Administrative Boundary Data Services (ABDS) – an EU project and its Hungarian aspects

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Abstract. The administrative boundary data are basic part of the European Spatial Geographic Infrastructure and serve as spatial reference for an extensive group of geographic information like the territorial statistics and administration.

The project titled as "Administration Boundary Data Services for the Control and Eastern European Countries" (abbreviated as ABDS for the CEEC) is supported by European Commission in the frame of 4th R+D framework program under number 977050. The project of 18 mouths duration started 1 December 1998. Its budget is 922,8 kEuro, with 500 kEuro of it supported by EU. The project coordination is provided by the Institute of Geodesy, Cartography and Remote Sensing, Hungary.

The ABDS for the CEEC project is an initiative proposed at the Forum on Information Society held in September 1996 with participation of ministry rank leaders from the European Union and Control and Eastern European Countries.

The ABDS for the CEEC project has the ambitions goal to elaborate and preparate a service system in which the administrative boundary data are expected to be supplied from a virtual database consisting of distributed local databases interfaced respectively. The distributed databases are the primary local data sites of the participating countries commissioned by legal acts to handle, register and supply of boundary data (cadastral offices in general). The practice of such type of distributed database utilization is general and widely spread informatics and computer techniques all over the world. However, it is not a general case for communities of geoinformation, including the cadastral offices networks – although Hungary stands a distinguished place with his nation-wide intranet "TAKARNET" connecting the land/cadastral offices.

For making sich a spatial data service of administrative boundaries operational in the future, the project organized full inventory on the administrative boundaries of participating countries, elaborates boundary data generalization method suitable for near real-time and on-line data supply, prepare the rules of the future data services operation of networked local data sites as well as elaborate the quality backround and standard conformity checking.

The paper presents the main details of the project, shortly discusses its Hungarian aspects and the project results.

1. Introduction and Project objectives

The enlargement process of the European Union (of 15 countries) is started (see AGENDA 2000, International Governmental Conference). This process will result a market of 480 million people with the associated countries in Central and Eastern Europe. The continent-wide thinking, mapping, management etc.

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requires spatial data for 36 countries actually. This part of the Old Continent has the chance to show and offer the same rules of the games in GI (Geographical Information) for himself and some other very important neighbouring zones: the Mediterranean, the TACIS countries (at present the situation of the CEEC is similar).

Precise, over time managed and well marketed data will be needed. It should contain spatial, geo-related data and re-engineered statistical and registry dataset.

The communication of the Commission for the European Parliament and the Council on GI2000 - Towards a European policy framework for Geographical Information is actually in the phase of adoption. The aim of this action is to raise awareness and start discussion at political level to be followed of an action plan. In this general European frame the strongly regional project will give the possibility for the CEEC to joint actively this process and the ABDS for this countries can assure a contribution on appropriate base to start this activities.

The SABE (Seamless Administrative Boundary of Europe) is the actually optimal approach for maintaining the current services in the EU member states aiming at spatial analyses and to be extended to the CEEC region. The enlargement process of the European Union contains as requirement for this countries the extension of the existing Eurostat/GISCO (Geographical Information System for the Commission) time series on spatial data.

The objectives of the proposed measure, project is the preparation and partially implementation - conforming to the availability of ABD in the participating countries and results of joint actions for funding - of (internet based) on-line service for ABD with liability of the data coming from the network of original sources having quality assurance for the collection, processing/updating and delivery of their data.

ABDS will be available with the defined resolution and at scale with recommendation for computer-aided further generalisation at each resolution/scale. ABDS gives agreed attributes for the administrative units, different indexes etc. Links to the most important ABDS-related datasets and ABDS applications via European/world wide metadata services are part of the service. The project will support the stepwise realisation of the extension, completion of the existing SABE dataset to the countries in the CEEC region.

The core of the on-line ABDS is the network of original data sources of large scale and generalised boundary data in the participating countries (with EUREF/WGS84 and UTM as reference and projection systems). Detailed inventory of the elementary boundary points, co-ordinates and all attributes of this co-ordinates including administrative information for all the life-cycle of the points create the base for the future ABDS. The main aim is assuring liability of data in on-line services in the original formats and on yearly delivery in the generalised versions.

The ABDS Memorandum of Understanding (convention) will contain rules for data capture (also recommendation for 3D), base regulation (with resolution-oriented object selection) for generalisation, for merge and refining of datasets, principles for commercialisation and specially for the protection of (intellectually and other) property rights. The specifications of the ABDS-sets and ABDS-process have to be conform to the CEN and ISO standards.

This first project in the series of projects, activities aiming at the complete implementation of ABDS has three tasks, beginning with the elaboration of the inventory (1st task) on administrative, mapping and statistical processes in the participating countries. With results of this inventories and analysis the data model with world-wide discussed generalisation/simplification rules (2nd task) for product and service specifications should be created as second task. This specifications give the base for the frame of implementation of the service - Memorandum of Understanding (3rd task).

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The project proposal contains elements for the standard conformity checking of the proposed data model, data production and delivery process. To complete this horizontal task absolutely necessary for the Memorandum of Understanding a separate multi-country PHARE action will be proposed.

A second separated project proposal will be the quality assurance for ABDS in the CEEC - with the aspects of the multi-site control of the regional network - as precondition of the service and important for the definition, re-engineering of data collection, processing and delivery. For this activities a multi-country PHARE action in the framework of PRAQ III can be proposed.

The 3rd parallel -timely joining - project proposal will be the feasibility study and implementation of the on-line electronic commerce of the ABDS as service.

The management structure and the participant organisations guarantee the harmonisation with other efforts in this field aiming new EU-wide services with the participation of administrations, industries and citizens.

The network activities needed for the service will be prepared and practised - learning by doing - during the project.

Special attention will be given to the marketing tasks in each parts of the ABDS, considering different stages of service provision in the participating countries. Basic approach is that new technologies, projects and programmes for data capture, system modernisation and computerisation can give the chance to meet by ABDS all medium term needs and challenges. The long-life switch-table between visible and non-visible environment and between commune-level and regional/continental level mapping and data processing will be prepared by ABDS.

The basic territorial units (actual Eurostat nomenclature) represent elementary polygons enabling the data use in the overwhelming majority of GI related economic, social, societal, cultural, environmental and other sectors.

Important parts of the content of the project results will be:

- Definition of the content of the ABDS for the CEEC with agreed rules for the operative service,
- Research, description of results of analyses and comparison of ABDS and similar solutions e.g. SABE with special regards to bottlenecks and other difficulties caused by the project innovation properties. Key elements are liability, guarantee of data and service.
- Reviewing of national solutions, country networks how the chosen project solution can be mastered in its complexity and which new tasks will be fulfilled including quality assurance in this segment of the activities.
- Further identification of external technical and financial assistance in solving special aspects of the ABDS that are not realisable by the national participants. These needs have to be analysed and included into the activities covered by the tasks, allowing a step-by-step or gradually implementation of the service, conforming the availability of data and service ability conforming ABDS requirements in the participating countries. For the decisions for the signature of the Memorandum of Understanding and to start the service all results of the project should be considered by the data owner participants, country networks.

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2. Targeted results

- Investigation of the present situation,
- Preparation and partially implementation of on-line service with new defined generalisation rules,
- Service in harmonisation with the ongoing process of traditional data collection actions (e.g. SABE),
- Use new European and ISO standards,
- Offering quality assurance and fulfilling requirements for the electronic commerce of spatial data,
- Preparing the active participation in pan-European activities (sectorial: GI 2000, general: Agenda 2000).

3. Basic approach of the project

- Elaboration of a new kind of data inventory for administrative boundary data,
- Implementation of the ABD-inventory for 9 countries of the base of commonly accepted questionnaire (8 countries from the CEE region and Greece),
- Analysis of this inventory and begin of data modelling,
- Inventory of existing generalisation/simplification rules,
- Elaboration, discussion, adoption of new rules for generalisation,
- Data modelling and testing with this rules,
- Elaboration of the Memorandum of Understanding with the key element of the ABD Services,
- Openness for the use of already agreed results of the project by competent organisations in other countries, regions,
- Strong networking in the process of the project implementation.

4. Impacts of the ABDS project

4.1. Who will have the impact of the expected results?

The ABDS as new on-line service will have essential impact for all domains where administrative data can be used: administration, statistics, land management, property registration, agriculture, environment, transportation, navigation, all kind of mapping and GI applications, software industry, electronic commerce, Earth observation etc…

4.2. What will be the impact of the expected results?

The expected results of ABDS allow the Central and Eastern European countries:

- to facilitate the harmonised production and delivery of this strategic content,
- offering the possibility of new quality for other joining projects for GIS based applications.

5. Project workplan, deliverables

This project proposal – as a sub-project of the whole ABDS for the CEEC project in the framework of the INCO COPERNICUS – contains for the preparation and implementation of the Administrative Boundary Data Service the following tasks:

- **task 1** inventory of ABDS fundamentals,
- **task 2** definition and agreement of rules of generalisation/simplification for the on-line service,
- **task 3** definition of the Memorandum of Understanding – base for ABDS.

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All tasks include test on datasets offered by participants.

5.1. The inverntory of ABDS fundamentals

New questionnaire has to be defined and agreed for the inventory. Three fileds has to be investigated:

- administrative processes, organisations, actions in the participating countries relating to the administrative boundaries (can one parcels be managed by two administrations?, separation or merge of administrative units, insignificant changes, low, orders, authenticity etc.)
- processes, organisations, actions related to the nomenclature (statistical offices, gazetteer, indexes, cross-indexes, separation of parts of administrative unit"s statistics when modification of boundary data is significant etc.),
- mapping related processes, organisations, actions (register of administrative boundary points, resolution)scale of mapping, update process, delivery of public information).

Properties of WP1:

- **Purpose**: inventory of the ABD situation.
- **Solution**: questionnaire.
- **Investigated fields**:
- administrative processes, organisations, actions,
- processes, organisations, actions related to the nomenclature,
- mapping related processes, organisations, actions.
- **Deliverable**: inventory report.
- **Responsible**: FÖMI

5.2. Definition of the rules of generalisation for the on-line service

A proposal for (world-wide) discussion in the GI community should be prepared. The proposal aims to arrive at

- model oriented approach, requirements of ABDS
- agreement on scales, resolutions
- definition of base geometric datasets
- thematically derived base datasets
- recommendations
- object oriented data model background.

Properties of WP2:

- **Purpose:** elaboration and adoption of the generalisation/simplification rules for the ABDS.
- **Solution:**
  - model oriented approach, requirements of ABDS,
  - agreement on scales, resolutions, updates,
  - definition of base geometric datasets,
  - thematically derived base datasets,
  - recommendations,
  - object oriented data model background.
- **Deliverable**: recommendation
- **Responsible**: FÖMI

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5.3. Memorandum of Understanding

For the MoU will be elaborated in the framework of this project:

- Regularisation of the content of the service
- Definition of the service
- Reference frame (proposed will be EUREF 89 with conversion to/from national/regional reference frames as option)
- Geometrical and topological base
- Conceptual schema for the databases (objects, attributes, relations etc.)
- Data content
    - object tables (boundaries)
    - attribute tables (administrative level, time, validity, consistency, indexes, register etc.)
    - relations tables (thematical, topological etc.)
- Quality items, verification
- Generalisation/simplification rules
- Base dataset, periodically, continuously update - logical and physical definition, requirements, archives, metadata
- Access, query rules
- Controlling, verification of data provision, service performance to be defined in the knowledge of the content of the service.
- Management of the MoU

Properties of WP3:

- **Purpose:** elaboration the contractual base of the ABDS.
- **Solution:**
    - definitions,
    - reference frame,
    - geometrical and topological base,
    - conceptual schema,
    - data content,
    - generalisation rules,
    - quality items, verification.
- **Deliverable**: text and annexes.
- **Responsible**: Estonia

5.4. Horizontal actions completing the tasks

5.4.1. Standards

ABDS data modelling and service definition will be based on standards of CEN TC 287 supported by the European Commission and of ISO TC 211. From this standard family the following norms having passed the preparatory phase should be studied, analysed and built into ABDS: transfer, positioning, quality, geographic identifier, metadata, query and update. From ISO TC 211 the topics conformance and testing, spatial and temporal subscheme, rules for applications schema, spatial operators and all items of the Working groups of geospatial data administration and geospatial services are important for ABDS at this preparation phase.
Other standards in preparation in this frame or other international standardisation body will be considered at time.

The first conformity checking with this standards will be made in 8 months after beginning of the project, with leading experts in this field as stated in the description of the series of projects for ABDS.

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5.4.2. Quality management

A project proposal to be prepared and to be financed separately will be elaborated and introduced to the multi-country PHARE to prepare parts of organisations for quality assurance of activities concerning ABDS. The aim of this activities is the development of special software supported procedures, which are necessary for the preparation of the implementation of theABDS for the CEEC.

5.4.3. Legal protection

Copyright issues will be considered in detail after having results of the commercialisation of the inventory, valorisations items, and experiences of studies in different European countries, co-ordinated by EUROGI.

The directive of the EU on the legal protection of databases - with special regard to the new ius generis tools in elaboration for the introduction in the EU member states - will be observed and applied integrated in the main tasks. The new regulation on electronic commerce will be observed and applied.

Properties of WP4:

- **Purpose**: the assurance of specific conditions, knowledge and information.
- **Parts**:
  - Standard conformity checking,
  - Quality assurance,
  - Legal protection of the datasets,
  - Information support for the project activities.
- **Solution**:
  - analyse,
  - establischment of criteria for the ABDS,
  - harmonisation,
  - support of intensive communication.
- **Deliverables**: reports, conformity certification, disposals.
- **Responsible**: FÖMI

5.5. Project management

The project has to be limited to the most important needs identified in this countries and to be started in the financial frame given for the implementation as decided by the European Commission on the base of the approved project proposal prepared for the INCO-COPERNICUS call for proposals in the expert meeting in Brussels 8 January 1997 and in the kick-off meetings held in Budapest 14 March 1997 and 8-9 September. The content of the project is limited for only the ABDS for the CEEC. The complete project ABDS for the CEEC can only be realised in more steps, where the present is the most important one creating the basic information and rules for the on-line services. Following this approach the management model is consisting of:

- Advisory Board
- Steering Committee
- Project coordination
- Networking
- Special partner Groups

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On the Board

Members**:**

- Chiefs of participating organisations - one representative of each national network designated by the country where the inventory will be made
- Experts of Eurostat, DG XVI, CERCO.
- Initiative co-ordinators as defined in the Action Plan description (U. Boes as EU DG official representative, V. Bognár as secretary of the Board)

The task of the Board is the support and a kind of supervision of the activities preparing the start of ABDS, including future harmonisation with other measures, actions and projects under the umbrella of ABDS. The Board helps the preparation of the Memorandum of Understanding and has the task of dissemination of the results with the own tools and possibilities.

Only the operational costs of the Board could be reimbursed in the frame of the projects. The secretary has to prepare and manage the implementation of the actions of the Board.

Important task is the contribution to the harmonisation of ABDS with the Commission's, CERCO's and other organisation's plans, actions.

The secretary for the Board is Mr. Vilmos BOGNÁR.

On the Project co-ordination

The participating partners have different activities detailed in the action plans and cost tables in order to assure the balanced arrangements during the implementation process and the mobilisation of own resources for the realisation.

The costs for different tasks to be executed by experts as subcontractors are included in the external cost in the FÖMI budget. Another budget line in the FÖMI budget is for the country inventory in the task 1.

In the countries where the country inventory will be made a country network secretary should be employed. This secretary should be a half-time technical expert 50-50 % financed by the project (European Commission) and by the country network (co-ordinator).

The co-ordinator of the project is the FÖMI and Mr. Szabolcs MIHÁLY is the scientific co-ordinator. FÖMI has to assure the secretary work for the project (including the support for the tasks relating to the functioning of the Board).

Properties of WP5:

- **Purpose**: provide the management and operative coordination.
- **Parts**:
  - Activities of the Board containing representatives of the EC, OMFB, CERCO and countries,
  - Activities of the Steering Committee,
  - Coordination of the implementation of the project,
  - Networking with country secretaries on the web,
  - Special Partner Groups.
- **Deliverables**: agreements, contracts, periodic reports, reports.
- **Responsible**: FÖMI.

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6. Participants of the Project

6.1. Partners

Bulgaria:	Technical University of Sofia
Czech Republic:	Research Institute for Geodesy
Czech Republic:	University Masaryk of Brno Faculty of Science
Estonia:	Statistical Office of Estonia
Finland:	Plancenter Ltd.
Greece:	Hellenic Cartographic and Cadastral Organisation
Hungary:	Institute of Geodesy, Cartography and Remote Sensing (coordinator)
Hungary:	Mapping Agency of Hungarian Deference Forces
Hungary:	Hungarian Central Statistical Office
Hungary:	Hungarian Public Utility for Regional Development and Town Planning
Hungary:	Hungarian Prime Minister's Office
Hungary:	HUNAGI
Lithuania:	National Service of Geodesy and Cartography
Latvia:	Central Statistical Bureau of Latvia
Poland:	GISPOL
Romania:	Research Institute for Informatics Research Laboratory
France:	MEGRIN
Italy:	GISIG

6.2. Experts

Altogether 6 experts are participating in the project, representing the activities needs and know-how in CEN TC-287 and ISO TC-211 standardization, CERCO and FIG.

7. Hungarian aspects of ABDS for the CEEC

There are a tremendous amount of aspects and tasks for each country participating in the ABDS projects. In this presentation the Hungarian aspects are outlined, mainly because of their importance and outstanding financial contribution to the project. They are as follows:

- the project is result of Hungarian initiative,
- the project coordination, management and secretariat are provide by the Hungarian side,
- the Hungarian side provides test data for examination of different generalization approaches,
- the test inventory as case study is done and exampled to the participating countius by Hungarian side,
- the testing of the data services is to be performed in Hungary.

The first two aspects have been mentioned earlier. The second two aspects are showing high-level activity, although these are not special with respect the other participants.

Special attention must be paid to the fifth ascpect. Using the resources of the Hungarian Lands, Cadastre and Mapping Agency institutional network it is the Institute of Geodesy, Cartography and Remote Sensing who makes testing of methodology, generalization and services rules elaborated in the ABDS project. During the test 116 District Land Offices networked under the intranet "TAKARNET" and being the primary local data sites of a type of distributed administrative boundary database network will operate together with FÖMI and will provide Hungarian ABD Services as based on ABDS rules. In spite of its importance of providing

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experimental results for a future ABDS practice, this test is highly beneficial from the Hungarian national point of view, too.

First, the just now introduced "TAKARNET" (together with the land office human resources, management and know-how as well as the network hardware and software) will be tested in operation and there will be feedback features for improving the "TAKARNET".

Second, the settlement and built-in area boundaries will be managed into the distributed ABD databases of primary local data sites providing these databases as GI products and establishing the standard conformity checking and data quality background for it. These products will represent a deep framework for referencing the GI data which, of course, will enhance for the profit of the ongoing National Cadastre Program of Hungary.

Third, the ongoing process of digitizing the analog cadastre maps in Hungary will have high profits from the settlement boundary product and the built-in area boundary products with their boundary site coordinates suitable for correctional and adjusting procedure of the above digitizing.

8. Results (1. December 1998 – 30. September 1999)

WP1 The inventory

- 3 tasks finished from the 5
- implementation of the inventory, Hungarian pilot inventory

WP2 The generalisation

- 2 tasks finished from the 4
- Czech and Hungarian test data on CDs and distribution

WP3 Memorandum of Understanding

- First task of Mou ready

WP5 The management

– *Pre-workshops*

March 1998	Debrecen, (H)	Management
April 1998	Prague (CZ)	Management
June 1998	Brno (CZ)	Generalisation
October 1998	Sopron (H)	Generalisation

– **Regular workshops**

March 1999	Prague (CZ)	1. Advisory Board meeting
May 1999	Lednice (CZ)	Generalisation
May 1999	Budapest (H)	Full project meeting
August 1999	Stresa (I)	Presentation of ABDS on the meeting of the EU Commission
August 1999	Sofia (B)	Meeting on Generalization
September 1999	Warsaw/Olstyn (P)	Meeting on the Memorandum of Understanding and Generalization

– Web site of the ABDS project prepared and operating

– The Project official web site http://abds.fomi.hu
  – Public area for "surfers"
  – Protected area for ABDS Consortia members New style of work!

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9. Future works

- Negotiation for enlargement of the "inventory" for the Scandinavian countries
- Cross actions with the Panel-GI, Agent, Gipsie projects
- WPs planned meetings this year
  - October Romania National/Inventory
  - November Finland 2nd Advisory Board meeting 1st Review meeting
- Planned meetings, next year
- 1 full meeting (board, partners, review)
  - May 2000 Estonia
- Thematic
  - MoU January 2000 Czech Republic
- Project preparatory in the 5th FW programme
  - February 2000 Hungary

10. Contacts

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