

# **GIS CROSSING NATIONAL BOARDERS - GIS A2E; A EUROPEAN UNION CORPORATE GIS TRAINING PROGRAM**

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## **ABSTRACT**

Since October 2002 a project, under the Leonardo programme, has produced a comprehensive GIS training material for use within the entire EU community. The project organisation consisted of 8 partners from Belgium, the Czech Republic, France, Latvia, Spain and Sweden.

The aim was to provide a GIS training material available on Internet, both for traditional education methods and for distant learning. It should cover all aspects on GIS from strategic considerations, through the decision process and GIS strategies to the user training with different technical aspects.

This paper describes the project from the beginning to the final result in terms of publicly available training material, which consists of three main blocks, named "Strategy and GIS Project Leading", "GIS Concepts and Methods" and finally "Related Technologies".

The paper also will describe how to get access to the material and give some ideas about how to customize the material for a specific organisation. References for the future will also be given.

## **TEXT**

### **Introduction**

The main purpose with the Leonardo da Vinci programme (or Leonardo da Vinci community Vocational Training Action Programme, which is the complete name of the programme) is to inspire to and provide funding for different training program activities, shared by a number of EU member nations. Thus a lot of different training program projects have been hosted by the Leonardo Programme.

The purpose of the GIS A2E project, which was performed during the years 2002 – 2004 was to propose a training service about GIS dedicated to professionals from the training sector in agriculture, forestry, environmental protection and water resources management. Trainers are the strategic target as the training offer will be proposed to training centers not specialized in GIS. The output should be available to use both in traditional classroom education sessions as in different types of distant learning sessions.

The project team consisted of 8 partners and was chaired by CNERTA/ENESAD in Dijon, France. Two experts (one from France and one from Sweden) were attached to the project. The main task for these experts was to ensure a project with a satisfactory level of quality in the project performance and in its output.

## Goals and objectives

The result of the project should consist of an integrated and adaptable offer for GIS training.




The offer should consist of a full set of pedagogical tools, according to a set of pedagogical sequences broken up into units and modules. The set of tools should be accessible and usable both for traditional classroom education and for different types of distant learning sessions. The tools should be possible to use by training bodies not specialized in GIS.

An educator's manual, a methodological guide to the creation of a customized training program and a toolbox for Internet based training sessions should be included in the training material. All the training material should be produced in English. One activity to customize the material, if necessary, should be to translate the training material to other languages.

### Goals and objectives

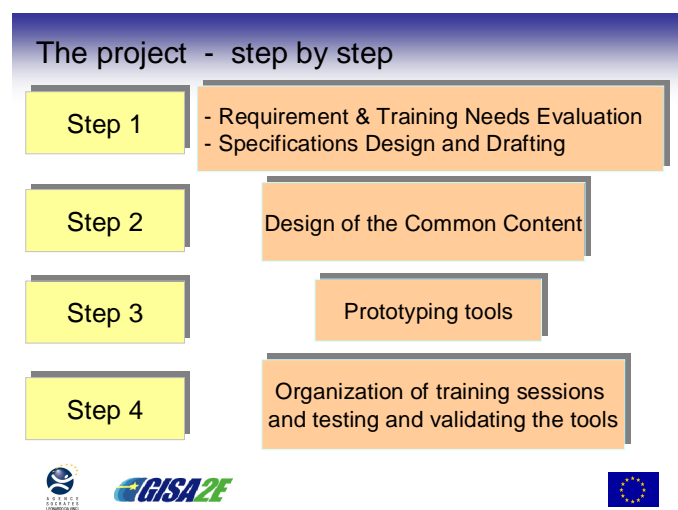
***The expected results consist of an offer of an integrated and adaptable training programme:***

- .....**analysis of requirements** of the public in partner countries should allow the definition of open professional and pedagogic reference sets and to structure a common and declinable training content.
- This content will be in the form of a **set of pedagogic sequences** broken up into different units and modules.
- **A complete set of pedagogic tools** (course documents, presentations, case studies, exercises) will be developed in off-line and online versions.
- Finally, the approach will be formalised in the form of an **educator's manual**, a methodological guide that will permit each educator to manage his own approach, to create a training programme adapted to the needs of his target audience and of adapting pedagogic products and creating new ones whenever necessary.



## The project – step by step

The project was performed within a frame of four steps. The first step included a needs analysis for training material, in terms of target groups, contents, importance and wanted level of skills after the training sessions. In order to achieve this a number of inquiries were done by all partners in the project. This means that we considered we had a fairly good impression of what was desired as result of the project. A concluding matrix was created which gave answers on our questions, expectations and desires.



During **Step No 1** the training material was drafted according to major principles. There was a lot of discussion about which training tools should be produced and also by whom. As a result of this matrix and the discussions a proposal for training units and modules was produced. The design of the training material showed to include three major blocks of sessions, namely:

- Strategy and GIS project leading
- GIS concepts and methods
- Related technologies

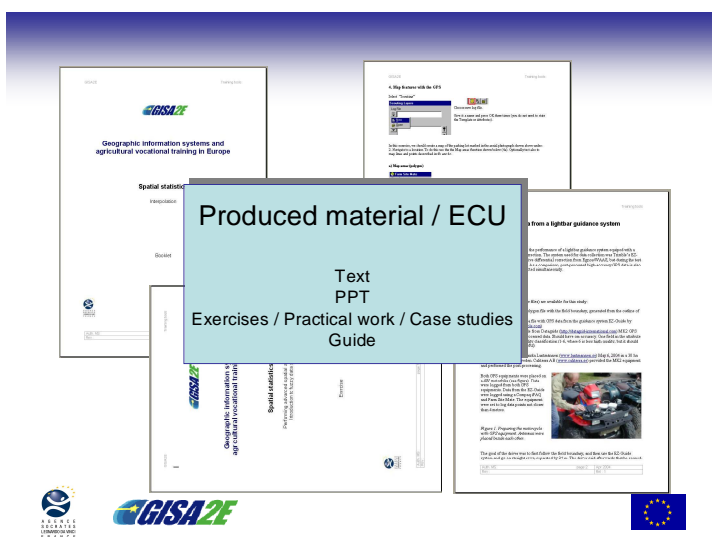
It also became evident that those tools which dealt with GIS strategy issues and project leading were to be rather difficult to produce as the experience of these issues among the partners was rather insufficient. It is worth a comment that a parallel project also funded by the Leonardo programme, the EGIS project, is suffering from the same problem.

During **Step No 2**, the main activity was to design the common content of the different training sessions. The procedure was to create syllabi for the sessions and to crosscheck that these syllabi covered all aspects on the decided topics and that nothing important was forgotten. This was a comprehensive work for a couple of months. There was also a number of coordination activities between the different responsible partners that was necessary in order to avoid different use of terms and concepts and to avoid doublings in the training material.

During this step the final decision was taken about the output in terms of training tools. Every training session should include (for traditional classroom education):

- a text document; literature both for the student and for the teacher/trainer
- one ore a number of OH slides files
- extra material for reading by the students (optional)
- case studies/practical exercises (optional)
- a bibliography
- a quick guide for the teacher as a HTML document

Additional to this material specifically designated for the teacher/training organiser should be included. Due to shortage of time not all training material was converted to use in distant learning sessions.



The main activity in **Step No 3** was to produce all the training material for traditional classroom education. This was a huge undertaking as the material consisted of more than 50 training sessions. A lot of cooperation and coordination had to be performed as well as a lot of cross check of the material in order to ensure that nothing important was forgotten. As the different components of the training material was finished it was delivered to the project manager and published on the project website. This made it possible for all partners to see what was done and to find out if there were any lessons to learn for their own job.

One important part of the production activities was to ensure the agreed graphical design on all the training material.

The second important activity during step No 3 was to plan for and prepare the test sessions. One objective was to find out if the produced material met the decided quality requirements. Another objective was to test different shapes of distant learning sessions. A third objective was to find out the needs for customizing the material to fit to different target groups. To all these issues we got a number of valuable and useful answers.

The third important activity was to begin the planning for dissemination of the produced material. A project that costs close to 700 000 € has to result in an output that really will be used. This is a responsibility, for all involved partners and other role players, at least to the tax payers in the EU nations who have contributed to the project with the necessary funding.

**Step No 4** was aimed at test and verification of the material. In total 20 training sessions were given and all partners were involved in one or more sessions. It is possible to claim that the project members, by the end of step No 4, had a very good impression of the quality of the material. One experience was that there were needs only for minor modifications. Once again the main problems occurred when giving education concerning the block “Strategy and GIS project leading”. This is really difficult as the target groups are that heterogeneous, covering all categories of individuals from CEOs to Geographic Information Officers and project managers.

The project ended with a final steering committee and technical committee meeting in October 2004 and an accompanying dissemination seminar. A few weeks later all the material was opened up for public use.

A number of experiences are worth mentioning:

- normal project management principles are relevant in a project like this. It is worth emphasizing that as shortcomings in this respect often cause time delay and poor costs control
- multinational project organisations need more time, than other project organisations to socialise in order to gain necessary knowledge about cultural differences, differences in use of words and terms etc.
- it is necessary with a closer control of the project members by different means in order to ensure that things are done on schedule and with agreed quality
- no payment should be given out without prior work performed in accordance with taken decisions

## **The contents of the training material**

The design of the training material consists of three levels. The highest level is named “blocks”. There are three blocks, namely:

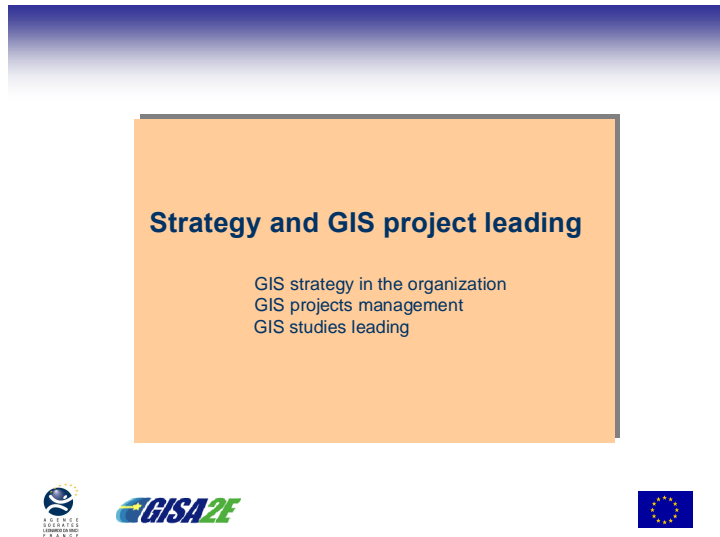
- Strategy and GIS Project Leading
- GIS Concepts and methods
- Related Technologies

These three blocks are described briefly later in this paper.

Each of these blocks include a number of modules that cover a specific topic. In total there are 13 modules. Each module consists of a number of Elementary Contents Units (ECUs). Every ECU constitutes a training session which can have a duration between 1 hour and a full classroom day. Thus a proper planning is necessary for a good result of a training program. The blocks, modules and ECUs are described in conjunction to the next three slides below.

One specific aim with this paper is to present the training material in a way that makes it possible for the reader to find out if the material can be used in their specific training situation with or without modifications.

It is quite obvious that this training material, in the GIS A2E project, has got a lot of influences from the Swedish StrateGIS project which was presented during ICC 2001 in Beijing, China, and performed in Sweden between 1999 and 2003. The StrateGIS project can be studied at the website [www.lst.se/strategis](http://www.lst.se/strategis) where a considerable part of the training material is available in English.

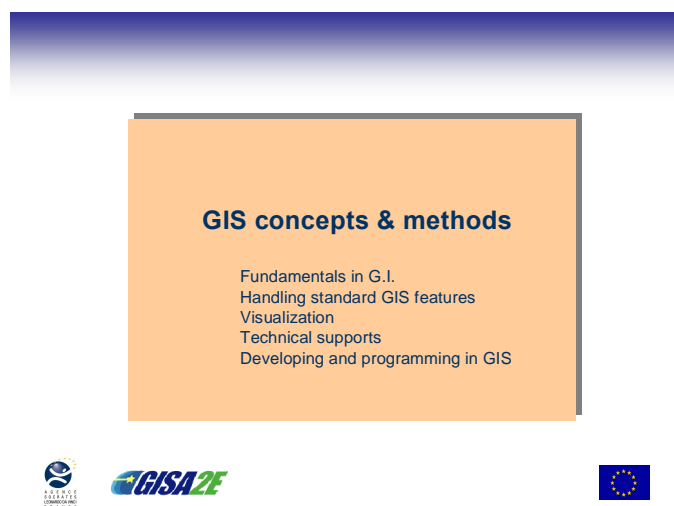


The first block of training tools "Strategy and GIS Project leading" consists of three modules and in total 13 training sessions. They deal with important GIS management issues both on the CEO level and on the project manager level. Each training session has a duration of ½ - 1 classroom day.

Here we learn about the importance of careful internal preparations prior to a development and implementation project. We study the important initial steps as the GIS study process, selection of data, use of internal and external consultants, partnership in projects, financial and legal aspects and a number of other issues. We discuss about the different steps in a development and implementation process, how to use different success factors and how to avoid the most frequent pitfalls.

We also discuss the process connected to Request for Proposal and Request for Quotation and some important factors to consider. Finally we talk about organisational implications of developing and implementing GIS in an organisation.

This block of training session is not well suited for distant learning. The main reason is that one important contribution to the result of this education is sharing the experiences from the students and their own organisations. Therefore it is strongly recommended to plan these training sessions in the context of a number of seminars.



The second block of training tools "GIS Concepts & Methods" consists of five modules and in total 12 training sessions, each with a duration of between 2 hours and a full day. Now we focus on the fundamental components

in GIS. How to build up, update and manage geographic databases is one important part of this block. Performing spatial analysis operations both with vector data and with raster data is another important component here. Knowledge about geographic data in itself is of course basic. Thematic mapping, 3D displaying and different cartographic documents are other important parts as basic GIS programming and knowledge about the GIS software market.

The practical exercises in the material are referring to Arc GIS 8, but can easily be converted to any other type of GIS software. A substantial number of these training sessions have been tested during step No 4 in the project and have proven efficient.

The basic target group for these training sessions are those who are supposed to work with GIS in a practical way within the organisation, although they are not supposed to be GIS professionals. Instead their professional skills are supposed to be found within agriculture, forestry, water resources management or other types of business.

The training tools in this block are well suited for distant learning sessions of different types as much of the material can be studied individually, either in a GIS laboratory or in the own office at home. However all types of distant learning sets high requirements on teacher presence either in the venue or on internet. It is advantageous to adopt one of the existing toolboxes for distant learning and use it in order to meet the students in a proper way when using the material for internet training. Within the project we have tested a toolbox named [Form@gri](#), developed by ENGREF, one of the French partners. The reference list at the end of this paper includes references to key persons in the project.



The third block "Related Technologies" consists of five modules with, in total, 18 training sessions, each with a duration between 2 hours and a full day. GPS and different areas of use both for navigation purposes and data capture is an important component in this block. So is also acquisition and use of different types of aerial photos and satellite images. Some time is spent to discuss interpretation of these materials. Basics concerning DEMs and how to use them for different purposes has been subject to a complete module. The module GIS and Internet was tricky to create as the development in this area is so rapid. The material has to be considered as "the best we knew in the fall, 2004".

Also these training tools block are well suited for distant learning sessions of different types as much of the material can be studied individually, either in a GIS laboratory or in the own office at home. The case studies and practical works in this block as well refer to use of Arc GIS 8, which has to be considered when composing a training program for the own organisation. A number of these training sessions were also tested during step No 4. Thus we know that they meet the requirements which were created from the beginning of the project.

The basic target group for these training sessions, as well, are those who are supposed to work with GIS in a practical way within the organisation, although they are not supposed to be GIS professionals. However here it is

necessary to analyse more carefully which training sessions should be given to whom. The material is a rich offer of tools

### **Use of the material – entitlements, restrictions and access to the material**

The great advantage with this training material is that it is accessible without needs for user-ID or passwords and it is free of charge for educational purposes, but only for that. Thus it is free to download all the material from Internet for educational purposes. However the volume of the material is considerable.

No other use is approved without prior written agreements with the contractor (CNERTA/ENESAD) and the producing partners concerned. This is important to remember as there is, until today, very little literature available about GIS management on the organisational and business levels. So far most GIS management literature deals with GIS project issues in different steps of a development and implementation process. For other issues described in the training material there is a rich offer of adequate literature available on the market. Just take a look on the list of references.

When using the material, for any purpose, it should be referred to source as “The Leonardo da Vinci Programme”, the name of the project (GIS A2E), to producing partner and to date of creation. When preparing for a training package using this material it is enough to have these references in one section of the material, preferably in the beginning of the training material. You are free to customize the material, to tailor it for specific purposes, add your own material to the basic tools and, if necessary, translate the material to your own language. This was one fundamental part of the context for the project. It is the desire of the partners to get the material widespread and used.

These few regulations can be found as complete text on the website of the project.

To get access to the training material – just enter the website [www.gisa2e.educagri.fr](http://www.gisa2e.educagri.fr), click on the word “Guest” on the opening page, then click “Pedagogical tools” and all the material is available. Then you can select wanted parts of the material and use it. In order to facilitate downloading the files are packed together as a number of zip-files.

### **Concluding comments**

The GIS A2E project has produced a rich offer of training material which is easily accessible on Internet. It is useful within many types of organisations, not only within agriculture, forestry, environmental activities and water resources management, but also in many other types of business as it is easy to customize the material for a specific organisation and tailor the material according to own requirements.

One specific advantage is that all the material has been produced by experts in agriculture etc, but with comprehensive GIS experience, not by GIS experts. Another important advantage is that the training material covers all organisational levels, and subsequently relevant issues, from the CEO level to the single GIS user level. This is important as there is a lack of good training material, and literature, for the senior levels of all organisations.

As the project was funded by the European Union access and use of the material for educational purposes is free of charge. Additional to this no user ID or password is required to get access to the material. Finally, as this paper includes contact information to key persons within the project it is easy to get in touch and get additional information or customizing assistance if desired.

### **REFERENCES**

**Literature** (a sample. The complete reference list is to be found in the training material)

The project website [www.gisa2e.educagri.fr](http://www.gisa2e.educagri.fr)

Environmental Modelling with GIS (Goodchild, Parks, Steyaert) Oxford University Press 1993

Geographic Information Systems: A guide to the technology (Antenucci, Brown, Kevany, Archer) New York, Chapman & Hall 1991

Geographical Information Systems and Computer Cartography (Jones, Ch) Addison, Wesley, Longman 1997

Geographical Information Systems Part 1 and part 2 (Maguire, Goodchild, Rhind) 1991

GIS and Organisations (Campbell-Masser) ISBN 0-7484-0205-5. Taylor & Francis

GIS, Organisation and People: A Social-Technical Approach (Reeve & Patch) ISBN 0748406530. Taylor & Francis

Managing Geographic Information Systems Projects (Huxhold-Levinsohn), ISBN 0-19-507869-1. Oxford University Press

Modelling our World: The ESRI Guide to Geodatabase Design (Zeiler). ISBN 1-879102-62-5. ESRI Press

Opening Access: GIS in e-government. ISBN 1879102870. ESRI Press

Principles of Geographic Information Systems (Burrough, Mc Donnell), Oxford University Press 1998

Uncertainty in Remote Sensing and GIS ((Foody, Atkinson) ISBN 0-470-88408-9. John Wiley & Sons

Web Cartography (Kraak, M-J) Taylor & Francis 2001

### **Key persons in the project**

Linda Arteta-Perrin, project manager, e-mail [l.arteta-perrin@educagri.fr](mailto:l.arteta-perrin@educagri.fr)

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#### The block “GIS Concepts and Methods”

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Mats SÖDERSTRÖM, SVL (SW), e-mail [mats.soderstrom@lantmannen.se](mailto:mats.soderstrom@lantmannen.se)

Bengt JULIN, ESRI-Sweden, e-mail [bengt.julin@esri-sweden.com](mailto:bengt.julin@esri-sweden.com)

Rafael SARDA, CEAB (SP), e-mail [sarda@ceab.csis.es](mailto:sarda@ceab.csis.es)

Adhoc and ENGREF, please see above

#### The block “Related Technologies”

CEAB, ENESAD, ENGREF, ESRI-Sweden, Masaryk University and SVL, please see above

## **BIOGRAPHY**

Mats, Söderberg, MSc

Born in 1942, retired army officer (LtC) from the Swedish Army (Royal Engineers)

MSc, bridge construction engineer in 1976

Participating in GIS and Command and Control Systems development since 1978 in the Swedish Armed Forces HQ.

Head of GIS development in the Swedish Armed Forces since 1990

Director of Military Geographic Service of the Swedish Armed Forces 1993-1998

CEO of the own company MS GIS & Mapping since Oct 1<sup>st</sup>, 1998. Business focus on GIS strategies and implementation planning, strategic studies concerning geographic information, project management and education. Activities both in Sweden and internationally.

Member of the Advisory Board of the Swedish National Land Survey 1993-1998

Member of the Market Board of the Swedish Geological Survey 1993-1998

Member of the Chart Board of the Swedish Maritime Organisation 1995-1998

Member of the Board of the Swedish National Road Database Project 1994-996

Member of the Steering Committee of the Swedish Corine Land Cover Project 1995-1998

Member of the Board of the Development Council for Geographic Information in Sweden 1994-1998

Member or the Board of the Swedish Cartographic Society since 1995

Member of the Scientific Committee to ICC 1997 in Stockholm