

# TWO STANDARDS ON DIGITAL MAPS AS PART OF THE HUNGARIAN NSDI

*Dr. Szabolcs MIHÁLY, Hungary*

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## ABSTRACT

Based on the standardisation of geoinformation in frame of CEN TC 287 and partly ISO TC 221 and taking into account the Hungarian conventions as well as the Hungarian Law on Surveying and Mapping (1996) two standards on digital maps has been issued in Hungary last 4 years.

The first standard is the conceptual model on digital basic map (on multicadaster map) issued by the Hungarian Board of Standards nomenclatured as MSZ 7772-1:1997. The standard has been realised in life using also the digital base map instructions. The MSZ 7772-1:1997 standard and its instructions has been applied and proved fully appropriate for the practice during 3 years of surveying practise in the frame of the National Cadastre Program.

The second standard is the conceptual model of Digital Topographic Data Base. The Hungarian Board of Standards issue number is MSZ 7772-2:2000. Recently the connected digital topographic data base instructions are elaborated in draft. Next year digital cartographic database conceptual model is expected to be issued.

Requirements for the map standards have been formulated as

- a) to follow the national legislation and practice in their content;
- b) to use the international geoinformation standards (or prestandards) in forming their structure;
- c) to provide continuity with the respective analogue maps of the earlier times;
- d) to provide communicative transparency between the map data bases of different resolutions (scales) in sence of their projection system, database structure, content and portrayal;
- e) as a consequence coming from the above paragraph, to get the content of the map data base of lower resolution (smaller scale) such that generalising the adequate part of the content of higher resolution (larger scale) and including the result into the map data base of lower resolution (smaller scale);
- f) to solve the technical regulation of map data base at two levels:
  - level of national standard giving the conceptual level, less sensitive to technological changes, not containing any institutional and economical relations, and reflecting those elements and technical matters which are common for the user community, data owner/provider and data capture considerations,
  - level of instruction giving the physical model, containing the technical details, the institutional and possibly the economical relations, reflecting those elements

and overall matters which are common for the data owner/provider and data capture considerations rather than those of the users as well as being able to be subjected to changes and modifications which surely are needed as the time is going ahead;

- g) to have the map data base consisting of such primitive data elements which are suitable for compiling user required tailored products and for clearly defined counting the supplied data elements when financial accounts are to be invoiced;
- h) to have the GI standard based map data bases such that serving for geoinformation systems as prescribed by the Hungarian Law on Surveying and Mapping;
- i) to have the standards, the instructions, the data of the map data bases as well as the interoperability between the different organisations and between the different data sources such that forming the basic part of the Hungarian NSDI.

The international GI structural standard used too derive the Hungarian map data base content standards were those of CEN and ISO which got readiness to be used and which have been coinciding to each other, namely: prestandards on spatial schema, quality, metadata and position.

Based on selected international structural GI prestandards two Hungarian content standards on map databases have been defined as it follows below:

- a) MSZ 7772-1:1997 Digital Maps: Part one: Digital Base Map Conceptual Model  
This standard is referred to in Hungarian as "DAT-Standard" by its Nick-name.
- b) MSZ 7772-2:2000 Digital Maps: Part two: Definition of Digital Topographic Data Base. This standard is referred as "DITAB-Standard" by its Nick-name.

The DAT- and DITAB-Standards are describing the conceptual model: Terminology, Data model of digital base map, Position (Map projection system, Reference, Height system), Classification of objects and thematical structure, Spatial schema (Geometrical primitives, Topological primitives, Spatial view), Attributes, Relations (between nodes, between edges, faces and rings), Data quality (Source, Extent of application of data, Quality of geometric data, Quality of attribute data, Actuality, Completeness, Consistency of data, Technology for data collection, Data protection, Verification).

The digital maps are represented in object-oriented relational database. The specific objects are described by their attributes, relations and data quality parameters. At conceptual model level the specific objects are represented by their generic objects. Objects with common attributes are grouped into one object group. The object groups having common attributes at higher level are grouped into one object classes. The attributes, relations and quality parameters are defined in the standard as generic. Their values are given in supplementary instructions.

Three object types are distinguished by its geometry: point, line, surface objects. The objects are managed by their topology such that fulfilling the full-topology requirement. The topology elements distinguished are: node, edge and face. The nodes are divided into more specific types. By geometry, the digital base map databases are 2-dimensional with planimetric coordinates. The heights are or can be given as attributes.

The "Thematic Structure", the "Object Classification" and the "Example Attribute Table" are annexed, for the DAT-Standard and for the DITAB-Standard. In the DITAB-Standard the objects and attributes are harmonised with the DAT-Standard as well as

with the DIGEST standard for NATO-compatible actions of the Hungarian Defence Forces.

## **CONTACT**

Dr. Szabolcs Mihály  
Institute of Geodesy, Cartography and Remote Sensing, Hungary  
Bosnyák tér 5  
H-1149 Budapest  
HUNGARY  
Tel. + 36 1 222 5111  
Fax + 36 1 222 5112  
Email: [szabo@fomigate.fomi.hu](mailto:szabo@fomigate.fomi.hu)