily tasks will be performed in a georeferenced way, streamlining processes to make them more efficient.

Importantly, the solution can also be integrated into other dedicated solutions (permit managing, auditing tours, etc.) at the facility, enhancing them with situational awareness capabilities.

Support for safety-critical processes and emergencies

The smart site solution is accessed by engineers and managers on their laptops, tablets or desktops, as well as remotely by field workers and in control rooms providing georeferenced awareness of processes at hand. BASF grouped related data into more than 250 themes so the right data can be presented in an understandable way to the right sets of people, this all via configuration and applying existing security roles and rules. Themes include situational plans, turnaround management, underground infrastructure, electrical cabling, environmental measurements, cadaster, piping, site engineering, site security, fire department operations, energy situational awareness and cleaning crew optimization. It is also used to track emergency vehicles, trains and critical assets on and in between sites.

To enable informed decision-making in case of an emergency, the solution integrates multiple data sources that automatically feed into the facility's fire brigade, site security and crisis center. For example, the system can visualize which buildings should be evacuated based on calculated behavior of a hazardous leakage for on-the-fly decisions and rapid response. The fire brigade also uses mobile devices to get direct access to plant assets that could be at risk.