

Some questions of realization municipal geoinformation systems at a level of area of administrative district of Moscow

A.E.Altynov

Ph. D., Senior lecturer, Faculty of the Cadastre and bases of the land act

N.J.Bydantseva

Assistant, Faculty of the Cadastre and bases of the land act,
Moscow state university of Geodesy and Cartography, Russia.

In this message will be covered the basic questions connected to development of municipal geoinformation system (MGIS), as the tool of information support to a managing part upravy one of the Moscow areas. Starting designing and realization of any information system it is impossible to step over a stage inspections of a subject domain in which the system will work, maximum to reveal the basic business-problems that in necessary volume to develop requirements to GIS which will be work in MGIS environment as one of many its component. As MIS to an essence is information model of the city environment, MGIS represents itself as the multifaceted information integrator of territory uniting the data property, ground, transport, engineering, housing and other sources. First of all MGIS it is characterized by spatial vision of the processes developed in city territory. In these processes a plenty concerning independent objects which need to be classified participates very much, "having placed" their models in "well arranged" classification system. It is typical of city agglomeration (GA) not only a plenty of copies of objects, but also their classes. This factor connected not with size of territory, and with rather plenty of types concerning the independent objects quite precisely allocated in GA, also leads us to understanding of that MGIS is an especial geoinformation system, requirements to which appear are inconsistent enough.

The traditional GIS-TECHNOLOGIES well modeling subject domains, connected to representation of a natural environment where a situation with plurality of types of objects where as more simple, than in city, force to assert, that MGIS - the system demanding and realization of considerably more serious methodological base. In the majority products used in this area GIS to the user it is enabled to work only with the single-level list of layers (types) of objects. The number of types of objects in projected MGIS so is great also they are dispersed on such plenty of subject domains (having also the rather independent classification systems), that the single-level list of layers is inadmissible restriction on work with a digital card of area. Realization of multilevel layers is required. If to consider also the requirement of modeling of city environment we in the natural way come to necessity of use of object-oriented approach (OOP) to description GS, and also MGIS as modeling representation of city. We shall consider integrated architecture MIS. We shall present a fantastic situation in Swift's spirit when the city is examined "from above" with giants (approximately how we an examined-ant hill). We shall assume, that each of giants is rather narrow expert in the subject domain (for example, on land management, power and ecology). In consciousness of each such giant-expert the city environment as the object of research, is reflected as a complex of numerous models GS (such experts it is possible to consider and it is simple as images of subject areas - About). Models of objects of the city environment are

organized in the classification systems generally arranged individually for each subject domain. Experts can cooperate among themselves, deciding as a result of dialogue adjacent (boundary) problems. It is possible, if their classification systems have certain the general the bases.

In figure 1 the city environment and the investigating experts of the subject domains represented as rectangular with rounded corners ("observing) her is schematically shown. Each expert considers GS from the positions and alongside with interdisciplinary uses the classifications of objects GS and the models with which help it analyzes and predicts behavior of these objects. All complex of the cooperating subject domains submitted in GS, together with models of components GS form integrated model of the city environment. Distracting now from fantastic analogy, we shall assert, that MIS serves for complex representation of all significant subject domains as the interconnected automated information complexes and it is created for the purposes of efficient control by objects GS and city as a whole. Development of such system - a grandiose problem also it not clear yet when even one even in part realized MIS will appear in our cities. But to consider this problem from the general conceptual positions it is necessary already today, - that the developed automated complexes "were well stacked" in the design vacancies allocated for them In figure 2 internal "device" of a subject domain within the framework of which it is formed characteristic objects GS is shown. A basis of internal structure Software is it is system-focused classification. She is necessary for us in the long term, instead of more limited object-oriented. However, for today it is possible to use structurally only object-oriented.

Classification in concrete Software is knowledge definitely ordered. To tell the truth, the author would like to understand as classification here something the greater, than it is accepted, probably, many experts in the field of municipal geoinformatics. We understand as classification not only the multilevel system of classes based on a principle of inheritance of properties, but also such system of classes where according to principles of the object-oriented approach semantic attributes of a class are added procedural (analytical, imitating) the models of objects concerning to the given class, and also models of their representation in some modeling environment (spatial, structurally functional - Council of Federation, etc.) . Moreover, in the object-oriented concept of construction of classification systems some concrete class of objects can simultaneously concern to various classification systems as it is shown on fig. 3. If object, we "distinguish" experts different About aspektyh models of representation of objects even one class can be much, - including within the framework of separate Software, let alone several subject domains. Taking into account, that in GS interconnected Software many tens, and even hundreds, it is easy to present however the integrated model GS being system of cooperating objects of various classes will be complex. Therefore, nevertheless to receive an opportunity to create large MIS in this life, the serious methodology is required, otherwise developers "will sink" in the sea of unorganized decisions.

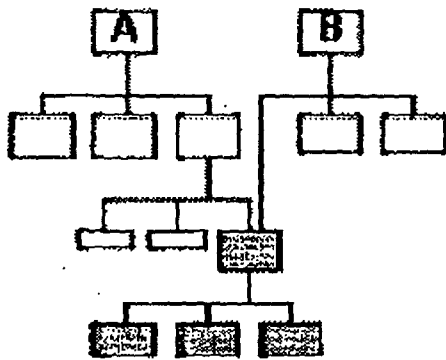


Fig. 1

Classification systems which should be supported modern GIS, are simply obliged to be multilevel. It is important, that it is multileve, instead of hierarchy. Hierarchy - more limited design, than multilevel. In hierarchical classification the class can be included only in one up class, instead of in some. In such image, GIS, supporting even hierarchical classifications (not speaking already about the single-level list of layers), a priori sets rigid restriction on representation diverse GS is inadmissible. The classification system together with models of objects from one party in the determining image influences system of recognition of objects of an environment, which experts "allocate" from this environment as significant (essential) to the activity (we always see that we know...) . And on the other hand objects, distinguish with the help of classification system, coordinate in some topological schemes painted as objects, for example, spatial (a topological electronic card) or structurally functional: basic schemes of power supply, a city water-pressure head network, thermal networks, etc. The Last - too the topological designs only determined in metric space. All this is supplemented with statistical and imitating models, with use of ideology of cellular automatic devices as without such ideology which are not demanding the decision of systems of the equations of excessively big order, it is difficult to speak about high-grade modeling life cycle of objects bulky GS both by way of their life cycle, and in the plan evolutionary.

Thus, high-grade MGIS, from my point of view, is such GIS which is built - in as a component architecture MIS and covering as methodological components enough wide number of fields of activity of the person many subject domains of the city environment which conceptual architecture is schematically shown on fig. 2. Certainly, still is, about what to talk in a heading " Municipal GIS ", - for example, about uniform system of addressing of objects of the city environment without what also it is impossible to construct in the city of MGIS.