Urban Planning in the Czech Republic & Humboldt project

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1 ABSTRACT

The European Union (EU) project Humboldt contributes to the implementation of European Spatial Data Infrastructure (ESDI) that integrates the diversity of geospatial data and metadata available for a multitude of European organisations. The main goal of the Humboldt project is to enable these organisations to harmonise their geospatial informations. Harmonisation of geospatial data makes possible an easier data sharing, management and publishing. This paper is focused on using and harmonisation of geospatial data in urban planning. At first the general questions of urban planning in the Czech Republic and some aspects of data harmonisation are described. The next sections are applied to Humboldt project and its scenarios, above all Humboldt Scenario Urban Planning. This scenario represents a concrete example of a geospatial data harmonisation processes in urban planning in the Czech Republic. There are described reasons of harmonisation, harmonisations needs and requirements, current problems, proposed solutions and importance of this project and its results for other activities.

2 INTRODUCTION

Decisions concerning about urban planning infringe the major part of population of every country. These decisions depend on large number of quality of background geospatial data. In the Czech Republic these data are designated as Territorially Analytic Backgrounds (TAB, in Czech UAP). The appropriate authorities must finished the first version of TAB by the year end (31.12.2008). Territorially Analytic Backgrounds contain findings and evaluation of status and development of territory by reasons of public policy, sustainable growth and change monitoring (Act 183/2006). TAB must be continuously updated. The complete updating must be done every two years. In the Czech Republic there is 219 responsible subjects (regions and one type of municipalities). Therefore activities connected with acquisition, processing and providing of urban planning data in the Czech Republic are frequented. The similar situation is also in other European countries (e.g. Latvia).

The main problem connected with acquisition, processing and providing of urban planning data is data heterogenity, because data come from many different sources (data providers). The heterogenity of data is more important, because the heterogenity results in better or worse data accessibility and using. The data heterogenity consists in many parameters (e.g. terminology, multi-lingual adaptability, coordinate referencing and units model, portrayal model, metadata etc.). One version of list of data heterogenities is available in publication [PORTELE, C. et al].

The need for harmonisation is due to the necessity of a cooperation of data providers, data processores and end-users on national and international level. In consequence of the growing globalisation the interconnection is related to more and more economical subjects and data sets. On the present there are above all relations with European Union members and other Euroepean countries very actual. It is necessary to awake that a majority of data is created on the local level. But these data are used on higher level (e.g. regional administration or government). [ČERBA, O. et al]

This paper (and also the Humboldt solutions) is based on these related projects and standards:

To achieve the objectives of Humboldt project and to maximize the benefits gained from the integration, the requirements of Infrastructure for Spatial Information in the European Community (INSPIRE) directive will be met, because INSPIRE aims to create the legislative and technical groundwork for the creation of a ESDI and Humboldt solution should be a part of ESDI. Document of INSPIRE Drafting Team "Data Specifications" called Methodology for the development of data specifications define data harmonisation components used in Humboldt project.

Global Monitoring for Environment and Security (GMES) initiative is to enable decision makers in Europe to acquire the capacity for global as well as regional monitoring. To achieve this, GMES needs to make full use of data collected from space-borne, airborne and in-situ observation systems that is then delivered to service providers through an efficient data integration and information management capacity. Data integration is one of the fundamental tasks of GMES, therefore Humboldt project and its results must be in agreement with European initiative GMES.

Reference Information Specifications for Europe (RISE) project addresses more specifically the GMES data harmonisation action line, and relates also to the INSPIRE implementation rules. Humboldt project uses for example the harmonisation requirements questionnaire from RISE Methodology and Guidelines on Use Case and Schema Development [PORTELE, C. et al].

Open Geospatial Consortium (OGC) standards – in the Humboldt project there are used standards defined web services, e.g. Catalogue service, Web Map Service, Web Feature Service, Geography Markup Language, Sensor Observation Service etc.

International Organization for Standardization (ISO) standards – from the view of Humboldt Scenario Urban Planning are very important Technical Committee 211 (Geographic information/Geomatics) standards, e.g. ISO 19115 (Geographic information -- Metadata), ISO 19110 (Geographic information -- Methodology for feature cataloguing), ISO 19139 (Geographic information -- Metadata -- XML schema implementation) and others.

Czech legislative rules.

3 PROJECT HUMBOLDT

The European Union project Humboldt contributes to the implementation of European Spatial Data Infrastructure (ESDI) that integrates the diversity of spatial data and metadata available for a multitude of European organisations.

Humboldt will start with an analysis to facilitate the re-use of existing concepts, processes, implementations and experiences. This also includes the analyses of harmonization processes in other application areas. Following Humboldt will extend the existing by the needs of users and administrators especially in the area of Global Monitoring for Environment and Security (GMES). As a cornerstone for future businesses, citizen security, risk management and many more opportunities, the ESDI has to be a lasting development, prepared for the steps that will inevitably follow with the continuing progression of globalization. To enable this, the Humboldt project suggests an optimized, community-centered implementation process. New knowledge will then be gained and new processes will be developed from the possible combination of data that already exists but is currently highly scattered and heterogeneous. [HUMBOLDT Project]

The Project Humboldt group is composed of 27 partners from 14 European countries (13 members of the European Union and Switzerland). The Fraunhofer Institute for Computer Graphics (Darmstadt, Germany) is the leader of the project. On the project there are cooperated following types of institutions: Commercial companies (e.g. LogicaCMG, Intergraph CR spol. s r.o.), national mapping organizations (e.g. French National Geographic Institute, Institute of Geodesy, Cartography and Remote Sensing, Hungary), research institutes (e.g. Swedish Meteorological and Hydrological Insitute, Hellenic Centre for Marine Research) and universities (e.g. Delft University of Technology, University of Rome "La Sapienza").

The project Humboldt is devided into 12 Workpackages (WP). These Workpackages cover all activities of Humboldt project (e.g. planning, state-of-art analyses, development, evaluation, training etc.). Except WP1 (Administration) there are the important the following three WPs describing the critical path of the project:

- WP2 (Cost & Process Analysis),
- WP5 (Framework Interface, Models and Architecture),
- WP9 (Scenario Applications).

Humboldt scenarios (WP2) provide input data (source materials for initial analysis) for WP2 and WP5. And outputs from WP2 and above all WP5 will be used back in scenarios.

The Humboldt project contain 8 scenarios (Humboldt Scenario, HS). The Scenarios are important drivers for the whole software development process and cover a wide variety of application domains, stakeholders and

test areas (e.g. urban planning, hydrology, marine science, forest management, risk management, nature protection etc.). In summary Scenarios real world applications offer:

- Essential information for the further development of the HUMBOLDT framework based on full evaluation of both framework and tool components.
- How-to guidelines to support the step by step implementation of the harmonisation process by service provider agencies.
- Best-practice examples on how tools and standards can be used to create the ESDI and support for the INSPIRE implementation guidelines and rules.
- Basis for user engagement and development of the training modules.
- Project visibility and support for both demonstration and exploitation initiatives.

4 HUMBOLDT SCENARIO URBAN PLANNING

The primary objective of the Urban Planning Scenario is to demonstrate the usability and the usefulness of Humboldt research and development activities. Humboldt Scenario Urban Planning should bring the Humboldt project together with projects related to the Urban Thematic Strategy (UTS) and consequently manage the information needs for the UTS delivery. The UTS strategy is guided by a vision of sustainable urban management in order to improve the socio-economic conditions of cities.

The use case UC HS02-02 is focused on the processing of geospatial data in urban planning in the Czech Republic.

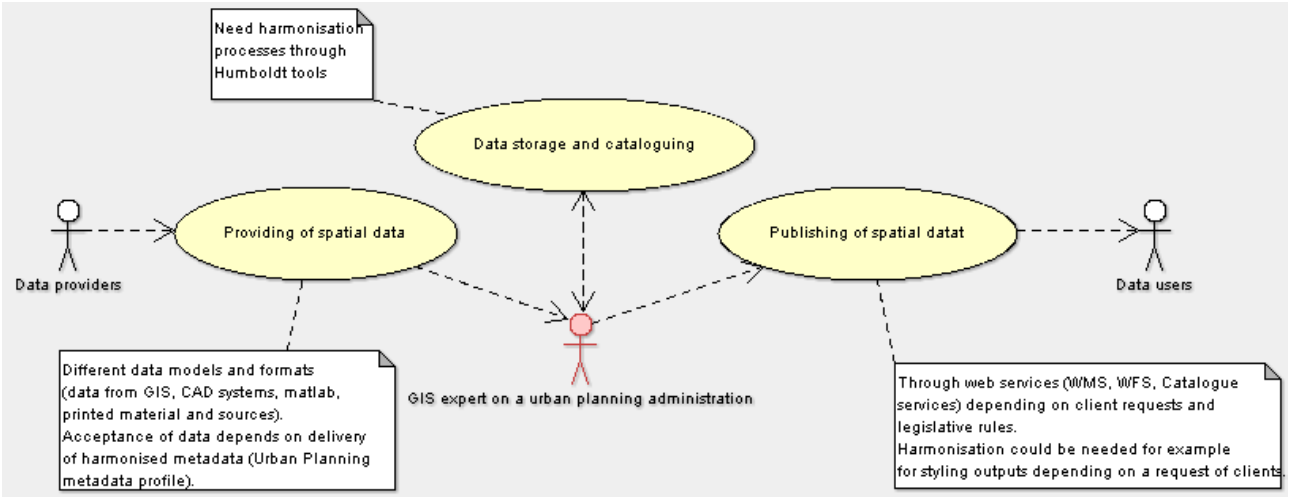

Fig. 1: UML Use case diagram of the use case UC HS02-02 of the Urban Planning Scenario.

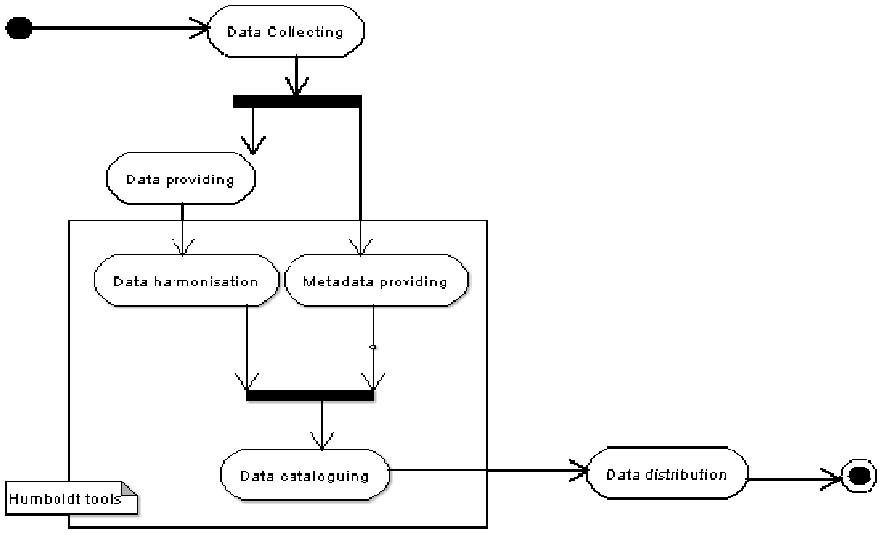

Fig. 2: UML Activity diagram of the use case UC HS02-02 of the Urban Planning Scenario.

In the use case UC HS02-02 there are three type of actors: geospatial data providers (set of different providers of geospatial data used in urban planning /e.g. network managements, cadastral offices, forestry etc./), GIS experts on an urban planning (territorial planning) administration and data users (e.g. planners, public administration, general public etc.). Data providers hand in data in different data models (e.g. GIS model, CAD model, raster images, data models of sensor measurements etc.), data formats (e.g. SHP, GML, DGN etc.), mediums (e.g. web services, files on CD, printed map etc.), quality, portrayal rules and others. Acceptance of these data depends on delivery of metadata based on Czech legislation rules (pasports). On the present the data providers must fulfil the conditions of Czech legislative (pasports), but after adoption of INSPIRE directive the metadata will have to agree with INSPIRE requirements. Therefore we proposed to fulfil the Urban Planning Metadata profile (combination of requirements of INSPIRE and Czech legislative). GIS expert must process accepted data. It means their cataloguing, storage (mainly in some database tool), and adjustment necessary for previous operations. Presently she/he must use many different software products mostly. After harmonisation process GIS expert will need only one tool based on web services, which make possible to catalogue the data. Catalogued data could be published (mainly through web services). The main goals of this example are better possibilities of searching, visualising and sharing data, better data access and higher quality of data and easier uniform data processing.

Data harmonisation is concerned in two types of data:

- Metadata in accordance with legislative requirements. These requirements are supported by Urban Planning Metadata Profile, which connects requirements of INSPIRE directive and Czech laws.
- Different input geospatial data sets representing changes in Territorially Analytic Backgrounds from data providers. The ordinance 500/2006 Sb. Contains 156 possible data layers.

We propose to harmonise the following issues of geospatial data and their metadata:

- Data (exchange) format
- Spatial reference system, reference grids
- (Conceptual) data model
- Classification schemes/systems
- Terminology / vocabulary
- Metadata profile
- Scale, amount of detail, aggregation for reporting
- Portrayal (legend/classification, style)
- Processing functions: their parameters and formulas
- Multi-linguality
- Consistency between the features

5 CONCLUSION

The main goal of the Humboldt project is to enable organisations to document, publish and harmonise their spatial information. That's why the project was named after Alexander von Humboldt, because this eminent personality of European science proposed integrating of knowledges across Europe. The software tools and processes created will demonstrate the feasibility and advantages of an ESDI as planned by the INSPIRE initiative, meeting the goals of GMES. Finally, a software framework and diverse tools will be developed and integrated into the ESDI to support spatial data and service providers in offering standardized spatial information.

The project is presently in phase of the finishing of initiatory analyses and prototype of the Humboldt Framework. Also the final list of concrete requirements (e.g. type of harmonisation, functionality of Humboldt tools etc.) is preparing. Therefore it is impossible to define and describe used technologies, platforms, methods and procedures now.

On the basis of actual results of Humboldt project and other similar project there are appearing the advantages of harmonisation of geospatial data sets. These advantages are very important for data providers,

data users and data managers, too. A success of Humboldt project demands on concrete developed tools and their implementation. The advantages of harmonisation processes in urban planning results from SWOT analyses and cost and process analyses in term of WP2. Harmonisation of urban planning geospatial data could have following benefits:

- Any duplicities in data,
- Application of INSPIRE recommendation,
- Clear origin and assurance of quality of the data,
- Data structure standardisation,
- Data purity, security and structure uniformity,
- Better data manipulation,
- Reciprocal data accessing per WMS a WFS – preservation data up-dating (possibility of on-line actualisation),
- Fall of cost for data updating and maintenance,
- Better software development,
- Better source exploitation,
- Improvement of chances in communication with authorities of EU,
- Urban management community support,
- Better utilization and commercialization of urban planning geospatial data,
- Increasing activities, e.g.: education.

6 REFERENCES

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