

**STANDARDIZATION AND INTERCHANGE OF DIGITAL CARTOGRAPHIC INFORMATION  
IN THE SLOVAK REPUBLIC**

Irena Mitášová, Milan Hájek  
 Department of Geodesy and Cartography  
 Faculty of Civil Engineering, Slovak Technical University  
 Radlinského 11  
 813 68 Bratislava  
 Slovak Republic

**Abstract**

The level of spatial digital data interchange in the Slovak Republic. The level of standardization in this field. State run databases. What and where has to be done to push standardization in this field forward.

**1 Review of current informatization status**

The need and importance of informatization in the post-communist countries of Central Europe have involved this field among state interests. In this context, research was held by state statistic offices and showed up insufficient support for factors that impact the level of informatization in the society. Concerning the technology background, computers with less powerful processors dominate, use of electronic communication and networks is low and higher order database systems are seldom. This reality often goes hand in hand with underestimating of content, organizational and financial background. According to research results and experts' conclusions, activities in following fields have to be developed to push informatization in the Slovak Republic (SR) forward.

- Completion and development of informatization legislature
- Design of IS model for state administration
- Building of data funds catalogues
- Support for crucial docile IS projects
- Compilation of main IDs and numeric codes
- Standardization of information technology elements and data elements.

**2 Assumptions for data interchange between state and private entities**

In the field of informatization, two fundamental documents were adopted by the Slovak government. "National Informatization Program" (1992, [3]) is a framing document, and "Conception of development of state administration IS for 1995 - 1996" (1994, [2]) is more detailed one.

To transfer and interchange data between various IS and to secure access to various sources of information a **metainformation system** has to be built and maintained. This fact is still not widely accepted. Concerning the state administration, besides the current list of information funds with description of logic, hardware and software environment, such system also should comprise data access description, including instructions for use.

When speaking about the crucial IS projects, the first regard is given to main identifiers (ID.) These IDs cover whole republic and compose exact code directories of phenomena, objects and subjects of information systems. Many IDs are maintained in computerized registers. Among 3D-oriented IDs, following two are essential:

- **municipality ID**
- **cadastral community ID**

Another four ones have statistical character

- **personal Nr**
- **registration Nr. of the organization**
- **V. A. T. Nr.**
- **basic urban unit Nr.**

Regarding data availability from docile ISs that are run by the state government, these systems can be divided as follows:

1. ISs that cover **civilization sources of the state** (information on human, natural, cultural and financial sources)

2. ISs focused on **ecological and legislation factors and state administration**. Data of this group feature great rate of alteration unlike relatively constant civilization sources database.

3. ISs that offer data for **governmental level** mainly (State statistical information system, systems that give account on state budget, systems that monitor financial and trade balances of the state etc.) Information of this type is reported and evaluated in regular intervals with distinct requirements for communication and software background.

Among the above-mentioned IS groups, the most space-related appears to be the first one, and considerably the second one. Table 1. specifies the sources for data interchange among the fields from the first IS group.

<i>Sources</i>	<i>Information Fund</i>
Human	Register of population migration IS of population health Statistical data on unemployed Register of private entities Register of studying youth
Natural	IS on water air soil forest biota geology
Structural	<b>IS of real estates cadastre</b> <b>Spatial data reference database for GIS</b> Register of regional-planning documentation IS on health care system
Cultural	IS of facilities for tourists and visitors IS of monuments, museums, galleries and libraries (CASLIN)
Production	Register of firms IS of producers, products and technologies Register of inventions Certification
Financial	IS on taxation IS on customs

Table 1: First IS group. ISs of civilization sources of the state

Two spatial information databases that are highlighted among structural sources in the table are under the authority of the Office of Geodesy, Cartography and Cadastre. Approximately 4,9 million parcels are registered in the SR (area of 49,000 sq km, population 5,5 mil.) A record tied to one simple lot consists currently of 110 items. Parcel-related data are collected, stored, kept up-to-date, and offered at inquiry. All over the Republic, some 3000 people work in this field.

The Office also is in charge of building and maintenance of positional and vertical control point networks, as well as of state georeference system. And finally, mapworks publishing is overseen by the Office. Map sheets of large scales (1 : 1000 - 1 : 5000), middle scales (1 : 10 000 - 1 : 200 000) and small scales (1 : 250 000 - 1 : 1 000 000) that compose mapworks, as well as a big group of docile administrative maps, outline maps and other ones are edited and published under an eye of the Office.

The Office builds its Automated Information System of Geodesy, Cartography and Cadastre since 1970 - two of its databases are highlighted in the table, the other ones are covered by another paper on this Conference (Štefan Špaček, Štefan Kondáš), as well as in [2].

In the SR, an increase of **private space-oriented activities** is evident during last four years. Some of them are focused on data collection for IS, the other design spatial background for databases. One of such activities is aimed at *Municipal Information Systems building (MIS.)* So far, each of such GIS applications is unique. The content of such a unique project, its hardware, software, methods of data collection and collected information availability for external users is set by local self-governments or their consortiums of users. The fact is that only richer and better organized towns are interested in MIS. Nevertheless, the necessity to integrate and interchange spatial digital data is evident, especially in the fields of real estates cadastre and service utilities infrastructure.

As an example of MIS a city of Banská Bystrica in the Central Slovakia can be mentioned. A digital technical map of the city is being designed in line with a survey of the city. Data measured are distributed into 19 reference files with 200 thematic layers. Building of the spatial information model is supported by means of GIS INTERGRAPH, objecting and topology is done by enhancement software. The total time needed for mapwork completion depends on financial situation of the city and companies involved, and is estimated to 5 - 6 years. The city area of 130 square km will be covered by 180 map sections, each to a scale 1 : 500. The MIS is going to serve 750 000 inhabitants.

### 3 Standardization of information technology and data

Binding standards will be promulgated by the State Statistic Office of the SR. Only such technical norm and information interchange manner that is verified and commonly available will be promoted to a standard. The list of standards promulgated by the Statistic Office will specify on which users and how much is particular standard binding. Selected European standards will be respected in origin without amendments.

The number of currently used data standards should be decreased - selection is necessary. Standards selection should be oriented towards Open Systems Interconnection (OSI) and network expansion. Therewith, standards are defined in 11 fields as follows:

1. Network communication and systems interconnection. Standards based on OSI reference model; see Figure 2. for model division into 7 layers.
2. Operating systems. Mono-user systems (MS DOS), multi-user systems (UNIX.)
3. National environment - standards for text coding.

Levels

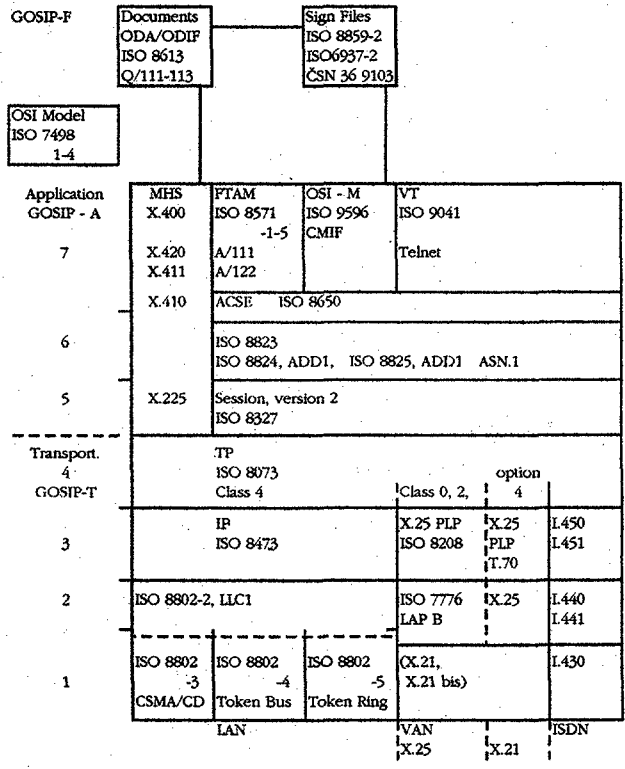


Figure 2: SOSIP scheme modified for the SR

4. Documents processing and interchange. Data support for documents, main models of documents, electronic data interchange (EDIFACT.)

5. Database systems. SQL query language according to ISO 9075, specification oriented at multi-user systems with RDBMS.

6. Software applications that allow network communication and communication with users in national language.

7. Media for data transfer: floppy discs, magnetic tapes, optic discs according to ISO standards.

8. Programming languages that are compiled under UNIX operating systems (ADA, C and SQL conformed.)

9. Graphical user interface represented by X-WINDOWS, MOTIFF and other ones for MS DOS and OS/2 IBM.

10. Computer aided design, CASE technology for projects management.

11. Safety data models for data protection.

The level of output standards that are used in the system of geodesy, cartography and cadastre reflect current possibilities. The Office has directed standards for electronic access to database of real estates cadastre. Standards are in force according to technology equipment of both, database holders and customers. Likewise, standards are developed for raster data interchange from digital cadastral maps (1 : 2800, 1 : 2000), and for GIS data (1 : 10 000.)

### **Conclusion**

New spatial organization, as a result of changes in the Slovak society and economy during last 6 years, requires dynamic methods of cartographic modelling and perception of state territory, fast and cost-effective ways of data updating, and data collection by photogrametry and remote sensing. Concerning new courses in Slovak cartography, the orientation from analog to digital data transfer is evident. This, of course, stimulates spatial data legislature and standardization. The latter becomes relevant for informatization headway and for effective use of information of state territory.

### **References:**

- [1] Mitášová, I., Hájek, M., 1994. Definition of standards for digital data transfer. In: Kartografické listy, Vol. 2/1994, pp. 21-36, Bratislava.
- [2] Conception of development of state administration IS for 1995 - 1996. Statistical Office of the SR, pp. 1-23, Bratislava.
- [3] Vojtičko, O., 1992. National Informatization Program of the SR. In: Geodetický a kartografický obzor, Vol. 4/1992, pp. 77-81, Praha.