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INFLUENCE OF UP-TO-DATE TECHNOLOGIES AND DYNAMIC CHANGES IN MODELLING SPATIAL DEVELOPMENT IN SLOVENIA

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Abstract

The paper deals with expected changes in spatial planning as a result of changes of national development concepts and on the influence of GIS technology to databases modelling in surveying and planning.
Keywords: *databases, GIS, Postojna, Slovenia, spatial planning, surveying, XII. Sedlar's meeting, 1992*

INTRODUCTION

Due to the independence of Slovenia and other not directly related and simultaneous processes the spatial policy of a new state is also in the process of changes. Market orientation and free enterprise open new demands and possibilities in modelling development strategies. In future system planning will have to rely on minimal standardization, with more intensive results elaboration, guidance, checking and monitoring. Spatial plans (national, regional, local) should be designed on a long range with a short term annual guidance of development and along with simultaneous conformation to new changes. Also the expected reorganization of local self-government will effect the new competence rearrangement in communes, regions and on the state level.

SETTING UP GISs

Mastering planning process procedures demands systematic collection, maintenance, processing and distribution of spatial e. g. geographically oriented and currently maintained basic data. Techniques and methods of work must be precise, rational and exact. New technologies, especially on the field of computer science, have sped up the development of systems, which support more objective decision-making, managing and planning. The interest for GISs (Geographical Information Systems) is noted for some time and in some countries these systems are beeing introduced as standards or standard technologies.

Chronologically 3 phases in GISs development can be monitored:

- pioneer introduction of GISs and pilot projects from the first beginnings of geoprocessing in 1960s (and more intensive around 1970-1985);
- elaboration of numerous applications for land cadastre, topography, natural and cultural heritage protection, environmental protection, town-planning and regional planning, management and other applications (around 1985-1990);
- general application on research and operational level (around 1990-2000).

Definitions on GISs have been given by many authors (Arnoff, Carter, Dueker, Smith, Borrough and others). According to a simplified explanation they can be understood as tools, enabling collection and processing of great quantities of geographic e. g. spatial data from various data sources with the intention to elaborate and display adequate analyses and modellings. Less capable are CAD (Computer Aided-Design) systems, which enable only automatic mapping, which has in the past increased productivity in elaboration and maintenance of cartographic material. Current GISs include a corporate database, based on the connection of topologically organized graphic and relational attributive database. To function they need 4 basic components: hardware, software, data and adequately trained staff. According to specific applications GISs are divided to cadastral, land, ownership, planning and pedological information systems and information systems for natural resources management, market analyses, decision-support, and others. The expansion of GISs and their numerous practical applications have been lately encouraging round the world and also in Slovenia the readiness and need to seek possibilities for greater mutual connection of branch carriers.

GIS already supports many procedures like data management, complex graphic algorithms, elementary spatial operations of covering up and various analyses. The development and future of GISs is directed towards expert oriented systems supported by artificial intelligence and towards integrated GISs, while due to simplicity and functionality the practical applications will be users oriented.GIS already supports many procedures like data management, complex graphic algorithms, elementary spatial operations of covering up and various analyses. The development and future of GISs is directed towards expert oriented systems supported by artificial intelligence and towards integrated GISs, while due to simplicity and functionality the practical applications will be users oriented.

Traditional spatial planning requires e.g. has required in the past quantitative alphanumeric and cartographic data. Nowadays the need is for more and more qualitative data and models, based on geographic data processing with implicit geometric and spatial characteristics. Due to GISs capabilities these concepts and technology will have to be included into spatial planning to improve above all the quality of prepared plans. Changes in spatial planning will be seen in the form of input data, possibilities of elaboration of various qualitative analyses and elaboration of scenario development and the output data, where various possibilities of results presentations will be available. General advantages of using GIS system in planning are: time savings at production and maintenance of cartographic basis, less costly maintenance, faster and more objective decision-making, greater reliability of data and higher processing standard, faster access to data and information, and other

advantages. Huge expenses in setting up a GIS system is the setting up of adequate databases and standardization of these with later reduction of maintenance costs. At present we lack knowledge and tools to process prepared data and make use of their versatility. According to available data 70-90 % of expenses go to GIS setting up and running spatial databases, which turns out to be a great obligation in cost and time.

NATIONAL TOPOGRAPHIC DATABASE SETTING UP

Within the frame of endeavors of the Ministry of Environment Protection and Regional Planning e. g. Republican Mapping and Surveying Administration, and in a promotional way last year some projects of methodological and technological basics started to be prepared in order to set up digital topographic and other surveying databases, which will be continued with some development projects into this year. Designers and planners will find interesting all new schemed databases ranging from land cadastre, building cadastre and territorial divisions – of ROTE till topography. In this year we can expect finally formed and verified global contents and organizational model of a system of surveying databases and their subsystems, which – due to their nature of basic data about space – are bound to be a basis for setting up information systems in other fields. In setting up multipurpose databases usually principles, regarding adjustment of criteria of output products, defining spatial data categories, scheme of demanded level of accuracy and evaluation of data sources and their quality, are taken into consideration. National topographic database, managed by the surveying service, will consist of basic topographic elements and their minimal attributes. Individual levels still remain to be defined in this topographic database. These levels will be in accordance with the already mentioned divisions of some activities on the following levels: state, regional and local community level and with this accuracy thresholds e. g. 1:250 000, 1:25-50 000 and 1:5 000 (10 000) scales. The system will have to provide the least possible topological level of data structures with the greatest adaptability for users.

The development phases of setting up basic topographic databases already include subsystems for digital relief basics with a reference system, digital database of buildings, hydrography and infrastructure objects and devices. In 1992 new vegetation projects will be schemed – land use and geographical names – toponyms and a separate project of territorial divisions. The selection of elements, which will be included into a unique database, depends on the agreed compromise among professionally argument based suggestions and financial possibilities of the budget. This will result in a solution between an ideally schemed subbases and possibilities of a practical realization of the setting up and later managing. Project solutions of digital databases elaborated, amended and adequately verified e. g. standardized, a beginning of an operational setting up according to priorities and mutual agreement can be regarded as acceptable. Presumably the most sensible thing to do would be to start with examined accuracy and to prepare surveying databases to be used on state level. These set up, they will be available to users of space as a starting point for the realization of their information needs.

At present it is not possible to create an unique database for planning from available data. The developed countries have not yet solved the problem of automated generalization of data elements at a transition to an optional accuracy

(scale). So presumably the planning procedures will come out of three data models for great (1:5 000, 1:10 000), medium (1:25 000, 1:50 000) and small (1:250 000 and smaller) scales, matching the expected levels of planning. The planners' data will have to be adequately reshaped and restructured to achieve qualitative application in proposed schemes of data models.

Along with assuring mutual connectivity of surveying and other systems in Slovenia also connections with the rest of the Europe will have to be assured, e.g. via CERCO (Commité Européen des Responsables de la Cartographie Officielle) and MEGRIN (Multi-purpose European Ground-Related Information Network) for the field of geographic information, CORIN (Coordinated Information on the European Environment) for environment, and others. The obligation of cooperation and coordination belongs to carrier data institutions.

CONCLUSION

Planners as one of the greatest user group of spatial databases need qualitative and accurate data to be able to direct spatial development and to be even more on equal footing as regards beeing included into processes of shaping ownership, natural, ecological, and also socially defined values. Dynamic processes in Slovene territory and introduction and application of GIS technology with elements of spatial management in planners' procedures will put forward a demand for a qualitative change in data selection, preparation, processing and application for creating and decisions monitoring on all levels of spatial documents preparation. Prior to the latter surveying data will have to adapt too, because they offer frame for new options.

An important issue is to gain new knowledge, experience, tools and of course financial means to realize coordinated projects as well in surveying as in planning with the aim to support the elaboration of an encouraging strategy of spatial development of the Slovene state.

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