Construction of the Generalized Model of Spatial Data for Activity of the Government Bodies and the Large Enterprises of Republic Bashkortostan

R.N. Bahtizin
Department of Mathematics
Ufa State Petroleum Technical University
Ufa, Russia
e-mail: ramil_bahtizin@mail.ru

S.V. Pavlov
Department of Computer Science and Robotics
Ufa State Aviation Technical University
Ufa, Russia
e-mail: psvgis@mail.ru

G.M. Saifutdinova
Department of Computer Science and Robotics
Ufa State Aviation Technical University
Ufa, Russia
e-mail: saif_gm@mail.ru

Abstract[1]

The article is devoted to construction of the generalized model of spatial data for activity of the government bodies and the large enterprises of Republic Bashkortostan.

1. Urgency of Research

One of most dynamically developing innovative technologies as all over the world, and Russia, are the geoinformation technologies intended for computer processing of spatial (geographical) data in all fields of activity. The geoinformation system (GIS) - reflects the real world by means of integrated in uniform system and the abstraction presented by a digital kind: cards and globes, sets of geodata, visual schemes of working processes, metadata and models of data.

Modern GIS support operations with objects of industrial and financial and economic activity of the oil companies: chinks; pipelines; roads, the rivers and water-currents, settlements, engineering communications, structures and items of seismological sounding, other elements of an infrastructure of petrotransport and natural objects.

In Republic Bashkortostan for last years separate departments, the organizations and the enterprises undertake significant efforts on creation of geoinformation systems (GIS) in sphere of the activity. The most advanced GIS-projects are realized in the Ministry of Natural Resources, Rosnedvigimost, Rospotrebnadzor, Management on Affairs of a Civil Defence and Extreme Situations, the Ministry of Internal Affairs, Open Society the "Uralsybnefteprovod", the Joint-Stock Oil Company "Bashneft", etc [1-4].

Thus works on creation separate GIS are conducted is isolated, not in coordination among themselves, that leads to duplication, and in some cases and to the contradiction of created and used spatial data about territory and objects of Republic Bashkortostan.

The international experience shows, that integration of the isolated spatial data at the state level in a uniform infrastructure of spatial data by means of GIS technologies allows to carry out cardinal break in duly maintenance of authorities, scientific researches, needs of the industry and the population authentic and consistent spatial data about the territory.

In the Russian Federation creation of an infrastructure of spatial data on the basis of GIS technologies which is called to unite and provide collective access to spatial data at three levels is already carried out: federal, territorial (a level of subjects of the Russian Federation) and municipal.

Therefore the urgency of creation of geoinformation system of Republic Bashkortostan is defined by that the most part of the information necessary for objects of management, characterizes geographically distributed objects, and existing for today at the enterprises the automated systems do not provide the decision of all circle of industrial problems of experts and operate with superfluous data. Now these problems are represented insufficiently researched both from the point of view of technological decisions, and from the point of view of methods of designing, therefore development of models and methods of integration diverse given, especially spatial and attributive, is actual.

2. The Purpose of Research

The basic purpose of creation and development of geoinformation system RB is development of scientific bases, creation and working off of technology of integration diverse on scales, thematic loading, structure, software of storage and representation of spatial data, and also stage-by-stage realization of the project on conditions of joint financing the interested organizations that will allow to provide:

- access to spatial data and their effective utilization for improvement of quality of a life of the population;

- improvement of quality and efficiency of the government and municipal management due to wide use of information resources of spatial data;

- acceleration of social and economic development and increase of competitiveness of republic on the basis of universal introduction of geoinformation technologies;

- maintenance of objective, continuous and independent monitoring and management of a condition and development of region, forecasting of its development.

3. Research Problems

For achievement of the specified purpose it is necessary to solve following problems:

- the analysis of the problems, spatial data demanding use;

- the analysis of all spatial data who are available about territory of Republic Bashkortostan, including space pictures and digital cards;

- development of system project GIS RB, including the analysis of available spatial data about territories RB and construction of information models of spatial data about territory RB;

- creation of the prototype of the multiuser base of spatial data of territory RB including all available, accessible for open use, spatial given territories RB (together with the interested departments, the organizations and the enterprises);

- stage-by-stage creation of digital model of territory RB corresponding on accuracy of M 1:25 000 for the most demanded sites of territory RB (originally for zones of harmful influence of waters (flooding, destruction) on the population and territory), (together with the interested departments, the organizations and the enterprises);

- development of methods and technologies of integration departmental GIS with GIS RB, on an example of the joint decision of a problem of support against freshet actions on federal, territorial (Republic Bashkortostan) and municipal (Ufa) levels (together with the interested departments, the organizations and the enterprises).

4. Scientific Novelty

Scientific novelty is integration of data and algorithms existing GIS the enterprises and their association in republican GIS which includes:

1. a method of the joint description of spatial and attributive data for integration of the geographical and attributive databases, considering features of models of existing DB.

2. information model of the spatial given objects of territory RB, considering all available, accessible to open use, spatial data (together with the interested departments, the organizations and the enterprises).

3. methods and technologies of integration departmental GIS with GIS RB, on an example of the joint decision of a problem of support against freshet actions on federal, territorial (Republic Bashkortostan) and municipal (Ufa) levels (together with the interested departments, the organizations and the enterprises).

5. Stages of Work

At the first stage it is necessary to lead the analysis of the spatial information of the government used by bodies and the large enterprises of Republic Bashkortostan at realization of the basic kinds of activity. The given stage includes gathering, ordering of the information, studying and the analysis of popular sources of the information, and also reception of the specialized (departmental) information used by bodies of the government and the large enterprises of Republic Bashkortostan at realization of the basic kinds of activity. Following steps development of functional and information models of use of the spatial information by bodies of the government and the large enterprises of Republic Bashkortostan. That includes formalization of the information streams connected with an exchange of spatial data between sources and the basic consumers (bodies of the government and the large enterprises of Republic Bashkortostan) and formalization of structure and interrelations of the spatial data necessary for activity of bodies of the government and the large enterprises of Republic Bashkortostan.

6. Expected Results

Construction of the generalized model of spatial data for activity of bodies of the government and the large enterprises of Republic Bashkortostan, is carried out for:

- increases of a management efficiency by Republic Bashkortostan and its municipal formations, due to automation and integration of diverse data and the objective control of a condition of key directions of economic development;

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- developments of an infrastructure of spatial data of the Republic Bashkortostan, caused by growing requirements of citizens, the organizations, bodies of the government and local self-management to completeness, quality and efficiency of reception of spatial data;

- the organizations of the hierarchical territorially-distributed system of gathering, processing, display of the information on a condition and development RB, maintenance of support of acceptance of administrative decisions with bodies of the government and local self-management together with the interested departments, the organizations and the enterprises;

- maintenance of rational use material both manpower resources at creation and use of spatial data;

- qualitative perfection of system of a supply with information of bodies of government RB on the basis of geoinformation technologies of a world level;

- developments of small business, formation of a regional innovative infrastructure on creation and use of spatial data.
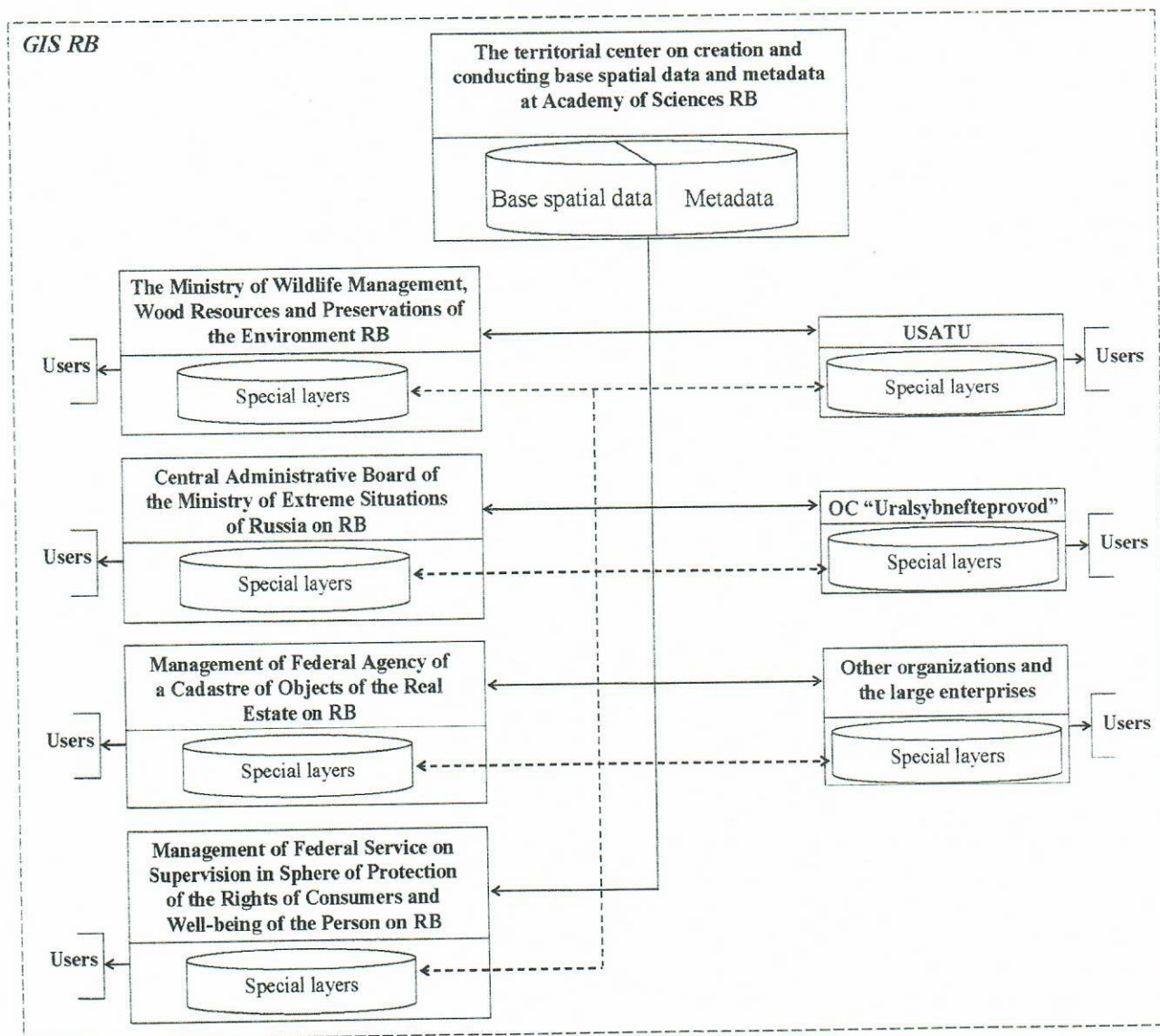

Figure 1. The Scheme of Interrelation and Use of Base and Special Spatial Data

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