

# Geoinformation on Demand – the Bavarian Example

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**Key words:** no redundant data storing, standards in data modelling and interfaces, rapid data access

## SUMMARY

Nowadays spatial data is well on the way to gain an outstanding importance for politics, economy, administration and each citizen. This development is initiated by several facts:

- over 80% of all daily used information contains spatial reference,
- this spatial reference is easily available by modern technologies of positioning in a standardised, global coordinate reference system with high accuracy, currentness and economical conditions,
- in addition to three spatial dimensions there is the possibility of integrating time as a fourth dimension or any feature attributes in spatial data services.

So GIS stand for a memory of interdisciplinary data, including a provision of its standardised spatial and chronological attribution, which is indispensable for any political, economical, administrative and ecological decision or problem-solving. Due to the possibility of analyses over various chronological scales, GIS fits the requirements of long period examinations over many years as well as those of disaster-management, where it often depends on minutes.

GIS mostly deal with huge amounts of data. Therefore the efficiency of data collection, data documentation and data services have a big relevance.

The observance of the following basic principles:

- no redundant data storing
- standards in data modelling and interfaces
- and rapid data access

is especially important. Only under these circumstances “Geoinformation on demand” actually makes sense.

In Bavaria, the administration of land surveying and cadastre has by law the task of establishing a spatial data infrastructure (SDI) called “Geodaten-Infrastruktur Bayern (GDI-BY). The big point is the extended definition of its scope. It is defined as collecting and providing not only basic spatial data (topographical and cadastral data) for the entire national territory, but also all specific spatial data of the public sector by web-services. GDI-BY is part of the German spatial data infrastructure initiative “Geodateninfrastruktur Deutschland (GDI-DE)”, which is part of the European SDI-Initiative INSPIRE. In the technical aspect GDI-BY is based upon the open standards of ISO and OGC as well as upon the mandatory nationwide SDI-Conventions.

Basic components of “Geoinformation on Demand” are the Integrated Spatial Database (IGDB) and a “Viewer of Bavaria”, called “BayernViewer”. Its advantage is the scalability to various ranges of specific spatial data of the public sector, for example the “BayernViewer-agrar”, developed for agriculture (INVEKOS and application of subsidies), the “Webservice of flood endangered areas (BayernViewer-aqua)”, developed for water management or the “BayernViewer-Denkmal” for spatial referencing of all listed monuments, buildings and archaeological sites. Already now the BayernViewer has evolved as an indispensable appliance for disaster-management and police force.

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## 1. INTRODUCTION

In November 2005, the coalition contract of the German Federal Government has been published. One major issue in the contract is the following statement: „A modern State needs an innovative, strong and efficient administration. Consequently we will continue on our way we have started with Deutschland-Online. We will reorganise the government cooperation on the field of Information and Communication Technology (ICT) for reducing expenses of the bureaucracy. By implementing central and ICT-based processes for the most important government services for the economy and the citizen (E-Government) we will play a leading part in developing an innovative and efficient administration.“ Of course therefore the spatial based data and information have to be included.

Nowadays spatial data is well on the way to gain an outstanding importance for politics, economy, administration and all citizens. This development is initiated by several facts:

- More than 80% of all daily used information has spatial reference.
- This spatial reference is easily available by modern positioning technologies by means of a standardised, global spatial reference system with high accuracy, correctness and economical conditions.
- In addition to the three spatial dimensions there is the possibility of integrating time as a fourth dimension or any feature attribute in spatial data services.

Geographical Information Systems - GIS - are standing for a memory of interdisciplinary data, including a provision of its standardised spatial and chronological attribution, which is indispensable for any political, economical, administrative and ecological decision or problem-solving. Due to the possibility of analyses over various chronological scales, GIS fit the requirements of long period examinations over many years as well as those of disaster-management with the need of on-demand-information within minutes.

## 2. DEFINITION OF SPATIAL DATA INFRASTRUKTURE (SDI)

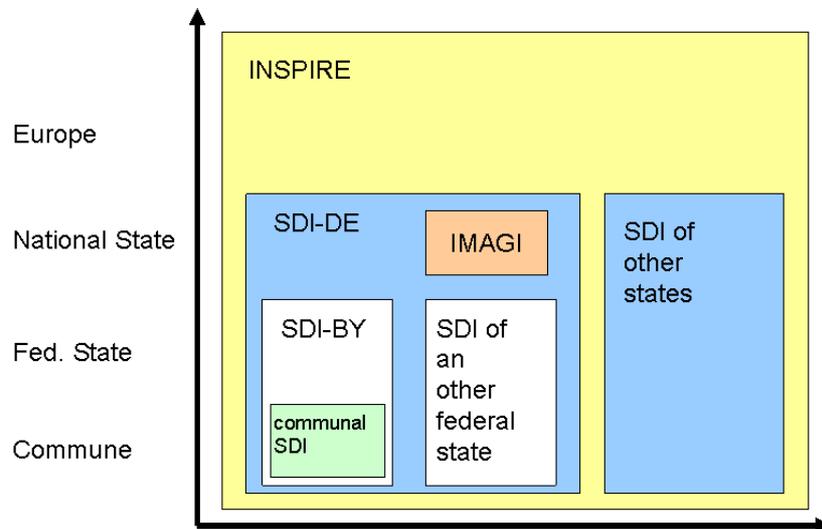
Most information implies a spatial reference. More and more, the growing IT-network enables access to distributed data. For this reason, the European Commission has launched an initiative to create a European Spatial Data Infrastructure (INSPIRE<sup>1</sup>, <http://inspire.jrc.it/>). The key objective of INSPIRE is to make spatial information available – concerning the extent of and the easy access to spatial data, starting with environmental policy. The draft of the European directive is still in the decision of the political process.

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<sup>1</sup> Infrastructure for Spatial Information in Europe

With the building of a collective national SDI<sup>2</sup> in accordance with the decision of the Chiefs of the Bundeskanzleramt and the Chiefs of the Staats- und Senatskanzleien of the Länder (CdS) from 27th November 2003 (GDI-DE, <http://www.gdi-de.org/>), the mandatory conditions for a spatial data infrastructure have been released.

The target of an easier use of spatial data will be approached on all levels of the administration. The SDI of the German (SDI-DE) federal administration is linking together SDI-activities of the Federal States as well as SDI-activities on communal level in Germany. Thus, there will be a hierarchical structure of SDI's. This means that SDI-DE bases on the SDI of Bavaria and the other federal states of Germany.



Based on the SDI-definitions of the EU-member states the draft of the directive INSPIRE defines an infrastructure with the following elements:

- Spatial data and Spatial services, Metadata,
- Net Services and Technologies,
- Agreements on the use and access
- Coordination and monitoring mechanisms and procedures.

This structuring of the SDI elements will be used as well for the SDI in Bavaria.

### 3. INSPIRE

INSPIRE is a European directive, initiated of the European Commission and developed in collaboration with decision bodies and other experts of the EU-member states. As a first step, spatial information shall be provided to analyse the state of the environment. INSPIRE shall enable an efficient European environmental governance and policy. Later, information concerning different themes shall follow (e.g. agriculture and transportation).

The basics of setting up INSPIRE are:

- The infrastructures for spatial information in the member states should be designed to ensure that spatial data are stored made available and maintained at the most appropriate level.

<sup>2</sup> Spatial Data Infrastructure

- It should be possible to combine spatial data from different sources across the community in a consistent way and share them between several users and applications.
  - It should be easily possible to discover available spatial data, to evaluate their suitability for the purpose and to know the conditions applicable to their use
  - Geographic information which is needed on all levels of administration should be provided in a way that comprehensive use is possible.
  - It should be easily possible to find out which geographic information is available at all.
- After conclusion of the political agreement process, the directive will be put into national law.

#### **4. GDI3-DE**

Already at the 17<sup>th</sup> June 1998 the Cabinet of the German Federal Government decided about the coordination of the spatial information in the Federal Republic of Germany. With that decision the federal „Inter-Ministerial Commission for Spatial Information” (IMAGI) has been founded.

The Chiefs of the Bundeskanzleramt with the Chiefs of the Staats- und Senatskanzleien of the federal States (CdS) have at the 27<sup>th</sup> November 2003 decided upon the construction of the Spatial Data Infrastructure in Germany (GDI-DE). A steering committee GDI-DE and an Office for Coordination the GDI-DE has been established. The steering committee GDI-DE has members of the Federal Government, the federal states and the communal associations (municipalities).

At the 28<sup>th</sup> October 2004 the working group of the State Secretaries for E-Government decided upon the tasks of the steering committee GDI-DE. The main tasks are:

1. Designing a concept to ensure an open SDI in Germany as a part of the European Spatial Data Infrastructure.
2. Steering and coordinating the activities of the federal states, the municipalities and the Federal Government in developing, updating and implementing of standards in European and international Spatial Data Infrastructure.
3. Deciding on pre-operating studies in implementing geo-portals in Germany following the principle „some for all“.
4. Caring about the installation of the National Spatial Data Bases (NSDB) by the government administration of Federal Government, the Federal States and the municipalities.

All these goals can be implemented only stepwise, following clear priorities and taking the available financial and personal resources into account.

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<sup>3</sup> Geographic Data Infrastructure is the German expression for SDI

## 5. DEMANDS OF THE ECONOMY

Both in GDI-DE and in GDI-BY on the Bavarian state level there is a close cooperation with the economy. In meetings with representatives of the economy, the demand of the economy on GDI has been formulated.

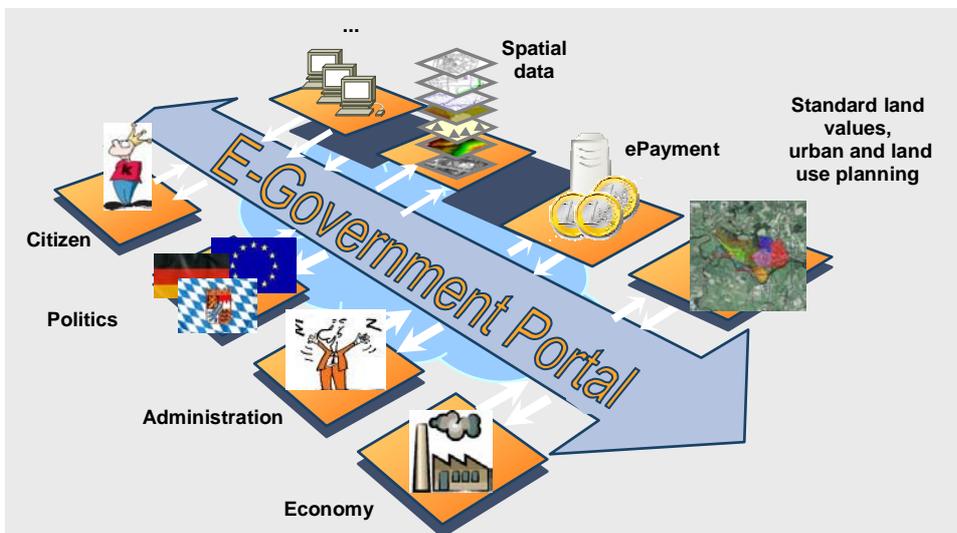
The wishes of the economy are useful impulses; they enable a more efficient relationship between economy and government (E-Government). Therefore administration has to name **one** contact office and **standardised central services** to assure an integrated provision of all relevant data. Besides viewing services additional services for the integration of spatial data in user-applications will be important.

Therefore the Bavarian Surveying Administration will pilot a project „**BayernViewer for the economy**” to visualise all spatial data which are of importance to the economy.

## 6. STRATEGY OF THE E-GOVERNMENT PORTAL BAVARIA

The E-Government initiative of the Bavarian Government started in 2002. Its target is to make the internet's advantages available equally to government offices as to the citizen within its relation to the government.

(<http://www.bayern.de/Wirtschaftsstandort/IuK/eGovernment/>). The projected E-Government Portal of Bavaria shall combine all the internet services of the governmental and municipal administration and provide a common access.



One of the most critical factors within offering E-Government- services is their acceptance by citizen and economy. This acceptance will be achieved by the transparency of information and simple access to online-services. Within the Bavarian E-Government initiative a central E-Government Portal will be developed which combines internet services of the governmental and municipal administration. The Bavarian E-Government Portal will offer new automatised

single services and additional possibilities to optimize administration process chains within government offices and therefore to provide a new quality of interaction between government and citizen as well as between governmental and municipal offices themselves. With this, a higher efficiency within the government administration will be obtained as well as a higher productivity of our entire economy. The objective is to include all level of administration, starting from the municipalities up to the EU authorities in the portal.

A so called portal software, that is to be implemented, will enable a non-redundant provision of central components (e.g. ePayment, process-controlled link of information and applications) as well as the presentation of the information on any end device (e.g. Web browser, mobile devices).

Geodata can provide a very important input on the building of an E-Government infrastructure and on the reform of the administration until they are accessible digitally and using standardised applications. The new, recently established geodata portal is part of the E-Government strategy in Bavaria.

## 7. SDI IN BAVARIA (GDI-BY)

The **Spatial Data Infrastructure Bavaria (GDI-BY)** has been defined 2003 by an inter-ministerial working group. Its general objective is the „easy access to and use of spatial data (reference and application data) for government administration, for economy and citizen on behalf of an efficient E-Government”.

Basis is the decision of the Board of Ministers on 14<sup>th</sup> September 2004 which states, that spatial reference and application data should be provided in standardized way to be used in GDI-BY. The ministries fully remain responsible for their gathered and maintained data. Besides that, on 1<sup>st</sup> August 2005 the Bavarian Surveying Administration has obtained the directive to set up a spatial data infrastructure in form of an Integral Geo Data Base (IGDB). IGDB will provide **geo reference data as well as geo application data and geo services** (Art. 12a VermKatG). IGDB is one of the base components of the Bavarian **E-Government strategy**. In Bavaria, at federal state level, access to and use of geo reference and geo application data shall be made easier step by step in terms of

- **institutional and organisational aspects** (responsibility, organisation, cooperation),
- **technical aspects** (data, metadata, services, products, standards),
- **legal aspects** (accessibility, protection mechanisms),
- **socio-economical aspects** (costs, prices, quality, qualification).

### 7.1 The Integral Geo Data Base (IGDB)

IGDB will be an important component related to the architecture of the E-Government infrastructure of the Bavarian Government.

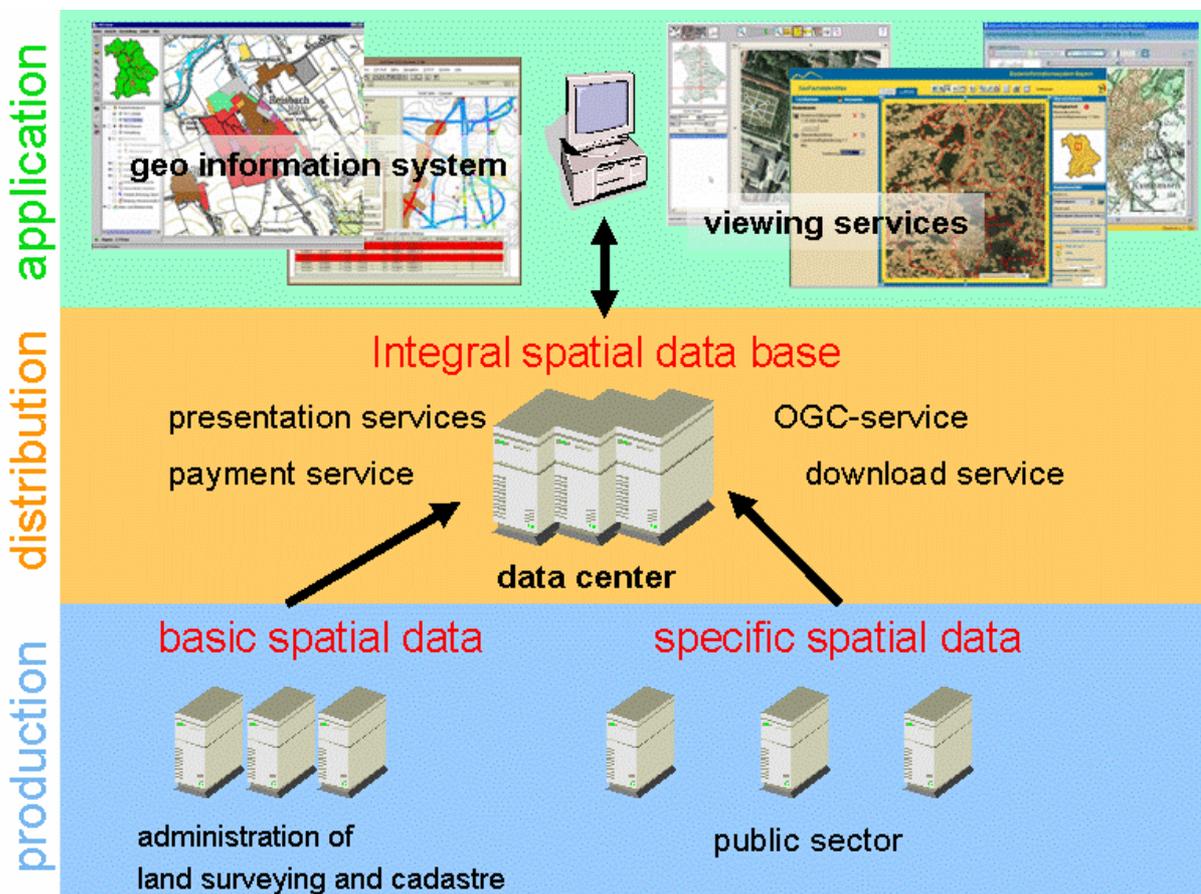
### 7.1.1 Principles

#### Separation of data production and distribution of data

Because of the different aims concerning production and distribution of spatial data the requirements on the logical structure and data storage as well as the requirements on the access to data are very different. Concerning data production, aspects as - for instance - fast changes, local access, refined query possibilities, data control, update mechanisms etc. are in the foreground. In contrary, for data distribution, aspects as

- fast provision of the data
- distribution formats are often determined by external institutions (OGC, ISO, CEN, companies)
- high availability,
- large area distribution,
- payment, cashing
- security

are to be primarily considered.



In addition, safety, security and integrity aspects are not to be kept unattended. Through the indicated separation, extern influence on data production can be avoided.

## **Responsibility and ownership of application data remain with the corresponding administration**

Responsibility for data production and distribution data as well as for data specification is generally remaining with the corresponding administration. The data ownership remains - separated of the question where data are located - generally with the data producing authority. It decides which data are accessible for internal use only, which data can be used within the administration and which are accessible for the public.

### 7.1.2 Approach

Realisation of the IGDB bases on the architecture of the Bavarian E-Government Infrastructure. The IGDB provides the geospatial reference and administrative application data to the E-Government portal using geo services in a service-oriented architecture (SOA). Services which are provided by the E-Government infrastructure can be used as well. It is planned to integrate a payment component (e-payment) using web services and to provide a central authentication component. The data standardisation bases on specifications of the Open Geospatial Consortium (OGC).

The IGDB will be complemented step by step by realising concrete and practical projects with focus on the demand of the economy and will be further developed by the gained experience.

Presently the following data are available via the WMS service in Bavaria:

#### Geo reference data:

As WMS:                                    ÜK 500, TK 50, TK 25, DOP, DFK, DOK  
WMS under construction:    ATKIS, contour lines, DGM, ALB

#### Geo application data:

As WMS<sup>4</sup>:                                   environmental protected areas, National and regional parks, Ramsar  
WMS under construction:   agricultural environmental measures, Natura2000, geological data, protected monuments, property values, construction site plans, flood risk areas and flooded areas

Besides cross country projects, initiated by the steering and coordination committee of GDI-DE, the Board of Ministers of Bavaria is considering the advancement of SDI in Bavaria as a central and future-oriented corner-stone for the build-up of E-Government in Bavaria and is supporting it by funds of the project "Invest future Bavaria". The project „Construction of a Spatial Data Infrastructure“ has been subdivided into six sub-projects:

- gathering and visualization of protected areas with an accuracy corresponding to the cadastral map
- digital gathering of area-shaped monuments
- providing (binding) land use plans in the internet

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<sup>4</sup>           Web Map Service

- country-wide provision of property values in the internet (VBORIS)
- soil information system Bavaria (BIS)
- multi-application form for agricultural subsidies

Involved into these projects are many ministries as well as the Bavarian municipalities. In addition, the construction of SDI is supported on very broad basis.

The public administration geo data are in future to be distributed to the public over the base component BayernViewer. In order to achieve this, the functionality of the BayernViewer will be continuously expanded. Using this very economical open source software for the provision of data, there will be less additional license fees for the users.

In order to comply with the data protection law, a detailed concept of authorisation has been elaborated which allows to provide person-related data to users who are authorised.

## 7.2 Basic Component GeodataOnline

GeodatenOnline (geodata online) is the geodata portal in Bavaria which offers several online-services of the Bavarian Surveying administration, for instance ordering services which allow to obtain data of the digital cadastral map (“Digitale Flurkarte DFK”) for presentation purposes as well as in raster data format or in vector data format. Additionally, the service BayernViewer is providing the viewing of rectified aerial images (“Digitale Orthophotos DOP”) and of Topographical maps - for entire Bavaria and free of charge. Based on this module, several special extensions have been developed and supplied during the last years on the demand of users.

- **BayernViewer-plus**: a chargeable service, with extended functionality and Bavaria-wide access to finely resolved Digital Orthophotos, to the Digital Topographic Map (DTK), to the Digital City Map (DOK) and to the Digital Cadastral Map (DFK),
- **BayernViewer-agrar** to assist the application for agricultural subsidies from the agricultural administration,
- **BayernViewer-aqua** as an information component visualising flood risk areas in the responsibility of the environmental administration
- **BayernViewer-Denkmal** for the Office of Protected Monuments in Bavaria

In future, the new geodata portal “GeodatenOnline” will combine all available products respectively services. The welcome page can be reached via <https://geoportal.bayern.de/portal>. The services can be used by authenticated and non authenticated users. One import new feature is a personification of the offered online services. After logging in, a registered user will be offered all the services he is interested in.



„My GeodatenOnline“ offers to registered users the sections

- log-in
- information
- FAQ – frequently asked questions
- contact

For registered users an additional functionality

- shopping basket
- download area
- order change

is offered.

Each customer gets only one identification which allocates his specific rights. The customer contact is stored with name, address and - depending on his preferred way of payment - either the customers account information or his credit card number. The order itself is carried out with the help of a shopping basket functionality. Selected products will be placed in a shopping basket with an automatic computation of the billing details, which can be only accessed by the customer itself. The shopping basket offers functionality as known from other internet services. The order will be processed within few seconds and will be placed in a personal download area.

In future the payment will be take place using the ePayment component of the E-Government Portal.

## 8. CONCLUSION AND LOOKING AHEAD

With the BayernViewer and the Integral Geo Data Base, the Bavarian Surveying Administration ist rather successfull in creating a Spatial Data Infrastructure. The Surveying Administration is delivering a major contribution to the E-Government in Bavaria. The task of

a land surveying administration is to provide geo data and geoinformations for citizens, economy and administration in an actual, technical high leveled and efficient way – in short:

### **Geoinformation on demand**

#### **BIOGRAPHICAL NOTES**

1943	born in Rosenheim
1965 – 1970	study of geodesy at the Technical Universities of Munich and Graz with an endowment by the German People Study Foundation
1970 – 1972	trainee in the Bavarian Land survey Administration finished with the Great Examination
1972	doctorate and entry in the Bavarian Land survey Administration
1978 – 1979	course in governmental and administration management at the Bavarian State Chancellery
1982 – 1998	senior governmental adviser in the Bavarian Ministry of Finance
1995	Honorary professor at the Technical University of Munich
since 1998	head of department of the Bavarian Land survey Administration and CIO in the Ministry of Finance
2002	member of the German Geodetic Committee

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