NATIONAL DEVELOPMENTS AND CHANCES FOR CROSS BORDER ACTIONS IN GEOINFORMATION

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The European Union from GI professional point of view

- Challenges
- Conflicts/Resolving the conflicts
- Common concerns by EU Directives
  - PSI Directives
  - GMES
  - INSPIRE
  - Galilleo
  - Water Framework Directive
  - .
  - .
  - EU-harmonised National Legistlation
- Cooperation between the European professional associations
- Common and Harmonized Impact and assistance of national professional associations on
  - European Commission
  - The Council
  - European Parlament

INSPIRE Directive

I. General provisions
II. Metadata
III. Interoperability of spatial data sets and services
IV. Network services
V. Data-sharing and re-use
VI. Coordination and complementary measures
VII. Final provisions

Data content: Annexes I., II., III.

Elements of the INSPIRE

- Players
- Data Content
- SW/HW/Network
- Data exchange
- Data policy
  - Accessability
  - Interoperability
  - Data integration
  - Data cooperation
  - Data pricing
- Standards
- Legal background
- Public – Private Partnership

INSPIRE data content
Annex I

Coordinate reference systems

Geographical grid systems

Geographical names

Administrative units

Transport networks

Hydrography

Protected sites

INSPIRE data content
Annex II

Elevation

Identifiers of properties

Cadastral parcels

Land cover

Orthoimagery

INSPIRE data content
Annex III

Statistical units
Buildings
Soil
Geology
Land use
Human health and safety
Government service and environmental monitoring facilities
Production and industrial facilities
Agricultural and aquaculture facilities
Population distribution – demography
Area management/restruction/regulation zones and reporting units
Natural risk zones
Atmospheric conditions
Meteorological geographical features
Oceanographic geographical features
Sea regions
Bio-geographical regions
Habitats and biotopes
Species distribution

National Spatial Data Infrastructure Strategy (NTIS) of Hungary

An NTIS Subcommission (August 2004) to harmonize the Hungarian NSDI with the EC INSPIRE Directive proposal. The Document of NTIS includes

- Establishing the organizational framework for creation and operation of the Hungarian NSDI,
- Revision of legal background and data policy,
- Harmonization of Spatial data standards and data base specifications with the EU ones,
- Creation and maintenance of the data spatially referencing the geographic information as needed for operating the Hungarian NSDI,
- Metadata services and access to spatial data,
- Knowledge based GI applications and GI tools for education,
- Cooperation with EU institutions and working groups of relevance.

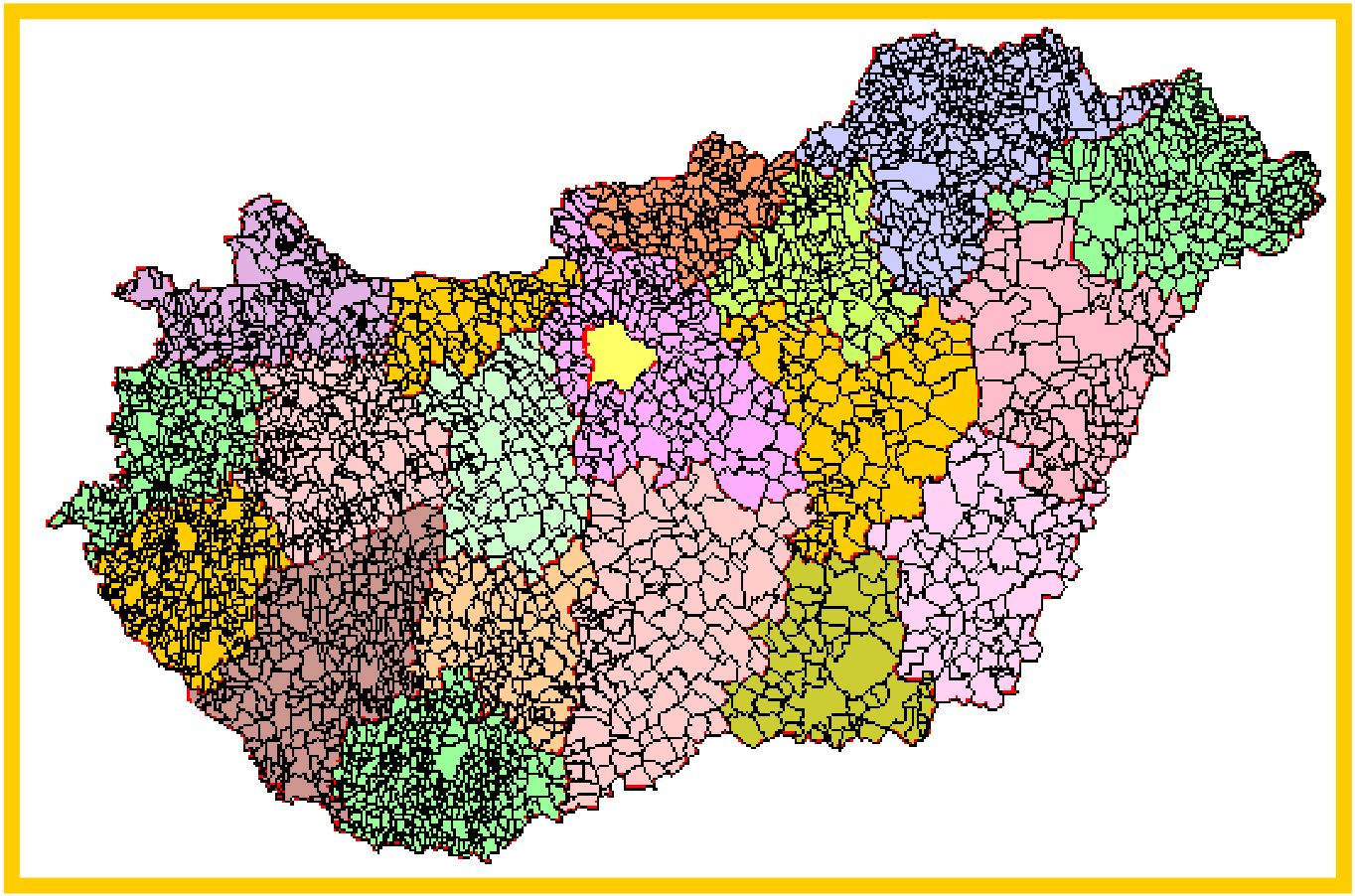
EXAMPLES

Spatial referrencing core data

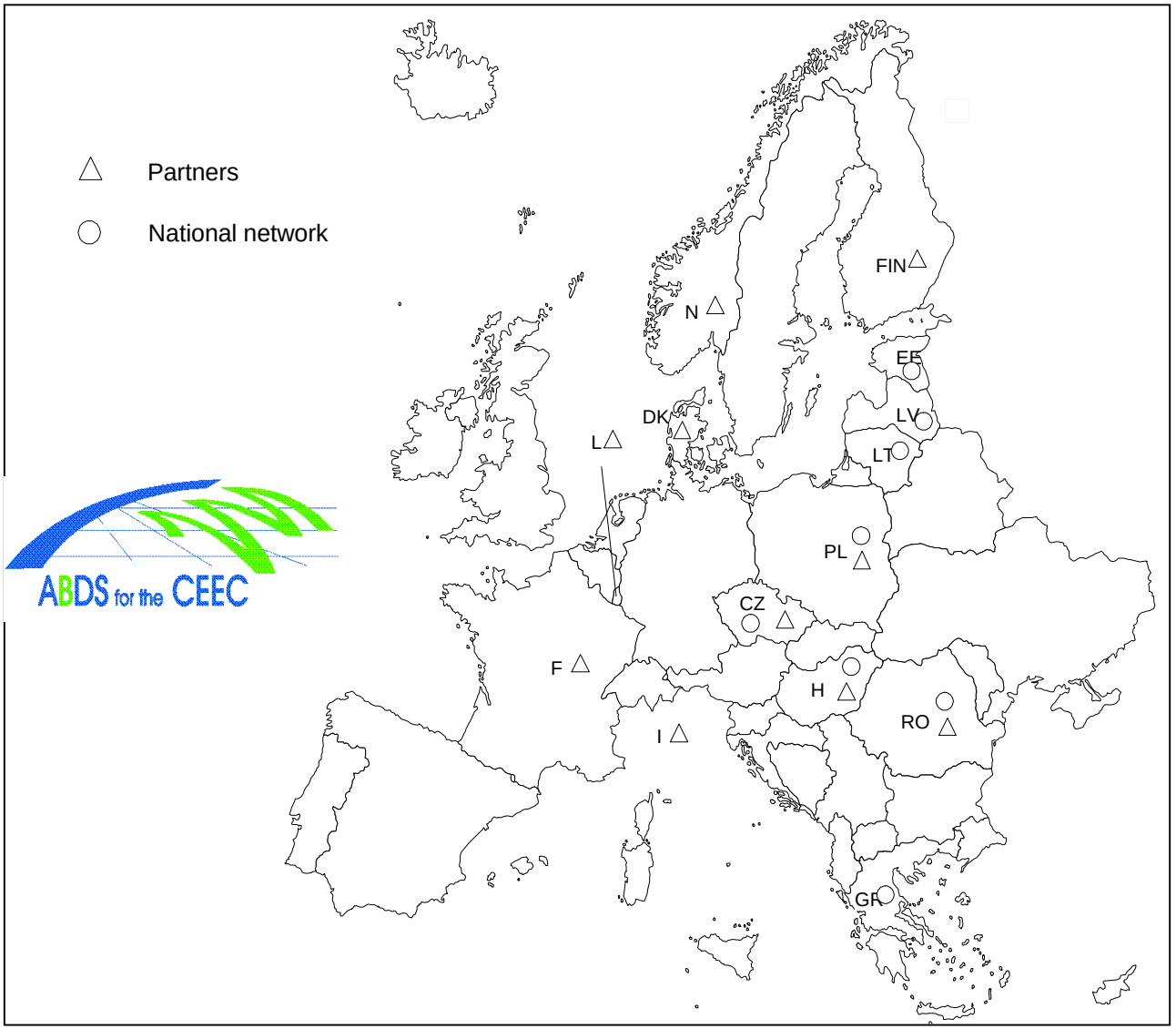
in Hungary and

in cross border actions

Administrative boundaries of Hungary



Participants of ABDS for the CEC Project



Seamless Administrative Boundaries of Europe (SABE)

Content:

- Boundaries of administrative units
- Names and codes of administrative units on the basis of the national nomenclature and representing the national administrative hierarchy
- Unified coding system for all the administrative levels including also names of different national administrative levels and the relations between them
- Location of residences of authorities of the units for the countries (not for all countries)
- Coastline information for the countries where the physical and administrative boundaries do not coincide.

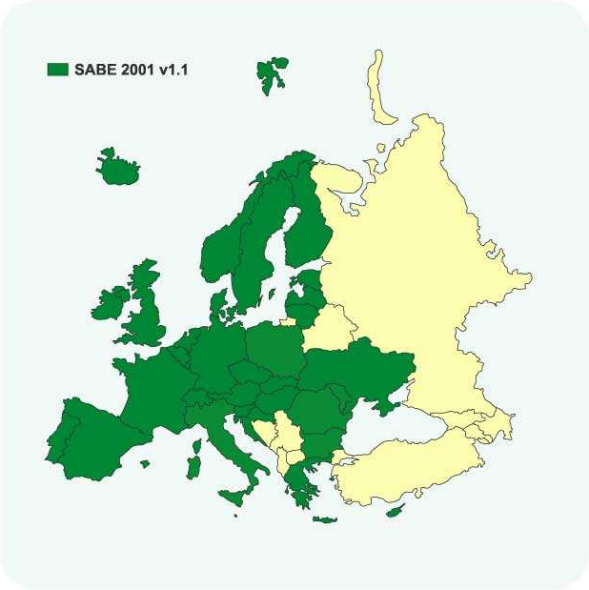
Coverage: see figure

Scale for Application:

The product SABE2001/Census is available for applications at 1:1 000 000 and 1 :100 000.

Format:

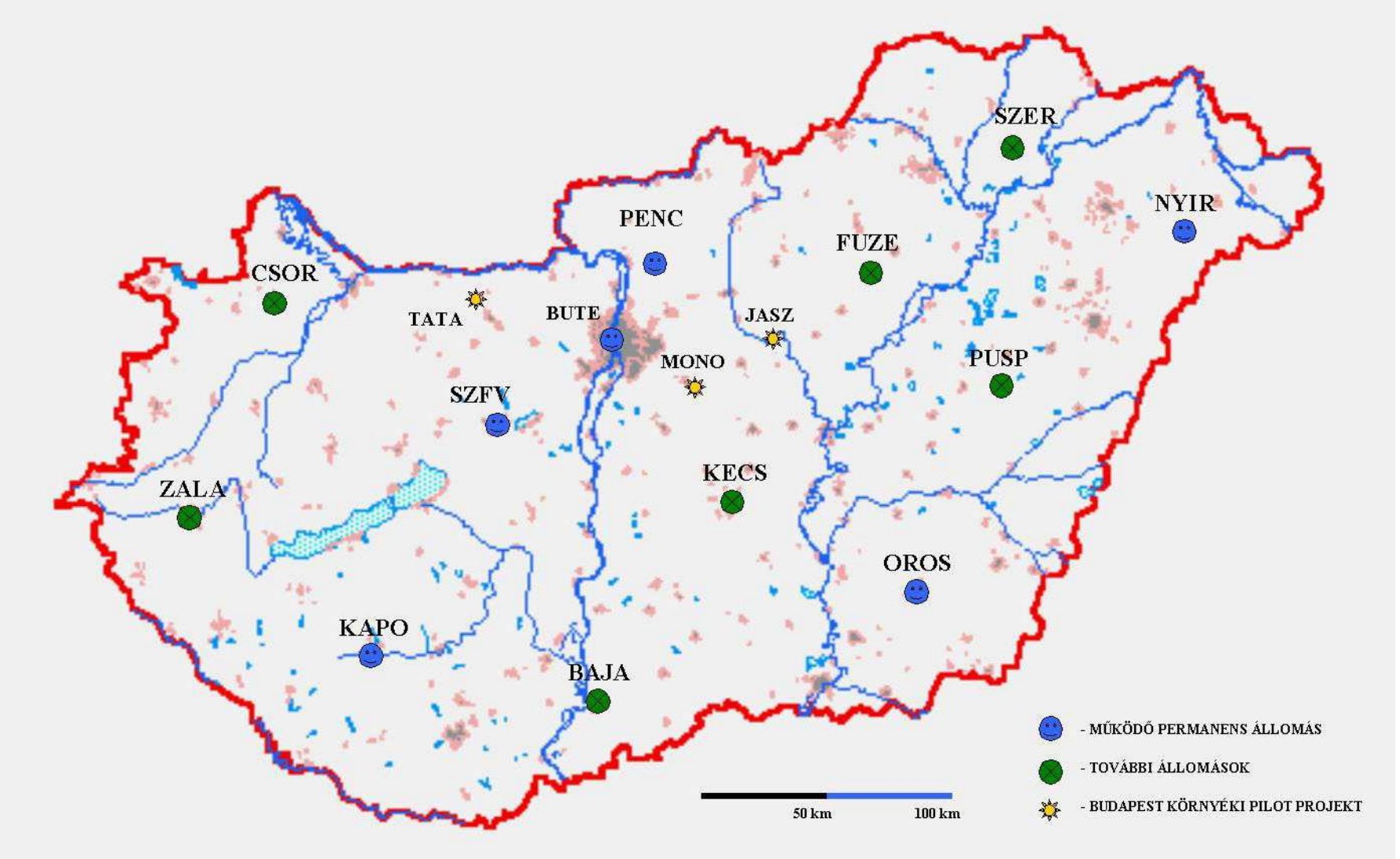
ARC/INFO® Export format



State border activites

- Cooperation in state border
  - Surveying, Maintenance, Registering, IT developments
- Common harmonization of generalization over the state border lines for their use in different resolution and scale GI applications, including the topographic and cadastral base maps
- Building the GI-oriented databases on thematic core data (transport, environment, land parcels, …) in narrow band alogn and connected to the state border lines of neighbouring countries
- Common actualization and data supply for public and private use in the above cases.
- **EuroBoundaries**

The Hungarian recent active GPS network



The EUPOS® Project EUPOS

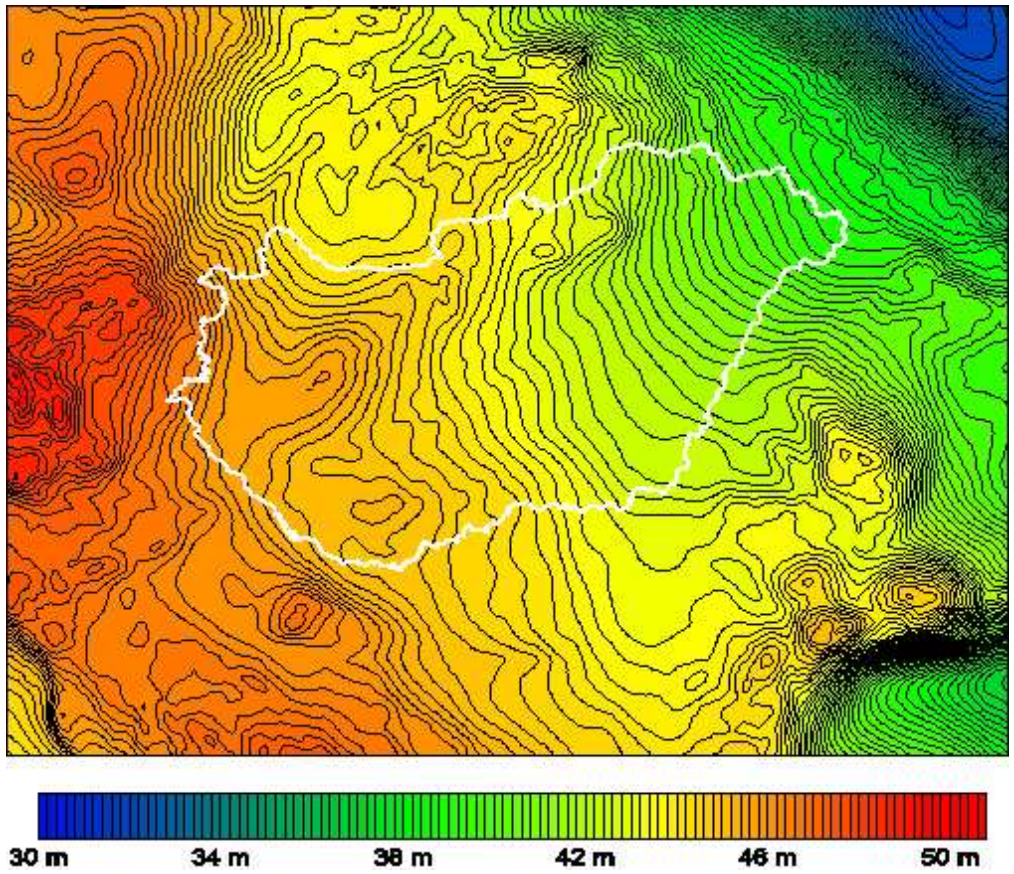


Members:

Bulgaria
Croatia
Czech Republic
Estonia
Germany
Hungary
Latvia
Lithuania
Macedonia
Poland
Romania
Russian Federation
Serbia
Slovak Republic
Slovenia

UN recommendation for realization in November 2002

HGEO 2000 gravimetric geoid solution



- **Comutation**: From gravimetric measurements, with FFT
- **Accuracy** : 0.5 ppm
- **Application field**: EOMA III.order network building by GPS technique

Spatial referencing geodetic network common activities

- Surveying activities for connecting and monitoring the geodetic networks between the countries
  - EUVN
  - EUREF (both 2D and 3D)
  - geoid (for GPS-type height determination)
- Possible common activity for
  - establishing,
  - wireless datasupply and
  - exhansting

  of the GNSS infrastructures between the coutries (e.g. EUPOS, Galilleo)
- Common participation in
  - the recent vertical movement monitoring and
  - the CERGOP Central European geodinamical monitoring program/project

EuroGlobalMap (EGM)

Release: EGM v1.1

Content:

Seamless and harmonised digital topographic dataset that covers Europe at the scale 1:1 Million. The database contain six themes (each theme contains one or more data layers):

- Administrative boundaries
- Hydrography
- Transport
- Settlements
- Elevation
- Named location (geographical names)



Coverage: see figure

Scale for Application:

1:1 000 000

Format:

ARC/INFO® Export format

Duration: The project started on July 1, 2002 and has ended in March 2004.

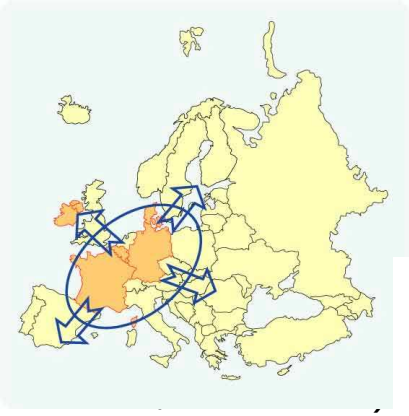
Update: The product is updated over a two years cycle (on average).

EuroRegionalMap (ERM)

Release: prototype of the 1:250 000 topographic dataset of Europe.

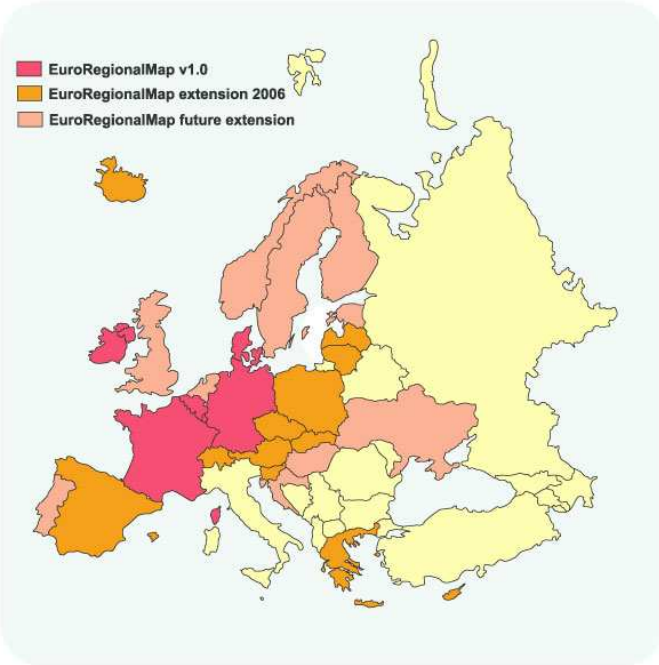
Content:

- administrative boundaries,
- hydrography,
- transport,
- settlements,
- vegetation,
- named locations
- miscellaneous (monuments, pov



Coverage: The first release currently covers 7 countries: Belgium, Denmark, Germany, France, Luxembourg, Ireland and Northern Ireland.

Duration: The first production phase covering seven countries has been executed from Jan 2001 till Oct 2003. The dataset will be gradually extended targeting to cover the whole of the Europe.



Early Metadata

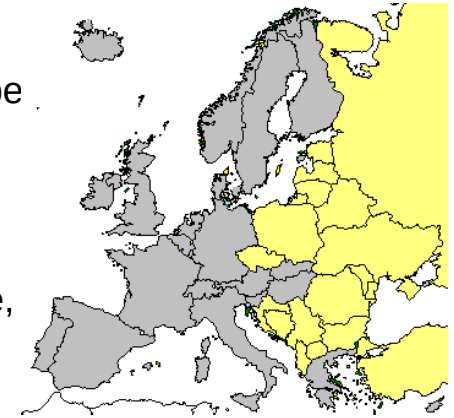
Geographical Data Description Directory(GDDD)

Created: in 1994

Aim:

- to establish a descriptive listing of the principal geographical databases available from the National Mapping and Cadastal Agencies of Europe.
- a pilot implementation of the European metadata standard CEN ENV 12657 of CEN/TC287.

Content: more than three hundred products are described, from 36 Europe Mapping Agencies.



Categories of information :

- Overview
- Commercial Information: geographical extension, conditions of sale, restrictions of use, format, etc.
- Technical Information: specifications, data source, content, update information, accuracy and other quality parameters, etc.
- Organisations: short description of the NMCAs providing the data

CORINE LAND COVER

CORINE = Co-ordination of Information on the Environment



Land cover: biophysical coverage of the Earth's surface (changes > 1 year)

- project initiated by the European Commission
- working scale - 1 : 100 000
- minimum mapping unit: 25 ha
- 28 countries are involved, 4.43 million km^2

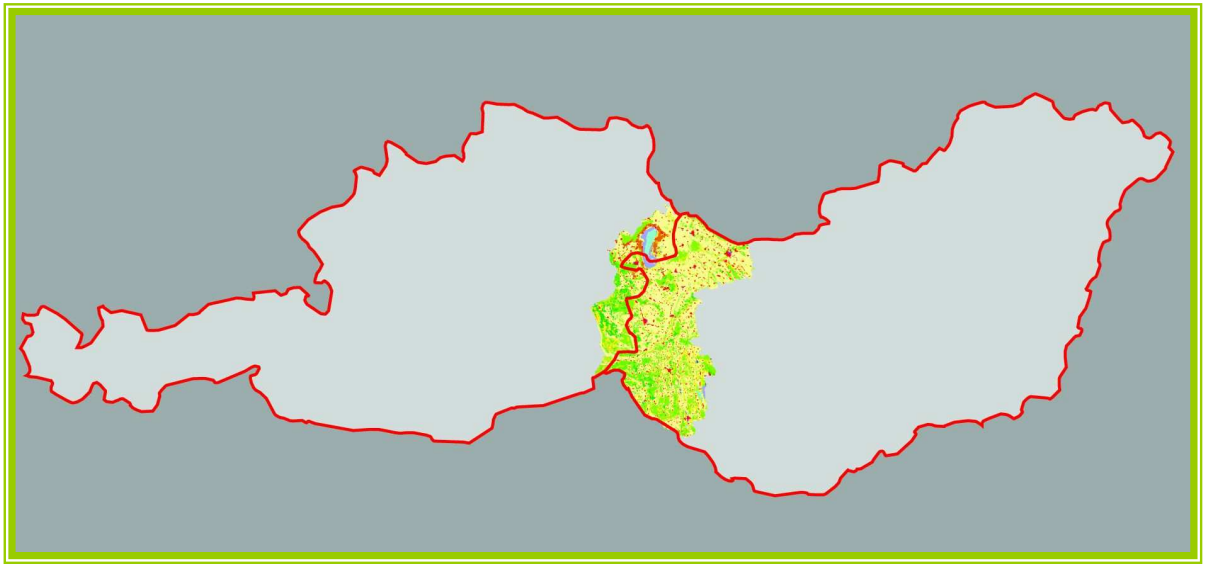
Purpose: To provide quantitative, consistent and comparable information on land cover

Applications: Land cover is a basic data source for environmental modelling, regional planning and orientation of the environmental policy in Europe

Possibilities of cross border co-operation between Austria and Hungary

How can CORINE Land Cover database and remote sensing (RS) data contribute?

Austria and Hungary share a 316 km long borderline,
a common cultural and historical heritage and similar landscape and natural characteristics as well as natural economic linkages,
which all encourage several means of cross-border cooperation.

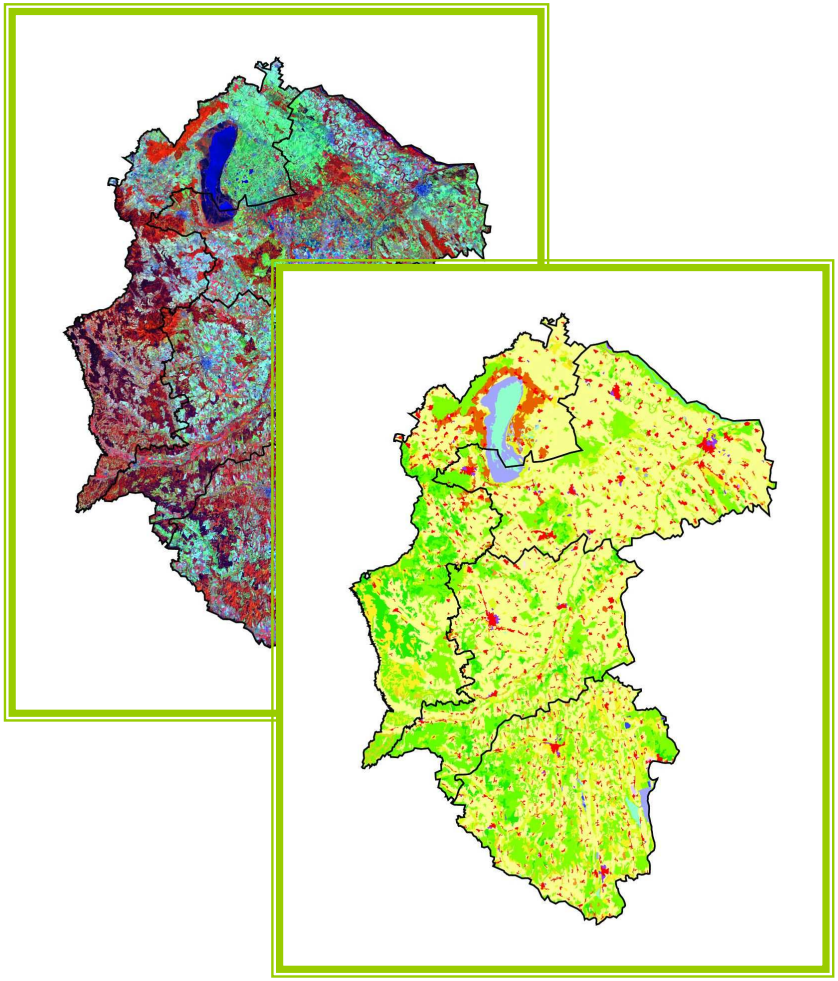


- Regional development (West-Pannon Euroregion)
- Nature conservation (Nationalpark Neusiedlersee-Seewinkel – Fertő-Hanság N. P.)
- Tourism development (Írottkő / Geschriebenstein Naturpark)
- Hydrology: catchment-level modelling of small rivers (Rába, Gyöngyös etc.)
- Environmental scientific research and transfer of know-how

REGIONAL DEVELOPMENT

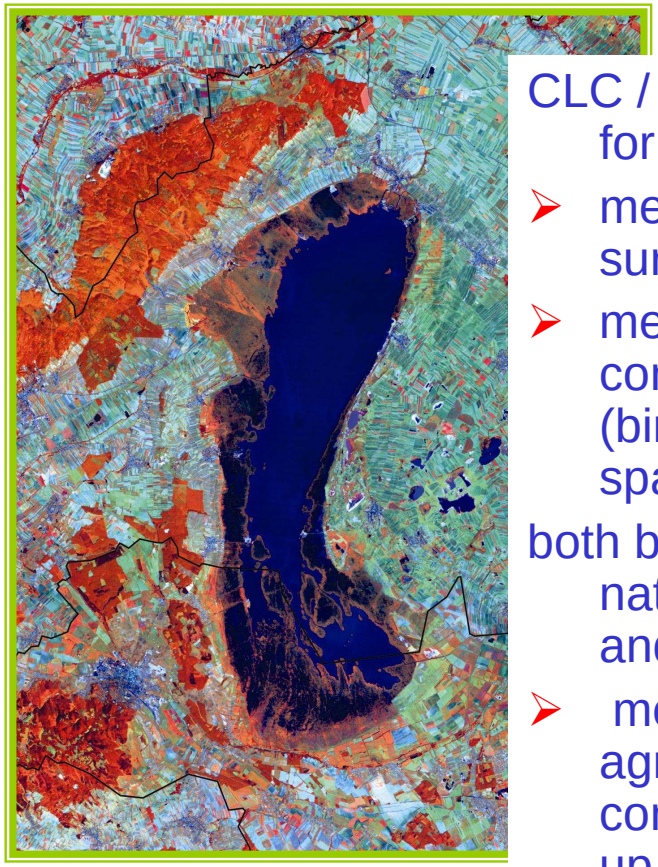
West-Pannon Euroregion (Province Burgenland, counties Győr-Moson-Sopron, Vas and Zala) was established in 1992, promoted by EU's Interreg Community Initiative.

- **Joint and harmonised development of transport networks** – CLC: modelling of fragmentation of natural habitats by transport routes
- **Harmonised cross-border spatial planning** – CLC: impact assessment of supports and developments (eg. urban sprawl, industrialisation, loss of natural habitats and ecological corridors)
- **Harmonised tourism development** – CLC: environmental impact modelling of tourism infrastructure development
- **Cross-border environmental projects** (dump sites, water and air quality protection measures) – CLC: watershed level contamination modelling



NATURE CONSERVATION

Neusiedlersee (Fertő-tó) and its surroundings form a UNESCO World Heritage Site, managed by Nationalpark Neusiedlersee-Seewinkel and Fertő-Hanság Nemzeti Park.

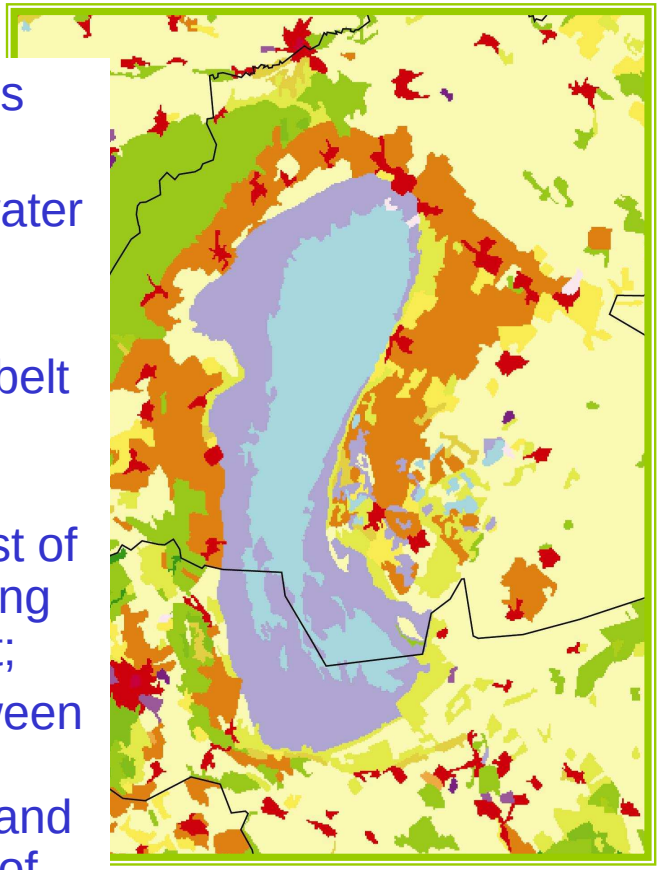


CLC / RS data can be a basis for:

- measurement of actual water surface,
- measurement and conservation of the reed belt (bird nesting and fish spawning sites),

both being a common interest of nature conservation, fishing and tourism development;

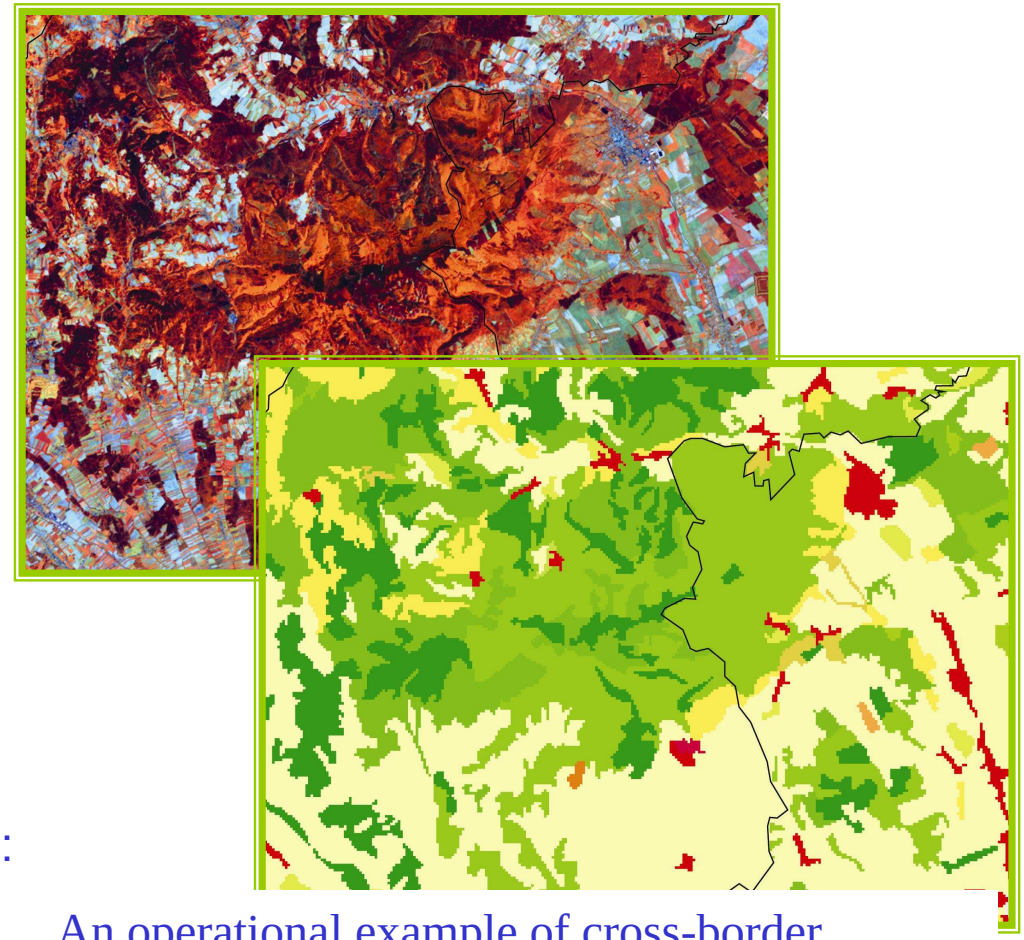
- monitoring conflicts between agriculture and nature conservation – objective and up to date measurement of area exchange between the two sectors.



TOURISM DEVELOPMENT

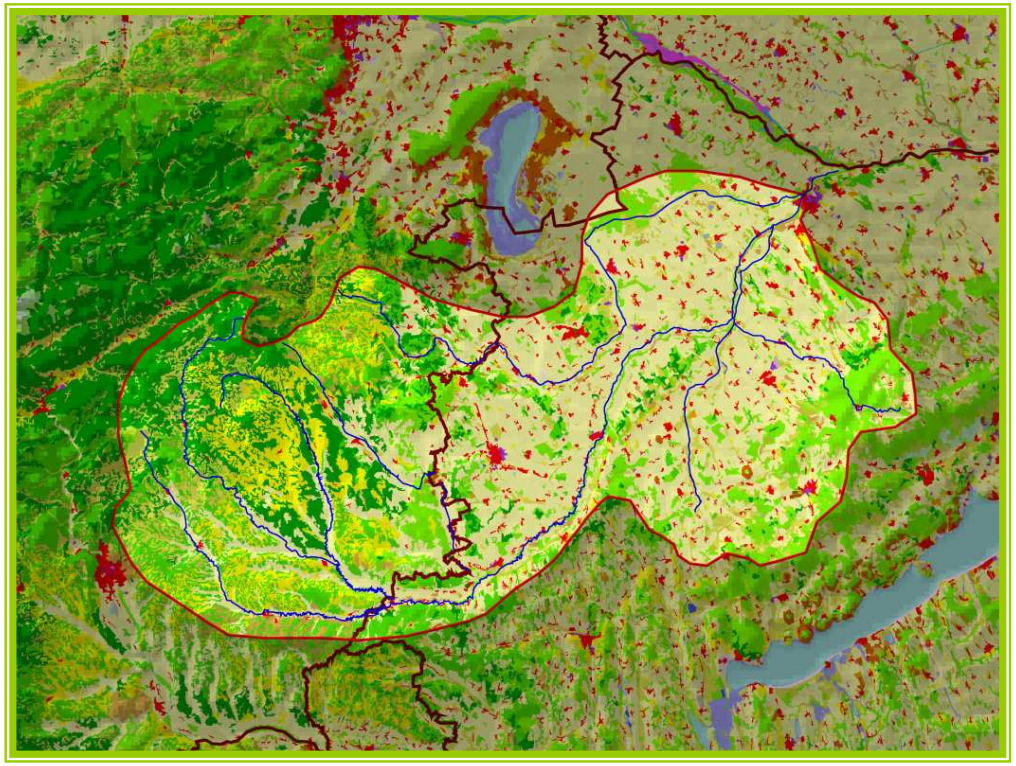
CLC / RS data might be used in the following fields of development:

- Protection of cultural landscape – CLC and satellite data: monitoring changes of land use due to increasing impact of tourism (eg. abandonment or re-occupation of agricultural fields)
- Construction of bicycle and trekking route networks – CLC and satellite data: assessing fragmentation and disturbance impact of routes on valuable natural habitats
- Provision of information to tourists – Satellite data and CLC: informative and spectacular maps on information boards and in brochures



An operational example of cross-border development harmonisation is the Írottkő / Geschriebenstein Naturpark in the region of Kőszeg (Güns) and Rechnitz (Rohonc) founded in 1997.

HYDROLOGY– catchment level modelling



The approximate water catchment area of the Raab river overlayed on CORINE land cover data

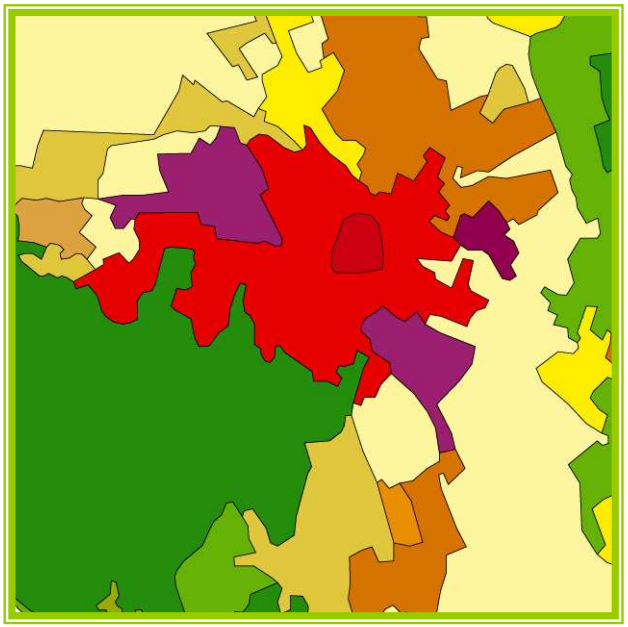
Hydrological modelling requires a catchment-wide perspective, assuming the cross-border harmonisation of the databases.

Land cover is a key component in modelling many of the hydrological processes, such as surface runoff, evapotranspiration or diffuse source pollution (nitrate, phosphorus)

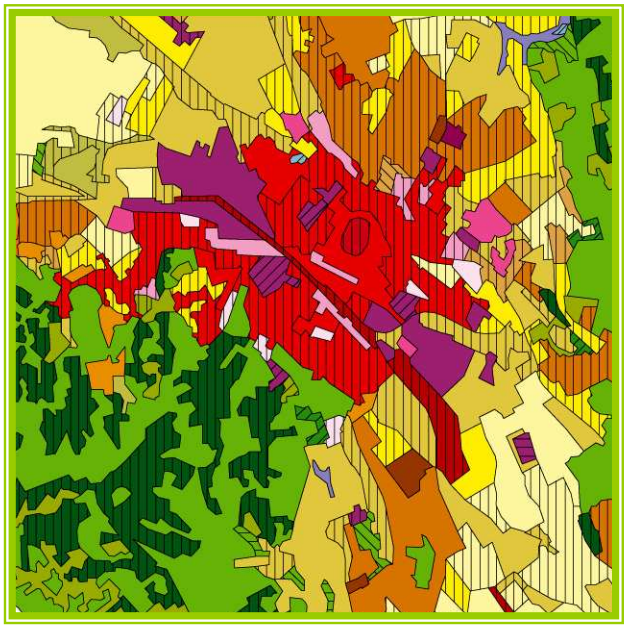
CLC2000 is a time-consistent, Europe-wide land cover database, which enables the number of cross border applications.

Policy relevance: EU Water Framework Directive

TECHNICAL COOPERATION
Sharing the know-how of producing a more detailed national CORINE Land Cover database.



Sopron
(Ödenburg)



National and sub-national level applicatons often require a more detailed land cover database. Its benefits comapred to the European-level CLC are:

Increased thematic resolution:	~80 land cover classes instead of 44
Increased area resolution:	4 ha minimum mapping unit instead of 25 ha
Increased linear resolution:	50 m minimum width instead of 100 m
Higher thematic realiabilty:	> 90% instead of 85%

NEEDS AND POSSIBILITIES FOR ECONTENT DEVELOPMENTS

Spatial data groups

- Principle spatial data
  - Spatial data for common spatial referencing
  - Principle thematic spatial data
- Spatial data of applied interest (social, technical, business, economy, political, etc.)

NEEDS AND POSSIBILITIES FOR ECONTENT DEVELOPMENTS

Principle spatial data (1)

- Spatial data for common spatial referencing
  - Spatial referencing framework data
    - Coordinate reference systems
    - Geographical grid systems (projection systems)
    - GNSS (GPS) infrastructure/Geodetic networks
  - Spatial referencing map data
    - Topographic maps
    - Cadastre system (legally referencing spatial data)
      - Maps of cadastral parcels
      - Identifiers of properties (real estate registration)
      - Administrative units
    - Georelated remote sensing data (orthoimagery)

NEEDS AND POSSIBILITIES FOR ECONTENT DEVELOPMENTS

Principle spatial data (2)

- Principle thematic spatial data
  - Transport network
  - Hydrography
  - Environmental data
  - Land cover data
  - Statistical data
  - Regional development data
  - Agricultural data (e.g. LPIS)
  - Land use data
  - Land te….. data

NEEDS AND POSSIBILITIES FOR ECONTENT DEVELOPMENTS

Types of organizations concerned in cross border activites

- Governmental organizations
  - National Mapping and Cadastral Agencies
  - Sectorial/Ministerial Organizations
- Non-Governmental Organization
- Participants of the GI-industry
  - Public sectors
  - Private sectors
  - Different enterprises
- Academical organizations



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Academic experience: Dipl. Photogrammeter-Surveyor (Institute of Geodesy, Ariel Survey and Cartography, Moscow, 1967), Doctor Tech. (Budapest Technical University, 1982), Candidate of Technical Sciences (Hungarian Academy of Sciences, 1981), Ph.D. degree (Budapest Technical University, 1995).

Practical experience: Satellite geodetic techniques and GPS. Elaboration of satellite geodetic adjustment software systems. Elaboration and nationwide harmonisation of the Hungarian „Digital base map" standard and „Digital topographic map database" standard. Coordination and successful realization of numerous national and international R+D projects. Database modelling. National Spatial Data Infrastructure. Coordinate system transformation.

Teaching: Periodical lecturing at the Budapest Technical University from 1981 as honorary associate professor (satellite geodesy, GPS, Land Information System). Lecturing at College of Geoinformatics, The University of West Hungary from 1989 as associate professor (satellite geodesy, GPS, GIS, LIS, digital photogrammetry).

Professional awards: „Lázár Deák Medal" of the Hungarian Professional Society (1982), „Fashing Antal Medal" of the Agricultural Ministry (1996), Academy Prize by the HAS (1993).

Publications: lecture notes, monographs, more than 170 papers published in proceedings and registered journals, similar amount of internal reports, a big part of it on GIS and digital cadastre.

Recent membership: Consulting member of Geoscience Department of HAS, Geodetic Scientific Committee of HAS (deputy chairman of the Committee), Chairman of GI Standard's WG of Hungarian Office of Standars, Representative to Eurogeographics, Hungarian representative to FIG Commission 3, Board Member of the Hungarian Society of Surveyors.

Recent position: Director General, Institute of Geodesy, Cartography and Remote Sensing, Hungary.