Concept of the monitoring system for commune land management according to the ISO series 19100 standards

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Concept (1/2)

- monitoring the changes in the rural and urban areas is necessary for proper land management
- allows better decisions for the spatial plans and the optimal use of the space
- local SDI
- use of IT tools in the land management at the lowest level of administrative division

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the goal of the created system is to integrate monitoring of the rural and urban areas

there are two subsystems, one of them realizes tasks for rural areas and the second one is for the whole administrative unit – commune

interoperability between these subsystems and data interchange are provided

IT aspects

system engineering

analysis of demands for software

software engineering
Cycle of system’s life

…and there are many more
…IBM Method Composer

System’s model

Business modeling
Users’ demands
Function structure of the system
Information structure of the system
Systems’ integration modeling
Software prototypes

Working within NSDI (1/2)

interoperability

data interchange

Figure 1 — Overview of data interchange between two systems

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Working within NSDI (2/2)

- national standards and regulations

But
- harmonization needed (lack of cohesion between themselves)

And
- integration needed

also with

ISO series 19100 standards

Structure of ISO standards (O. Østensena, Ispra 2004)

- ISO 19103 - Conceptual schema language
- ISO 19107 - Spatial schema
- ISO 19108 - Temporal schema
- ISO 19109 - Rules for application schema
- ISO 19110 - Feature cataloguing methodology
- ISO 19111 - Spatial referencing by coordinates
- ISO 19112 - Spatial referencing by geographic identifiers
- ISO 19113 - Quality principles
- ISO 19114 - Quality evaluation procedures
- ISO 19115 - Metadata
- ISO 19115-2 Metadata – extensions for imagery and gridded data
- ISO/TR 19121 - Imagery and gridded data components
- ISO 19123 - Imagery and gridded data framework
- ISO 19130 - Sensor and data model for imagery and gridded data
- ISO 19131 - Data product specification
- ISO 19137 - Generally used profiles of the spatial schema and of similar important other schemas
- ISO 19138 – Data quality measures
European standards (examples)

- **EN-ISO 19101:2005** Reference model
- **EN-ISO 19105:2005** Conformance and testing
- **EN-ISO 19107:2005** Spatial schema
- **EN-ISO 19108:2005** Temporal schema
- **EN-ISO 19111:2005** Spatial referencing by coordinates
- **EN ISO 19112:2005** Spatial referencing by geographic identifiers
- **EN ISO 19113:2005** Quality principles
- **EN ISO 19114:2005** Quality evaluation procedures
- **EN ISO 19115:2005** Metadata

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Feature cataloguing

ISO/DIS 19110 (1/3)

- feature catalogues define the types of features, their operations, attributes and relationships
- they provide better understanding of the content and meaning of the data
- reduce costs of data acquisition and simplify the process of product specification for geographic datasets
- in Poland classifications of features in datasets in spatial planning and especially for rural planning differ and are partly, because there are still not catalogued domains and the catalogued ones are not consistent in many cases
- harmonization is needed
### Feature cataloguing
ISO/DIS 19110 (2/3)

**Table 1:** Elements geograficzne obszaru obszarów

<table>
<thead>
<tr>
<th>linia</th>
<th>Opis</th>
<th>Kwartalna</th>
<th>Ocena</th>
<th>Data</th>
<th>Odpowiadający</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1</td>
<td>Linea 1</td>
<td>Opis 1.1</td>
<td>Ocena 1.1</td>
<td>Data 1.1</td>
<td>Odpowiadający 1.1</td>
</tr>
<tr>
<td>1.2</td>
<td>Linea 2</td>
<td>Opis 2.2</td>
<td>Ocena 2.2</td>
<td>Data 2.2</td>
<td>Odpowiadający 2.2</td>
</tr>
</tbody>
</table>

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### Feature cataloguing
ISO/DIS 19110 (3/3)

**Feature Catalogue**

**Name:** Feature catalogue of subsoil SA  
**Domain:** Managing systems of urban and rural areas  
**Version:** 1.0  
**Date:** 2008-03-25  
**Producer:** Agromedia Zdrowie  
**University of Warsaw and Ministry of Agriculture**

**Feature Types**

<table>
<thead>
<tr>
<th>Name</th>
<th>Definition</th>
<th>Code</th>
<th>Feature attribute names</th>
</tr>
</thead>
<tbody>
<tr>
<td>PT_EW</td>
<td>Segment area</td>
<td>PT_EW</td>
<td>level of erosion, theme</td>
</tr>
</tbody>
</table>

**Feature Attributes**

<table>
<thead>
<tr>
<th>Name</th>
<th>Definition</th>
<th>Code</th>
<th>Feature attribute units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land of erosion</td>
<td>PT_EW</td>
<td>1 (‘enumerated’)</td>
<td></td>
</tr>
</tbody>
</table>

**Fig. 2:** The excerpt of the feature catalogue of the subsoil for rural areas
Application schema (1/3)
facilitate the acquiring, processing, analyzing, accessing and transferring of geographic data between different users, systems and locations

Application schema (2/3)
A conceptual schema for a given specific application.

**Conceptual schema**

Abstract and general description of information in terms of IT. It is a basis for consistent realizations in different environments.
Application schema (3/3)

The feature catalogue can be the base for application schemas.

In presented monitoring system application schemas provide the description of the data structure required by two subsystems, one for the rural areas and the second one for the whole administrative unit – commune.

Example model integration with some standardized application schemas
Metadata

Closing remarks

The monitoring system, which is in accordance with the ISO series 19100 standards:

- can deal with web services (prCEN/TR 15449, 2006) and can be both the data producer and the data user

- metadata of the subsystems are placed in the catalogue servers, the application schemas provide reaching the consensus about data structure and are base for the transport and storage of geographic information in XML/GML

- can work within NSDI on the commune level (be part of local SDI)