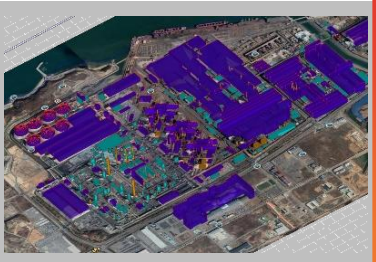
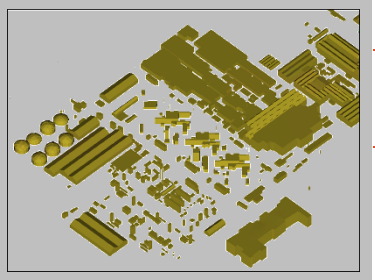


FLUIDYN-REALTIME

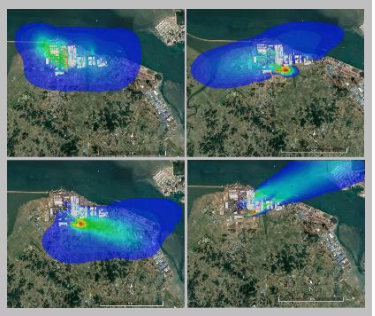
REAL TIME MONITORING AND MANAGING ATMOSPHERIC EMISSIONS



Software platform for Industries, City Councils and Consultancies

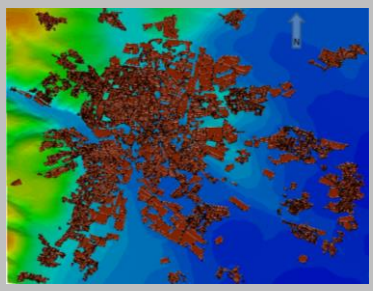
FLUIDYN-REALTIME is a set of operational solutions to monitor and analyze atmospheric emissions and their impact, specifically developed to aid industries, city councils and their delegated services. The tool offers several features:

- 3D monitoring of atmospheric dispersion of gaseous and particulate emissions in real time and in forecast mode,
- Optimization of sensor network deployment (fixed networks) or measurement protocols by on-board means (vehicles, drones),
- Continuous monitoring of sites for leaks: detection, localization, and mitigation (Fire and Gas detection feature in risk management),
- Continuous source mapping (all origins) and their spatial assessments.



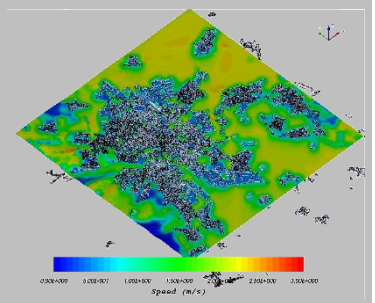
The tool is composed of several numerical modules and interfaces that can be used independently or together.

3D Simulations for real time impact mapping and monitoring

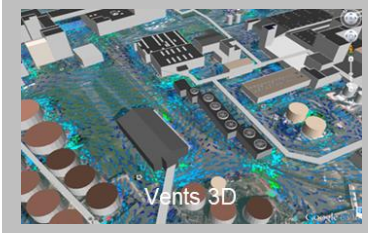


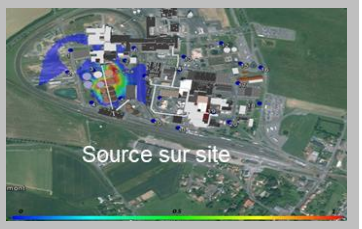
The solutions use 3D CFD modelling of turbulent atmospheric flows and dispersion (Euler / Lagrange) for real time impact mapping and short-term forecasts (t_0+3d). The software platform is **Fluidyn™-PANEPR/PANEIA**, which integrates the following modules:

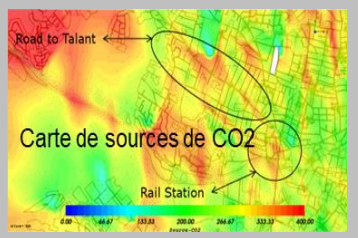
- **Real Time Module**: real time monitoring (slightly delayed for in situ data acquisition) and source recalibration (flow rate by sensors).
- **Forecast Module (PS)**: short-term forecasting from 24h to 48h or 72h for projected emission scenarios.



The 3D-CFD methodology explicitly addresses all topographical complexities (buildings, relief, processes, land use, road routes, etc..) and their influence on local flow and turbulence. It uses meteorological data (in situ or via national services) and sensors for the control and calibration of known sources. The software continuously maps air quality on a local scale (industrial site, city district) or on an urban scale for all meteorological conditions observed in the area covered and potentially including all pollutant sources: transport (road, fluvial, maritime), housing (heating), industry (processes, storage, chimneys) in urban/rural/agricultural areas.







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FLUIDYN-SENSORMAP

Inverse Modelling – Aim : emission monitoring and qualification

FLUIDYN–SENSORMAP is a module explicitly dedicated to emission monitoring and mapping. In an industrial context, it is used for the detection, localization, and analysis of toxic and flammable leaks (accident / risks). In an urban context, or in a normal situation, il allows to map emissions from all known and unknown sources, present in the domain of study.

Inverse Modelling – Functions and solutions

The functions and analysis execute the assimilation of data acquired in situ via the sensor networks distributed spatially over the urban / industrial domain to be monitored and / or around the process units for leak detection. The model uses innovative inverse modeling methods for positions and sensor data acquired at regular/continuous intervals and distributed geographically. The functions rely on the production of adjoined 3D-CFD dispersion database (inversed from sensors) and associated scalar renormalization and inversion matrix functions.

Fluidyn™-SENSORMAP proceeds in stages:

- **Preparation – optimization of sensor network**: Calculation of adjoint dispersion functions for many sensor positions, construction of visibility functions and optimization, thereby producing the best distribution of measurements for the widest coverage and rapid detection. Used for the Fire & Gas detection design.
- **Operational function**: Collection of batches of measurements from sensors, and current meteorology – Inversion and source mapping.
- **Analysis and emission report**: Search/location on instantaneous map of peak values (leaks) – long-term aggregation and assessment of multi-source emissions in the agglomeration for emission registers.

Application sectors and Target markets

- Air, Odors, noise
- Local authorities and administrations, agriculture and agroindustry, engineering – design, environment and eco-activities, industry, transport, and logistics

References

AJINOMOTO, DGA–MNRBC, ERAMET, ELYLOOS, VEOLIA, SIAAP, KANEKA, HYUNDAI, RELIANCE, EVERIMPACT/DIJON City…