

Application of 3D Virtual City Models in Urban Analyses of Tall Buildings



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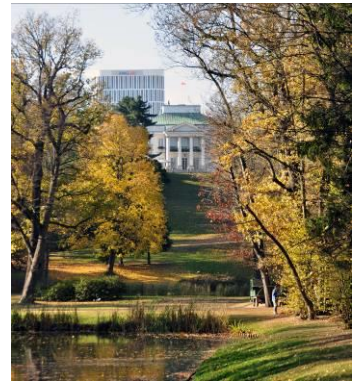
Bauhaus University Weimar
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Faculty of Architecture | InfAR
Raum 105 Hauptgebäude

ABOUT PROJECT 2TaLL

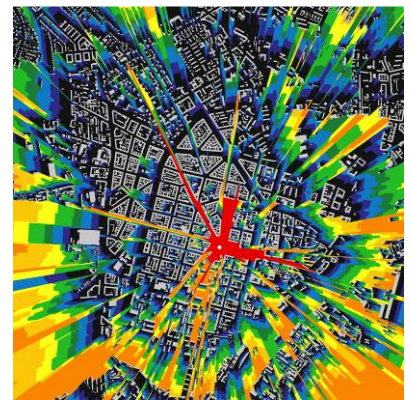
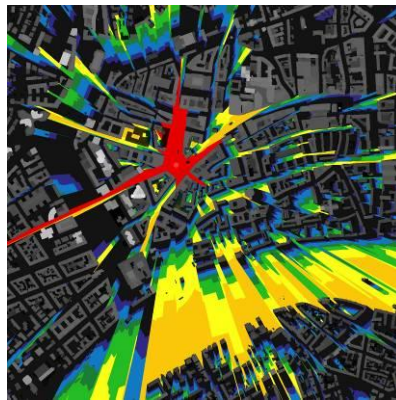
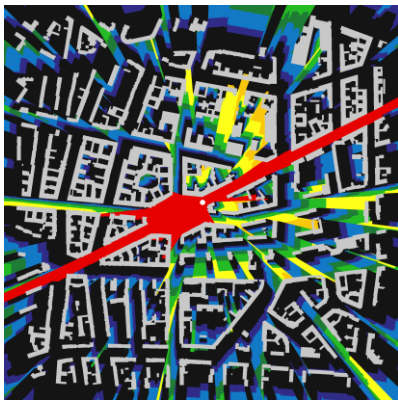
The 2TaLL project examines possibilities and limitations of using virtual models of cities (3D) to provide advanced urban analyses focused on impact simulations of tall buildings on landscapes of European cities. The planned height of buildings is subject of discussions, conflicts and controversies, especially for historically composed cities in Europe. This trend is growing worldwide. Most of tall buildings in Europe were built in this century. In many instances, negative consequences of an inappropriate location of a tall building result from inability to foresee its spatial impact. However, proper delimitation of all possible locations for visibility of tall buildings has key importance for urban planning. How is the impact of building changing with increasing height? How the landscape is affecting visibility of building in space? How is the impact changing dependently on urban composition and urban structure of city etc.? Important outcome of the presented subject is an interpretation of basic relationship between tall buildings and the city itself.

2TaLL project is interdisciplinary combination of geo-information and urban planning, contributes to the development of theory & applications in the two fields of engineering science. The project results are important for determining new areas in which virtual models of cities can be applied (geo-information science), as well as for broadening specialist analysis of urban space (urban science). The project aims at development of new methods of urban simulations using the most recent computer techniques, such as simulating impacts or tall buildings on complex spatial structure of cities, delimitating areas of protection of city panoramas and historically originated urban interiors and introducing multi-aspect systems of urban analyses (3D-UAS) to combine spheres of geo-information with urban planning. One of the main objectives of the project's dissemination is its presentation in the broadest forum of people interested in urban issues: both planners, designers and scientists.

Project is realized by three PhD scientists from West Pomeranian University of Technology in Szczecin, Poland: Klara Czyńska, Paweł Rubinowicz and Adam Zwoliński. They are experienced in leading scientific research and applications in planning. Some digital methods of analysis of cityscape have been applied in planning studies (under leadership of prof. Marzęcki) for 2 Polish cities: to define parameters of tall buildings in Szczecin (up to 10 planned investments, 2005-2007) and for protection of historical panorama in Lublin. The results of studies were successfully applied in the strategy of development or master plans.



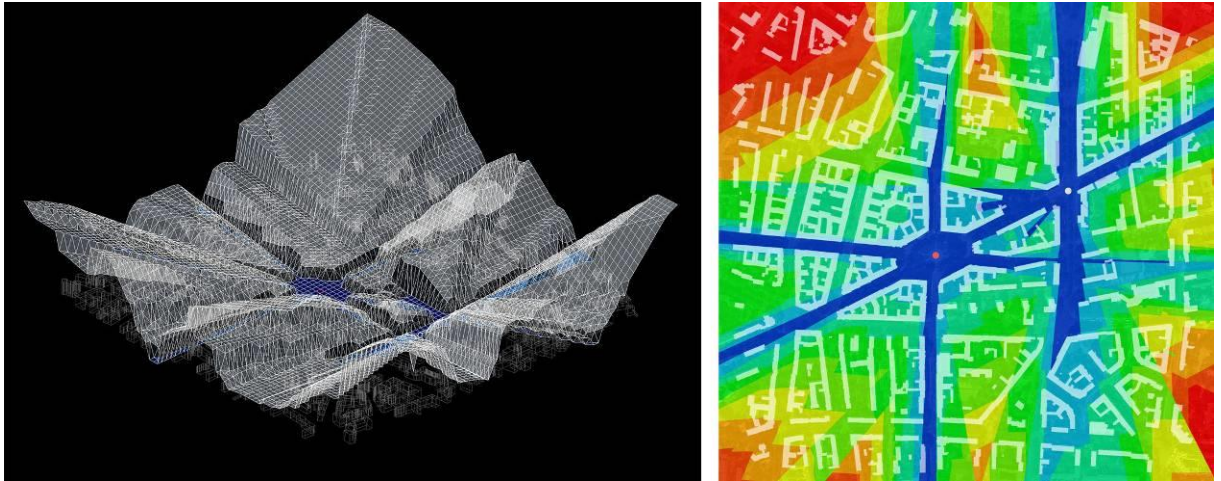
Among key results already achieved in the project is documentation of tall buildings development and its impact on cityscapes of 12 European cities: Vienna, Milan, Paris, Frankfurt, Köln, Brussels, Amsterdam, Munich, Nuremberg, Wrocław, Dresden, Warsaw – on a basis of fieldwork



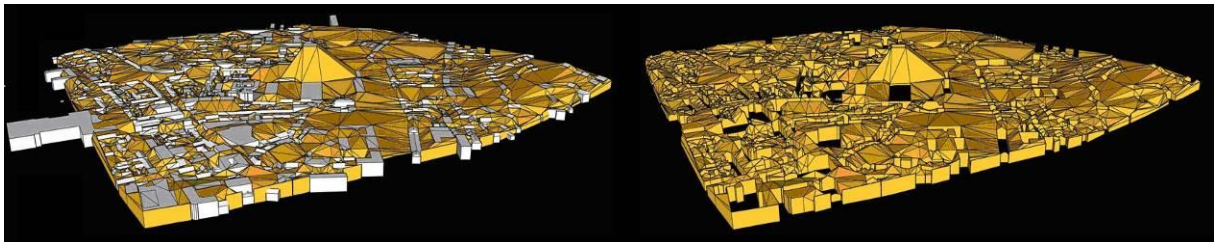
Examples of analyses of Visual Impact Size (VIS) for Berlin, Frankfurt and Szczecin (Poland). Analysis illustrates in color size of tall building visible in space. The simulations obtained with the use of 3D isovist and a program prepared by the authors



Simulations of Szczecin's (Poland) panoramas with height rulers placed in locations of planned tall buildings. The method helped determining numbers and limit heights above which specific buildings can be seen above skyline

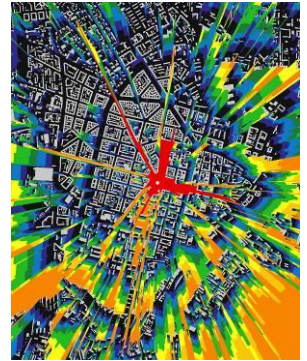


Visual Protection Surface (VPS) simulations for Berlin (for 2 viewing points). VPS method involves determining geometrical relations between the scope of protecting strategic views, and maximum heights of buildings in a city – presented on map (right) with height levels marked from 0.0 to 250.0m above ground level

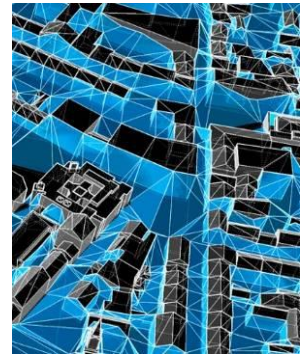


The method of 3D-Negative in virtual city model. The 3D-Negative is geometric representation of space between buildings. The method is introduced to analyse geometrical structure and typology of public spaces in cities

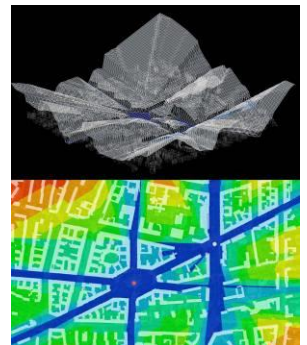
**APPLICATION OF 3D ISOVISTS
– VISUAL IMPACT SIZE METHOD**



**TALL BUILDINGS AND ADJACENT PUBLIC SPACES
– 3D NEGATIVES & SHADING ANALYSIS**



**PROTECTION OF CITY LANDSCAPE VALUES
– VISUAL PROTECTION SURFACE METHOD**





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