Plan4all – State of the Art in the Harmonisation of Spatial Planning Data

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1 ABSTRACT

The European project Plan4all focuses on the interoperability and harmonisation of spatial planning data according to the INSPIRE Directive, the European initiative for a common spatial data infrastructure. An important issue of the project is the state of the art in spatial planning data harmonisation in Europe including the collection, description and analysis of the different European planning systems, already existing spatial data infrastructures (SDI), best practise projects, technological aspects, the INSPIRE requirements as well as user requirements. The state of the art analysis identifies the project's challenges and provides important information for the further proposal, testing and implementation of common procedures and standards for spatial planning data harmonisation. The aim of Plan4all is to support holistic planning, the building of a European network of public and private actors from different levels and the establishment of an SDI. The whole spatial planning sector should profit from the availability of understandable and more transparent planning information throughout Europe.

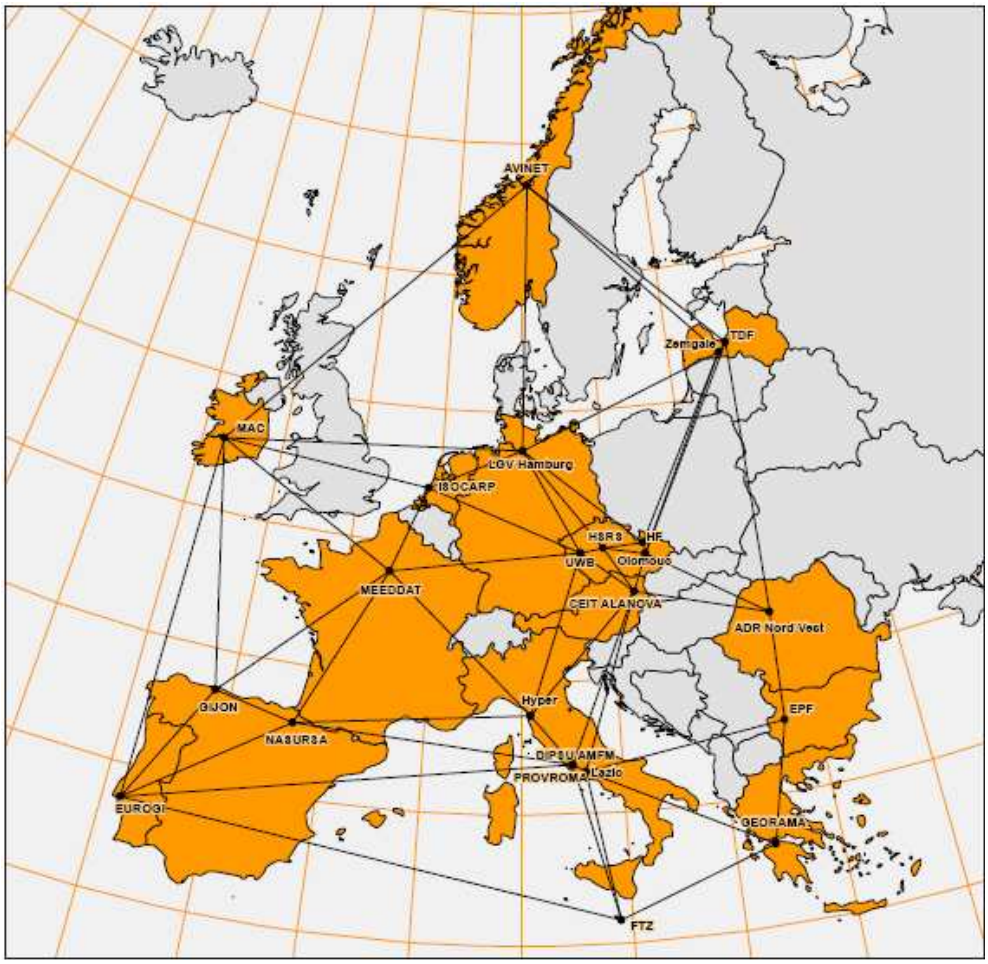
2 THE OVERALL IDEA OF PLAN4ALL

2.1 Trends and challenges in Spatial Planning in Europe

Today's planning practise is facing major challenges such as decentralisation – following regionalisation on the one hand and globalisation on the other hand, cross-border and transnational planning, vertical and horizontal integration, bottom-up approaches and involvement of multiple actors on different levels with different interests and intentions. Nevertheless, these ideas and concepts are difficult to apply because the legal situation in Europe is rather fragmented and planning laws are disjointed. Even experts from one country might have problems to understand the planning regulations of the neighbouring country. Especially for investors and decision makers it is almost impossible to compare planning regulations across Europe. Heterogeneity of datasets and sources, gaps in availability, lack of harmonisation between datasets in different scales, duplication of information as well as loss of time and resources in searching for needed data are characterising for the European situation in spatial planning.

2.2 Harmonisation of Spatial Planning Data and Spatial Data Infrastructure (SDI) building

Plan4all is a European project which is co-financed by the eContentplus programme of the European Commission and focuses on interoperability and harmonisation of spatial planning data in Europe to support holistic spatial planning activities. Data harmonisation means that all member states use a common set of coordinate reference systems, data models, classification schemes, portrayal rules, etc. Interoperability is understood as providing access to spatial datasets through network services, independent from whether the existing dataset is actually changed (harmonised) or just transformed by a service for publication (EUROGI and AMFM, 2009). The aim of Plan4all is to support the development of a European spatial data infrastructure (ESDI) and a European network of public and private actors from different levels, i. e. local, regional and national public bodies, stakeholders, ICT industry, organisations dealing with planning issues and regional development, universities and international organisations (see fig. 1). The main objectives are to define the rules for European spatial planning data interoperability, to find consensus about harmonisation of spatial planning data, and to establish an SDI. Plan4all is based on existing European best practises, the results of current research projects, the INSPIRE directive and the requirements of the users. Therefore these aspects are described and analysed into more detail in the state of the art analysis.



CZ	**UWB** - University of West Bohemia in Pilsen	NL	**ISOCARP** International Society of City and Regional Planners
CZ	**Olomouc -** Statutarni mesto Olomouc	LV	**TDF** - Technology Development Forum
CZ	**HSRS** - Help service remote sensing s.r.o.	DE	**LGV Hamburg** - Landesbetrieb Geoinformation und Vermessung Hamburg
NL	**EUROGI** - Stichting EUROGI	LV	**ZPR** - Zemgale Planning Region
IT	**PROVROMA** - Provincia di Roma	MT	**FTZ** - Fondazzjoni Temi Zammit
GR	**GEORAMA**	ES	**NAVARA** - Navarra de Suelo Residencial S.A.
IT	**Hyper** - Hyperborea S.r.l.	IE	**MAC** - The National Microelectronics Applications Centre Ltd
AT	**CEIT ALANOVA** gemeinnützige GmbH	NO	**AVINET** - Asplan Viak Internet as
ES	**GIJON** - AYUNTAMIENTO DE GIJON	BG	**EPF** - Euro Perspectives Foundation
CZ	**HF** - Help forest s.r.o.	RO	**ADR Nord Vest** - Agentia de Dezvoltare Regionala Nord-Vest
IT	**AMFM GIS** ITALIA	IT	**Lazio** - Regione Lazio - Direzione Regionale Territorio e Urbanistica
IT	**DIPSU** - Dipartimento di Studi Urbani - Università degli Studi di Roma Tre	FR	**MEEDDAT** - Ministry of Ecology, Energy, Sustainable Development and Town and Country Planning

Fig. 1: Partners in Plan4all SDI building (Source: Plan4all newsletter)

3 STATE OF THE ART

The state of the art analysis is a detailed description of the current status of the spatial data harmonisation process in Europe. The methodology chosen is to carry out standardised questionnaires which were answered by the project partners and describe each national situation in spatial planning, data harmonisation and SDI building. Furthermore, there are a collection and analysis of best practise projects, research projects and existing INSPIRE documents. In addition Plan4all profits from the experience of some partners who have already been involved in related activities. Knowledge transfer and exchange of experience are provided through interactive events, i. e. workshops and conferences as well as the Plan4all web portal.

3.1 Fragemented structure of Spatial Planning Systems

The state of the art analysis provides a comparable collection, description and analysis of best practise SDIs in relation to each spatial planning system. The results show the fragmented spatial planning systems in Europe but also that the aims of data harmonisation and SDI building become more and more present. The biggest challenge in SDI building is the complexity of the planning system itself because of fragmented

legislations of the planning systems which in some cases even vary within one country. Examples for decentralised planning systems are Germany and Austria that have different legislation on the level of each state (16 and 9). In this case the role of the national level in spatial planning is limited as there is no competence of spatial planning. In general the inconsistent terminology in spatial planning reflects the fragmented planning system. One term can mean something different depending on the state which might lead to misunderstandings and the need for introducing a glossary of spatial planning terms. Also the high number of actors which are involved in the planning process and which have different interests and intentions make holistic planning challenging. Spatial plans have different legal definitions, different binding aspects, they are established in different scales, on different administrative levels, their updates vary and they have different representations. Whereas plans are more schematic in France they are very precise in Germany. In addition not all regions/municipalities in Europa do have plans. Although there are still big gaps in spatial planning data harmonisation and SDI building, SDIs become more and more present in spatial planning procedures on the national, regional and local level. Altogether more than 40 best practises in the field of SDI could be identified and described in Europe. The majority are cross-border EU-initiatives. With 24 partners from 15 different countries Plan4all is one of the biggest networks and transnational projects in this field. For each state within the Plan4all project there is a structogram that demonstrates the relation of spatial planning instruments and SDI (the Austrian example see fig. 2). (cp. Rubitzki/Vancutsem, 2009)

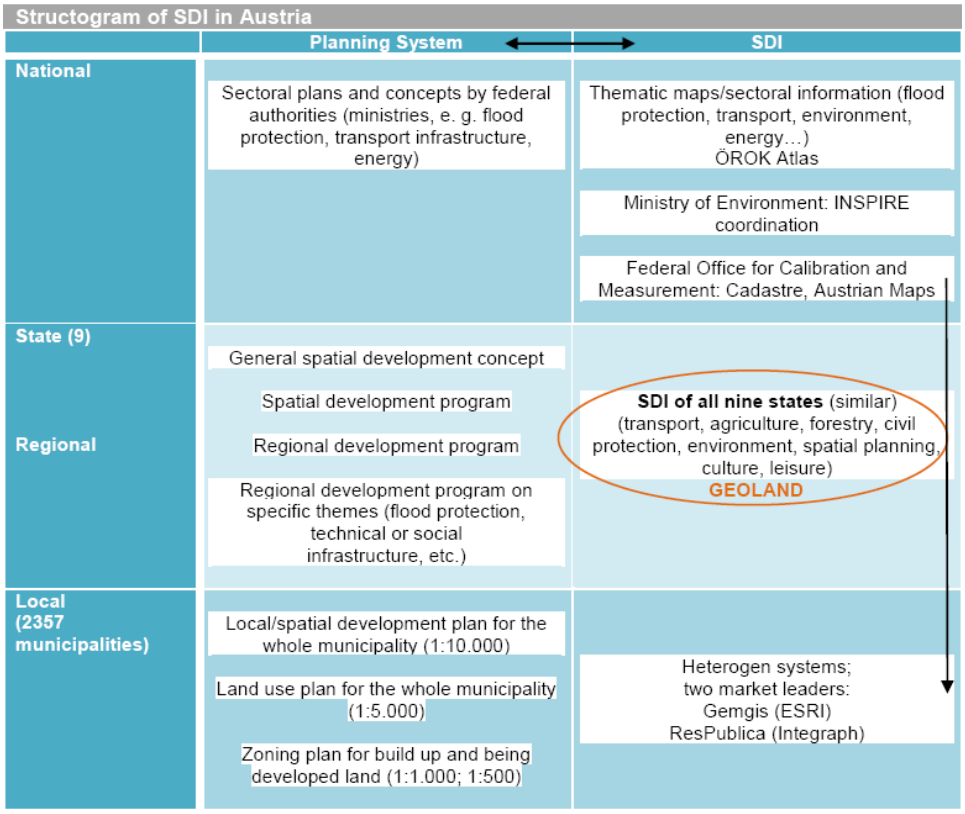


Fig. 2: Structogram of SDI in Austria in comparison with the planning system (Source: Rubitzki/Vancutsem, 2009)

3.2 Technological aspects and data quality

The detailed examination of more than 40 existing European best practise projects in SDI implementation identifies used technologies and innovative challenges in data harmonisation. Relevant software and services for SDI building are collected, described and classified in a standardised way. The first step is to establish a framework for classifying existing technologies with focus on technology convergence and the emergence of applications. Collected services and products were classified according to the used standard, technology (client-side, server-side, services, protocols and functionality), interactivity (simple web mapping, real web mapping, semi-interactive, fully interactive) and approach (graphic viewer, web cartography, web mapping, web GIS, routing, etc.). There is a wide range of available software, either commercial or open source products which make SDI building feasible but also challenging in terms of compatibility. Moreover, the focus is on data evaluation and quality criteria. Data quality consists of various aspects: accuracy (in both geometric and attributive terms), completeness, consistency, system currency (meaning the time frame from

when the real world changes to when the information system state is updated), timelines, volatility, accessibility, and interpretability. The framework should work as a reference for the further development in the project, so all user groups can rely on the quality of Plan4all data or rather measure data quality. However, data is only as good as its metadata[1] and the current situation is not always satisfying. Whereas some regions do have metadata which is collected according to international standards, others do not use any standards for their metadata collection and others do not collect any metadata at all. Therefore Plan4all underlines the importance of metadata collection. (Beyer/Wasserburger et al., 2009)

3.3 INSPIRE as the regulatory framework

Plan4all focuses on the definition of common procedures and methods for spatial planning data sharing according to the INSPIRE directive[2]. For that reason several INSPIRE documents were analysed, their requirements listed and an INSPIRE-oriented set of recommendations was provided. Altogether 23 documents – originated by INSPIRE, INSPIRE-related projects and projects related to spatial planning – were analysed with a format composed of descriptive items and a SWOT[3] table. INSPIRE sets standards regarding availability, quality, organisation, accessibility and sharing of spatial information. The INSPIRE directive applies for the development of spatial planning data models and metadata profiles. INSPIRE requirements claim for the definition of metadata elements on dataset level for all the data and services related to the seven selected data themes (INSPIRE annexes II and III[4]) in addition to the mandatory metadata elements set of the INSPIRE metadata regulation[5]. Also Plan4all issues data modelling and application schemas according to the INSPIRE documents "Generic Conceptual Model (GCM)" and "Methodology for the development of data specifications". All in all it should be possible for spatial data sets to be combined and for services to interact without repetitive manual intervention in a way that the result is coherent and the added value of the data sets and services is enhanced. The directive does not require the collection of new spatial data and it does not establish new infrastructures, moreover it is based on already existing data and infrastructures created by member states that should be made compatible by common implementing rules (IRs) to guarantee usability in the community and transboundary context. The analysis of the INSPIRE requirements has produced the following general recommendations for the project: Interoperability of spatial planning data can only be achieved with consistent efforts on all levels. Especially interoperability on terminology as well as on base and thematic data has to be achieved as planning is a holistic activity. It is recommended to explicitly express topological relationships, e. g. administrative units at the same level of hierarchy must not overlap, gaps between administrative units are in principle not allowed and boundaries of neighbouring administrative units must have the same set of coordinates. (cp. EUROGI/AMFM, 2009)

3.4 Multiple user requirements

The analysis of user requirements focuses on basic procedures and processes in spatial planning, spatial planning data, standards and regulatory framework, technical possibilities and alternative infrastructures, requirements on data and metadata models, used intellectual property rights (IPR) models and user involvement in decision processes. The requirements were defined by the following user groups: spatial planning authorities, other civil service authorities, owners of transport and technical infrastructure, planning engineers and city planners, firms, NGOs, investors and real estate owners, real estate agents, public, researchers and students. Because of the big differences between individual countries in spatial planning systems, also the user requirements vary by country as well as by actor. To sum up, some common requirements for all partners could be defined. Required for data harmonisation are the vertical and

[1] Metadata is "data about data (...)", for example the title, subject, author, date, etc. of the data. (http://www.yourdictionary.com/computer/metadata, retrieved on March 2010)

[2] The acronym INSPIRE refers to the Directive 2007/2/EC of the European parliament and the Council of 14 March 2007 with the aim to establish an Infrastructure for Spatial Information in the European Community. The directive entered into force on 15 May 2007 and will be fully implemented in 2019.

[3] SWOT – Strenghts, Weaknesses, Opportunities, Threats

[4] The seven selected INSPIRE themes are: land cover, land use, utility and government services, production and industrial facilities, agriculture and aquaculture facilities, area management/restriction/regulation zones and reporting units as well as natural risk zones.

[5] The INSPIRE Metadata Regulation is mandatory for all spatial data themes of the INSPIRE Directive Annexes. The INSPIRE document Technical Guidelines based on EN ISO 19115 and EN ISO 19119 (revised edition) provides technical guidelines for the implementation of the INSPIRE Metadata Regulation on the base of ISO 19115 and ISO 19119.

horizontal interoperability of tools and methods, the implementation of web services as well as the possibility to publish own data and to use web map services from other data providers, the definition of a spatial data legend for data presentation, INSPIRE compliance, the possibility of metadata profile extension, free access to spatial planning data, the possibility to make physical data accessible in electronic format together with ensuring of digital right management and the use of UML for data model description. In addition the following issues should be covered: implementation of an explanatory dictionary for spatial planning (glossary), a multilingual thesaurus for spatial planning, a referential geographical system and projection, a description of the data transformation process and tools for data transformation. (HF et al., 2009)

4 OUTLOOK

The state of the art analysis provides an important base for further development in data harmonisation and SDI building. The development of a metadata standard, the development of data models for the seven selected themes and the implementation of networking standards according to the INSPIRE Directive and the user's needs are currently in progress. In a next step the implementation of these standards will be tested on a large-scale testbed with the aim to demonstrate the technical feasibility of the designed models. The publishing of data will respect IPRs which will be agreed between data holder and project team. Output will be a Plan4all geoportal consisting of harmonised spatial planning data from the Plan4all partners with the aim to further extend the network with affiliated partners. On long term the data harmonisation process is open for future extensions to other themes such as transport, energy, etc. Plan4all is a testbed for INSPIRE and supports the distribution of the INSPIRE idea which is the development of a European spatial data infrastructure as well as the support of holistic planning.

5 REFERENCES

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