

Radiation model of the urban environment

Development status

Phase 4

The transition from the prototype to the final and fully functional form. At this stage, the prototype is already fully tested, or the technology is certified and ready for mass deployment.

IP protection status

Partnering strategy

Collaboration, licensing



Institution

 INSTITUTE OF COMPUTER SCIENCE
The Czech Academy of Sciences

**Institute of computer science,
CAS**

Challenge

Advancing climate change, together with rapid urban development, is leading to problems with air quality, thermal comfort and related health risks. This forces cities to effectively plan countermeasures both in existing buildings and for new urban projects. One of the key atmospheric processes affecting the heat balance in the urban environment is light and heat radiation and its spread between the sky, the earth's surface, buildings, vegetation and other elements of the city. Existing urban climate models have used either very simplified radiation schemes or loosely connected external radiation models, or the models are not designed for the processing of sufficiently large areas.

Description

The radiation model solves light and heat radiation and its propagation in a 3D simulation of the urban environment, where it can compare different scenarios of urban development or examine the effectiveness of specific adaptation measures. It is an important part of the urban climate model PALM-4U. This model solves radiation explicitly in a three-dimensional representation of the urban environment with multiple reflections and semi-permeable vegetation shielding. At the same time, it is parallelized for calculations on supercomputers and can simulate large areas on a fine scale in the order of meters. The model results make it possible to compare different scenarios of new urban development or to examine the effectiveness of specific adaptation measures under different meteorological conditions.

Commercial opportunity

Urban studies. Modeling will show the effectiveness of planned measures and changes and reveal cases where, for example, tree planting can lead to poorer ventilation and increased concentrations of air pollutants in addition to improved thermal comfort.