

# INTERACTIVE „SKETCHING“ OF THE URBAN-ARCHITECTURAL SPATIAL DRAFT

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## Abstract

*The recent innovative information technologies and the new possibilities of multimedia exploitation in the realm of architectural design and education support the development of image communication methods on the basis of interactivity. The presented method of perceptual iconic simulation is based on the principle of an analogue-digital model cinemascope simulation of the urban space in laboratory conditions in real time and real model environment in a natural horizon. In architectural teaching and in urban spatial structures design it enables a continual semantic evaluation of the graphic output and its further multimedia processing.*

## 1. Introduction

Representation by visualization is one of the basic tools of information communication in urban and architectural activities. The standard forms were and still remain e.g. 2D presentations of ground plans, sections, elevations. The spatial studies are interpreted on the plane by means of axonometric, isometric and perspective images. The experience teaches us to perceive this information, as if it was spatial. The perception of the architectural and urban spatial manifestations through vision has been improved by optical systems of movie, photography, stereo photography, holography, video and subsequently the analogous graphic systems of IT.

However, in the realm of spatial structures formation we have at our disposal a further medium – model representation, 3D physically – analogue and virtual – digital modelling. Spatial or space-creative composing is in every respect imaginative and significantly contributes to quality in the harmonic complexity of the creative message of the architect. We consider manual spatial modelling, the interactive "sketching" in design as the most effective tool from several aspects. In the following part of my contribution I will therefore present our experiences with this phenomenon in the educational realm and introduce several examples.



Figure 1: The working model representing the current situation already in the phase of analyses is a good tool

## 2. Decomposing the creative process

Urban-architectural design as a principal topic of architectural studies follows in the sense of demands on solution of the given task these three phases: I. phase analyses – preparatory tasks are performed, research and analyses; II. conceptual phase – in which alternative design solutions for the fulfilment of the hypothetic intention are elaborated with subsequent verification and evaluation; III. phase – completion of the final solution, elaboration of the project documentation and media presentations. The single phases are ordered in the following chart:

<b>1</b>	<b>Setting</b> Task, objectives, conditions	Task - qualitative and quantitative determination, summarisation of demands, conditions and incoming topics
<b>2</b>	<b>Specification of resources</b> Analyses	Details, research and analyses, appreciation of design decisions, working model basis elaboration
<b>3</b>	<b>Idea and conception</b> Invention	Searching of hypothetic resources and conceptual matters, acceptance of hypothetic intention
<b>4</b>	<b>Synthesis of matters</b> Synthesis – alternative applications ↓	First concept, finding of alternative solutions, representing (sketches, A or D graphic represents, 3D models)
<b>5</b>	<b>Verification</b> Critical search and appreciation	Visual searching and examination on model represented spatial manifestations of the alternative solutions
<b>6</b>	<b>Simulation</b> Spatial imagination, anticipation of the experience	Medial visualization, static and dynamic spatial representation, urban environment modelling
<b>7</b>	<b>Evaluation</b> Authors design comparison	Appreciation, comparison and selection of the optimal alternative in terms of quality and complexity of design
<b>8</b>	↑	(In case of correction necessity in phase 5 – 6 – 7 the better alternatives are modelled returning to phase 4)
<b>9</b>	<b>Implementation</b> Design elaboration	Selected solution (alternative) finishing corrected by expected aim solution
<b>10</b>	<b>Presentation</b> Outputs representation	Medial elaborating of representative outputs of task solution according to separate scenario



Figure 2: Finding of alternative solutions – composing the single components of the operational and architectural structure

From the didactic aspect mainly those phases are relevant, in which it is possible - in an imaginative manner - to support the research and decision-making process with the aim to test, compare and continuously evaluate the fulfilment of the hypothetic intents of the initial task ideas.

### 3. Application of the spatial modeling method

In our conditions, the creative process of searching and subsequent decision-making in the studio is supported by the spatial modelling method. This means, that the draft is sketched in modelling material into the working model. A good tool for finding initial points and ideas is the working model representing the current situation already in the phase of analyses (Figure 1). It significantly supports the process of creative thinking mainly from the aspect of respect to the spatial continuity and in looking for topics of architectural composition for balanced spatial manifestation of the relevant components of the urban structure.

The elaboration of the concept and of the development of draft alternative solutions continues on the working model in the studio using conventional sketching or CAD design methods. The model serves as a tool for composing the single components of the operational and architectural structure (Figure 2-3) according to the rules and the progressive principles of functional, operational and architectural spatial urban structure design. The model becomes an interactive medium of cooperation between the teacher and the working group of the students. It generates a creative atmosphere for generative thinking and design. The applied abstraction of architectural elements offers resources for a quick re-composition, what in all contexts actively supports the alternative solutions design (Figure 4).

### 4. Conceptual decision-making and verification, composing alternatives

From the point of view of crystallization of the design, the dominant phases are: verification, simulation and evaluation. It is in these phases that a confrontation of the sensory content of the spatial characteristics of the physical structure occurs, and the visual experience of the anticipated environment as seen by the authors and future user eyes is simulated. The alternation of the compositional spatial configurations is reviewed usually by a static visual verification in the endoscopic horizon using the architectural spatial studies mode. The actual statement value here

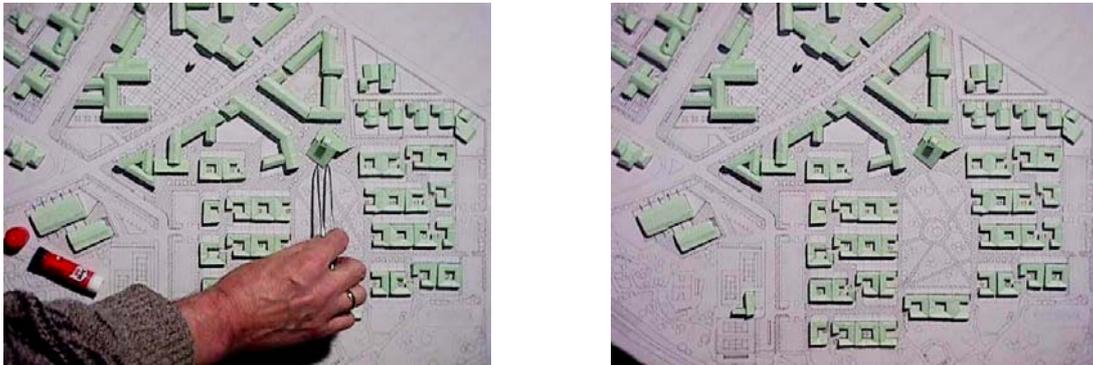


Figure 3: Finding of alternative solutions – functional, operational and architectural spatial urban structure completion

depends on the scale of the studied model presentation. Decisions concerning composition are connected to evaluation in the context of the "symmetrically" oriented system of image sequences, when the scene itself is standing still, e.g. street, square, dominating figures (Figure 5). The orientation and sequences are selected according to the type of urban structure and the character of the internal environment, e.g. directed, lateral sequence or a panoramic view (Figure 6).

The spatial manifestations of the components, their ordering and relations towards the internal environment dimensions are being verified during the motion in temporal sequences - we simulate the spatial experience in a reduced structure on the working model.

A cinematoscopic sequence reviewing of the sequence evokes the experience of a spatial motion effect even if the monitor projection display is 2D. This happens due to our experiences from the perception dynamics in real space. In a similar manner we are able – on the basis of experiences - to perceive a spatial character of a static perspective presentation.

## 5. Visual simulation and evaluation

Verification and appreciation in the simulation and evaluation stage are transferred more to the psychological level. The simulation of perceiving a new spatial reality transmits to the user a feeling of identification and it leads subjective attitudes towards quality and complexity of the formed environment. The simulation is performed in motion mainly in order to achieve an anticipation of the dynamic continuity of subjective spatial imagination. The established atmosphere directs the evaluation attitudes of the authors in the process of comparison and selection of the successful alternatives.

The methodology of simulation adheres to several principles relevant in laboratory conditions of preliminary visual appreciation and evaluation of spatial design ideas „sketched" on the model. The recording unit of the simulator imitates rotation and other types of spatial motion (it simulates speed according to the model scale), it combines motion with standstills along the route, dynamic examining in expected sequences or it combines lateral views with vertical sequences of the recording block for completing the spatial characteristic features of the components (spatial latticed complexes, dominating figures and similar).



*Figure 4: Finding of alternative solutions – abstraction of the architectural elements offers resources for a quick re-composition by the alternative solutions designing*

Through the choice of viewing points or by view routing we apply the principles of descriptive representation – the central perspective. We make use of the effects of perspective as a means for component organization and optical deepening of the picture (first, second and the third plan). All aspects of image transformation are scheduled in advance in the working scenario. Decisions about the way of perceiving the environment are also taken here: panoramic or cinemascopic. Particular problems are binocular presentations via binocular stereograms, which are the only ones capable of saving the true spatial experience of a chosen view.

Endoscopic simulation offers an ideal interactive and very sensitive environment for the process of searching and discovering new motifs *"in situ"*, for composing location and in the broader context also for complex spatial composing. Archived parts of the simulation procedure can be useful later in the final design presentation.

## 6. Implementation and elaboration, design presentation

The incorporation of the verified motifs into the final design solution represents the ultimate phase of the creative progress. The architectural structure is completed on the working model in scales 1:1000, 500, 400 alternatively 200. In case of the classical "manual" design procedure we record the "model sketches" quickly and precisely on a sheet of paper by copying them in 1:1 on photocopying machine (Xerox) with a minimal contrast. If the solution has been gained by composing directly on the model, a spatial sketch can well be put on paper. On its basis it is then easy to prepare the graphic documentation in the analogue or digital mode (CAD). The documents obtained from laboratory conditions, i.e. from the simulation and evaluation processes or the computer generated 3D visual simulations, which are elaborated in the post-production phase, become a valid enrichment of the presentation. The offered solution (submitted design) is, however most illustratively documented by the precisely elaborated presentation model.

## 7. Conclusions

From the presented experiences it is possible to summarize, that spatial modelling as a tool of urban-architectural design has, according to contemporary possibilities of display media of IT several some significant advantages:

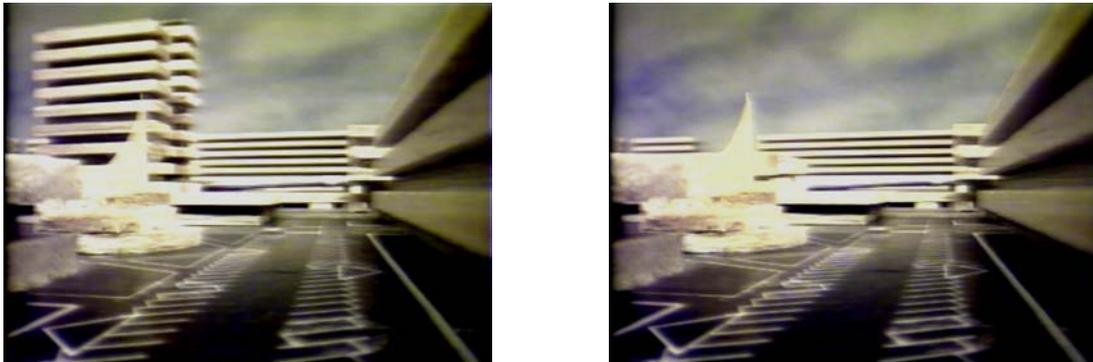


Figure 5: Critical search and appreciation – alternation of the spatial configuration of the square components

- it has become a creative interactive medium for high quality aesthetic-compositional analyses and of verification of alternatives,
- it increases spatial imagination and has a didactic significance in the repeated search and decision making in the individual design phases,
- it creates a convenient environment for teamwork in the creative design process and for generation of new ideas with possibilities of immediate corrections,
- physically it represent the real substance of the creative, communication and simulation process (physical model presence),
- it enables continuous recording, experimental verification and evaluation of the created draft, anticipating the scenarios for the users in real time and space,
- it enables synchronous processing of media outputs, their presentation and archiving.

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*Figure 6: Critical search and appreciation – visual examination of the components configuration on a panoramic opened spherical view*