

# Geo-Information in Land Use and Development Acquisition – Availability - Application

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# Preliminary Remarks



At least 80% of public and private decision-making is based on some spatial or geographic aspects

The ISO BULLETIN, July 2001

A balance between public and private interests in land use and land development requires measurable, objective, and traceable basic data

In accordance to the main topic of the 37<sup>th</sup> EFLUD symposium, August 2009

Geoinformation is part of the infrastructure of a country

Personal credo of authors



# Content



- „New“ Dimensions in Geoinformation
- New Instruments, Methods, and Systems in Geoinformation
- ICT in Austrian Land Reform Authorities
  - Use of Technologies and of Data
  - Data Quality and Data Exchange
  - Competences and Educational Aspects
- Conclusions



# „New“ Dimensions: Spatial Aspects

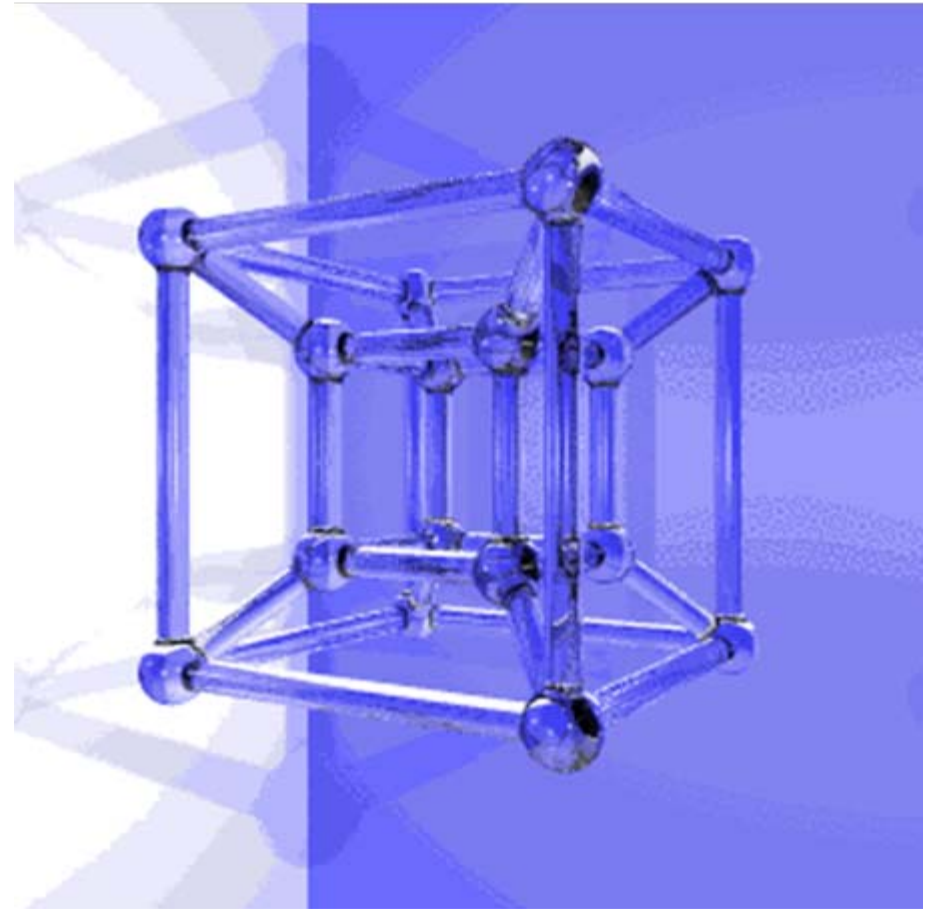


„3D instead of 2.5D“

Improved geometric  
resolution of objects

Improved thematic  
(radiometric und spectral)  
resolution of objects

Improved geometric and thematic  
accuracy of objects



*Bilduelle: [www.upload.wikimedia.org](http://www.upload.wikimedia.org)*



# „New“ Dimensions: Time Aspects



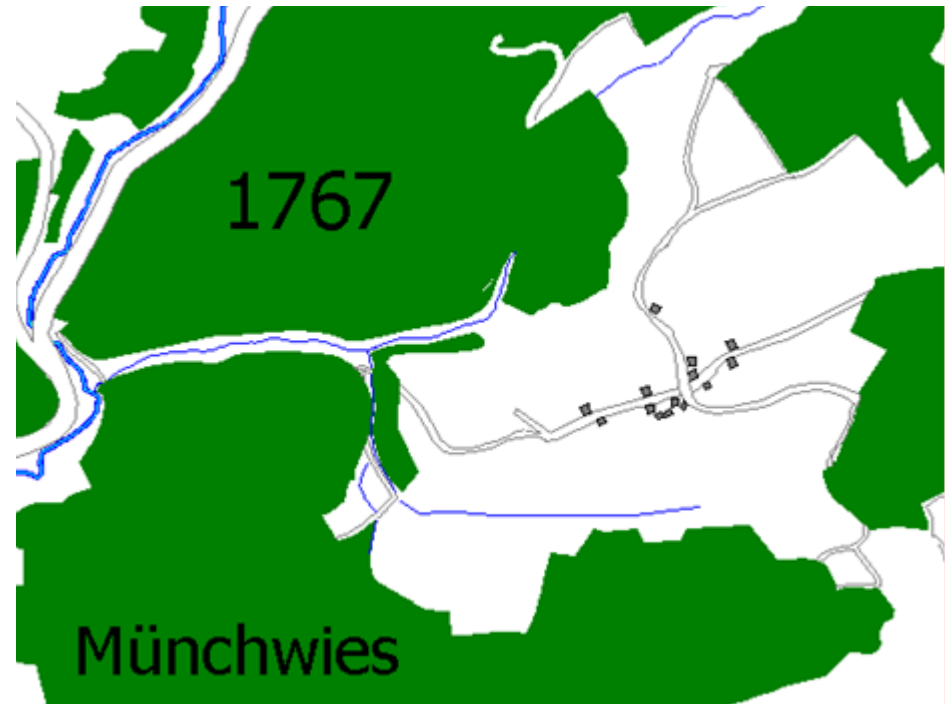
## „Time Series“

Acquisition of high resolution natural data in real „real time“

Increased rates (increased frequency) of data acquisition (Automatisation)

Acquisition of temporal and spatial changes of nature (change detection)

Data acquisition methods independent from weather and light conditions



*Bilduelle: [www.muenchwies.de](http://www.muenchwies.de)*



# „New“ Dimensions: Virtuality



## „Digital Earth“

Availability of geodata independent of time and position

Modelling & Simulations

Improved data exchange due to metadata & standards (standards)



Bildquelle: [www.oneclinical.com](http://www.oneclinical.com)

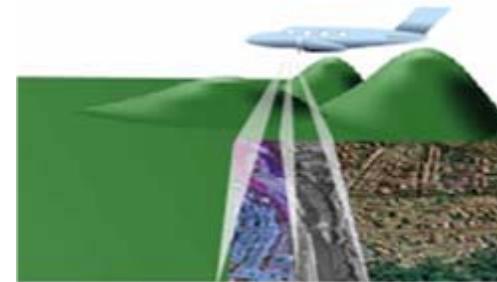


# New Systems and Methods

Total Stations and GNSS



Laser Scanners

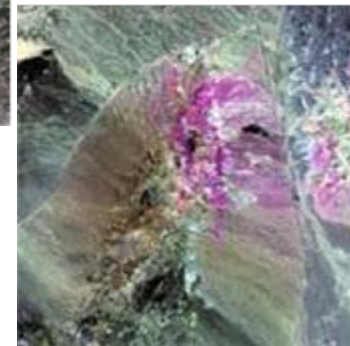


Digital Photogrammetry

Semi- automatic and full-automatic  
image processing methods



Web-technology



GIS-Modelling & GIS simulations techniques

# Total Stations

- Integrated Surveying Software (Coordinates)
- Automatic Target Recognition (Reflector)
- Graphic Display

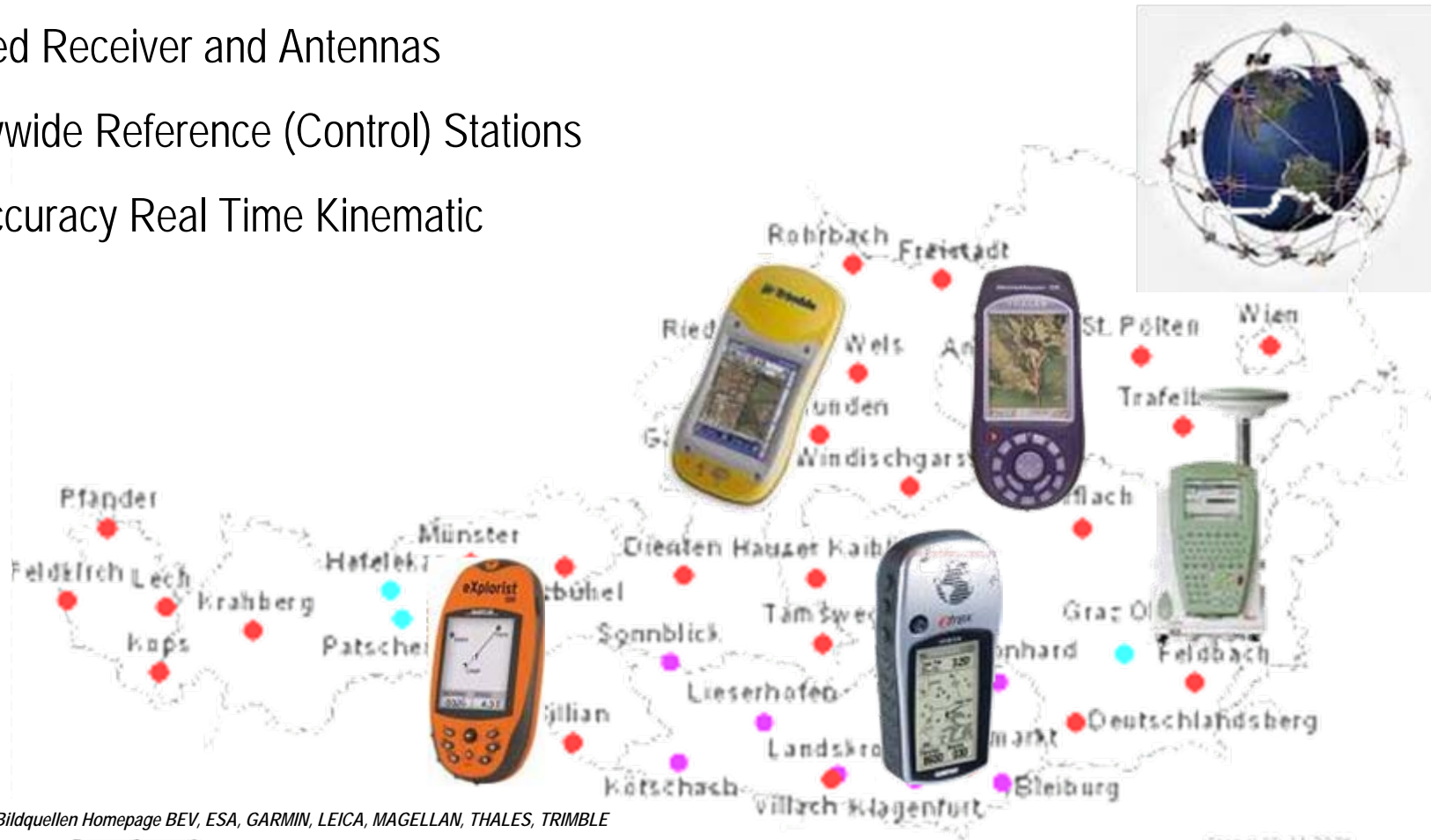


*Bildquellen: Homepage LEICA, SOKKIA, TRIMBLE*

# GNSS



- Improved Receiver and Antennas
- Countrywide Reference (Control) Stations
- High Accuracy Real Time Kinematic



Bildquellen Homepage BEV, ESA, GARMIN, LEICA, MAGELLAN, THALES, TRIMBLE

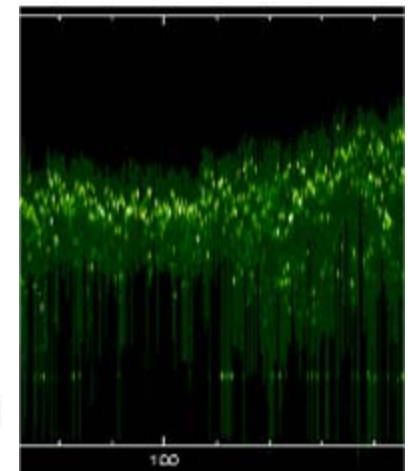
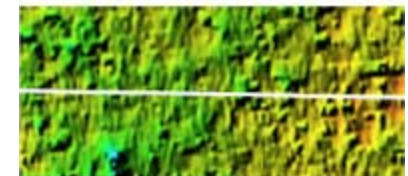
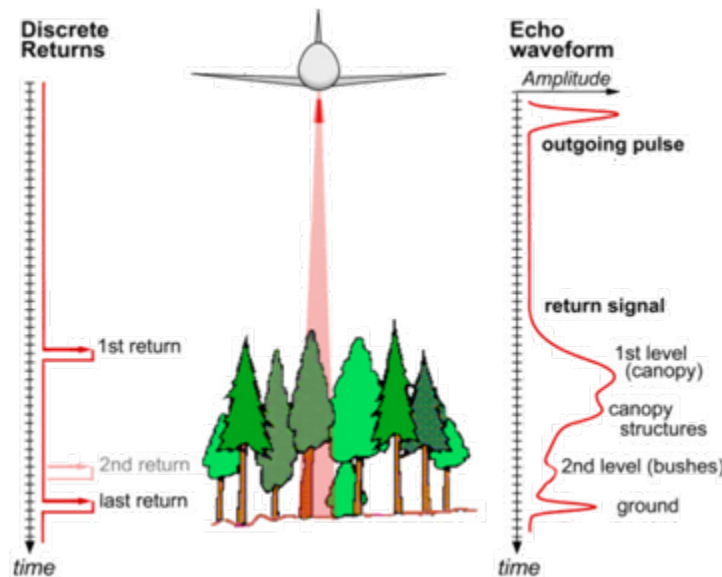
Frank G. 30.11.2006



# Laserscanning



- High Acquisition Rate  
(*Millionens of Points / Minute*)
- High Point Density  
(*up to 10 cm -Airborne*)
- High Accuracy  
( $\pm 10$  cm Height Accuracy - *airborne*)
- DTM & DOM  
(*first / last pulse – multi-pulse*)
- New Products:
  - *City Models*
  - *True-Orthophotos*
  - *3D-Visualisations*
  - ...



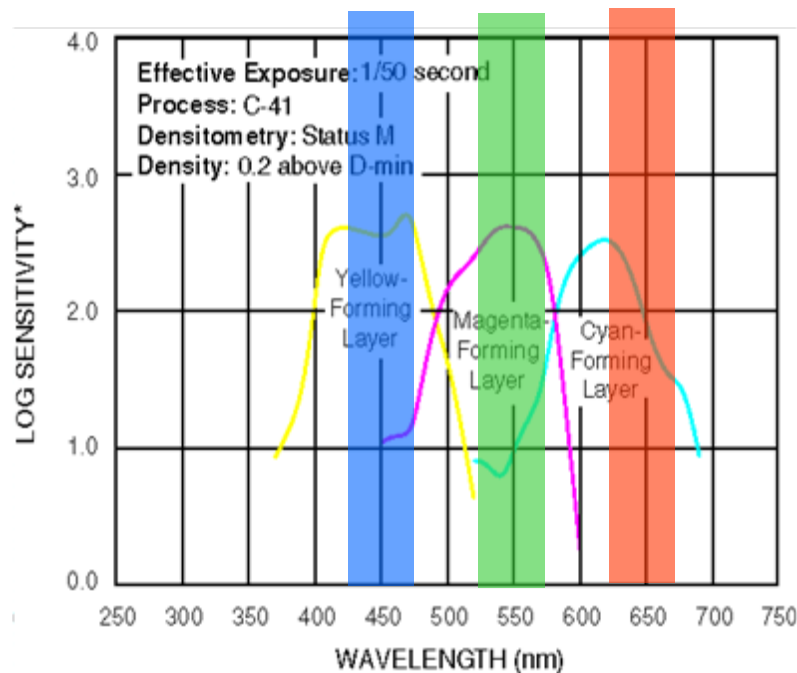
Bildquellen: RIEGL - Litemapper



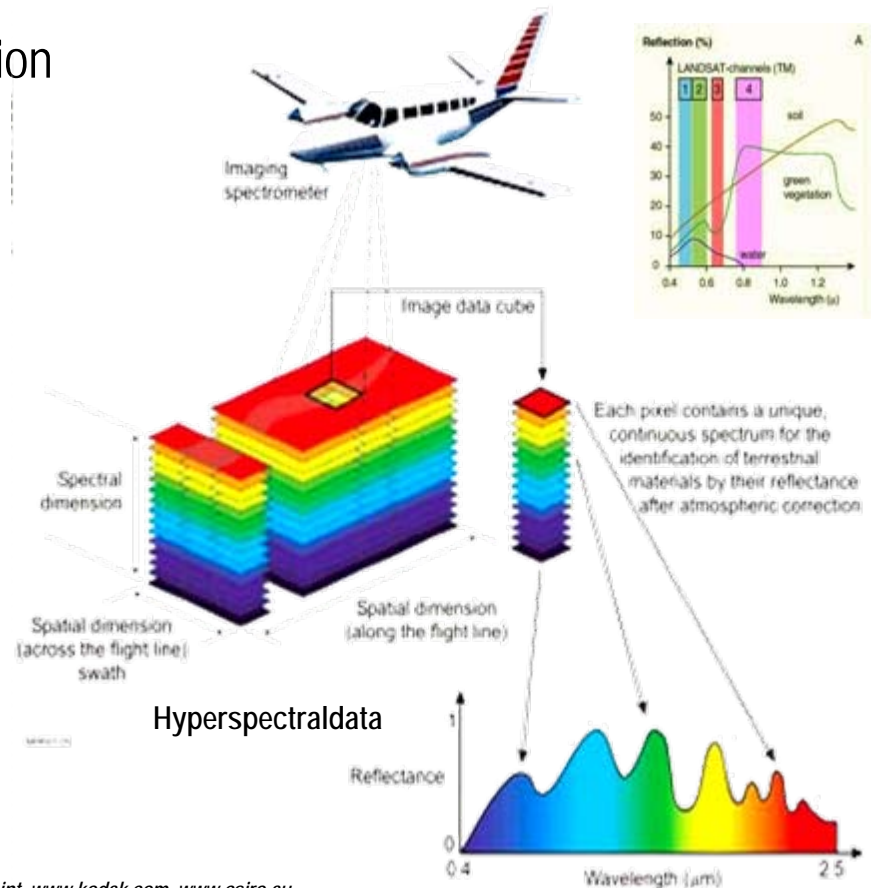
# Digital Photogrammetry



- Improved spectral and radiometric resolution
- Real-Time Measurement of Exterior Orientation
- Automatic DSM Measurements



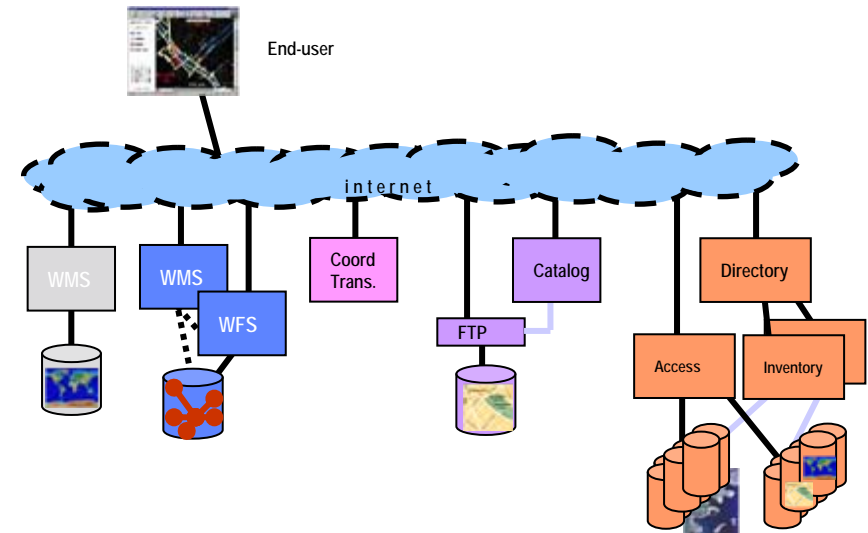
Bildquellen: [www.eduspace.esa.int](http://www.eduspace.esa.int), [www.kodak.com](http://www.kodak.com), [www.csiro.au](http://www.csiro.au)



# Web-Technologie & Web-GIS



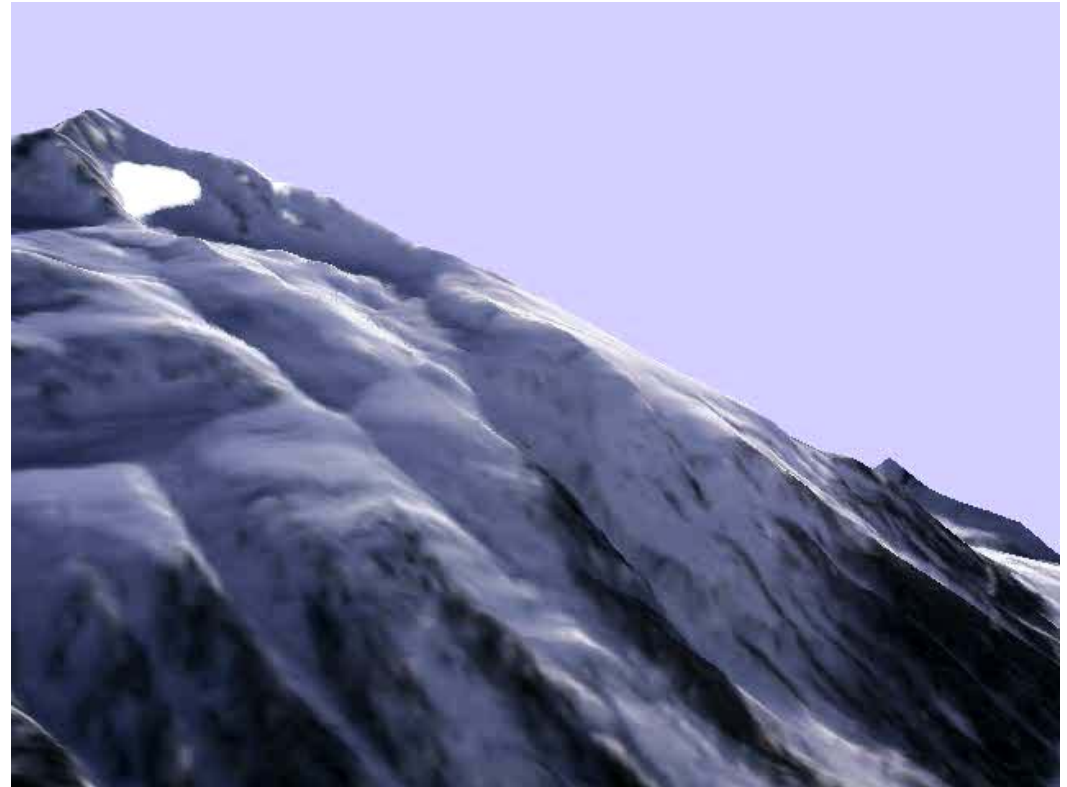
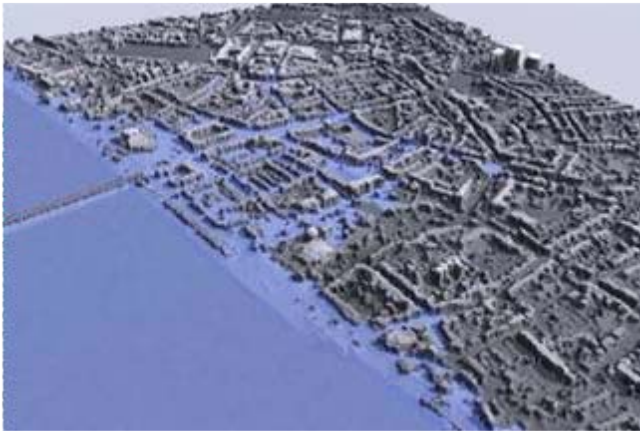
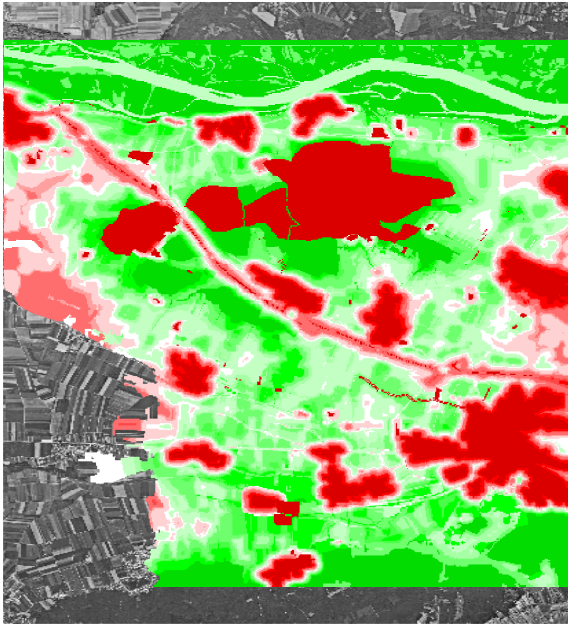
- Improved Geodata - Infrastructure
  - Availability of Geodata (local, regional, national))
  - Interoperationality (Standards ISO 19100-Serie)
  - Metadata (ISO 19115; CSW 2.2)
- Decentralisation of Information
- Real Time Access to Geodata
- Increase Interaktivität using Web 2.0 (Informations Exchange, Forums, Blogs, ...)



Bildquelle: M.Mittlböck



# Modelling and Simulation



*Bildquellen: [www.galtuer.gv.at](http://www.galtuer.gv.at), [www.geolas.com](http://www.geolas.com), [www.uni-kassel.de](http://www.uni-kassel.de), BOKU-IVFL*



# The Project



## Title

Use of geoinformation and of modern ICT to improve the efficiency of land reform (LC) processes

## Objective

Investigation on the competence and on the intensity in the use of geoinformation and of modern ICT at Austrian and Hungarian Land Reform Authorities(LC)

## Partners

 University of Natural Resources and Applied Life Sciences Vienna – Department of Landscape, Spatial and Infrastructure Sciences

*Reinfried MANSBERGER, Walter SEHER*



University of West Hungary – Faculty of Geoinformation, Székesfehérvár  
*GUMBAS Katalin, KATONA János, NYIRI Judit, PODÖR Andrea, UDWARDY Péter*

*financed by the Austrian – Hungarian Action*



# Approach of Implementation: Methodology



Input:

REALITY CHECK

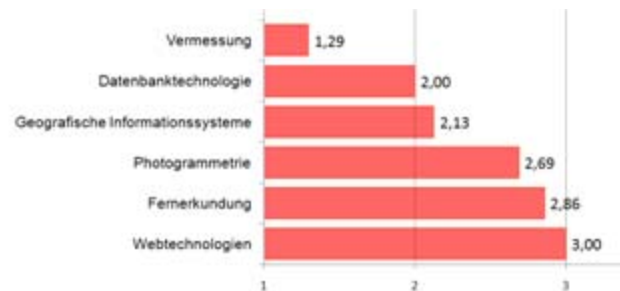
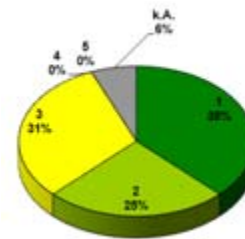
Methodology:

- Questionnaire
- Interviews
- On-site visits

ANALYSIS

Methodology:

- Analysis of Input



Output:

FINAL REPORT  
Conclusion  
Recommendations

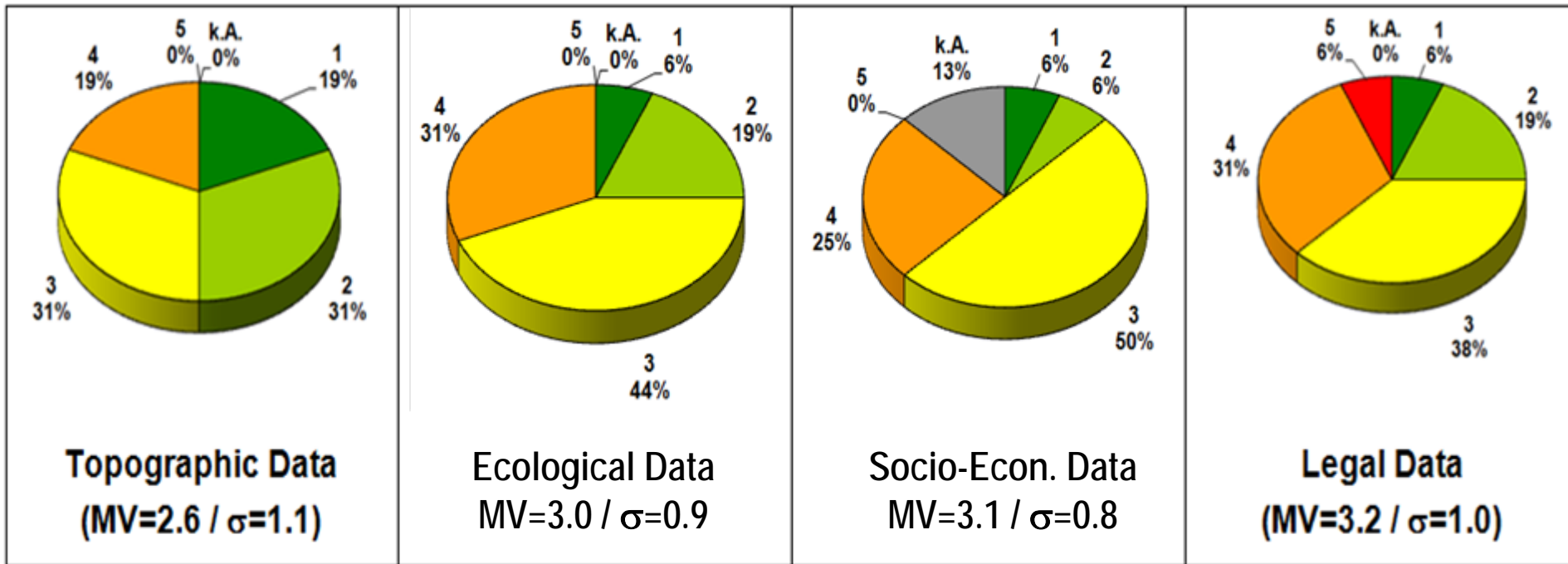






# Use of Geodata:

## Potential for Improvement of Data Quality <sup>1</sup>



1 .... High Potential

5.... Low Potential

k.A. ... No Answer

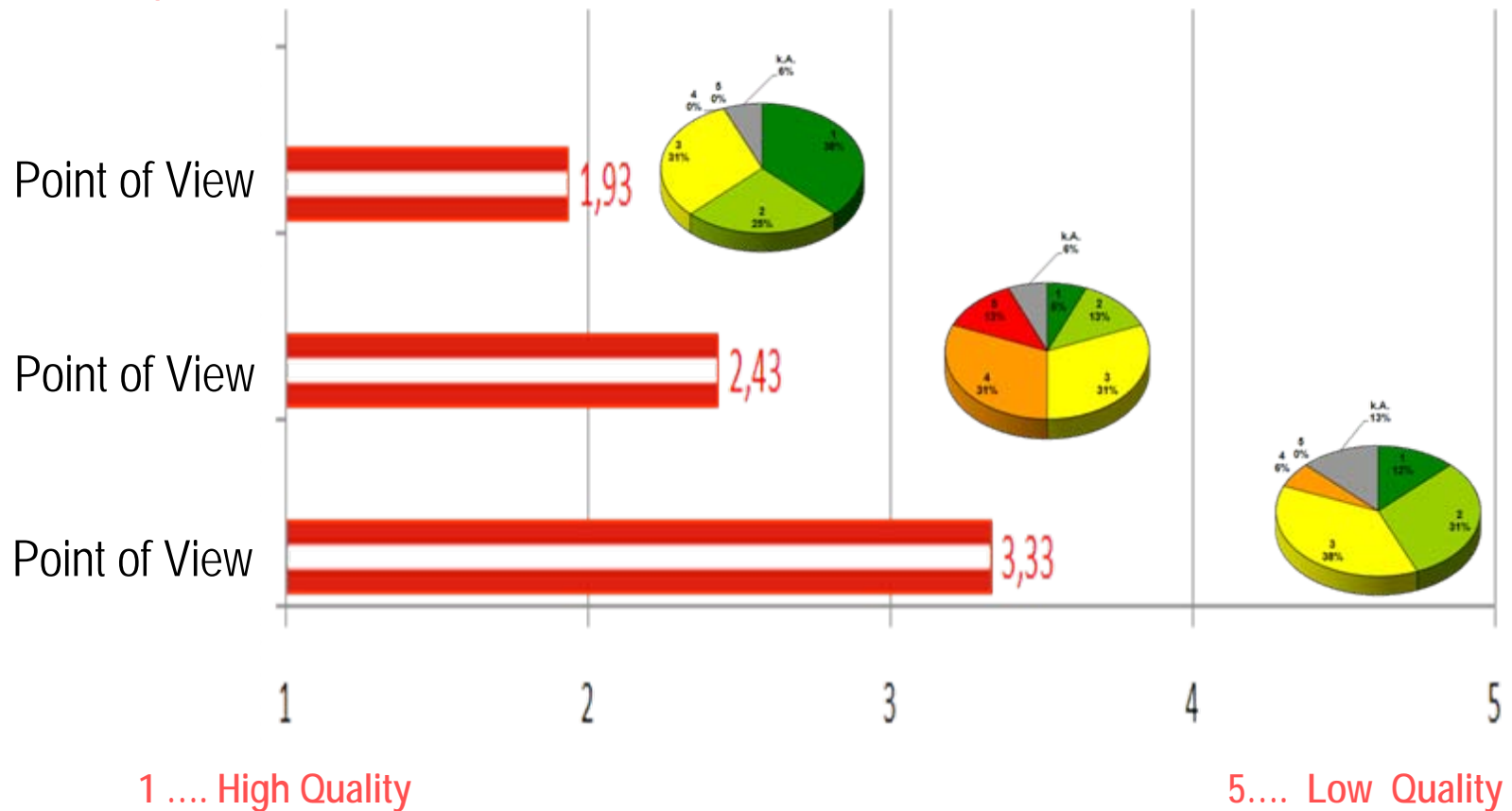
<sup>1</sup> accuracy, resolution



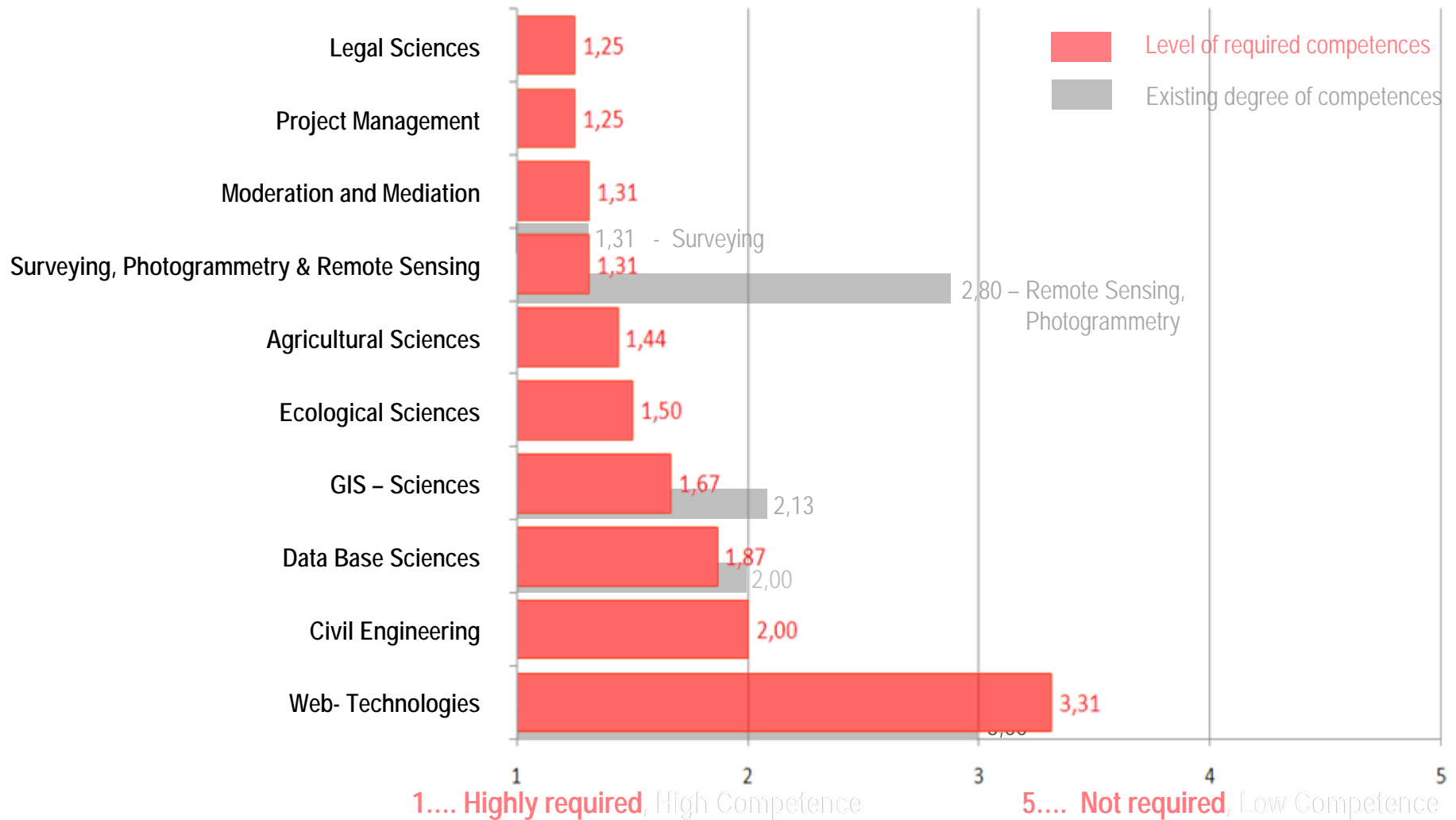
# Use of Geodata: Quality of Data Exchange with other Institutions



Financial - Legal - Technical ??



# Knowledge for LC Processes: Required Competences – Existing Competences

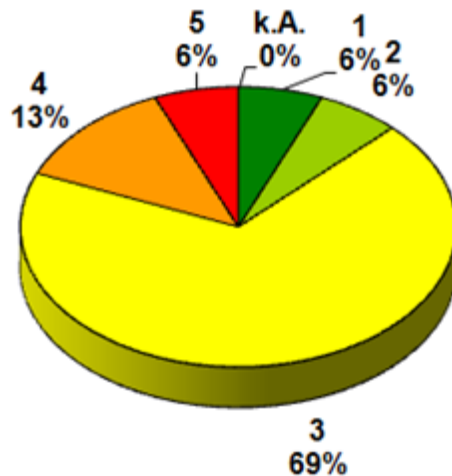


# Education & Training

## Education meeting Requirements for LCA



### Academic Education & Training

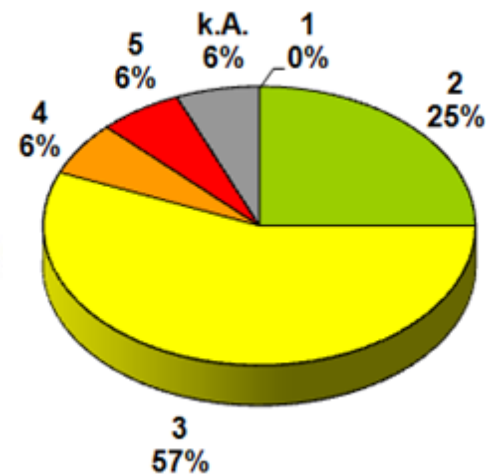


(MW = 2.8 /  $\sigma$  = 0.8)

1 .... High Satisfaction



### Continuous Professional Development



(MW = 3.1 /  $\sigma$  = 0.9)

5.... Low Satisfaction

k.A. ... No Answer



# Conclusions and Recommendations



- Various geodata are required and used in an extended way for land consolidation processes
- Improved availability and improved (geometric, thematic, temporal) resolution of geodata
- Land Surveying (incl. Remote Sensing & GIS) is an essential task in LC projects
- High potential for the use of GIS – modelling techniques and modern communication technologies at Land Reform Authorities
- Data exchange between public institution has to be improved (especially from a financial point of view) – INSPIRE?
- Academic education and training as well as continuous professional development (CPD / LLL) in the field of geoinformation & ICT has to be improved



What remains to be said . . . .



**THANK YOU**  
**for Your Attention**

# Questions ?





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