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City Experimental Lab

Abstract

The present contribution deals with the required scale of performances regarding an adequate simulation environment for recent and future challenges of urban development planning based on the concept „City Experimental Lab, CEL“. This paper issues concrete project experience covering the capital city of Upper Austria, Linz. Such CEL could and should act as an “expert system” in the preliminary stages of decision-finding, making available all particulars regarding decisions to the politicians, the planning administration, outside advisors and particularly to the citizens concerned in the suited present-day manner. It could be used for work sessions of planning- or design councils, expert hearings, for the continuous information of citizens on present planning work at the various degrees of concreteness and commitment, etc.. Thus those possibilities are to be enhanced which turn the present city configuration into a virtual experience by integrating visions, utopias and the future developments.

Resumen

Basándose en el concepto del „Laboratorio de espacios urbanos“ el siguiente artículo presenta las características necesarias de un entorno simulado adecuado a retos actuales y futuros en la planificación del desarrollo urbano. En este artículo se mencionan experiencias ya obtenidas en la capital Linz. Un „Laboratorio de espacios urbanos“ podría y debería ser un sistema sofisticado que ofrezca a los políticos, la administración, los asesores externos y ante todo a los ciudadanos, de una forma moderna y dinámica, las bases para facilitarles el proceso de toma de decisiones, y que además apoye de manera óptima cualquier proceso de decisión relacionado con el espacio urbano. Así y tomando en cuenta todas las visiones, utopías y posibles desarrollos futuros, se multiplicarían aquellas posibilidades que hacen de la visualización del espacio urbano todo un evento virtual.

A-Urban Development Planning

Spatial / regional / development planning deals with the configuration of the vital space being utilized by mankind focussing on the conception of a possible future also being worth-living. Issues of conveying of space-related problems and the comprehensible, clear representation of space-related planning ideas are closely connected therewith. The characteristics of space together with the traces of the past make fore the focal decision basis regarding queries concerning future preservation or change. A basic principle of system theory is that all phenomena are interlaced with each other in space, i.e. are related to each other. Space related system elements and system relations thus are to be considered in their entirety within their interaction structure. A multitude of interlaced space-related development- and renewal processes contributes to the steady changes of the habitat. Encouraging a mutual partner-dialogue throughout the citizenship renewal potentials can be activated and the democratic acceptance of planning ideas is bound to be improved. Development planning takes place at various **planning levels**, simplified at the level of supralocal spatial planning (regional planning) and the urban and local planning. Different scales and spatial degrees of detailing correspond to these differing levels of planning. As in all planning spaces the vivid dialogue and the interaction of planning levels, (region, entire city, urban space, space sectors and public space - squares and street space - at the interface to the architectural object) are of utmost importance with regard to profound further development. (figure 1)

The working field of local planning is the municipality, regardless of size and status, including their functional and spatial integration within the greater area. Therefore, local planning represents a comprehensive, interdisciplinary task. Furthermore, the consideration of inter-communal planning work and strategies plays an important part. Local planning thus increasingly acts as “communal development planning” with integrative and coordinating tasks. Urban development is communal development planning in urban areas. Development of our settlement space is increasingly developing within the intermunicipal, regional global space, this applying to the urban space in particular. City and region presuppose, influence one another, are mutually dependent. The region acts as reference space for the supralocal development planning. The settlement space of cities has become less and less comprehensible for its inhabitants and visitors. Even in those cities to be viewed from scenic sights from mountains or towers the settlement areas vanish within the town precinct and stretch into the region. Municipal bounds, however, make for distinct boundaries, form barriers and define areas of responsibility, ecological, economic, social and constructional-infrastructural interconnections often reach far beyond these limits. Approaching the **urban space** it becomes perceptible in three-dimension as experience space for its inhabitants, the animated and inanimate nature, for planning work and projects. (Figure 2).

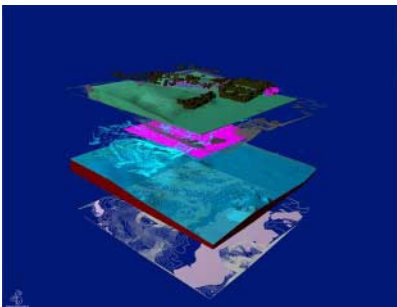


figure 1 - Planning levels



figure 2 - Urban area Linz, digital city model as working model incl. fictious large-scale project “culture bridge”



figure 3 - City and building-up volume – example 1

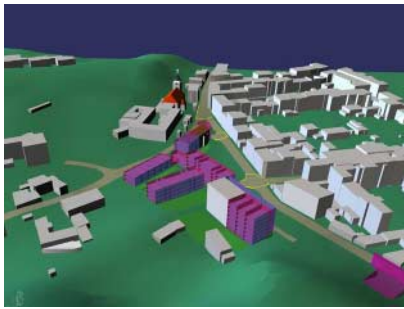


figure 4 - City and building-up volume – example 2



figure 5 - City and building-up volume – example 3



figure 6 - City and building-up volume – example 4



figure 7 - Visualization of large scale projects (fictious large-scale project "culture bridge", Design: F. Moser)



figure 8 - Deducing and visualizing of frame conditions of planning

Configuration of the urban space and its space sections is significantly influenced by the securing and further development of the “**city and building-up volume**”. In the long run the building-up volume acts as the defined three-dimensional scope of reference and action regarding constructional-spatial development, specifying the interaction between material three-dimensional elements and free areas throughout the settled area. The “interaction between material three-dimensional elements and free space” of the settled area defines the quality of the public space. The architectural object and its relation to the public space is the sensitive joint to be keenly observed with regard to configuration. (Figures 3, 4, 5, 6).

Regional planning calls for the tuning and interaction of flexible concepts (e.g. regional development concept, local development concept, spatial master image, configuration concept) at all planning levels - regional and municipal - with the pertaining legally binding planing instruments (e.g. regional development plan, zoning plan, building-up plan, displacement plan). Major planning issues of local / urban development planning comprise the production of a local (spatial) development concept and the urban development concept, to be linked with the conception of a “spatial master image” and furthermore, the drawing-up of a zoning / landuse plan. The conception of the “building-up and urban volume” is the focal action field of the municipal configuration planning, particularly concerning the building-up planning. Design / configuration concepts are to make for improved conveying and dynamics of the legal tools zoning- and building-up plan. The building-up / building regulation plan is to advance to an instrument for configuration of public spaces. Design / configuration models also contribute to conveying of contents of building-up plan and as evidence for their translation into reality. These space-related concepts and plans entail differing normative obligations. “**Spatial impact analyses**” are used throughout the entire planning process, thus making the spatial impacts of planning recordable. (figure 7), in the urban-spatial context, “space compatibility testing”.

Spatial impact analyses enable the necessary comparative representation of spatial impacts and effects of differing planning scenarios and variants, but also of concrete projects within the space. They are to be performed prior to space compatibility testing and space-related decision finding for the different planning levels and for differing space- and planning related degrees of definition (from the master image to the concrete project as such). The visual dimension is of major importance regarding their representation.

B-Simulation Environments

Suited “simulation environments” are required for the consideration of recent and future issues of regional planning to accompany space-related processes of analysis, synthesis and decision-finding. Support is to be available for efficient registration, aggregated representation and interlacing of major space-related stock data, for the development of frame conditions and objectives with spatial reference and, finally, in the representation and optimizing of planning variants and the conveying thereof. Due to the increasing complexity of the issues concerned “simulation environments” for regional planning are to be furnished in computer-assisted, digital form wherever possible. The “**digital city**” (in its broadest meaning) is used today in order to best-possibly devise and define the real city of tomorrow. “Digital Cities” are to be regarded both as “marketplaces” or “turntables” for information where communities (larger cities and smaller municipalities or municipal associations) furnish planning-, citizen- and/or user-relevant information (e.g. in form of municipal information systems). “Digital Cites”, however, can also act as “working models for the city of the future”.

Space-related model production and simulation thus represent the “building blocks” being planning-methodically indispensable throughout the complete planning process. **Space-related model production** is to be regarded a reliable and necessary reduction in terms of spatial complexity. Utilization of (spatial) models is a basic component considering ideas and actions of planning. Models act as reproductions of an original portraying their major and most essential characteristics thus facilitating spotting and solving of specific problems. **Space-related simulation** is to be considered as the anticipation (possible reproduction or reconstruction) of reality (spaces and processes). Simulations lend themselves to optimizing of planned “space”, planning- and space-related processes and are to be regarded as significant contribution regarding comprehension of “planning”.

Space-related simulation comprises various “**media**” and “**techniques**” acting as “media-technical scope of action” accounting for the relevant state of the art for reasons of efficiency. “Media” principally is to be defined as “means” or something to be “mediated”, such as planning relevant information on an object or an action (via text, sound, image, film/animation, etc). Furthermore, it may act as facility for the circulation of opinions, information, cultural work or education, or in the sense of “mass media” (e.g. film,

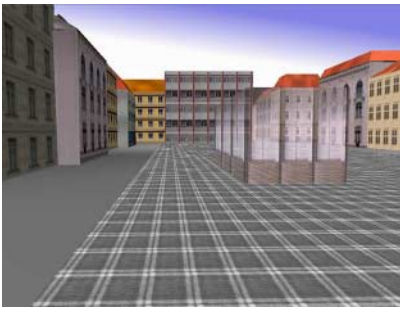


figure 9 - Conception of space-related ideas

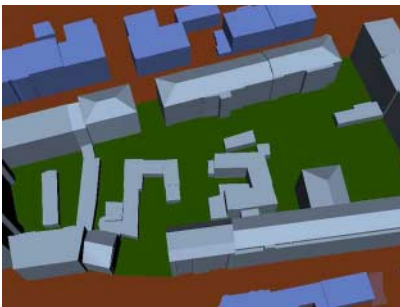


figure 10 - Conception of space-related ideas – stock

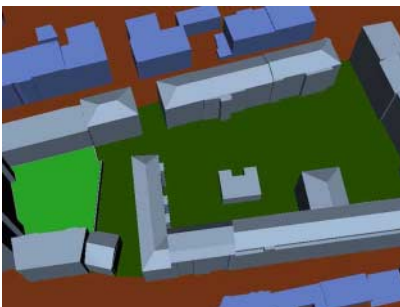


figure 11 - Conception of space-related ideas – optimizing planning variant

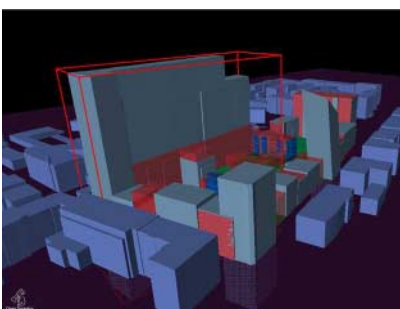


figure 12 - Optimizing process – „falsification“ of planning variant



figure 13 - Moving in space – digital drives in real time

broadcast, TV, press, internet). “Technique” refers to the means and manner for interlacing the available hard- and software options (in the broadest meaning) throughout the tension field of media and information purpose.

“Mediation” of planning ideas (in its broadest meaning) and acceptance of planning ideas has been constantly gaining in importance. Acceptance of planning ideas however is closely connected with their clearness and thus their comprehensibility. Methods and techniques of a simulation-aided, space-related planning are to be regarded as indispensable within this working context.

C-“City Experimental Lab”

A city experimental lab can and should represent an “expert system” in its broadest meaning acting prior to decision finding furnishing planning-relevant decision basics to the politicians, the planning authorities, extern consultants and, particularly to the engaged citizens in a modern and adequate form thus carefully accompanying the decision-finding processes of space-relevance.

The CEL should support various ways of „electronic sketching“ (from visualizing of planning findings based on handwritten, dimensioned “input graphics” to digitally integrated “sketching” of spatial ideas and concepts. An additional challenge for CEL’s is „spatial interaction with cyberworlds“. This comprises navigation in digital city models (free choice of viewing points by the user, “moving” in space, i.e. digital drives and digital camera rides, resp.) in real time; modification of the digital model (by moving, shifting, rotating, scaling, texturing etc. of digital objects). In this context new designing of user-interfaces by overcoming the “obstacle” monitor by real time interaction with digital models (e.g. by utilizing the VR-environment CAVE) is called for. Utilization of a city experimental lab can be offered individually or in team-oriented working sessions (e.g. in the framework of competition juries, design consultant sessions, etc. and in collective processes, local (in situ) or “remote” (by means of tele-cooperation).

A city experimental lab is to support the following planning phases and elements, e.g:

1. online-urban space monitoring, spatial analysis
2. conception, planning and draft of space-related ideas
3. space compatibility testing and spatial impact analysis
4. optimizing processes
5. mediation, decision finding and space-related quality management
6. political and management consultancy regarding construction-spatial issues
7. civic participation and public relations

The following three main fields of application should be integrated into the CEL:

“Spatial Information Systems” / “Civic Participation”:

Online „urban-space-monitoring“ of urban constructional indices (e.g. building-block-density, city energy indices), utilization information, relevant geoinformation etc; new configuration of the municipal information and communication management and the civic participation.

“(Remote) Teamwork” / (“Telecooperation”):

The growing complexity of problem situation in urban and regional planning as well as urban construction work is increasingly calling for the development of working structures making for a continuous cooperation, also throughout (larger) geographic distances. The possibilities of high-performance networks (e.g. via ATM – Asynchronous Transfer Mode) are to be put to full use.

“Space Databases”, „Planning Support Systems”, “Expert Systems”

Setting-up of multi-functionally useable space databases containing geoinformation for spatial analyses, 3D-data for the generation of 3D-city models; support of the entire planning process (spatial analysis, deducing of frame conditions of planning, designing and elaboration of variants, visualizing of planning and projects, spatial impact analysis and “spatial synthesis”.

The following pictures show selected subjects of the CEL-application field:

figure 8 - Deducing and visualizing of frame conditions of planning

figure 9 - Conception of space-related ideas

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Links

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figure 10 -Conception of space-related ideas – stock

figure 11 -Conception of space-related ideas – optimizing planning variant

figure 12 -Optimizing process – „falsification“ of planning variant

figure 13 -Moving in space – digital drives in real time

A city experimental lab is to stress those possibilities making for the virtual experience of the specific urban configuration by integrating the future developments (visions, utopias, alternative scenarios and variants).

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