



Leonardo da Vinci



**GI-INDEED**

Geographic Information in the Implementation  
of Net-based Distance Education for  
Environmental Decision making

Leonardo Pilot Project  
No. 2005 S/05/B/F/PP-161012

# GI-INDEED White Paper

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## **I GI-INDEED outlines**

GI-INDEED is a EU Leonardo da Vinci Pilot project targeting to develop a training initiative that helps to bridge the lack of knowledge about the support that a tuned use of geo-information can offer to the various government levels in implementing the existing and the forthcoming EU environmental directives.

The perspective is to favour a better environmental decision-making by the organisations in charge at the different levels of the process of governance.

Four training modules are foreseen in order to achieve the goals of the project (Environmental web services, Data harmonisation and SDI, Use of SDI for protected areas, Use of SDI for coastal areas).

Training actions are addressed to both organisations and individuals (i.e. local authorities, environmental agencies, private companies, training & education providers, special interest groups and citizens).

The project foresees a preliminary phase of assessment and analysis of the target group needs, a consequent procedure of development and testing of training material, and also the creation of an autonomous course selector, a web based tool where trainees can test their skills and receive guidance for courses to select.

Workshops are also arranged in order to exchange ideas between the target groups and the project team and getting feedback and validation.

### **I.1 INSPIRE and the Copenhagen Declaration**

On April 11<sup>th</sup> 1994, the President of the U.S.A. Bill Clinton signed a presidential order requesting the US federal agencies to provide their geographical information on the Internet. This was the beginning of an intensive developmental work on what we nowadays call Spatial Data Infrastructures (SDI).

Eight years after the presidential order, on April 11<sup>th</sup> 2002, the EU Commissioners Margot Wallström (DG Environment), Pedro Solbes (DG Economy and Finance/Eurostat) and Philippe Busquin (DG Research/JRC), signed a memorandum of understanding to create an infrastructure for spatial information in Europe (INSPIRE). This document turned into a proposal for a directive that is currently being processed in the European Parliament, Council of Ministers and Commission.

The INSPIRE initiative aims at improving the access to geographic information in Europe. Since DG Environment is one of the directorates in charge of its implementation, environmental issues had an important role in the development of the proposal.

INSPIRE is not only a proposed directive. Its principles are based on a new way of collaboration, with e-government, e-commerce and access to public information as underlying pillars. When developing this concept, several problems have been identified, such as the availability of competent personnel and the need of competence development. Common opinion is that, if the competence issues are not solved, the INSPIRE initiative will not have the positive effects on the environment and economic development as it is aiming to.

Moreover, political initiatives about training have so far mainly been restricted to the national level. In November 2002, the European Ministers of Education agreed on an action plan: the Copenhagen Declaration, where the European dimension, the recognition of formal merits (European CV, Europass etc) and the validation of non-formal merits are stressed.



The GI-INDEED project aims at developing competences at European level in the field of environmental decision-making, by means of the improvement of lifelong learning and continuous vocational training.

## **I.2 Project context and objectives**

GI-INDEED (Geographic Information in the Implementation of Net-based Distance Education for Environmental Decision-making) is a EU Leonardo da Vinci Pilot project (No. 2005 S/05/B/F/PP-161012, October 1st 2005 – September 31<sup>st</sup> 2007) aiming at developing and providing professional training that helps to bridge the lack of knowledge about the support that a tuned use of geo-information can offer to the various government levels in implementing the existing and the forthcoming EU environmental directives (Water Framework Directive, Habitat Directive, INSPIRE, PSI Directive on the reuse of public sector information).

The perspective is to favour a better environmental decision-making by the organisations in charge at the different levels of the process of governance.

As overall, GI-INDEED aims at improving the possibilities for lifelong learning and continuous vocational training within the field of handling geo and environmental information, thus in the long perspective contributing to support authorities in implementing EU directives. The objective is also to set-up preliminary conditions for pan European recognition of GIS-related vocational training.

More analytically the project aims to:

- increase knowledge about environmental data handling
- give the various stakeholders a guide for easier access to environmental information
- develop a training content at the European level, also suitable to a local context
- contribute to standards for competence certification, thus improving transferability of competence

## **I.3 The project development**

The project foresees a preliminary phase of assessment and analysis of the GI requirements of the various professions involved in the environmental sector (for more details see section I.4). The existing knowledge gap is assessed and analysed in detail and expressed as a draft curriculum. The survey is based on interviews, questionnaires, workshops and following analysis.

According to the subject of the two application oriented training modules (SDI for, respectively, protected areas and coastal management) and to the INSPIRE implementation plan, where Spatial Data Interest Communities (SDICs) play an important role, GI-INDEED partners will have a close dialogue with two SDIC's (Geo-Information in Protected Areas and Nature Conservation - NATURE-GIS and Geo-Information Community in Coastal LANDscape - GI-CLAN). That is important in order to specify the user's needs.

A consequent procedure of development and testing of training material is developed on the following four subjects:

1. Environmental web services: to give an overview on relevant standards, specifications and solutions required to provide and utilize harmonized geographic data. The module is targeted for technical personnel, for instance system administrators, developers or maintenance personnel.
2. Data harmonisation and SDI: to provide general knowledge on how to use components of the modern SDI's that are currently evolving. In particular, it focuses on how to build spatial data infrastructures (SDI), a key objective of which is to make more and better local, national



and global spatial data available. The aim is to give an overview on relevant standards and specifications required to produce and get access to harmonized geographic data. Apart from technical issues, organizational and legal aspects have to be considered. These topics provide the basis for understanding the architectures and technical aspects of interoperable web applications described in the other modules. The module is targeted for technical personnel, for instance system administrators, developers or maintenance personnel.

3. Use of SDI for protected areas: nature conservation and protected areas management present complex aspects and involve numerous interest groups from diverse cultural or technical backgrounds. In such a context, while the trend is to optimize the exploitation of already available spatial information, the use of Geographical Information Systems (GIS) technology is often restricted because of a lack of understanding and communication between GIS experts and end users. This lack could be fulfilled gathering and rationalizing all efforts made by operators and organisations and better identifying specific needs of authorities in charge of environmental protection and in particular, by pursuing the access to high quality Geographical Information. The module is addressed to experts in the specific field of protected areas not familiar with SDIs and IT and GIS technical personnel for a practical application of SDI.
4. Use of SDI for coastal areas: to help regional and local administrations to comply with their commitments inherent to coastal planning. The aim is to favour a sound use of geo-information in implementation at the local level of the principles of coastal management and of the lessons by existing best practice, mostly developed in international projects. To get this aim at the best it is foreseen an introductory part on the fundamentals of coastal management and on existing best practice as well as a specific part about geo-information as usable in this field. The specific objective of the module is training on coastal management and on the release of services for the administrative bodies and for the non-governmental organisations present in coastal planning. The module is addressed to experts in the specific field of coastal areas not familiar with SDIs and IT and GIS technical personnel for a practical application of SDI.

E-learning training technologies, already operational but not widely diffused in the field, are used for real diffusion of innovation, in practice and at a scattered local level.

GI-INDEED uses state-of-art e-learning technologies in a standardised environment, in order to optimise the exploitation of the training materials and -to increase dissemination- to allow the migration to different platforms.

To use these resources, the trainee and the trainer only need a web browser and Internet access, strongly reducing licensing problems for data and software.

Within this environment, the trainer can monitor the work of the trainee and provide guidance. In addition, conference systems are used for messaging, discussing etc.

Web-based tools will be set up to give the trainees the possibility to test their skills and receive guidance for courses to select. The "course selector" will be based on three use cases, namely:

- a) a section for a potential trainee to evaluate if a certain course fits his or her needs
- b) a section for a trainee to test the amount of knowledge and skill that he or she has already acquired
- c) a section for a teacher to enter the information required by the use cases of the course selector (points a and b)

Workshops are scheduled along the duration of the project in order to exchange ideas between the target groups and the project team and getting feed-back and validation.

During the user need definition phase, local workshops are organised to:

- favour local involvement



- get in touch with meaningful local experiences
- sum up the lessons of the assessment phase and validate them
- discuss the structure of the training modules

The aim is also to harmonise the training modules at a European level, so they should be incorporated in the European framework for professional training (Europass, ECDL etc).

The European Computer Driving License (ECDL) is an initiative that has achieved a European recognition. There is currently an Italian initiative aiming to implement also in the GIS sector the principles of ECDL. GI-INDEED will cooperate with this initiative assuring that there will not be any competing overlaps. Perhaps also some GI-INDEED modules could be incorporated in a future ECDL for GIS.

### **I.5 The target audience**

GI-INDEED training is addressed to both organisations and individuals and in particular:

- local authorities using geo-information services
- environmental agencies responsible for implementing legislation
- companies needing environmental information for decision making
- training & education providers
- special interest groups and citizens

An aim of the project is to develop training components that can be adapted to individual as well as to organisational needs. Given the subject of the training modules, the trainees will be mainly already employed people and the adoption of e-learning techniques is fundamental to ensure professional up-dating of these.

## **II. Partnership**

The partners of GI-INDEED ensure comprehensive coverage of the problems and issues related to Geo-Information and environmental decision making. Key partnership categories are:

- universities: to provide effective and up-to-date knowledge and services for training and distance based education
- training providers: to ensure the relevance of the training content and to hold in due consideration the target group needs
- international associations: to guarantee a wide dissemination at international level thanks to their networking capacity

### **Partners Presentation**

#### **II.1 Högskolan i Gävle (SE) - University of Gävle**



The University of Gävle with an enrolment of 11 000 students, is a young and expanding institution. It recruits students from all over Sweden. The University is continually developing its contacts with foreign universities through student and staff exchanges as well as through joint international projects. A range of courses is given in English within the regular study programmes. Among the study programmes offered some are unique in Sweden such as Surveying and Mapping, Creative Software Engineering and Health Promotion/Health Education. The University enjoys the benefits of working closely with local trade and industry. A Science Park has been established with the aim of attracting companies to the University campus area and thereby creating a stimulating



environment for research and development activities that will be of benefit to the students and the local community.

The University has a long experience in external training and distance based education. In 2003, around 39% of the education was given to temporary students and 26% of the students followed distance based courses. Within the departments of Technology and Built Environment, several courses are given that relates to the GI-INDEED proposal.

In this project, The University of Gävle will act as contractor, project coordinator and main developer of one module in the training program. In addition, the university will provide technical assistance and services within the partnership, for issues that relates to the GI-specific training platform that is to be used. The university will also play a fundamental role in the dissemination phase and when implementing the final results. The university intends to provide training services for a larger market, after the completion of the GI-INDEED project.

## **II.2 Fvm Képzési Es Szaktanácsadasi Intézet (HU) - Educational and Advisory Institute of Mard**



The Ministry of Agriculture and Rural Development Educational and Advisory Institute (FVM KSZI) has experience in:

- needs analysis and evaluation of vocational target groups from point of view of employers and employees
- the workout process of training aims and target competences in the new LIME vocational training
- the formulation of professional and examination requirements
- organisation of the new basic pedagogical documentation for accreditation process
- the curriculum development for helping tutor and student work
- the formation of the tutor network
- the organisation and the execution of two pilot courses which serve the testing of
- the training material, the tutors, regional training and knowledge centres
- organisation and execution of trial examscooperation in the modification process of the tasks of the training consortia
- the formation of the total quality management (TQM) in the vocational education

In this project, KSZI will, among other things, contribute to the assessment and analysis of target group needs, participate in the development of training material and organise testing of training modules.

## **II.3 Nyugat Magyarországi Egyetem Geoinformatikai Főiskolai kar (GEO) - University of West Hungary, College of Geoinformatics**



The College of Geoinformatics, University of West Hungary, Székesfehérvár (HU), is the leading institution in Hungary in continuing professional education and training on land surveying, geoinformatics and land management. The College is involved in various flexible education programmes for land management giving professional development services to engineers, technicians and executives. In 2004 the College provided training corresponding to around 500 student days and their income from professional training is around 30% of their annual educational income. The College of Geoinformatics has accumulated a great experience in the UNIGIS and similar international networks of universities, which offers common modules by open and distance learning to in-service professionals in the area of Geographical Information Systems and Land Management.



In 2006 College of Geoinformatics organized the 9th AGILE International Conference on Geographic Information Science (<http://www.agile2006.hu>) and also FIG International Workshop on e-Governance, Knowledge Management and e-Learning (<http://www.fig.hu>). The College also has a long experience of migrating university modules to training courses. The College will ensure proper organisation and development of one module relating to "Data Harmonisation and Spatial Data Infrastructures".

#### **II.4 ICCOPS – Landscape, Natural and Cultural Heritage Observatory (IT)**



ICCOPS is an International Non-Governmental Organisation founded in 1992 as a non-profit association with the aim of collaborating with international organisations, national authorities and local institutions in the field of the integrated coastal zone planning and management. During its activity, ICCOPS has addressed in particular the Mediterranean problems, collaborating with the Mediterranean Action Plan of the United Nations and it has acquired the status of *Non-Governmental Organisation* of the Mediterranean Action Plan. ICCOPS has recently enlarged its focus to the landscape, with the aim to promote and favour, by plans and any other action on the coast and the marine area, a wide consideration of all the ecological and anthropic elements that are summed up in the landscape.

In this framework, ICCOPS institutional aims are:

- to give technical-scientific assistance on coastal issues and landscape by means of active sharing and exchange of knowledge, information, results and specific skills, in particular for education and information
- to foster the training and education of experts, both through multidisciplinary training programmes for users from the private and public sector, and through school and university courses
- to discuss and deepen the issues of integrated coastal management and landscape assuming as reference the European Union policies and the UNEP Programme on Regional Seas

ICCOPS activity consists in:

- organisation and development of initiatives of training and education on integrated planning and management and coastal landscape
- scientific and technical consultancy/studies in integrated management and landscape
- environmental and social analysis of coastal systems, with particular regard to coastal landscape
- organisation of scientific events on the subject

In the field of training ICCOPS is presently involved in the project ECO-IMAGINE - European COferences and forum for Integrated coastal Management and Geo-INformation rEsearch. It is partner as well in the programme "Oceans21 - GIS for Coastal Management and Coastal Education", a co-operative programme of the Intergovernmental Oceanographic Commission (IOC) and the International Geographical Union (IGU). with the task of Technical Secretariat.

Moreover it participated in many international activities, both as promoter and as by offering collaboration and skill. Among the most recent are:

- FORMATAC - Formation pour le Maroc sur l'Aménagement du Territoire Côtier (Two interdisciplinary training courses on Coastal Management - Tangier, 12<sup>th</sup>-16<sup>th</sup> July 2004 and 27<sup>th</sup> September-1<sup>st</sup> October 2005)



- organisation of the international conference CoastGIS'03 - 5th International Symposium on GIS and Computer Cartography for Coastal Zone Management (Genova, Italy 16th –18th October 2003)
- collaboration to the Master “Esperto in gestione integrata delle aree costiere” (Expert in Integrated Coastal Zone Management) held in Savona (Italy) from April to December 2000
- organisation of the Intensive Course on Integrated Coastal Management in the Mediterranean and Atlantic Coasts: Focus on Conflicts (July 1999)
- organisation of the International Conference "Education and Training in Integrated Coastal Area Management" A contribution to the 1998 International Year of the Ocean (May 1998)

## **II.5 GISIG – Geographical Information Systems International Group (IT)**



GISIG is a sectoral non profit Association on GIS and Geographical Information constituted in 1992 to act as European Technology Transfer Centre on GIS and is today composed by about 100 organisations from more than 20 European countries. These organisations are universities and research institutions, GIS technology suppliers, local bodies, companies operating on territorial subjects, which guarantee interdisciplinary expertise on the GIS tools and on their sectoral applications. To pursue its objectives the Association has set up an operative framework organised at European and thematic level:

- European level. It is related with the main activity and the operational lines of the Association in the framework of the EU policies of Training and Education, Research and Technology Development, International Co-operation and Regional Development.
- Thematic level. Thematic Networks are promoted in order to create frameworks of common interest and to establish links and partnerships with different GIS application domains, user groups (including Local Authorities) and professional operators, combining the use of GIS technology with the study and the development of the application domain thanks to an integrated approach. Initiatives are promoted in the field of
  - GIS and nature preservation (Nature-GIS Network)
  - GIS and Integrated Coastal Area Management (ICAM-GI Network)
  - GIS and Water Resources (Water-GIS Network)

GISIG has promoted various European projects and initiatives in training, networking, transfer of technology related to geographical information and territorial analysis and has co-ordinated projects of professional training in the framework of the COMETT and Leonardo programmes, as well as, recently, within the Marie Curie action of the 6FP for education of researchers.

The ICAM-GI network currently gathers complementary organisations such as research institutions, universities, public authorities and private companies, operating in GIS development and in coastal areas studies. Within the network, various activities are carried out with the aim to raise awareness towards specific aspects of coastal management.

Within the Nature-GIS network, the results of the recently concluded NATURE-GIS project, a thematic network on GIS use for protected areas and nature preservation, will be disseminated and taught in GI-INDEED.



## II.6 AGILE - Association of GI Laboratories in Europe (NL)



The Association of Geographic Information Laboratories for Europe (AGILE) was established in early 1998 to promote academic teaching and research on GIS at the European level. AGILE seeks to ensure that the views of the geographic information teaching and research community are fully represented in the discussions that take place on future European research agendas and it also provides a permanent scientific forum where geographic information researchers can meet and exchange ideas and experiences at the European level.

The two main objectives of AGILE are:

- to promote academic teaching and research at the European level. This will be reflected by the establishment of working groups on specific topics intended to influence the future European geographic information research agenda.
- to facilitate networking activities between geographic information laboratories at the European level. This will be reflected in several different kinds of activity including focused meetings based on state-of-the-art presentations on key research issues and European geographic information research conferences.

At the moment (January 2006) there are more than 90 members from 24 different European countries (<http://www.agile-online.org>).

Within the GI-INDEED project, AGILE supports the curriculum development and quality assurance of project results. The activities are carried out by the Institute for Geoinformatics, University of Münster (<http://www.ifgi.de>).

## II.7 LANTMÄTERIET (SE)



Lantmäteriet, originating from 1628, is a Government agency. The mission is to give support for creating an efficient and sustainable use of Sweden's real property, land and water. The organisation has three main activities, which also form the organisational structure: Cadastral services, Land and Geographic Information Services, and Metria (working on a competitive, commercial basis).

The division of Cadastral services carries out cadastral-procedure activities and provides different types of services, which are closely linked to their official duties. The cadastral services comprises real property formation through formal cadastral survey and maintenance of the real property register. Common tasks are sub-division of land into plots for building houses and recreational homes and to ensure the availability of land for building roads, railways and public utilities.

Land and Geographic Information services include the analysis and establishment of demands and needs of geographic and real property information in society. It also includes the efficient collection, storage and administration of such information. The collection is carried out by Lantmäteriet itself or in co-operation with other public agencies or organisations in society. An important task is to make the information available and used by a broad spectrum of users thereby contributing to efficiency, improvement and renewal in the public as well as in the private sector.

Metria is the part of the organisation with resources for aerial photography, collection and manipulation of geographical and real property information, surveying computation and map production, geographic information systems, physical planning. Metria carries out its services on contract and operates in competition with other Swedish and international companies on the national and international markets. Lantmäteriet will contribute to the project by its genuine



knowledge within the field of handling geographic and environmental information. Lantmäteriet has also great experience within the field of vocational training, in Sweden as well as abroad. Lantmäteriet has for several years been active in the development of the INSPIRE initiative and is a member of the INSPIRE working program.

## **II.8 Zilina Univerzita (SK)**



The Faculty of Management Science and Informatics of the University of Zilina (UNIZA) was established in 1990. The Faculty educates about 1100 students in the following study programmes:

- Information and Management Systems, with specialisations in applied informatics, management, information and control technology
- Applied Mathematics with specialisations in economics, physics and technology
- Post graduate (doctoral) degree (Ph.D) study in internal and external forms in specialisations applied mathematics, automatisisation and control, transport and communication technologies.

The faculty consists of 8 departments: Department of Mathematical Methods, Informatics, Macro- and Microeconomics, Technical Cybernetics, Information Networks, Transportation Networks, Management Theories, Software Technologies. There is total number of 115 academic staff. The faculty has extensive international co-operation within the EU educational programmes as TEMPUS, SOCRATES, Leonardo da Vinci, INCO etc. and in the introduction of e-learning technologies.

Within this project, University of Zilina will contribute to the definition of user needs, development of training material, piloting training materials and valorisation activities.