Virtual representation of the historic space riches

The deepest source of understanding the contemporary nature of the city is genuine consciousness of its history

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Paper discusses use of modern techniques to gather, convert and present the historic facts concerning the shape of the city - for an example of Warsaw. Aim of the project is to analyze chances of cooperative use of historic data base and contemporary software in intention to create virtual model of the old urban structure.

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Introduction

Problem of town modeling is nowadays object of studies for many explorers. Their researches refer to digitalization of geodesic materials, creation of data base containing information of building and architectural forms, use of measurements and air – photographs to generate the model. Virtual pictures of cities may become a practical tool facilitating management of urban policy. They allow to estimate results of planned building investment already on the stage of project.

Authors’ area of interests does not directly concern problems recognized at the beginning. Issues of computer tooling workshop and technical aspects of model’s creation are found definitely peripheral. The essence of deliberation is to use the spatial visualization for requirements of urban analysis. For description of history of the city, its influence on present day and conditions for future activity.

Aim of the work

Understanding of urban scale transformations demands efficiency in interpretation large scale plans, spatial imagination and ability to embrace significant number of information from different fields of interest: engineering, sociology, economy, history, biology and many others. This is an assignment for explorers: architects, urban-planners, town-building historians. In order to facilitate use the effects of their activity by the wider circle of receivers, they have to introduce them in coherent, intelligible form. At the present time standards of geodesic measurement and its graphic representation, air – photographs, advanced techniques of computer expression efficiently uphold the creation procedures.

In historic context we do not find support in precisely appointed net of geographic coordinates. The more distant past – the less reliable source of information. Graphically incoherent, replete with inadequate information, often are prepared in specific convention resulting from applied techniques of representation (woodcut, copperplate).

The aim of the authors’ work is completion of key materials and their interpretation with intention to construct a model of Warsaw showing historic development of the city. First studies connected with this subject were conducted from halve of the 90s, in the course of preparation the doctorate of J. Slyk. Object of the undertaken
analysis were large town-planning foundations realized in period 1700 – 2000. Exercised archival plans were placed in layers with use of the computer techniques embracing indispensable corrections and calibrations. Iconography and numerical data were used in initial works on construction of the three-dimensional model.

At the present time authors acceded to systematize the creation of visualization of the Warsaw historic space. Subject matter was divided in three groups of problems. In each of them the materials are gathered and progressively involved in construction of models.

**Development of urban organism**

Most general scale of considerations refers to changes of public space forms – squares along with streets and buildings cataloged in chronological order. To these changes belong both processes of active creation (formation of town-planning foundations) and „passive” transformations (building of traced quarters and plots, modernization, building extension, technical improvements of infrastructure). Second type of transformations is not often precisely evidenced. At last there are in history of the cities works of destruction (fires, war damage).

Observation of entirety of development process has to lean on analysis of accessible plans. By putting them in layers and comparisons we obtain information about two-dimensional form of the city. We complement them with cadastre data, originating from historic rates and with analysis of available iconography – this is how the third dimension of space is formed.

Form of display in this area of studies lies in creation of straight block representation for entire city in chronological sequence – every 50 years. Model considers relations of existing and new-created building structure, net of the streets and graphic distinction of erected elements basing on sources of different reliability.

**Town-planning foundations**

Large group of residences, breaking ups driven systematically in limits of one investor’s grounds, park and garden foundations, ideas of new transportation and view connections – these are the examples of town-planning activities of significant scale. They create sometimes the most valuable fragments of urban structure. They are easy to define in time and space. Source basis – project, descriptions of investor’s intentions and often legal documents – allow to possess knowledge about planned form of activities. They also give a base for estimation of completeness, sources of creators’ inspiration, financing, techniques of realization etc.

In history of Warsaw basic processes of this type were selected. Part of them found already detailed description (in Jan S?yk’s doctorate dissertation). Other become analyzed in light of similar criterions.

Regarding town-planning foundations composition, form of presentation embraces confrontation of two models. First describes state of area before undertaking the development activities. Second – consequence of accomplished works. In case of introducing essential changes to project during realization, an additional – idealized model is built: the perfect representation of the project.

First of models can be a fragment of described above (in previous passage) model of Warsaw „in historic profile”. Second – receives more detailed form. It contains simplified information about architecture of most important objects, rules of composition (axes, building lines, etc.).

**Scenery of the city**

Development of urban form of the city is not only tracing of new streets and building over the plots. For proper estimations of perception of different places and regions, shape of the space, crucial sections, view displays it is necessary to take into
account influence of various factors: topographical, natural, whether at last decorations of public space interiors („street furniture”, tiles, greenery, facades coloring, saturation and forms of traffic).

Indicated subject matter is comparatively difficult to control in aspect of needs of computer model. Topographical changes (displacements of Warsaw Escarpment and its ravines, dislocations of Vistula river-bed etc.) find in former plans symbolical representation. They demand interpretation basing on additional data and information. Iconography is far from faithfulness, especially in the landscape aspect – it often submits to stylization, embellishing etc. Even more difficult appears obtainment of precise information about decoration of streets and squares.

There was obligatory in model imaging of urban scenery to use the rule of reductions and avoidances of doubtful source premises. Authors concentrated on problems most essential in urban scale – direction of bank lines of Vistula River and other water-courses, location and form of Warsaw Escarpment, main rules of greenery arrangement in space of the streets and park grounds (private and public).

Tools

Process of studying the source materials begins in area of software for bitmapped graphic (mainly Adobe Photoshop). After scanning plans demand work at elimination of dust, flaws, disfigurements, sometimes also mechanical damages of original material. Their effect is readable, contrasting graphic calibrated to suitable proportion and size. During the correction of disfigurements the present (or from interwar – period) geodesic plan is used as a material of reference.

Driven attempts of transferring the plans from XVII and XVIII centuries to vector form did not give satisfying results. Their „off-handed”, stylized graphic contains precious not lineal information, useful in following stages of work.

Model of historic Warsaw, in editor’s layer is created basing on ArchiCAD software pack. Works driven for period to about 1900 do not subject to easy automation on account on deficiency of appropriate source materials (air – photographs, measurements: precise and coherent in form).

Each object situated on the plan demands identification on former pictures or in registers. On this base height and block form are attributed to them. Authors are trying to confirm the information in two independent sources.

Shape of the terrain is created with tools of ArchiCAD basing on present topography data (precise height – records) with bringing changes resulting from analysis of historic plans.

Location of building objects on prepared in this manner base facilitate well-known tools of the software pack (gravitation etc.).

Further works connected with presentation go on with use of many different tools. Depending on actual needs we obtain: floor views, sections, elevations, panoramas – directly from model; perspective views, sun – studies, animations created in ArtLantis and 3DStudio MAX software; VR scenes generated by ArchiCAD and many others.

Limitations, perspectives for further activities

Talked over problems are in present moment object of authors own investigative activities. Because foundations of undertaken work was endeavor to obtain coherent outlook – bases for further studies – authors had to embrace wide topical and chronological range. They use experiences connected with town-building studies, urban-planning practice and practical use of CAD tools.

After attainment to prepare XIX and XX century models we intend to work over use of automation modeling processes on the ground of existing geodesic maps and air – photographs. In these activities we will take into account GIS standard and settle model in the net of coordinates.
Substance context, co-ordination

Essential context for construction of historic Warsaw computer models is established by activity of town-building historians (T. Zarebska, W. Ostrowski, T. Tolwinski, O. Sosnowski) and Warsaw-researchers describing development of the city in a very traditional form. In the background on the other hand are programs of city modeling – driven in many centers, for several needs and basing on diverse methodological origins.

We locate our work in area of town-planning studies. Spatial analysis is the priority of research. Construction of the model has to serve preparation of comparative studies, describing structure of the city and its historic transformations. In this context appears understandable use the results of studies of Warsaw’s history explorers. Consciousness of state of knowledge in this range implies honest estimation of source materials and interpretative correctness.

Indirectly we use experiences in creation of models for present cities. In following parts of work (XIX and XX centuries) we will try to tie the historic model with existing elaborations and geodesic groundwork.

We derive inspiration from realization of different projects: scientific, or commercial (Troia, Lohia, Tampere, Jerusalem, Glasgow, Graz and others).

We expect to perform cooperation in frames of creation the bases of knowledge built on three-dimensional models. There are researches of this type carried out on our faculty. We consider, that models of historic town-planning system – and source materials gathered in course of preparing them can become one of the fields of such a base.

Great importance we attach to form of presentation. We count, that synthetic comprehensible transmission will help to stimulate interest in studies of the city history. We attend also, that it can determine good tool for analysis preceding urban and architectural scale design.

Résumé

Condition of understanding the present shape of the city is consciousness of its past. Observing the urban transformations of the towns shown as objects settled in certain topographical, economical and historical conditions demands assembling and use of extremely diverse materials. Finding an universal method for moderate presentation of effects of such researches is a challenge for contemporary explorer. Modern media open new choice of possibilities in this range. Creation of the three-dimensional model of XVIII century Warsaw becomes an inauguration of virtual trip, which limits and scale will be systematically extended.

References

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