

AIRCITY

Visualising air quality everywhere in the city

One of the main challenges of the concept of sustainable cities is to precisely understand and forecast the way their inhabitants are affected by the neighbourhood pollution. Thanks to advanced computing technologies and more accurate urban data sources, AIRCITY is able to simulate

in 3D the air quality in urban environments with great precision, in each and every street, taking into account the buildings and the traffic flow. AIRCITY relies on the parallel computing model PMSS developed by a team of researchers gathered around ARIA Technologies; designed originally in collaboration with CEA for emergency preparedness and industrial risk management needs, used and validated in these fields, PMSS is also able to represent with extreme accuracy the wind fields and the continuous dispersion of pollutants in a city.

A resolution of just a few metres

AIRCITY allows the simulation of air quality everywhere



Information management through innovative tools

The simulation results produced by AIRCITY are easy to access and to understand by all:

- Visualisation with the Geographical Information Software ArcGIS, through the ARIA City™ software of ARIA Technologies
- For the general public: on-line publishing on a website where the daily forecasts can be displayed on computers, smartphones, tablets, etc.
- For advanced users: 3D tools allowing to study the computed wind fields and concentration levels precisely (EWB and Paraview for further scientific use) or to graphically enhance the results through immersive displays and videos (LANDSIM3D®).

All these tools have the same goals: to allow everybody to see wind and air quality in the city.

AIRCITY in Paris: a few figures

- 3-metre** resolution everywhere
- 12 X 10 km** modelled (all Paris)
- 20** Airparif monitoring stations
- 3** Lidars positionned (aerosol and wind Lidars)
- 1000 km** of streets for road traffic emissions
- 120** tiles assembled for massively parallel computation





with a resolution of just a few metres. To achieve such accuracy, it nests successive meteorological computations ranging from the continent down to the street level. In the case of Paris, the local meteorological forecast was deduced from the results already obtained by Airparif, the organization officially in charge of air quality monitoring in the Greater Paris and by the interregional platform Esmeralda. Terrain, buildings, rivers, emissions, traffic-induced turbulences, chemical reactions: all the specific parameters of the city are integrated in the modelling.

Multiple applications

AIRCITY makes it possible to display air quality forecasts for the following day, as well as to study specific urban development plans with a high level of accuracy: real-time management of the access to urban tunnels or by-passes, input of electric vehicles or of new tramway lines, renovation of neighbourhoods

or definition of mandatory long-term sustainability development plans for the city. In each case, AIRCITY allows the planners and the general public alike to understand better the short- and long-term consequences of the proposed changes on the environment.

AIRCITY in your city

After a first full-size setup in the city of Paris, AIRCITY can now be reproduced in other cities of the world. ARIA Technologies offers a range of different innovative solutions according to the size of the city, the proposed domain of study, the available data (topography, buildings, road traffic, emissions), and the computation means (dedicated set of computers or cloud computing).

Compared results, validated model

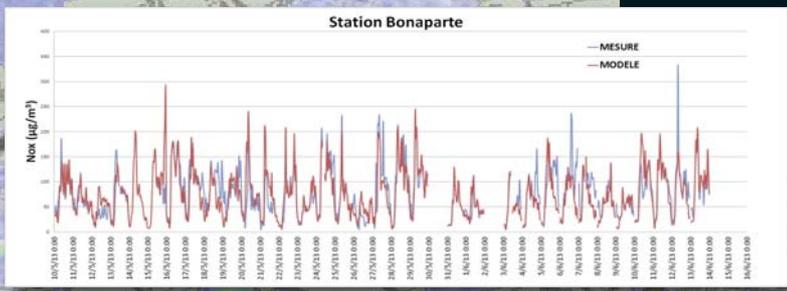
After the development of the system, the model was validated: the results were successfully compared with the data obtained through a Lidar monitoring campaign (aerosols and wind Lidars) organized by Leosphere, and with those provided all year long by Airparif's permanent air quality monitoring stations.



Photo © Airparif



Photo © Leosphere





ARIA Technologies
 8/10, rue de la Ferme
 92100 Boulogne-Billancourt – France
 Tél. : +33 (0)1 46 08 68 60
 www.aria.fr

In partnership with:



With the technical help of:



With the support of:

