

# Information Technology and Spatial Data Infrastructure for E-Government

*Hartmut Müller*

FIG Workshop on eGovernance,  
Knowledge Management and eLearning  
Budapest, Hungary, 27-29 April, 2006



# Who are we?

University of Applied Sciences, Mainz, Germany  
Institute for Spatial Information and Surveying Technology

Information  
Technology and  
Spatial Data  
Infrastructure  
for E-Government

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Mainz, Germany  
i3mainz, Institute for Spatial  
Information and Surveying  
Technology - Fields of Competence

- Digital image processing
- Photogrammetric Imaging
- Remote Sensing
- Digital Cartography
- Surveying
- Databases
- Geographic Information Systems
- Software Development
- Internet Development
- Multimedia
- 3D Visualization



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# Topics of Presentation

- Geobasic Data as an SDI backbone
- Spatial IT implementation issues  
in public administration
- Organisation issues
- Technical issues
- Cost benefit aspects



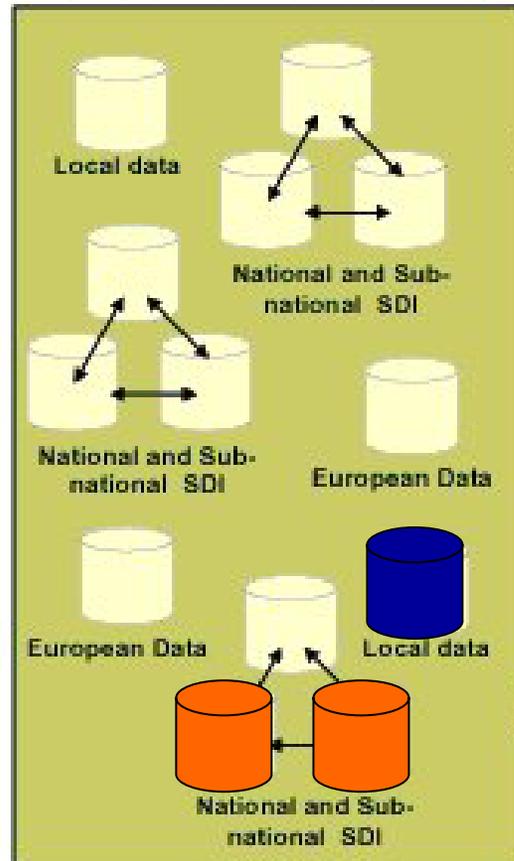
# INSPIRE

Infrastructure for Spatial Information in Europe  
Information Flow - Addressed Items

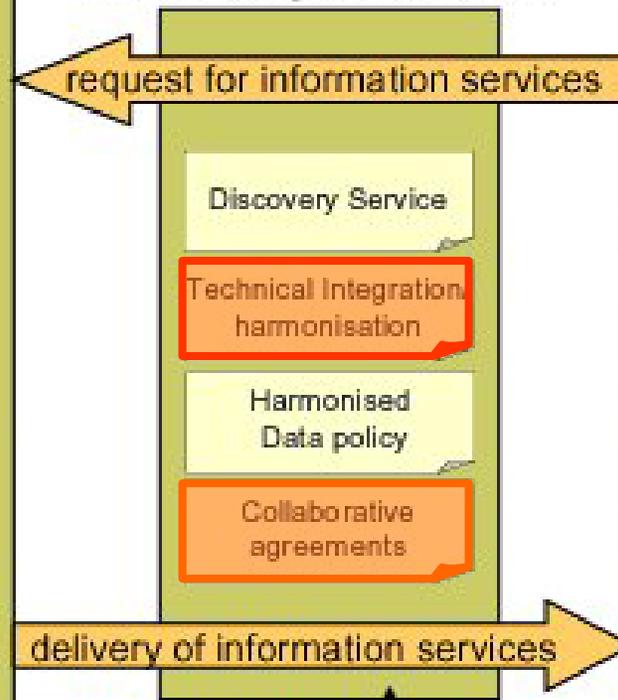
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## Data resources



## INSPIRE specifications



## Users



# Government & Administration Levels in the FRG

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- National level (Bund)
- Regional level (Land) 16 Laender
- Local level (Landkreis) ~ 250 Rural area districts
- Local level (Gemeinde) ~ 15.000 municipalities



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# SDI Management in Germany



- 1. Federal republic with 16 Länder**
- 2. SDI development at federal, regional and local levels**
- 3. Far reaching autonomy of the Länder:**  
responsabililty for their own topographic service,  
land and property register,  
environmental and statistical data collection,  
data policies.
- 4. Data collection largely decentralised,**  
carried out mostly at regional and local levels (municipalities)
- 5. processing and maintenance of data**  
adapted to local and regional requirements



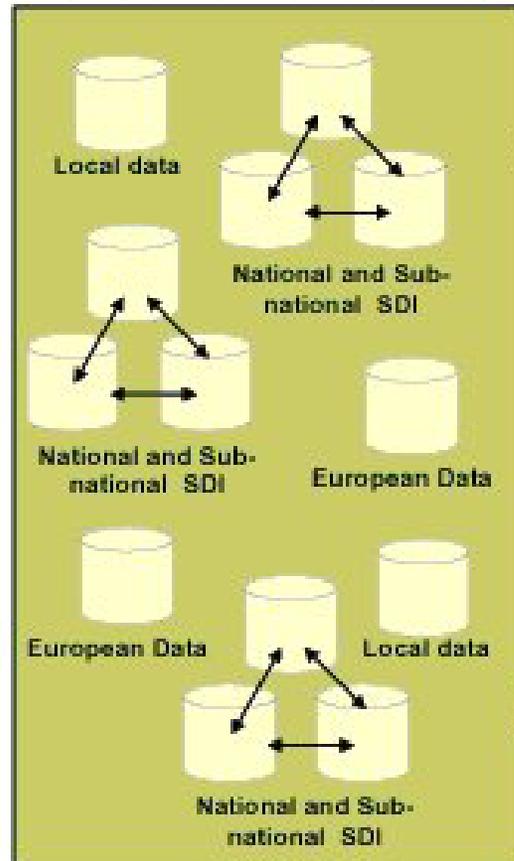
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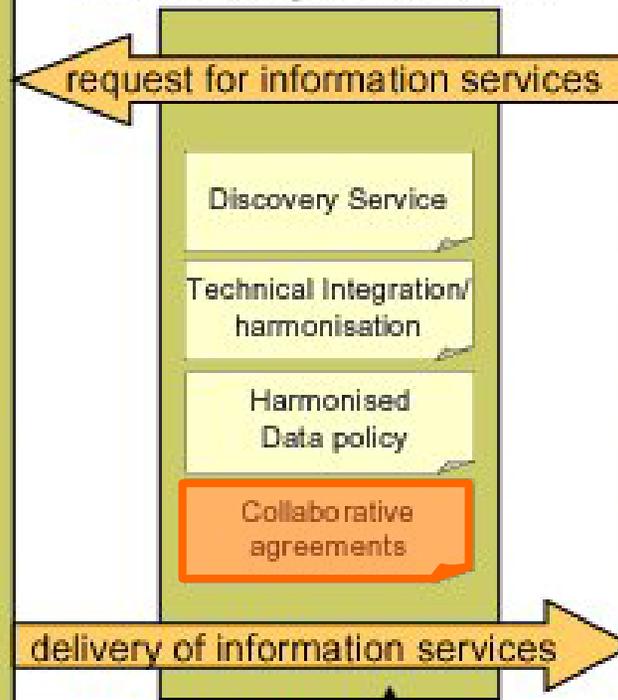
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## Data resources



## INSPIRE specifications



## Users



ISO





# Collaborative Agreement Regional Level / Local Level

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- **Contractors**

- L VermGeo Rhineland-Palatinate

*State Agency for Surveying and Spatial Basic Data*

- Landkreistag Rhineland-Palatinate

*Umbrella organisation of all rural area districts*

*(regional level) in the Land Rhineland-Palatinate*

- **Lump sum** to be transferred on a year by year basis

- **Benefits for** administrative units at the **local level**

- all spatial basic data provided by surveying authorities available
- no specific budget needed



# Spatial Basic Data Ressources

Regional SDI

Data Provided by Surveying authorities

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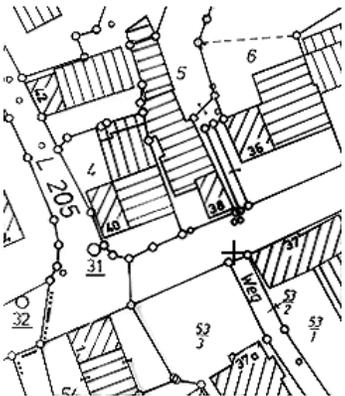
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- Digital Landscape Models – DLM
- Digital Topographic Maps – DTK



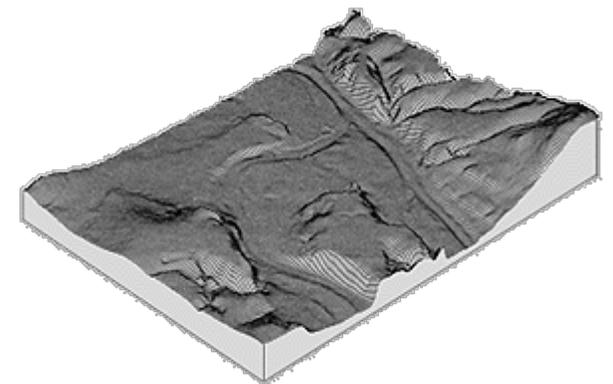
■ Digital Orthophotos –



- Automated Real Estate Register – ALB ownership, land use, etc.

■ Automated Real Estate Map – ALK

boundaries, buildings, etc.



■ Digital Terrain Models – DGM



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# Study Area

Rhineland - Palatinate, South West Germany  
One of 16 German Laender

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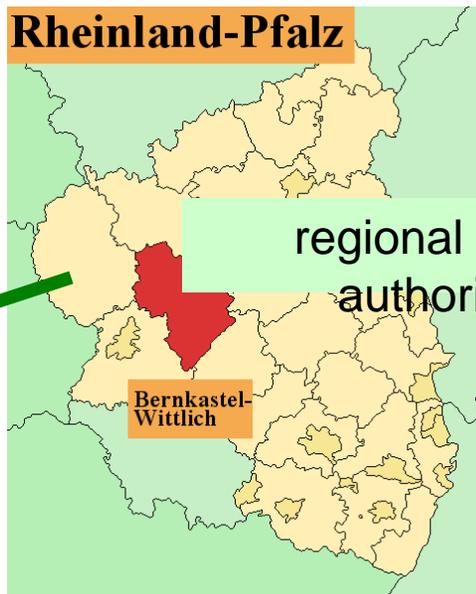


# EUROSTAT NUTS

Nomenclature of Territorial Units for Statistics

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regional pilot  
authority



Rhineland-Palatinate: NUTS 1 level territory  
24 rural district areas: NUTS 3 level territory



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# Local Authority

Subset of Public Service Products

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### **Tourism**

support the tourism in the region

### **Building administration**

management of the buildings owned by the authority

### **Finances**

borrow credits, safeguard credits, financial statistics

### **Roadworks**

ensure road safety

### **Transportation**

organisation of school buses, public transportation

### **Heavy loads**

control of heavy loads crossing the region

### **Infection prevention**

prevent infectious illnesses

### **Land use regulation**

control land use in the region

### **Landscape planning**

guarantee feasible development

### **Protection of species**

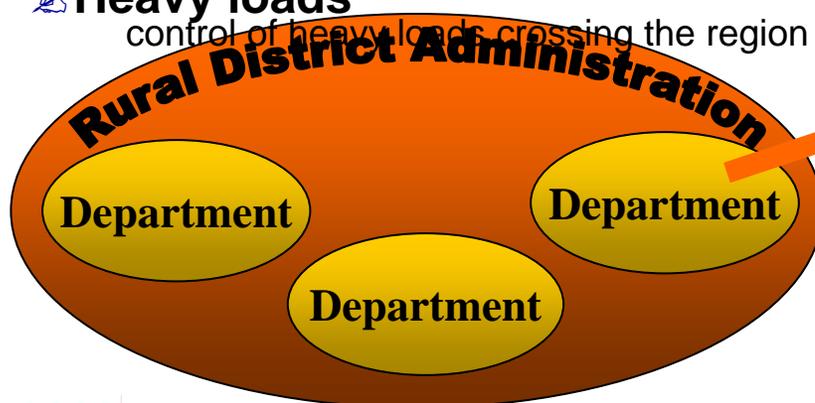
protection of wildlife habitats

### **Drinking water control**

secure the drinking water quality

### **Agrarian subsidy**

distribute special subsidies for farmers



**Responsibility  
for a specific list  
of service products**

**Total of  
~ 170 service products**



# Current Situation

## Local Level Authorities

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Infrastructure  
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- ☰ Overall little use of Spatial Information Technology
- ☰ Some isolated GIS applications in use (bottom up)
- ☰ Spatial basic data not usable due to technical problems
- ☰ Growing danger of scattering and of missing integration
- ☰ Partly missing awareness of Spatial Information Technology benefits



The project study intends to

- ☐ develop a conceptual model for spatial IT implementation at the local administration level
- ☐ give special credit to the integration of spatial basic data
- ☐ guarantee compatibility with ISO and OGC standards
- ☐ consider the role of spatial IT as a part in a work flow environment
- ☐ seek for stimulation of spatial IT application in administration units



# Spatial IT Implementation

## Principal Project Work Plan

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Spatial Data  
Infrastructure  
for E-Government

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2003/2004

### ■ System analysis

- strategic planning
- field research and analysis of given situation
- conceptional modelling
- user specific concept
- IT-concept
- cost-benefit-analyses

2005/2006

### ■ System acquisition

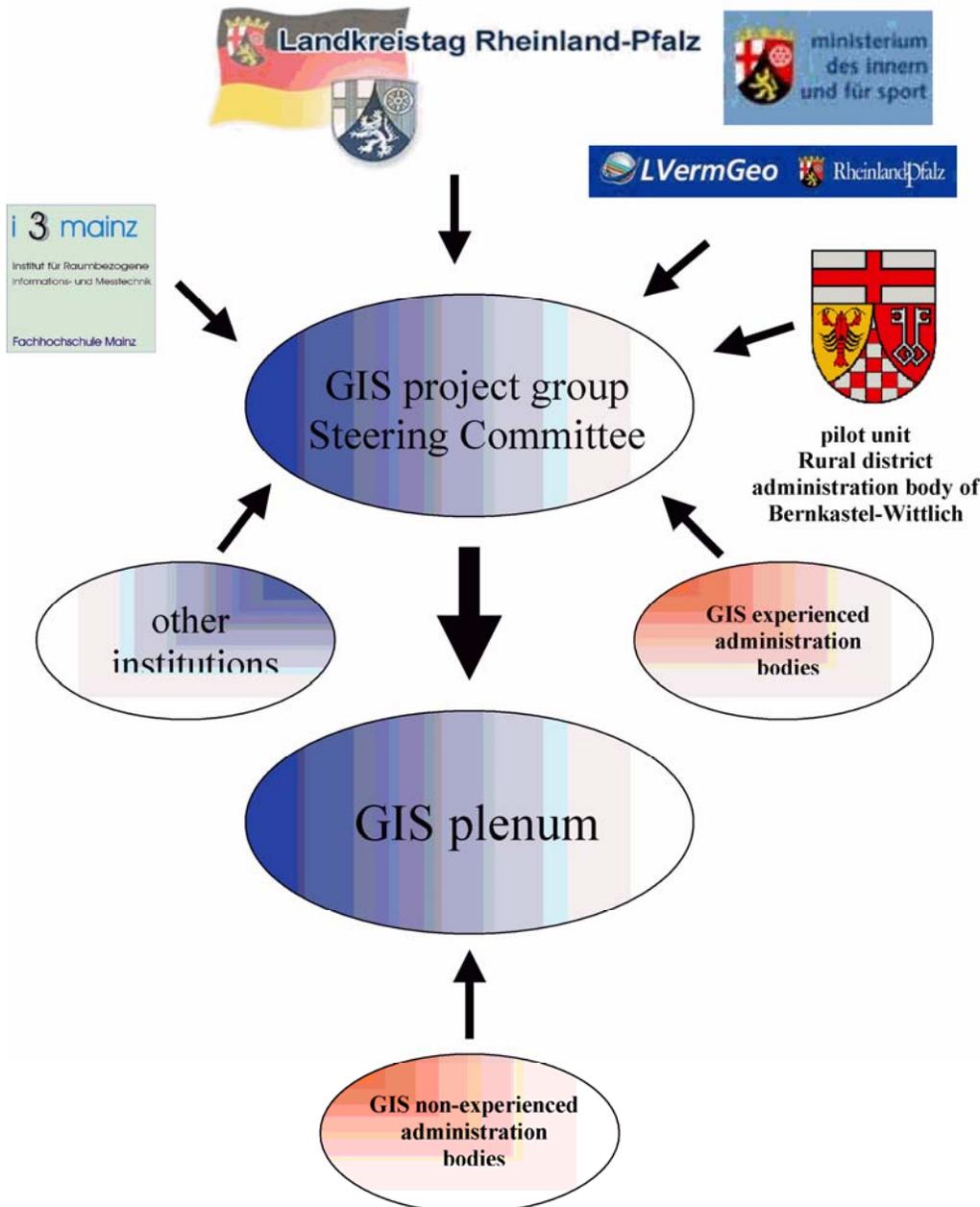
- public tender procedure
- offer rating
- functional tests
- system rating, system recommendation

### ■ System implementation

- system installation, system acceptance
- data acquisition, data migration
- system use



Information  
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Project  
Organisation  
Partners and Tasks



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# Spatial IT Implementation Project Work Plan

Tasks

Information  
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for E-Government

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## ■ System analysis

- strategic planning
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## ■ System acquisition

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# Questionnaire - General

## Level of Service Products

Information  
Technology and  
Spatial Data  
Infrastructure  
for E-Government



- ✍ What is the purpose of the product?
- ✍ Which data are used ?
- ✍ How is the spatial data reference defined?
- ✍ Which software will be established?
- ✍ Which data formats will be used ?
- ✍ Is a a GIS-System / Online-GIS-System already in use?
- ✍ Is it possible to support this product by a GIS-application?
- ✍ Is it possible to use the geo-spatial basic data provided by the Land survey administration?
- ✍ Which other authorities will take part in the results?
- ✍ How many people access the data?
- ✍ Are there any special problems to be addressed?



# Spatial IT Implementation Principal Project Work Plan

Tasks

Information  
Technology and  
Spatial Data  
Infrastructure  
for E-Government



## ■ System analysis

- strategic planning
- field research and analysis of given situation
- conceptual modelling |
- user specific concept | *merged into one step*
- IT-concept |
- cost-benefit-analyses

## ■ System acquisition

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# Spatial IT Implementation Principal Project Work Plan

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for E-Government

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## ■ System analysis

- strategic planning
- field research and analysis of given situation
- conceptual modelling |
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- IT-concept |
- cost-benefit-analyses

Results of conceptual work

**Requirement specification  
document**



## Contents

### General description

- Current situation
- Goals
- Organisational issues
- Service product oriented budget
- Status Quo of spatial information processing at the pilot administration agency of Bernkastel-Wittlich

### System requirements

- General conception
- non-functional requirements and general functional requirements
- GIS requirements
- Data management
- General IT requirements

### Service product specific requirements

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## Requirement Specification Document

Version Jan 13, 2005

by

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i3mainz – Institute for Spatial Information and Surveying Technology,  
Mainz University of Applied Sciences

in cooperation with the members  
of the project group 'Geospatial basic information'  
of Landkreistag Rheinland-Pfalz

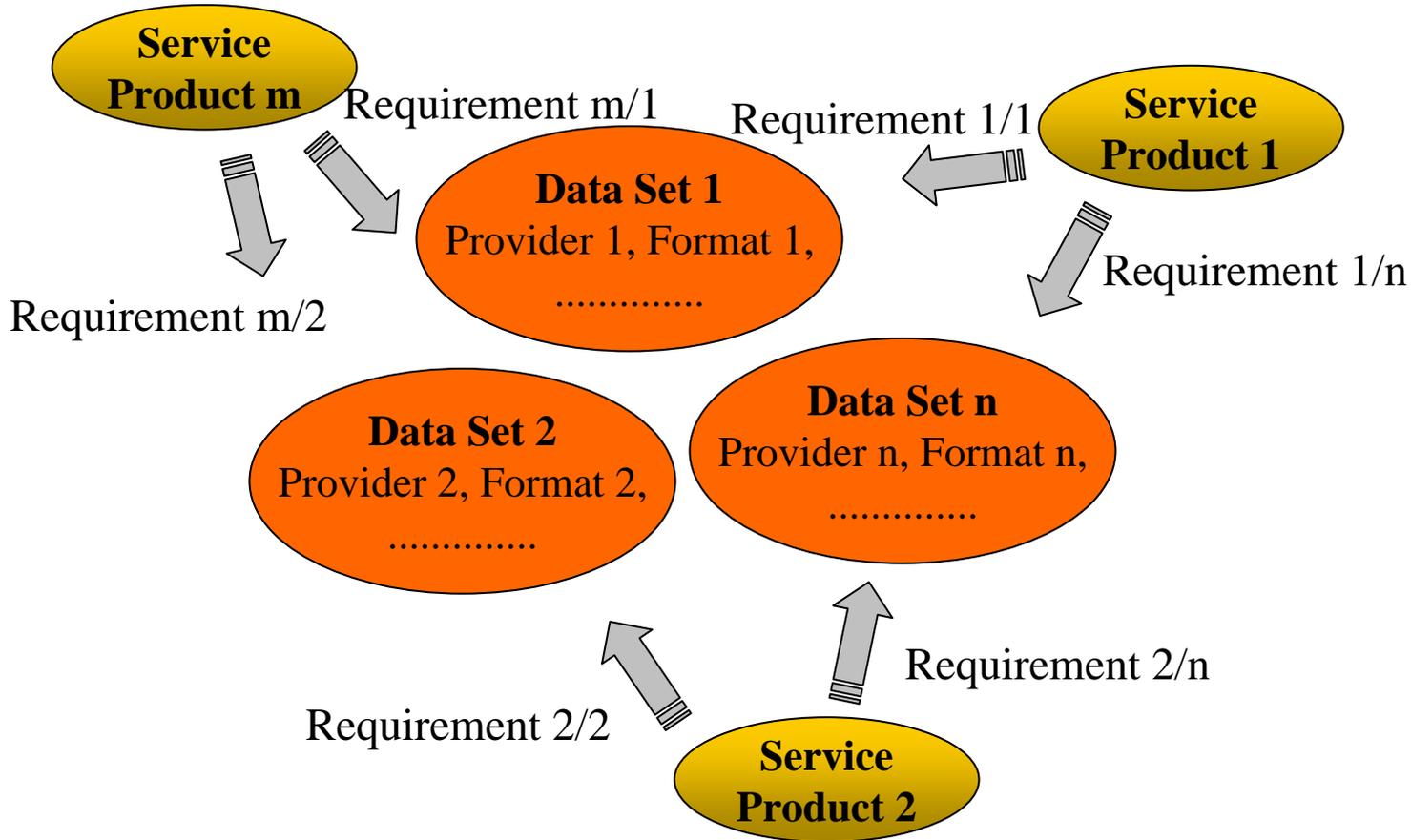
and the regional administration agency of Bernkastel-Wittlich

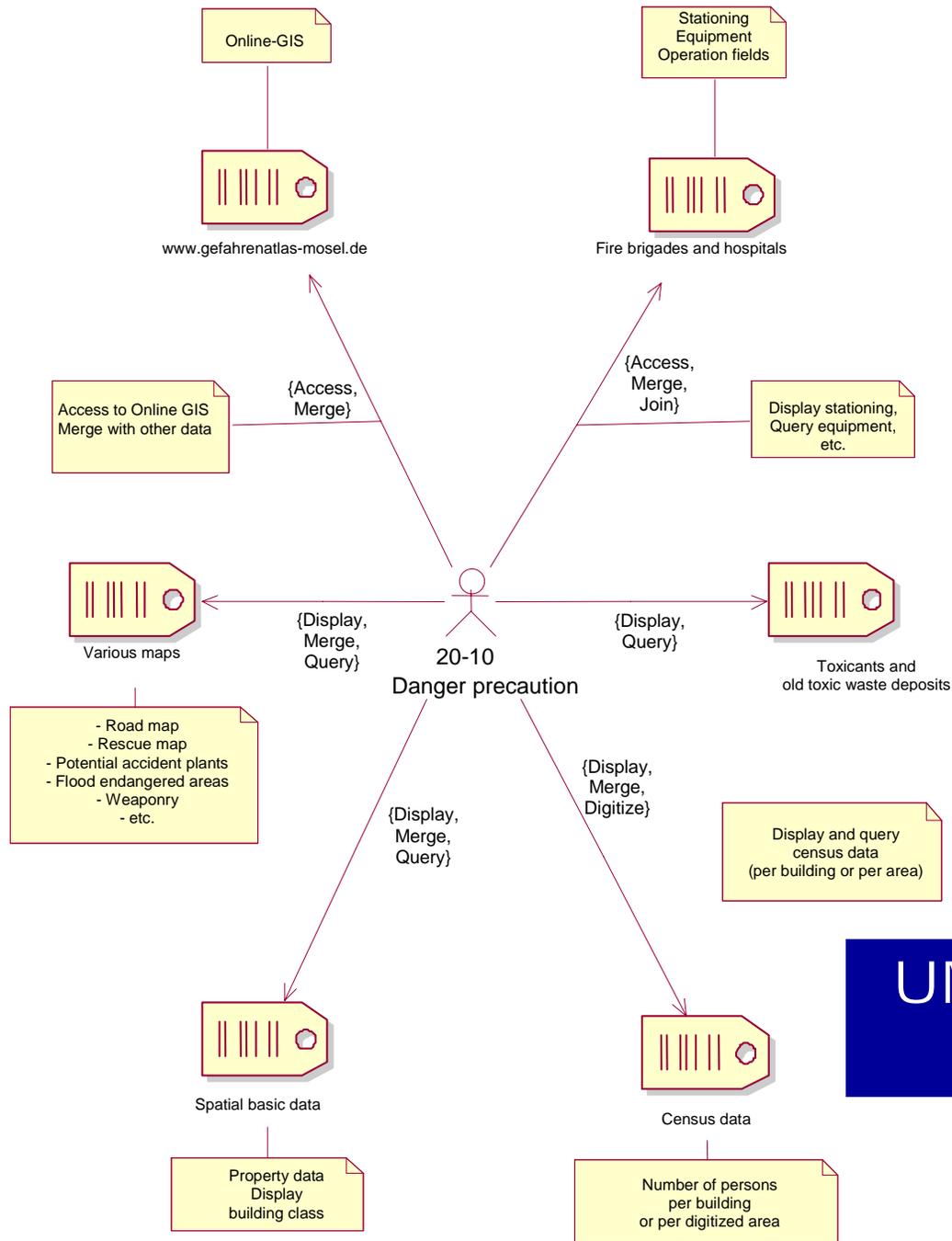


# Spatial IT Implementation

Service Products <-> Data Sets

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# UML Use Case Diagram

Service products  $\leftrightarrow$  Data sets

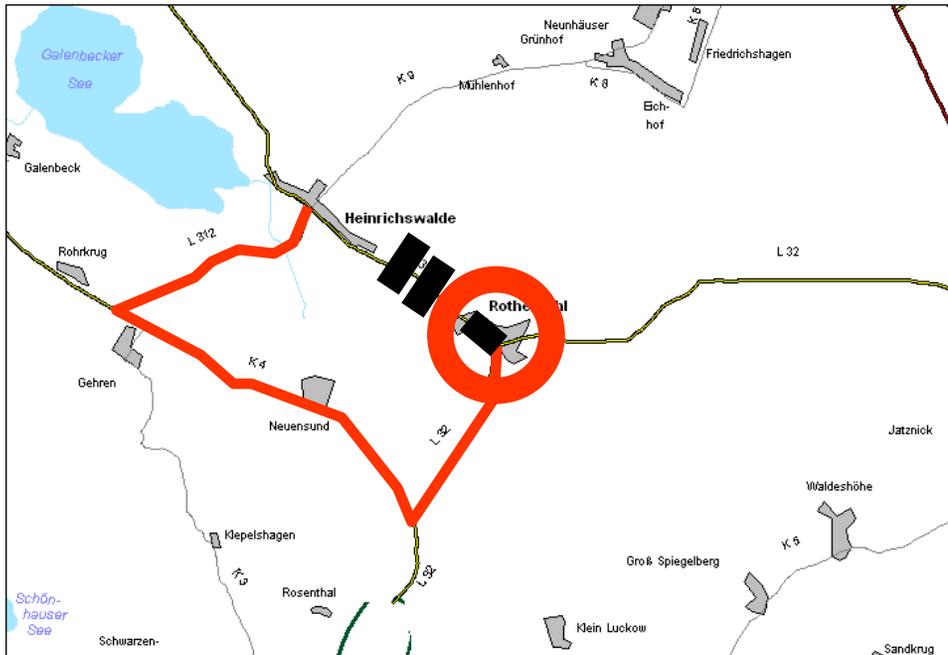
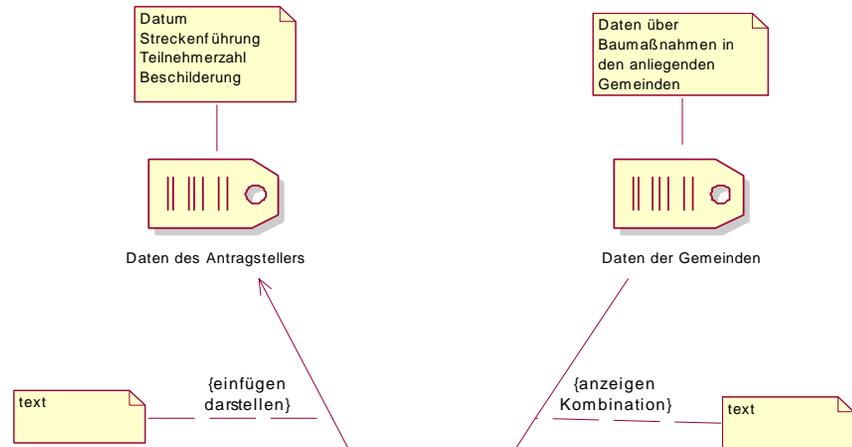
Use case Traffic regulation

*Available data: application + local authority information  
+ geo basic data*

Result: diversion plan



# UML representation



21-02-01 Verkehrsregelung und -lenkung (Umleitungen)



ALK

Straßen

# Spatial IT Implementation Principal Project Work Plan

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Technology and  
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Infrastructure  
for E-Government



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# Cost benefit assessment

Reference Level Service Products

## **Cost control not yet available**

-  full controlling tools announced to be available from 2007

## **Introduction of 4 benefit categories**

-  quantifiable (work load reduction, ...)
-  operational (quality, up to dateness, performance, ...)
-  strategic (new technology, presentation to the public, ...)
-  external (government, citizen, NGOs, ...)

## **Benefit rating for all 170 service products**

-  0 none
-  1 low
-  2 medium
-  3 high

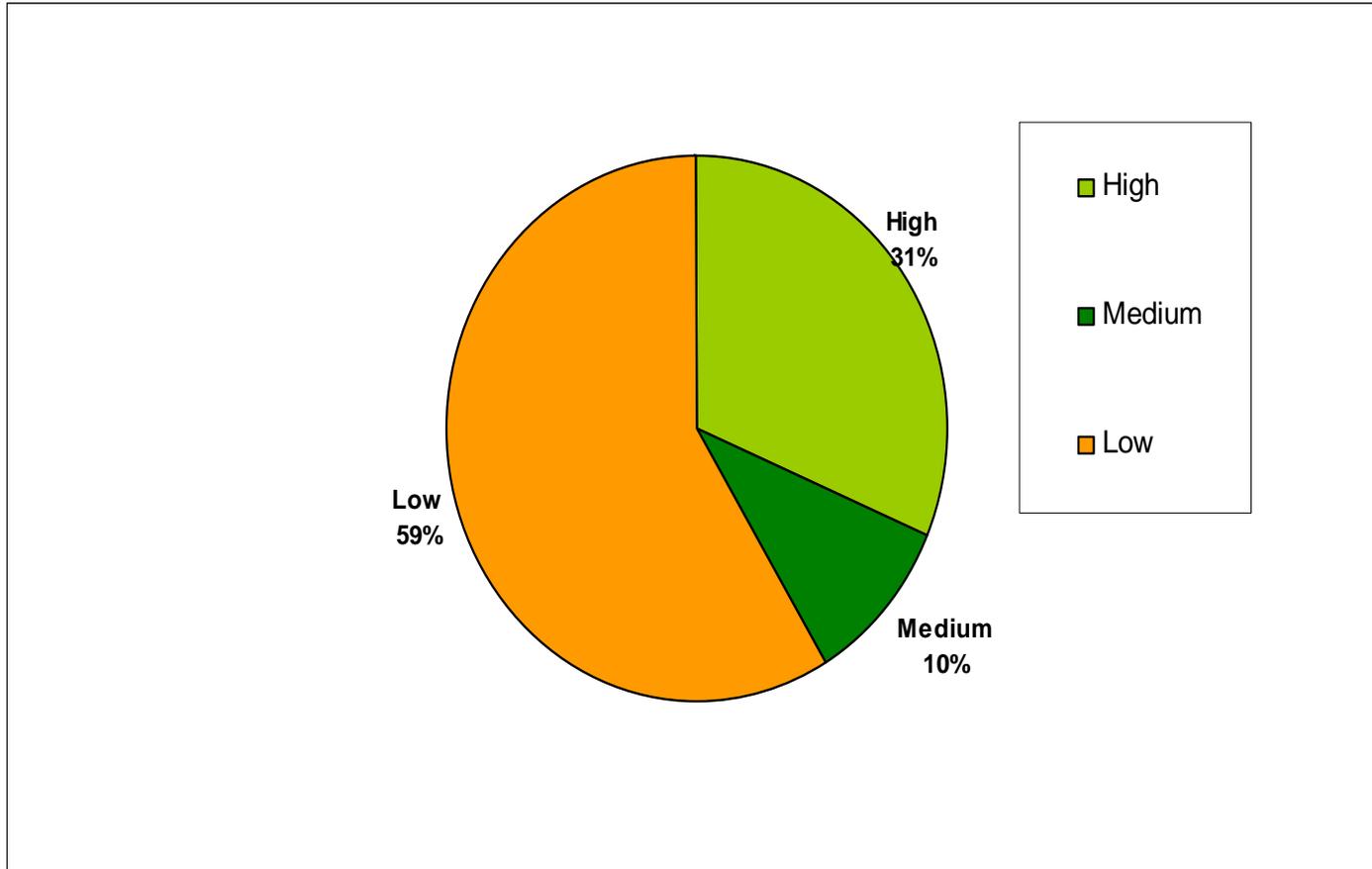
## **Result: one mark per service product 0, ..., 12**

## **Ranking of service products -> implementation plan**

# Potential Benefits of Spatial IT Use I

## Level of Service Products

Information  
Technology and  
Spatial Data  
Infrastructure  
for E-Government

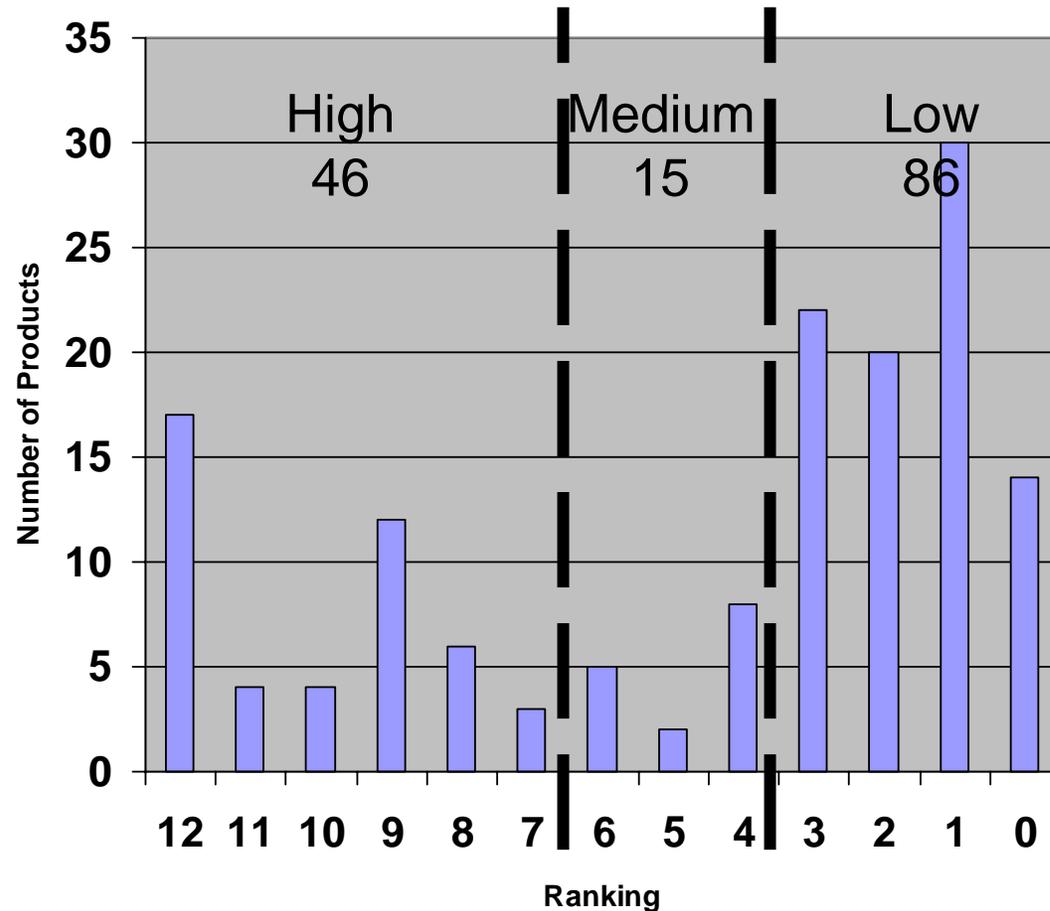


# Potential Benefits of Spatial IT Use II

Level of Service Products

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# Potential Benefits of Spatial IT Use III

Service Products with Highest Spatial IT Potential

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-  land use planning
-  urban land use planing
-  agrarian furtherance's
-  epidemic abatement on animals
-  business development
-  transportation
-  tourism
-  ...



# Spatial IT Implementation Principal Project Work Plan

Tasks

Information  
Technology and  
Spatial Data  
Infrastructure  
for E-Government

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## ■ System analysis

- strategic planning
- field research and analysis of given situation
- conceptional modelling
- user specific concept
- IT-concept
- cost-benefit-analyses

## ■ System acquisition

- public tender procedure | *completed*
- offer rating |
- functional tests | *until*
- system rating, system recommendation | *Nov 2005*

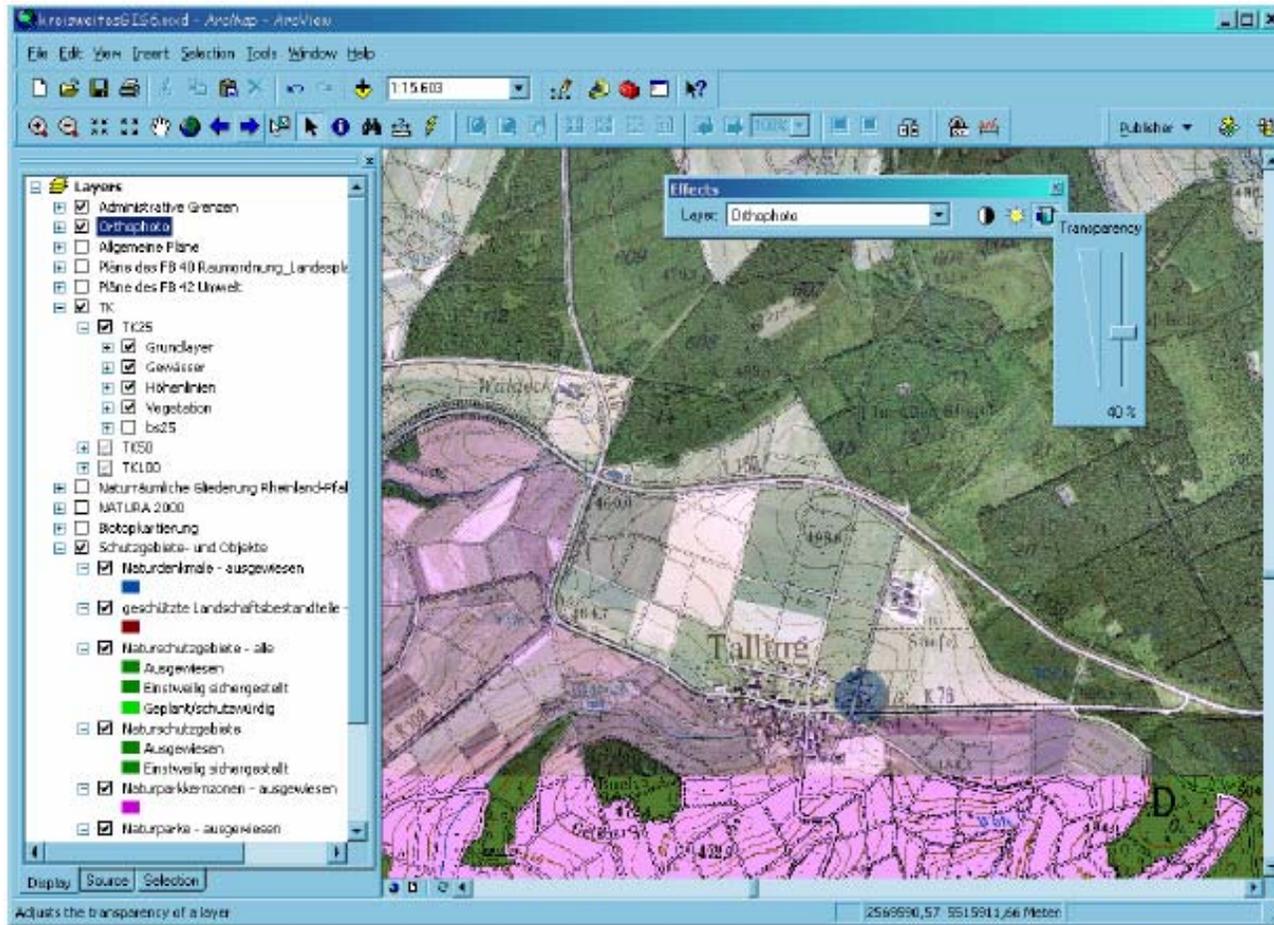
## ■ System implementation

- system installation, system acceptance | *currently*
- data acquisition, data migration | *under work*
- system use



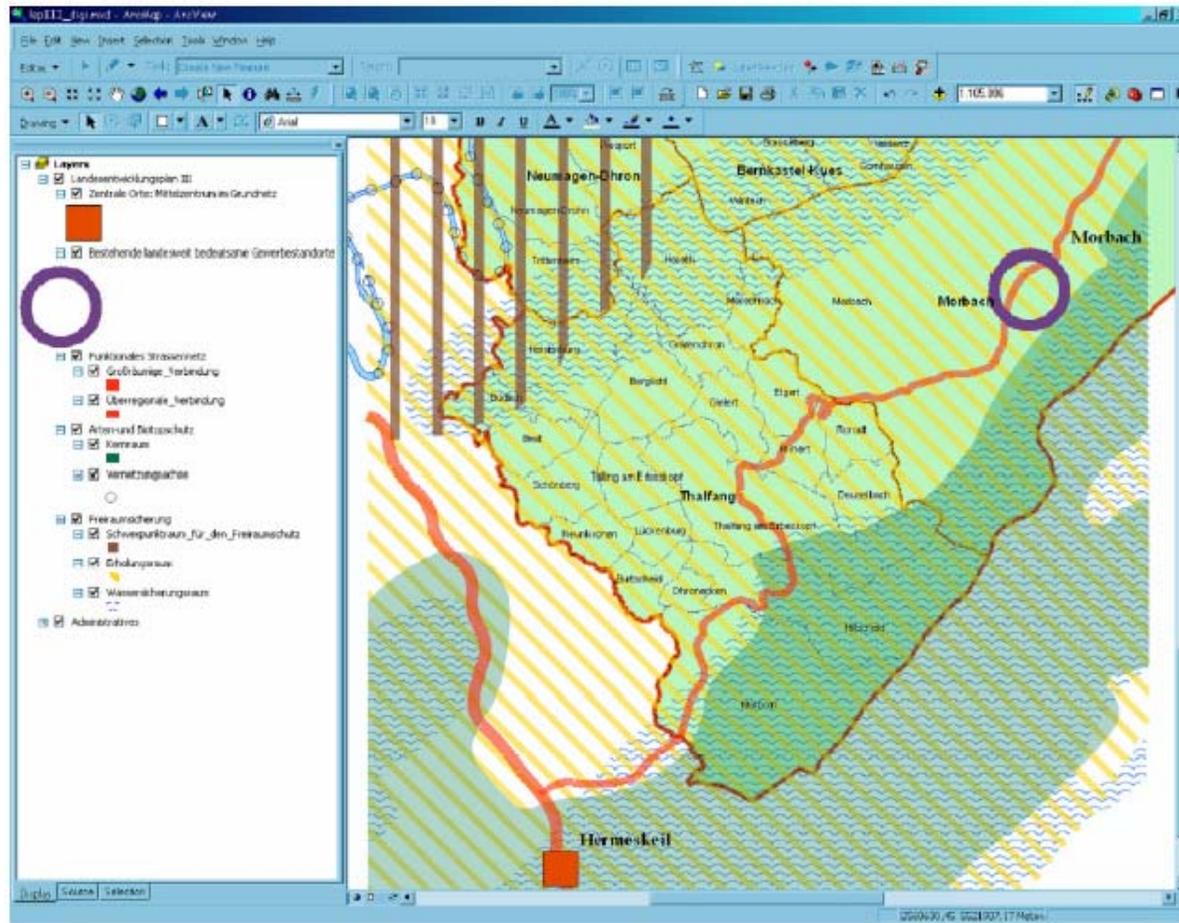
# Use Case 1

## Wind Power Plant, Site Selection



# Use Case 2

## Wind Power Plant, Land Development Plan



# Spatial IT Implementation

## Current work

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- **Improve cooperation with local administration bodies**
  - realize synergy by joint data acquisition (scanning and georeferencing of zoning plans, landscape planning plans, etc.)
- **Develop the meta data acquisition and maintenance strategy**
  - close cooperation with surveying authorities (GDI RLP)
- **Identification of quantifiable external user benefits**
  - citizen, regional and local economy



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# Conclusions

How does the project fit with INSPIRE Principles?



- ⊕ Data should be collected once and maintained at the level where this can be done most effectively
- ⊕ It should be possible to combine seamless spatial information from different sources across Europe and share it between many users and application
- ⊕ It should be possible for information collected at one level to be shared between all the different levels, detailed for detailed investigations, general for strategic purposes
- ⊕ Geographic information needed for good governance at all levels should be abundant under conditions that do not refrain its extensive use
- ⊕ It should be easy to discover which geographic information is available, fits the needs for a particular use and under which conditions it can be acquired and used
- ⊕ Geographic data should become easy to understand and interpret because it can be visualised within the appropriate context selected in a user-friendly way



Thank you

