Real-time Simulation of Inner-City Traffic Pollution

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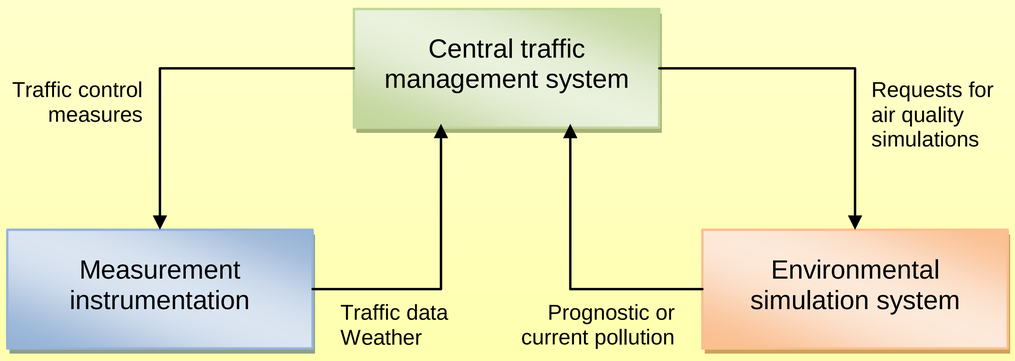
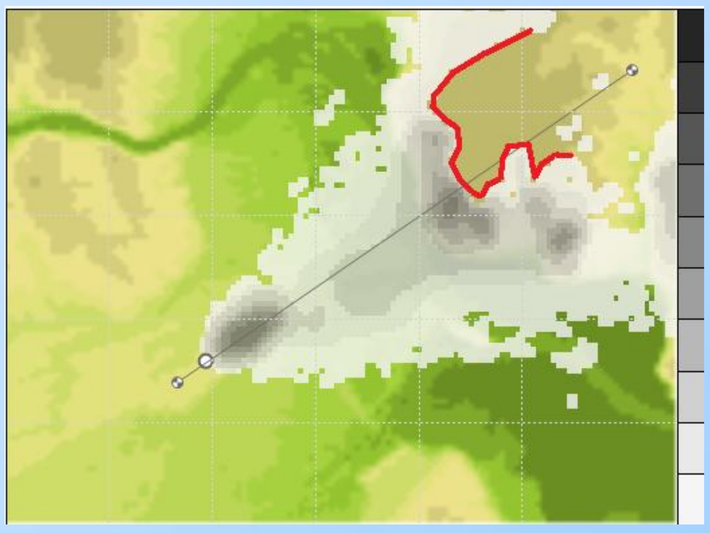
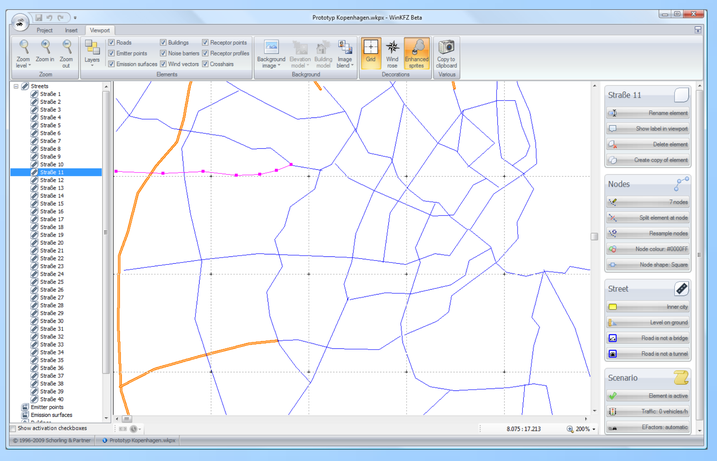
Environmentally-aware intelligent traffic systems

Schorling & Partner is involved in the research of environmentally aware intelligent traffic systems that automatically predict imminent pollution threshold violations and influence traffic flow to avoid heavily congested areas, thus giving the pollution build-up time to disperse.







Pollution simulation model

As it is not economically viable to cover wide city areas with immission measurement units, a more cost-effective approach is to simulate the pollution levels based on current traffic data and meteorological information.

The accuracy of an atmospheric dispersion model depends in no small part on the precision and detail with which the physical boundary conditions can be modelled; as a result, the software developed by Schorling & Partner supports many parameters and phenomena that inferior models ignore.

- **Digital terrain models** affect the macroscopic wind field
- **Digital building models** profoundly influence the microscopic wind field

- **Multiple wind measurements** can be taken into consideration
- **Weather phenomena** such as temperature inversions are allowed for

- **Legacy immissions** are carried from one interval's simulation to the next
- **Advanced NO_X / NO_2** reaction model imitates the actual chemical process

Pilot project

In 2007, Schorling & Partner was commissioned to develop a real-time immission simulation pilot system for a major European city. This prototype covered 7500 x 5000m² of a heavily built-up metropolitan area.

In 15-minute intervals, this system acquired data on prevailing traffic and weather conditions and used these as input for the simulation models. The result was a 7.5x5.0km² immission grid at a resolution of 10m.

By applying a distributed and scalable simulation model, the system was able to perform each interval's simulations in under 15 minutes.

During its six-month test run, the system reliably and automatically simulated the entire city's traffic-induced immissions in real-time.

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