



# Spatial Data Infrastructures in Romania: State of play 2010



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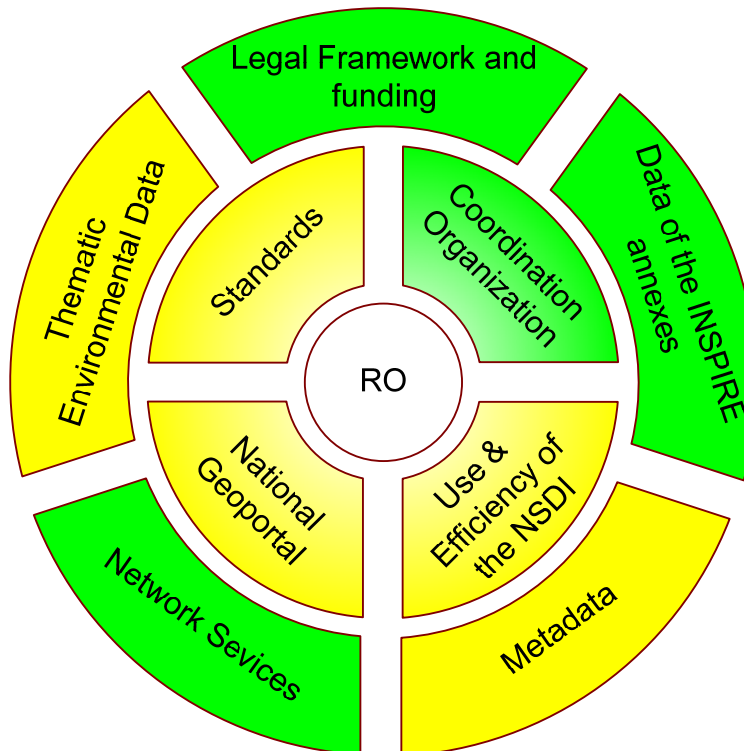
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## Change matrix 2010 versus 2007

A concise graph is added to indicate changes of the various paragraphs compared to the previous report. Two colours are used: Green and Yellow indicating major and minimum changes respectively compared with the 2007 State of Play. This graph does not reflect the country situation. It merely represents our findings/changes per section from our preparation of the desktop analysis.



## Executive summary

In Romania coordination within the country between the public sector players dealing with spatial information (Environment, Statistics, Agriculture, Defence, ...) is being stimulated by the INSPIRE initiative. An INSPIRE working group has been set up with 5 sub-groups aiming to coordinate and collaborate between the different SDI stakeholders. A first project called INSPAM was initiated in 2005 which can be seen as the start of a first thematic SDI. The project aimed to apply the principles of INSPIRE in the fields of water management, forestry and meteorology. Some pilots will make it possible to test and evaluate the set-up of interoperable systems.

The ANCPI, the Romanian NMA, presented in this report as the possible nucleus for a NSDI, has some coordinating role but not towards the military, private companies, universities, ..., which are important data producers and users. Since the release of the first version of the report, it is the ANCPI or National Agency for Cadastre and Real-estate Publicity (successor of the NOCGC) that is coordinating GI activities. It is understood that also the private sector is developing activities in the GI field, as data provider, application developers or developers of GI projects.

The ANCPI is technically advanced in the sense that it uses modern GI / GIS technology to perform the tasks of the past, but not the new tasks in the context of an information society. Nevertheless, the ANCPI remains a good start point should a real SDI be developed. The ICI can play a supporting role in this respect.

Metadata are almost non-existent. Metadata-based and other access services to spatial data are lacking. On the other hand, a lot of datasets and updates of datasets of the themes of the annexes of the INSPIRE Directive are becoming gradually available and a prototype project is running to develop the first geoportal and metadata catalogue. At the same time, during the last years numerous SDI projects have been developed in Romania and the Government is leading towards the INSPIRE implementation.

There is not yet an implementation plan but the Romanian Contact Point for INSPIRE Directive (i.e. National Agency for Cadastre and Land Registration-NACLAR) is going to develop a project financed from European structural instruments in order to develop an INSPIRE strategy in Romania.

Furthermore, in 2010, the INSPIRE directive was implemented by Ordinance nr. 4/2010 establishing the National Spatial Data Infrastructure (INIS).

## Table of Contents

<b>CHANGE MATRIX 2010 VERSUS 2007 .....</b>	<b>1</b>
<b>EXECUTIVE SUMMARY .....</b>	<b>2</b>
<b>TABLE OF CONTENTS .....</b>	<b>3</b>
<b>ABBREVIATIONS AND ACRONYMS.....</b>	<b>4</b>
<b>1           GENERAL INFORMATION.....</b>	<b>6</b>
1.1     METHOD .....	6
1.2     THE GI-, GIS- AND SDI-SCENE IN ROMANIA .....	6
<b>2           DETAILS OF ANCPI .....</b>	<b>9</b>
2.1     GENERAL INFORMATION .....	9
2.2     COMPONENT 1: COORDINATION AND ORGANIZATIONAL ISSUES .....	10
2.3     COMPONENT 2: LEGAL FRAMEWORK AND FUNDING.....	13
2.4     COMPONENT 3: DATA FOR THEMES OF THE INSPIRE ANNEXES .....	16
2.5     COMPONENT 4: METADATA .....	20
2.6     COMPONENT 5: NETWORK SERVICES .....	21
2.7     COMPONENT 6: THEMATIC ENVIRONMENTAL DATA .....	24
2.8     STANDARDS .....	25
2.9     USE AND EFFICIENCY OF THE NSDI .....	25
<b>3           ANNEXES.....</b>	<b>28</b>
3.1     LIST OF SDI ADDRESSES / CONTACTS FOR ROMANIA.....	28
3.2     LIST OF REFERENCES FOR ROMANIA.....	28

## Abbreviations and acronyms

ANCPI	National Agency for Cadastre and Real-Estate
ANM	National Authority for Meteorology
ASRO	Romanian Standards Association
CT	Core Thematic Data
DDNI	Danube Delta National Institute
EDIS	Extended Decentralised Implementation System - EDIS;
EEA	European Environment Agency
EUROGI	European Umbrella Organisation for Geographic Information
FIR	Further Investigation Required
GI	Geographical Information
GIS	Geographical Information System
GISEE	GIS-Technology and Market in South East Europe
GNSS	Global Navigation Satellite Systems
IBIOL	Institute of Biology Bucharest
ICIA	Research Institute for Artificial Intelligence, Romanian Academy
ICAS	Forestry research and Management Institute
ICI	National Institute for R&D in Informatics
IFGFC	Institute of Cadastre, Geodesy, Photogrammetry and Cartography
INCDD	Danube Delta National R&D Institute
INHGA	National Hydrology and Water Management Institute
INIS	National Spatial Data Infrastructure
INSPIRE	INfrastructure for SPatial InfoRmation in Europe
MoEWM	Ministry of Environment and Water Management
NACLR	National Agency for Cadastre and Land Registration
NOCGC	National Office of Cadastre, Geodesy and Cartography
NMA	National Mapping Agency
NMNH	National Museum of Natural History
NSI	National Statistical Institute
NSDI	National Spatial Data Infrastructures
OGC	Open Geospatial Consortium
PPP	Public-Private Partnerships
PSI	Policy and legislation on access to public sector information
REF	Reference data
ROMPOS	Romanian Position Determination System
ROSA	Romanian Space Agency

SDI            Spatial Data Infrastructures  
SDIC          Spatial Data Interest Community  
UAICI        University of Iasi



# 1 GENERAL INFORMATION

## 1.1 Method

This report is summarizing the review of SDI in Romania, and reflects the degree to which the SDI situation in Romania is similar to the ideas set out in the INSPIRE position papers<sup>1</sup> and in the more recent INSPIRE scoping documents.

The 2003 version report was based mainly on the analysis of (limited) web site material readily accessible, on the reports and the results of the GIS workshop for the Phare countries of 2001 (EUROSTAT) and on documents presented on several workshops and conferences. For the 2004 version, the final country report for Romania of the GISEE-project was consulted.

Romanian experts have not provided other comments to the earlier versions of the report. Almost no useful websites were encountered. For the 2005 version of the report, Romania Authorities were contacted to give input, but no feedback was received at the date of publication. SADL received some indirect comments and information which was integrated in the current version of the report.

For the update of 2006, SADL received valuable input from Romanian Stakeholders, Angela Ionita (Research Institute for Artificial Intelligence, Romanian Academy) and Ion Nedelcu (Romanian Space Agency). The summary of the current status and problems of the Romanian SDI was described in a paper entitled “Strengths and weaknesses in Geospatial Data Infrastructure in Romania”, presented during the EC GI&GIS workshop in Innsbruck in June 2006. Other useful information could be found in the study of Geolink Ltd on the Romanian NSDI and INSPIRE. For the 2007 update, no information regarding data sets, services or data sharing practices was received. Information regarding the transposition of the PSI could be found through other channels.

For the 2009 update, the Draft Questionnaire for the detailed survey was answered, providing some information regarding the INSPIRE implementation. Moreover a number of presentations and research papers found in Proceedings and Conferences were used along with relevant websites found on the internet or indicated by the Romanian contact points. The report concerning the situation of INSPIRE implementation by dr. Angela Ionita was a prime source of information. In this version obsolete information was removed, while a conclusion paragraph regarding the status of each indicator was added for each component.

## 1.2 The GI-, GIS- and SDI-scene in Romania

In the strict sense, there is not yet an SDI in Romania. The general statement is confirmed by the GISEE-report on the state of GI-technology and market in Romania. GISEE is an

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<sup>1</sup> INSPIRE position papers, final versions: RDM, ETC, DPLI, ASF, IST, IAS (latest version).

EU-funded project with contract N° IST-2001-37994. Nevertheless, plans are made to develop (components of) the Romania SDI, mainly through SDI related projects. One of those projects is INSPAM which aims at testing and validating the ideas and concepts elaborated by the INSPIRE working group which guides the INSPIRE implementation process. Over the last 2 to 3 years special efforts were made to develop and update key datasets which will become part of the Romanian SDI. Despite those efforts, it is still true that a lot of work has still to be done (better collaboration, metadata developments, etc.).

The most important player with regard to GI at the national level is the National Agency for Cadastre and Land Registration, or ANCPI, (former National Office of Cadastre, Geodesy and Cartography - NOCGC) which was founded on July 29 2004 and operates under the authority of the Ministry of Public Administration and Interior. The possible future Romanian NSDI is described in this report from the perspective of ANCPI. This choice is based on the fact that the ANCPI is the only central body that has at least a partial mandate with regard to coordinate spatial information issues and that it has been involved in the formulation of an initial NSDI-strategy. ANCPI is active member of EuroGeographics. It is not a member of EUROGI.

The National Agency for Cadastre and Land Registration of Romania (ANCPI), as an institution subordinated to the Ministry of Administration and Interior, is responsible for:

- Cadastre, Land Registration and Land Management;
- Geodetic Reference Network and National Mapping;
- Guidance, support and control on the enforcement of legal framework;
- Strategy development according to Government's policy;
- Representation at a national and international level.

Other Ministries with a role on the GI-scene are: the Ministry of Public Works, Transportation and Housing (Directorate for Urban Cadastre) and the Ministry of Communications and Information Technology. The latter is responsible for the implementation of the Information Society in Romania and initiated several e-Government projects for the modernization of Government. The activities in this field are influencing and will further influence development of the Romanian SDI. The National Institute for R&D in Informatics (ICI) which is under the authority of the latter Ministry contributed to the development of a strategy for developing an SDI for Romania through particular projects like ABDS and PANEL-GI. Findings and proposals resulting from these activities are also included in this report.

Romania does not have a national GI association as such, but the Forum for the Information Society has had a role in developing the Information Society Strategy within which the NSDI is nested.

The Ministry of Defence operates a Military Topographic Department. This Department owns and produces various types of data which however do not seem to be made available for non-military users.

Despite the lack of a SDI-framework, a lot of GI and GIS activities are going on in Romania, but they are spread over several players, even if most of them are part of the same Romanian State Administration.

## 2 Details of ANCPI

### 2.1 General Information

**Official address:**

National Agency for Cadastre and Real-Estate (ANCPI)

202 A, Splaiul Independentei, sector 6

Bucharest, Romania

Telephone: +401-2127339

Fax: +401-2225224

Central e-mail: [office@ancpi.ro](mailto:office@ancpi.ro)

**Overall contact person:**

Mr. Alex Radocea

Same address

Romania has developed a preliminary NSDI policy only. The Romanian National Spatial Data Infrastructure is a subset of the National Information Infrastructure of which the aim is to develop an umbrella of policies, standards, agreements and partnerships among a variety of sectors and disciplines that will promote a more cost-efficient production, a higher availability and an augmented use of high quality policy-relevant data in the broader framework of the information society.

ANCPI's main focus is on developing the cadastral services. Existence of a modern cadastral institution is considered a must in a market-oriented economy. In order to reach the whole coverage of Romania with land registration by 2010, ANCPI is now in the process of producing updated maps that will serve for the production of cadastral index maps. A big effort is needed to register all the real estate properties. An operational cadastral system can be considered as an important building block for an NSDI.

A €1 million grant from the EEA Grants will now allow ANCPI to address these issues through a major organisational and human resource development project. The project will be carried out in partnership with the Norwegian Mapping and Cadastre Authority and the Land Registry of Iceland.

A platform for founding a new mapping authority will be created within the organisational structure of the ANCPI. Strategies, staffing plans and product and service specifications will be elaborated in order to prepare for the transition to the European geodetic reference system. Among the activities within the project is also the establishment of a new staff training centre and the development of on-site and internet-based courses. In addition, the ANCPI will establish a study centre bringing together social scientists, legal and technical experts which will monitor and advise ANCPI management on the latest technical and policy developments (<http://www.eeagrants.org/id/1369.0>).

## **2.2 Component 1: Coordination and organizational issues**

To support SDI activities, an INSPIRE work group was set up coordinated by the Romanian Space Agency (ROSA) – OM 4147, May 23, 2005. Five sub-groups were defined:

1. Reference data and metadata;
2. Geospatial data models and specifications;
3. Data services and communication architecture;
4. Data and service sharing, and implementation and
5. Monitoring.

Leading institutions have been assigned to form the sub-groups (NACLR, MoEWM, ROSA). Other stakeholders are involved as well: the Alexandru Ioan Cuza University of Iasi (UAICI), the Danube Delta National R&D Institute (INCDD), the Forestry research and Management Institute (ICAS), the National Hydrology and Water Management Institute (INHGA), the National Authority for Meteorology (ANM), the Research Institute for Artificial Intelligence, Romanian Academy (ICIA) and the Romanian Standards Association (ASRO). The working group created in 2005 the Spatial Data Infrastructure for Environmental Protection Applications, INSPAM, which is clearly a thematic SDI. INSPAM aims to initiate and develop an interoperable framework able to contribute to the establishment of the Romanian SDI following the INSPIRE initiative. The work consists in the elaboration of the system concept and architecture, networking and dissemination, system implementation, case studies and evaluation. Fields of application are forestry, water management and meteorology.

ANCPI is in charge of the coordination of the activities related to cadastre, geodesy and cartography. In subordination of the ANCPI are the following institutions:

- The County Offices of Cadastre, Geodesy and Cartography which are organised as decentralised public services, with headquarters in the municipality of each county and
- The Institute of Geodesy, Photogrammetry, Cartography and Cadastre, which also is a public institution.

On January 12, 2010 on the site of Ministry for Environment and Forests ([http://www.mmediu.ro/proiecte\\_acte.htm](http://www.mmediu.ro/proiecte_acte.htm)) the Project of DECREE (ORDONANTA) for establishing the infrastructure for spatial information in Romania, according to the Law 52/2003 regarding the decisional transparency in public administration, has been published for public debate. Citizens and interested institutions may send, within 10 days from publishing data (01.12.2010) opinions/suggestions to Ministry for Environment and Forests.

The project of DECREE (ORDONANTA) will complete the legislative framework concerning the organization and functionality of the ministries and other central and local public administration's bodies, involved in the establishment and development of Romanian NSDI.

According to the Project of DECREE (ORDONANTA), the provisions of normative paper is incumbent on the Ministry of Administration and Interior, Ministry of Environment and Forests, Ministry of Agriculture and Rural Development, National Agency for Mineral Resources, Ministry of Health, National Institute for Statistics, Ministry of Economy, Commerce and Business, Ministry of Regional Development and Tourism, Ministry of National Defence, Ministry of Transports and Infrastructures, Ministry of Culture, Ministry of Labour, Family and Social Protection, Special Telecommunications Service, and Ministry of Public Finances.

This DECREE has been approved on January 20<sup>th</sup>, 2010 including the Ministry for Communications and Information Society, Ministry for Culture and National Heritage and Romanian Academy and has been published on January 29, 2010 as Act 4.

**The Project of DECREE (ORDONANTA)** is structured as follows:

Chapter I:	General provisions	4 articles
Chapter II:	Metadata	2 articles
Chapter III:	Network services	6 articles
Chapter IV:	Data sharing	1 articles
Chapter V:	Coordination and complementary measurements	4 articles
Chapter VI:	Final provisions	7 articles
ANNEX 1:	Spatial data sets I	
ANNEX 2:	Spatial data sets II	
ANNEX 3:	Specifically spatial data sets	
ANNEX 4:	Responsible Authorities for spatial data sets mentioned on ANNEX 1-3	

(Angela Ionita 2010)

There is not yet an implementation plan but the Romanian Contact Point for INSPIRE Directive (i.e. National Agency for Cadastre and Land Registration-NACLRL) is going to develop a project financed from European structural instruments in order to develop an INSPIRE strategy in Romania. Although there are not specific funds foreseen for the implementation of INSPIRE, the same Government Ordinance no. 4/2010 foresees the possibility for public authorities to stipulate within their budgets sums for INSPIRE responsibilities and, also a national program dedicated to INSPIRE. This plan is still under development and a thorough research is still needed for its creation.

As determined in Ordinance nr. 4/2010 transposing the INSPIRE directive, the Council for National Infrastructure for Spatial Information (INIS Council) is the coordinating body established to implement INSPIRE and is composed from a number of National authorities/organizations:

- Ministry of Administration and Interior,
- Ministry for Environment and Forests,
- Ministry of National Defence,
- Ministry of Public Finances,
- Ministry of Agriculture and Rural Development,
- Ministry of Regional Development and Tourism,
- Ministry of Transports and Infrastructures,
- Ministry of Economy, Commerce and Business,
- Ministry of Education, Research, Youth and Sports,
- National Agency for Mineral Resources,
- Ministry of Health,
- National Institute for Statistics,
- Special Telecommunications Service.
- Ministry for Communications and Information Society (<http://www.mcsi.gov.ro/>)
- Ministry for Culture and National Heritage (<http://www.cultura.ro/>)
- Romanian Academy ([www.acad.ro](http://www.acad.ro) or <http://www.acad.ro/def2002eng.htm>)

The presidency of INIS Council is held by the Ministry of Administration and Interior through ANCPI and the vice- presidency by the Ministry for Environment and Forests. The Secretariat of the INIS Council will be taken up by the National Agency for Cadastre and Real Estate Publicity.

NACLRL and the Ministry of Environment and Forest are the most active members in the INSPIRE implementation. Specifically NACLRL is involved on the creation of the Romanian Geoportal and Metadata and created a separate INSPIRE department dedicated to those tasks.

NACLRL is currently working on the Romanian Geoportal with no envisaged deadline yet. However two projects have been conducted on preparing a prototype Geoportal and those are the Geoportal created by the Romanian National Agency for Cadastre and Land Registration (ANCPI) and the Dutch Kadaster International. (Bulens et al., 2009) and the ROEnv Geoportal developed by the Ministry of Environment and Sustainable Development (Oana et al., 2009).

### **2.2.1 Conclusions of Component 1**

The Romanian SDI approach is truly national. SDI building blocks have reached a significant level of operability. As determined in Ordinance nr. 4/2010 transposing the

INSPIRE directive, the Council for National Infrastructure for Spatial Information (INIS Council) is the coordinating body established to implement INSPIRE and is composed from a number of National authorities/organizations. ANCPI is in charge of the coordination of the activities related to cadastre, geodesy and cartography. NACL and the Ministry of Environment and Forest are the most active members in the INSPIRE implementation. Specifically NACL is involved on the creation of the Romanian Geoportal and Metadata and created a separate INSPIRE department dedicated to those tasks

Based on these conclusions we score the indicators as follows:

- The approach and territorial coverage of the SDI is truly national
- One or more components of the SDI have reached a significant level of operationality (Partially)
- The officially recognised or de facto coordinating body of the SDI is a NDP, i.e. a NMA or a comparable organisation
- The officially recognised or de facto coordinating body for the SDI is an organisation controlled by data users (No)
- An organisation of the type 'national GI-association' is involved in the coordination of the SDI (No)
- Producers and users of spatial data are participating in the SDI (Partially)
- Only public sector actors are participating in the SDI

## **2.3 Component 2: Legal framework and funding**

### **2.3.1 Legal framework**

The "Law of Cadastre and Real Estate Publicity" (law no. 7/1996).regulates the activities in the domains of cadastre, geodesy and cartography and founded ANCPI, which is organized according to Government Decree No.1038/1996 and its subsequent modifications (Romanian Government Decree No. 98/1999).

In 2005, the emergency governmental ordinance No. 95/2005 laid the responsibility for the establishment of the national environmental spatial infrastructure for policy making with the national central public authority responsible for environmental management.

In 2010, the INSPIRE directive was implemented by Ordinance nr. 4/2010 establishing the National Spatial Data Infrastructure (INIS).



### 2.3.2 Public-private partnerships (PPPs)

In Romania, the PPP model is gaining importance in the form that ANCPI is the public body with overall responsibility and the private firms perform the bulk of the surveying/map production under contract (Geolink Consulting, Ltd, Romania: National Spatial Data Infrastructure and INSPIRE).

### 2.3.3 Policy and legislation on access to public sector information (PSI)

The “Act on the Free Access to the Information of Public Interest” of 12 October 2001 allows individuals to request public information held by government departments and requires government departments to respond to requests and provide information about their activities within 30 days.

Governmental Decision no. 878/2005 on public access to environmental information implements EU Directive 2003/4/EC ([http://www.apador.org/en/legi/hot\\_1115\\_2002\\_e.rtf](http://www.apador.org/en/legi/hot_1115_2002_e.rtf)). Directive 2003/98 on the re-use of public sector information was transposed by the Law of 25 April 2007 ([http://ec.europa.eu/information\\_society/policy/psi/docs/laws/romania/law\\_april\\_2007.pdf](http://ec.europa.eu/information_society/policy/psi/docs/laws/romania/law_april_2007.pdf)).

### 2.3.4 Legal protection of GI by intellectual property rights

In 1996 Romania adopted a modern Copyright Law that went into force on 24 June 1996 (Law no. 8 of 14 March 1996). It explicitly protects three-dimensional works, maps and drawings in the field of topography, geography and science in general.

Article 9 of the Copyright Act states that official texts of a political, legislative, administrative or judicial nature, and official translations thereof, do not benefit from the legal protection accorded to copyright. Article 122 of the Copyright Act was amended to implement, directive 96/9 on database protection, as part of the effort to bring the Romanian legislation in line with the *acquis communautaire*.

### 2.3.5 Restricted access to GI further to the legal protection of privacy

Art. 26 of the 1991 Constitution states: " §(1) The public authorities shall respect and protect the intimate, family, and private life. §(2) Any natural person has the right to freely dispose of information on himself unless by this he causes an infringement upon the rights and freedoms of others, on public order, or morals."

Romania implemented directive 95/46 and enacted on 21 November 2001 Law no. 677 regarding the data protection (Data Protection Act) (OJ, Part I, no. 790 of 12 December 2001); and in 2005 Law no. 102/2005 regarding the setting up, organisation and functioning of the National Supervisory Authority for Personal Data Processing.

### 2.3.6 Licensing framework

The prices of distribution of GI products are regulated, but no further information could be found.

### 2.3.7 Funding model for SDI and pricing policy

#### *Funding*

ANCPI is a self-financing agency, while the Institute of Geodesy, Photogrammetry, Cartography and Cadastre receives financing from the state budget. The World Bank assisted the Romanian Government in the task of establishing a new cadastre and land registry system, for which a loan of an estimated \$45-50 million was proposed.

In the future under Ordinance nr. 4/2010, transposing the INSPIRE directive, the public authorities responsible for the data sets have to ensure their own funding for performing their tasks under the Ordinance.

#### *Pricing*

It is considered a global strategic objective for the Romanian NSDI to set up the legal framework to enforce a uniform, accurate and operational system for fees on the basis of real ownership. Currently, the pricing of GI is oriented to cost recuperation. The price list for ANCPI products can be found in Ordinance 456 of 17 December 2004.

### 2.3.8 Conclusions of Component 2

In 2010, the INSPIRE directive was implemented by Ordinance nr. 4/2010 establishing the National Spatial Data Infrastructure (INIS). There is not yet an implementation plan but the Romanian Contact Point for INSPIRE Directive (i.e. National Agency for Cadastre and Land Registration-NACLAR) is going to develop a project financed from European structural instruments in order to develop an INSPIRE strategy in Romania. In Romania, the PPP model is gaining importance in the form that ANCPI is the public body with overall responsibility and the private firms perform the bulk of the surveying/map production under contract. In 1996 Romania adopted a modern Copyright Law that went into force on 24 June 1996. It explicitly protects three-dimensional works, maps and drawings in the field of topography, geography and science in general. In the future under Ordinance nr. 4/2010, transposing the INSPIRE directive, the public authorities responsible for the data sets have to ensure their own funding for performing their tasks under the Ordinance..

Based on these conclusions we score the indicators as follows:

- There is a legal instrument or framework determining the SDI-strategy or – development

- There are true PPP's or other co-financing mechanisms between public and private sector bodies with respect to the development and operation of the SDI-related projects (Not so clear)
- There is a freedom of information (FOI) act which contains specific FOI legislation for the GI-sector (No Information found)
- GI can specifically be protected by copyright
- Privacy laws are actively being taken into account by the holders of GI (No Information found)
- There is a framework or policy for sharing GI between public institutions (No Information found)
- There are simplified and standardised licences for personal use (No Information found)
- The long-term financial security of the SDI-initiative is secured (No)
- There is a pricing framework for trading, using and/or commercialising GI (No Information found)

## **2.4 Component 3: Data for themes of the INSPIRE annexes**

### **2.4.1 Scale and resolution: European, National, Regional, Local, Other**

The following digital data are produced by the Institute of Cadastre, Geodesy, Photogrammetry and Cartography (IFGFC), which is the operational branch of the ANCPI:

- The digital map of Romania at scale 1:500.000 including the following layers: planimetric elements such as railways, road-network, settlements, administrative boundaries and place names; hydrography such as main rivers, lakes, the Black Sea and Danube Delta; elevation at an interval of 100 meters (from which also a DTM has been derived).
- The topographic map database at scale 1:50.000. It has more spatial and semantic detail as compared to the previous map, but not all the elements were digitized. It is not clear which layers are not in the database. The original maps from which they are scanned are at scale 1:25.000

Both databases were developed starting from the original paper maps. The maps were scanned; geo-referenced, spatial objects were vectorised by tracing and coded.

- There are orthophotos for the whole territory (42 districts). In 12 districts, they are used to update the digital database at scale 1:50.000.

Users can have access to the available data at: <http://www.ancpi.ro/harti/digitale.html> and <http://www.ancpi.ro/harti/analogice.html> for digital and paper maps.

Other databases are developed within the framework of particular projects. Some examples are:

- Digital database of Bucharest at scale 1:2.000 (1997);
- Real estate cadastre for the City of Constanza at scale 1:500 (also quite recent – exact year unknown);
- Agricultural cadastre for the district of Fundulea at scale 1:2.000;
- Real estate cadastre for the municipality of Craiova at scale 1:1.000.

#### **2.4.2 Data by resolution or scale range for the INSPIRE themes**

Following information is taken over from the GISEE-final report on Romania (2004).

- ANCPI is owner, provider and user of administrative boundaries, cadastre maps and topographic data, but not of elevation data. These data have national coverage; they exist in analogue and digital form, and in large scale, except for the administrative boundaries that exist only in medium scale. The data have to be paid for. ESRI formats and Tiff are used to store the data. ANCPI also owns and uses aerial photos, orthophotos and scanned maps. These data exist on national level and in digital form.
- ANCPI owns cadastral data on national level and uses addresses – but in this case, nothing more is specified. Cadastral data is digital, charged or with restricted access.
- The Military Topographic Department is owner, provider and user of administrative boundaries, elevation and topographic data. They have this data with national coverage and in digital form, both raster and vector. Analogue data exist only for elevation and topographic data. These data are charged and access is restricted. As reference system, they use WGS84 and old systems.
- MTD also owns all types of imagery and is also provider and user. However, of satellite images, MTD is only user, and they do not exist on national level.

### **2.4.3 Geodetic reference systems and projections**

For all the civil maps and digital spatial databases, the Stereographic 70 projection is used as reference system. The parameters, nor the ellipsoid or spheroid are known.

The Military Topographic Department also works with the WGS84 system.

### **2.4.4 Quality of the data**

Quality is stated as being high, but refers only to the fact that the sources of information to develop the digital datasets are high quality topographic maps.

In addition, most of the digitized topographic maps are dating from the eighties and only some of them have been updated by means of orthophotos.

It is not known whether there exists a quality assurance procedure / manual.

There are no procedures to manage versions of the database.

### **2.4.5 Interoperability**

The software used within the ANCPi:

- For data acquisition, MicroStation from Bentley and the I/RAS, I/Ras C, I/Parcel Vec, I geo Vec products from Intergraph are used.
- For GIS operations and data management, MGE – Basic Administrator, Basic Nucleus, Base Mapper – from Intergraph, as well as AutoCad Map and Land Developer from AutoDesk are used.
- For attribute data Microsoft SQL is in use

As far as known, there are no data converters to other systems available, nor is there a use or planned use of open software systems. The main problem right now, is the upgrade of existing proprietary software.

### **2.4.6 Language and culture**

If there are documents with background information, they are in the Romanian language.

### **2.4.7 Data Content**

No information has been found.

## 2.4.8 Geographical names

Geographical names are integrated in the database from the original topographic maps. There is no fixed system of updating.

## 2.4.9 Character sets

Unknown

## 2.4.10 Conclusions of Component 3

Geodatasets existed which provide a basis for contributing to the coverage of pan-Europe for the INSPIRE-selected data themes and components while the geodetic reference system and projection systems are standardised, documented and interconvertable. The INSPIRE 2010 MR confirms the statement. 220 data sets have been reported 72, 39 and 109 for Annex I, Annex II and Annex III respectively. For all the civil maps and digital spatial databases, the Stereographic 70 projection is used as reference system. The parameters, nor the ellipsoid or spheroid are known. Quality is stated as being high, but refers only to the fact that the sources of information to develop the digital datasets are high quality topographic maps. If there are documents with background information, they are in the Romanian language.

Based on these conclusions we score the indicators as follows:

- Geodatasets exist which provide a basis for contributing to the coverage of pan-Europe for the INSPIRE-selected data themes and components
- The geodetic reference system and projection systems are standardised, documented and interconvertable (Not so clear)
- There is a documented data quality control procedure applied at the level of the SDI (No)
- Concern for interoperability goes beyond conversion between different data formats (No)
- The national language is the operational language of the SDI
- English is used as secondary language (No)

## 2.5 Component 4: Metadata

### 2.5.1 Availability

From the questionnaire survey conducted by the GISEE project, metadata have been found for 27 geodatasets, which are mostly in digital form. No standard is used. This means that for most geodatasets no metadata is available. This is confirmed by the paper of Angela Ionita who states that the lack of metadata in most domains is one of the key issues to be solved in order to build an efficient and effective SDI. It should be noted that metadata are considered very important for the future NSDI steps and on the transposition to INSPIRE legal document a number of articles are dedicated to metadata.

### 2.5.2 Metadata catalogues availability + standard

An informal communication from ANCPI reveals that a catalogue is planned for ANCPI data. The envisaged standard is not known. <http://geoportal.ancpi.ro/geoportal>

For the prototype geoportal project by ANCPI (under the PHARE Twinning project) the elements used for all metadata descriptions were at least:

- ID Metadata file identifier
- Name Identification
- Information.MD\_DataIdentification.Citation.CI\_Citation.Title
- Short description Identification Information.MD\_DataIdentification.Abstract
- Scale Identification Information.MD\_DataIdentification.Spatial resolution
- Format (vector/grid/scan/analog)
- Distribution information.MD\_Distribution.Distribution format.MD\_Format
- Owner/publisher/provider
- Identification Information.MD\_DataIdentification.Point of contact.CI\_ResponsibleParty(role)
- Topic category\* Identification Information.MD\_DataIdentification.Topic category
- Keywords (use GEMET) Identification Information.MD\_DataIdentification.Descriptive keywords
- Pricing
- Identification Information.MD\_DataIdentification.Resource
- constraint.MD\_Constraints.Use Limitations
- Links Identification Information.MD\_DataIdentification.Supplemental information

*\*The element TopicCategory is used to make a division in different type of data sets.*

Furthermore, in the prototype project, the CatMDedit tool (developed by The Advanced Information Systems group of the University of Zaragoza and GeoSpatiumLab S.L) was used for Editing. There had to be some modifications (adding values to the used thesauri) to make the tool suited for the Romanian data sets. Metadata is published in catalogues. The catalogues, set up as services, can be access points to search for specific datasets. Also these services are set up by using OGC standards for catalogue services (CS-W). Once the metadata was created it was stored in a metadata data base of the eXcat, the server component for serving the metadata used for the prototype. (Bulens et al., 2009)

### **2.5.3 Dublin core metadata standards for GI-discovery**

Not applicable.

### **2.5.4 Metadata implementation**

Metadata production and management is currently not implemented.

### **2.5.5 Conclusions of Component 4**

Metadata are produced for an important fraction of geodatasets of the themes of the INSPIRE annexes. The 2010 MR reveals that for the reported datasets of INSPIRE (32%, 46% and 39% of the data sets have metadata for Annex I, II and III respectively). Under the ANCPI geoportal there is a metadata catalogue but no further information on the operational status was found online.

Based on these conclusions we score the indicators as follows:

- Metadata are produced for a significant fraction of geodatasets of the themes of the INSPIRE annexes (Partially)
- One or more standardised metadata catalogues are available covering more than one data producing agency (Partially)
- There is a coordinating authority for metadata implementation at the level of the SDI (No)

## **2.6 Component 5: Network Services**

### **2.6.1 On-line access service for metadata: discovery services**

Metadata are not available on-line.



## 2.6.2 On-line access service for data: download services

Not available.

## 2.6.3 Inter-linkages of on-line access services for metadata and data

Not available.

## 2.6.4 OpenSource software for access services

The use of OSS to build governmental portals is a new development in Romania.

## 2.6.5 Viewing services

There is a Natura 2000 portal developed by ROSA composed of a data loading interface, an information access interface, a database and security rules. The objective is to give officers of the Ministry of Environment easy access to the data.

Other portals exist, all of which are using proprietary GIS systems. The Romanian Waters Portal and the Biodiversity Portal are two examples of this.

Moreover, a number of view services for maps and travelling information are available:

Maps with GPS coordinates for all counties, Bucharest and general Romania is available at:

- <http://welcometoromania.ro/>
- [http://www.monitorizareflota.ro/index.php/industrii/transport-logistica.html?\\_kk=pozitionare%20gps&\\_kt=c30530af-87f3-44dd-8f1d-b285c70656a4](http://www.monitorizareflota.ro/index.php/industrii/transport-logistica.html?_kk=pozitionare%20gps&_kt=c30530af-87f3-44dd-8f1d-b285c70656a4) <http://www.romania-harta.ro/> or <http://romania-harta.ro/harta-ro.html>

Transports and travelling information are available at:

- [www.hartionline.ro/ro/harta/0.html](http://www.hartionline.ro/ro/harta/0.html) or [ro.html](http://www.hartionline.ro/ro/harta/ro.html)
- [www.rotravel.ro](http://www.rotravel.ro) (under construction)
- [www.turism.ro](http://www.turism.ro)
- <http://rovt.ro/index.htm>
- [www.daciamagnifica.ro](http://www.daciamagnifica.ro) and <http://www.romaniadigitala.ro/>
- <http://map.cimec.ro/>
- [www.greenmap.org/greenhouse/en](http://www.greenmap.org/greenhouse/en)
- <http://mapsromania.celendo.eu/#>
- <http://www.travelworld.ro/en/index.php>
- <http://www.romariantourism.ro/harta/romania>

- <http://www.portal-info.ro/harti/harti.html> interactive maps
- <http://hartaro.info/>
- <http://www.ro.map24.com/>
- <http://www.bursatransporturilor.webro.info/harta-rutiera-romania/>
- <http://www.romaniadigitala.ro/en/index.php> (5 languages)

### **2.6.6 Availability of catalogue services that perform payment operations**

Not applicable

### **2.6.7 Availability of catalogue services to extract and send data to a user application**

Not available.

### **2.6.8 SDI user applications**

There are some specific user applications, but they are never country wide (rather project oriented) and mainly focused on management and inventory of spatial data. Potential end-users use indirectly the data in the form of print-out of maps.

In literature, there is one generic application mentioned, i.e. a query system for Real Estate Information (Cadastrre) and Agricultural Land Use.

A number of various SDI use applications have emerged during the last years. A detailed description is provided in the Report concerning the situation of INSPIRE implementation 2010 by Angela Ionita. Some examples are listed in section 2.8.

### **2.6.9 Availability of geo-processing services**

Not available.

### **2.6.10 Conclusions of Component 5**

Although MR reports 5 discovery services, the <http://www.roenv-geoportal.ro> could not be accessed and the rest did not seem to enable metadata search. At the same time, the MR reports 28 services the majority of which can not be loaded and there is no clear description of the standards used regarding the rest. The MR further reports states 10 download services (whish are 3 actually) in which no concrete download function was found.

Based on these conclusions we score the indicators as follows:

- There are one or more discovery services making it possible to search for data and services through metadata (No)
- There are one or more view services available for to visualise data from the themes of the INSPIRE annexes (Not so clear)
- There are one ore more on-line download services enabling (parts of) copies of datasets (Not so clear)
- There are one or more transformation services enabling spatial datasets to be transformed to achieve interoperability (No information found)
- There are middleware services allowing data services to be invoked (No information found)

## **2.7 Component 6: Thematic environmental data**

The ANCPI does not deal with thematic environmental information. The GISEE-report states that Environmental Protection would be one of the Policy fields which would benefit most from an operational NSDI.

The Romanian Environmental SDIC has the mission to produce the environmental data themes according to INSPIRE implementing rules and to coordinate the INSPIRE implementation in relation with the environmental data themes. The RoEnv SDIC is including all the institutions that are contracted by the Romanian Ministry of Environment or its subordinated bodies in projects related to INSPIRE Directive implementation at the national level.

Part of the SDIC are: the Danube Delta National Institute – DDNI ([www.indd.tim.ro](http://www.indd.tim.ro)) TeamNet International ([www.teamnet.ro](http://www.teamnet.ro)) Forest Research and Management Institute - ICAS ([www.icas.ro](http://www.icas.ro)) National Museum of Natural History “Grigore Antipa” – Antipa NMNH ([www.antipa.ro](http://www.antipa.ro)) Institute of Biology Bucharest – IBIOL ([www.ibiol.ro](http://www.ibiol.ro)) Ioan Cuza University from Iasi – UAIC ([www.uaic.ro](http://www.uaic.ro))

### **2.7.1 Conclusions of Component 6**

The Romanian Environmental SDIC has the mission to produce the environmental data themes according to INSPIRE implementing rules and to coordinate the INSPIRE implementation in relation with the environmental data themes. The MR confirms that statement since 220 datasets are reported (72 for Annex I, 39 for Annex II and 109 for Annex III).

Based on the information provided on the previous paragraph we score the indicator as follows:

- Thematic environmental data are covered by the described SDI-initiative or there is an independent thematic environmental SDI

## 2.8 Standards

The Romanian Standards Association (ASRO) actively participates on the NSDI groups. Moreover, for the prototype geoportal project by ANCPI OGC and ISO standards have been considered.

### 2.8.1 Conclusions of Component 7

Based on the information provided on the previous paragraph we score the indicator as follows:

- The SDI-initiative is devoting significant attention to standardisation issues (Partially)

## 2.9 Use and efficiency of the NSDI

A number of various SDI use applications have emerged during the last years. A detailed description is provided in the Report concerning the situation of INSPIRE implementation 2010 by Angela Ionita. Some examples are listed below.

- The *ROEnv GeoPortal* is a collaborative effort by and for the Ministry of Environment and Sustainable Development under the PHARE Project “*Technical assistance to develop the environmental related GIS maps*”. Its purpose is to facilitate the discovery and publishing GIS data and maps to support the following environmental sectors: nature conservation, industrial pollution control and risk management, air quality and noise, waste management and water quality

(<http://www.icim.ro/proiecte/prezentare/wfden.html>)

- ON-LINE GIS AIR QUALITY MONITORING AND WARNING SUPPORT SYSTEM FOR BUCHAREST URBAN AREA (Not yet available for) public.
- HYDROGEOLOGICAL WEBMAPPING GEOPORTAL – ([http://www.geohydroconsult.ro/servicii\\_ro.html](http://www.geohydroconsult.ro/servicii_ro.html)) (under development).
- INTERGRAPH ([www.ingr.ro](http://www.ingr.ro)) present a number of SDI implementation practices such as asset management, e-services, environment protection and management, geospatial database, Ingeea suite, law enforcement and public

safety, mineral resources, railroads, roads, tax zoning, telecommunications, urban development, and utilities.

- Focsani City Hall decided on developing an integrated system with an important geospatial component entitled "Information System for Patrimony Management". The system allows storing and finding the technical-functional information associated to the spatial components of the patrimony objects, like administration rights, network licensees for clarifying, updating and linking factual evidence and city hall accountancy records. Users of the geospatial system, regardless of the institution they represent, can identify the component elements of the listed patrimony objects on the map and generate connections between object and components. If the items are not found on the map, then users responsible for the data update will introduce into GDB the geometry and the technical characteristics of the components that will be linked to the object in the accountancy records. Thanks to the system, the employees at Focsani City Hall are no longer forced to stockpile the technical-descriptive data on paper, but benefit from the digital advantages of the Geospatial Data Bank (GDB). However, the website is not in English ([www.focsani.info](http://www.focsani.info))
- The National Meteorological Administration created a website with its main objective being the implementation of a numeric pilot system for the integrated evaluation of probable pollution over the urban environment caused by implementing urban development propositions, by creating the OpenGIS system that allows remote operation for the benefit of the local authorities. This goal is reached by inserting the key factors into the system: air pollution, surface water pollution, underground water pollution. The system eases the urban planning process for the local authorities by modelling the quality factors of the air and water environments (<http://www.meteoromania.ro/index.php?id=0&lang=en> )

SICUAT is the National Programme for implementing a Geographic Information System (GIS) FOR ACHIEVEMENT DATA BANKS REAL ESTATE cadastral utilities, Town planning and development

#### [The general objectives of the project:](#)

Providing logistical support for the development and application "Extended Decentralised Implementation System - EDIS;

- Developing advanced techniques and tools for Spatial planning at national, regional, urban, rural, sustainable development in line with EU requirements;
- Implementing development strategies and policies and improving statistical activities and monitoring the level of development.

#### [The specific objectives of the project](#) are:

To promote draft legislation and to promote a National Program for Implementation of a Geographic Information System (GIS) unit to achieve data banks for land-urban housing, urban and regional planning and its foundation (<http://sicuat.utcb.ro/index.html>)

The Romanian ROMPOS and Hungarian GNSSHu.net Cross Border Data Exchange Agreement is another SDI application. A similar agreement was signed at Bucharest (on 10.05.2010) for GNSS data exchange in the border area between Romania and the Republic of Moldova. The two similar services for satellite positioning, ROMPOS and MOLDPOS, will exchange GNSS data from the GNSS permanent stations installed near the border.

Last but not least Geo-spatial.org is a collaborative effort by and for the Romanian community to facilitate the sharing of geospatial knowledge and the discovery and publishing of free geographic datasets and maps. It was created by a small team of young scientists as an attempt to overcome the Romanian specific geospatial dysfunctions (<http://earth.unibuc.ro/>)

### 3 Annexes

#### 3.1 List of SDI addresses / contacts for Romania

SDI Name	Web address	Organisational mailing address	Over-all contact person: tel./fax/e-mail
National			
ANCPI: Agentia Nationala de Cadastru si Publicate Imobiliara	NA	202 A, Splaiul Independentei, nr 202A, sector 6, Bucharest, Romania	Mr. Alex Radocea Tel.: +40-21-2127339 Fax: +40-21-2225224 <a href="mailto:office@ancpi.ro">office@ancpi.ro</a>

#### 3.2 List of references for Romania

Web sites	
	<a href="http://gisig.ima.ge.cnr.it">http://gisig.ima.ge.cnr.it</a>
	<a href="http://prodlogsys.ici.ro/ici/expoeng/domenii/gis.html">http://prodlogsys.ici.ro/ici/expoeng/domenii/gis.html</a>
	<a href="http://td1.ici.ro">http://td1.ici.ro</a> website of the Centre for R & D in Informatics (ICI)
	<a href="http://www.publicsectorinfo.com/summary_results/11b.html">http://www.publicsectorinfo.com/summary_results/11b.html</a>
	<a href="http://www.spatial.maine.edu/~onsrud/gsd/Romania01.doc">http://www.spatial.maine.edu/~onsrud/gsd/Romania01.doc</a>
	<a href="http://www.publicinfo.ro/INITIAT/Legea%20accesului%20engl.pdf">http://www.publicinfo.ro/INITIAT/Legea%20accesului%20engl.pdf</a>
	<a href="http://ir2.ici.ro/ictpa/ictpa2000/ionita_apg.html">http://ir2.ici.ro/ictpa/ictpa2000/ionita_apg.html</a>
	<a href="http://www.dsclex.ro/law/18_1996.htm">http://www.dsclex.ro/law/18_1996.htm</a>
	<a href="http://sicuat.utcb.ro/index.html">http://sicuat.utcb.ro/index.html</a>
Publications	
	Luca, G., Report on the use of GI in the NMA in the Republic of Romania. Paper presented during the Workshop for Candidate Countries on GIS, October 2001, EUROSTAT, Luxembourg.
	Stangu, I., Cadastre – The Interface between the Human Society and the Environment, paper presented during the FIG XXII International Congress, April 19-26 2002, Washington
	Vandenbroucke, D., Report of the visit to the NSI and the NMA of Romania, 26-31 July, 2001, EUROSTAT, Luxembourg. (In preparation of the Workshop for Candidate Countries on GIS, October 2001)

Other	
	Questionnaire filled in by the NMA and NSI of Romania in preparation of the Workshop for Candidate Countries on GIS, October 2001, EUROSTAT, Luxembourg.
	GISEE, 2004. Spatial Data Infrastructures in South East Europe. Country Report Romania. GISEE-deliverable D 4.1.2RO: 51 p.
	Ionita, A., I. Nedelcu, S. Andrei, V. Chendez, V. Craciunescu, M. Bichir and V. Gancz, Strengths and weaknesses in Geospatial Data Infrastructure in Romania, Bucharest, 2006.
	Probert, M., Romania: National Spatial Data Infrastructure and INSPIRE, A study and report by Geolink Consulting Ltd.
	Ionita, A., 2010. Report concerning the situation of INSPIRE implementation, 2010.
	J. Bulens, M. Schram, G. Dragan, D. Docan. A twinning experience in prototyping a NSDI in Romania, GSDI 11 world conference, 2009.
	C., Oana1, J.S, Smaranda, L., Zavate, C., Vasile, A., Badea. ROEnv GeoPortal: A collaborative effort by and for the Romanian Environmental Sectors. GSDI 11 world conference, 2009.
	Ionita, A. and Roman, A., Using GIS for the protected areas management in the context of INSPIRE national spatial data framework and the Romanian accession to the European Union, 2007.