

European Efforts in the Field of Geographic Metadata and Related SDI Activities

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1. Introduction

Geographic Information is often perceived in Europe as a sign of sovereignty and standardisation in that field was first seen as a national concern. In 1989, The AM/FM European Division organised in Montreux a workshop dealing with transfer standards. At the time, the challenge was national and discipline specific. National solutions such as the National Transfer Format (NTF) from the United Kingdom or discipline-oriented solutions such as DIGEST (on-line see: <http://www.digest.org>; DIGEST is an acronym for Digital Geographic Information Exchange Standard; the Digital Geographic Information Working Group – DGIWG – of NATO countries maintains this standard) were compared. In 1991, it was felt necessary to set up a specific, Technical Committee at the European Committee for Standards (CEN, Comité Européen de Normalisation) level: CEN/TC 287 – Geographic Information (since September 2004 see <http://cen.iso.ch/livelink/livelink.exe>). The technical committee finished its work in 1999 resulting in a set of ENv (European experimental standards) in the field of Geographic Information:

- ENv 12009: 1997, Geographic Information – Reference Model;
- ENv 12160: 1997, Geographic Information – Data description – Spatial schema;
- ENv 12656: 1998, Geographic Information – Data description – Quality;
- ENv 12657: 1998, Geographic Information – Data description – Metadata;
- ENv 12658: 1998, Geographic Information – Data description – Transfer;
- ENv 12661: 1998, Geographic Information – Referencing – Geographic identifiers;
- ENv 12762: 1998, Geographic Information – Referencing – Position;
- ENv 13376: 1999, Geographic Information – Data description – Rules for application schema; as well as some CEN reports:

- 1 ● CR 12660: 1998, Geographic Information – Processing – Query and update: spatial aspects; 1
- 2 ● CR 13425: 1998, Geographic Information – Fundamentals – Overview; 2
- 3 ● CR 13435: 1998, Geographic Information – Vocabulary; 3
- 4 ● CR 13568: 1999, Geographic Information – Conceptual schema language. 4

5
6 The CEN developed standards will be kept as experimental standards until an evaluation is
7 done in relation to the appropriate DIS (draft international standard) or IS (international stan-
8 dard) of ISO/TC 211 (International Organisation for Standardisation/Technical Committee
9 211 on Geographic Information/Geomatics). This evaluation has occurred in November 2003
10 and the revived CEN/TC 287 (secretariat by NEN, the Netherlands Normalisation Institute)
11 abandoned these ENv's ISO191XX standards are accepted in November 2004 by CEN mem-
12 bers as EN-ISO standard. 12

13 CERCO (Comité européen des Responsables de la Cartographie Officielle) is the forum 13
14 where the heads of the official National Mapping Agencies of Europe meet. It has been in- 14
15 volved in co-operative activities of exchanging information on mutual problems and in col- 15
16 laborative initiatives towards a better integration of the products of its members. CERCO de- 16
17 pended on periodic assemblies and working groups, from its start in 1980. In 1991, CERCO 17
18 created its Permanent Technical Group to conceptualise a Multi-purpose European Ground 18
19 Related Information Network (MEGRIN). Then, 18 CERCO's National Mapping Agencies 19
20 (NMA) decided in 1993 to create the MEGRIN Group, which further developed into the 20
21 GIE MEGRIN (Economic Interest Group), later with 19 members. As of first January 2001, 21
22 CERCO and MEGRIN decided to fuse into EuroGeographics composed of more than 30 Eu- 22
23 ropean NMA's. Metadata and quality is a central activity. 23

24 In 1990, the DG XIII (Directorate General XIII, in charge of Telecommunications, Infor- 24
25 mation Market and Exploitation of Research) of the Commission of the European Commu- 25
26 nities organised a workshop in Brighton, U.K., on the activities that the Commission could 26
27 undertake in the field of Geographic Information. (DG XIII is now renamed to DG Infor- 27
28 mation Society with slightly different remit.) At the meeting, there was consensus on the 28
29 possible benefits that could be gained by the Geographic Information economical sector 29
30 from the creation of a European Umbrella organisation. A team of four prominent experts 30
31 worked between 1991 and 1993 to investigate the feasibility, desirability and practical de- 31
32 tails of creating such an organisation. In 1993, EUROGI, the European Umbrella Organi- 32
33 sation for Geographic Information, was set up. Amongst others, the promotion of stan- 33
34 dardisation and use of spatial data infra structures using metadata standards are their activ- 34
35 ities. 35

36 Realising present-day economic development, modern countries demand accurate and de- 36
37 tailed geographic information to maximise the value of promising new geographic technol- 37
38 ogies such as Global Positioning Systems (GPS) and Geographic Information Systems (GIS). 38
39 To realise all the potential benefits of geographic technologies at the European level, EU- 39
40 ROGI stimulates the harmonisation of required geographical data by European co-operation, 40
41 complementing the same efforts at the national level, trying to improve: 41

- 42 ● transfer and integration of geographic information; 42
- 43 ● sharing of experience gained by the numerous national and international geographic tech- 43
- 44 nologies research initiatives; 44
- 45 45

- 1 ● contribute to the reduction of the costs of geographic information and geographic technolo- 1
2 gies and to their more widespread use. 2

3
4 The mission of EUROGI is to maximise the effective use of geographic information for the 3
5 benefit of the citizen, good governance and commerce in Europe and to represent the views of 4
6 the geographic information community. EUROGI achieves this by promoting, stimulating, en- 5
7 couraging and supporting the development and use of geographic information and technology. 6
8 EUROGI tries to achieve this mission by the following objectives to: 7

- 9 ● raise awareness of the value of GI and its associated technologies; 9
10 ● encourage the greater use of geographic information in Europe; 10
11 ● work towards the development of strong national GI associations in all European countries; 11
12 ● facilitate the development of a European Spatial Data Infrastructure (ESDI); 12
13 ● represent European interests in the Global Spatial Data Infrastructure (GSDI). 13

14
15 The European Commission has long been involved in standardisation, as one of its major 15
16 projects CORINE was developed in the field of the environment. EUROSTAT, was leading the 16
17 GISCO (GIS for the Commission) project (one of the outcome of the CORINE project) and 17
18 is also using the SABE database (Seamless Administrative Boundaries in Europe), produced 18
19 by MEGRIN and updated now by EuroGeographics for many European countries. 19

20 In the last decade, the DG XIII of the EU has set up framework programmes for the stim- 20
21 ulation of the use of digital techniques and was executing the fourth and the fifth framework 21
22 programmes for Research and Development (FP-4 and FP-5) till 2000. The European Union 22
23 stimulated the use of digital information by the INFO2000 programme, which was supported 23
24 by EUROGI for the field of Geographic Information. 24

25 The central theme of INFO2000 is the development of a European information content 25
26 industry, capable of competing on a global scale and able to satisfy the needs of Europe's 26
27 enterprises and citizens for information content, leading to economic growth, competitive- 27
28 ness and employment and to individual professional, social and cultural development. The 28
29 programme aims to achieve this through four main Action Lines: 29

- 30 ● stimulating demand and raising awareness; 30
31 ● exploiting Europe's public sector information; 31
32 ● triggering European multimedia potential; 32
33 ● Support Actions. 33
34

35 The INFO2000 programme had a four-year work programme from 1996 until 1999. Several 35
36 projects of the INFO2000 programme were dealing with metadata. 36

37 In the European context, a specific issue is the use of many (natural) languages used in the 37
38 metadata services in the different European countries. Some EU funded projects are especially 38
39 dealing with this problem. 39

40 Based on the experiences of several projects carried out under the 4th and 5th Frame- 40
41 work Programme, the EC Directorate General Joint Research Council developed the INSPIRE 41
42 project for Environmental issues in Europe. The background of INSPIRE (Infrastructure for 42
43 Spatial Information in Europe) (see <http://www.jrc.cec.eu.int>) is the complexity of environ- 43
44 mental problems in Europe with many distributed datasets, requiring an integral approach. 44
45 Geo-information becomes an important factor for this European policy in the 6th Framework 45

1 Program of the EC (FP-6). INSPIRE aims at well-functioning national geo-information in- 1
2 frastructures, based on common standards. There are 17 projects defined within INSPIRE as 2
3 an EC project by the DG JRC, containing technical standards and protocols, organisational 3
4 aspects, information policy and management and access to geo-information both for policy 4
5 makers and the citizens. From Technological point of view INSPIRE relies on the following 5
6 principles: 6

- 7 ● data collection and management at one site; 7
- 8 ● seamless access from different sources; 8
- 9 ● application at different scales; 9
- 10 ● access for all policy makers under acceptable conditions; 10
- 11 ● easy to find by good metadata; 11
- 12 ● easy to understand and interpretation. 12

13
14 In the next parts the efforts and results on the developments of standards and the use of 14
15 metadata in Europe will be discussed in more detail both at the European level (paragraph 2 15
16 of this chapter), as well as at the national level (paragraph 3 of this chapter). 16
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18 **2. European projects funded by the EU** 18

19
20 The European geographical information market is still very nationally focused, and this means 20
21 that users requiring pan-European datasets face a number of obstacles in acquiring the infor- 21
22 mation they require, including: 22

- 23 ● lack of awareness of available datasets, their quality and means to obtain them; 23
- 24 ● datasets from different organisations are often available with different licence terms (which 24
25 may even be contradictory); 25
- 26 ● data itself is unlikely to be consistent across borders. 26

27 **2.1. ETeMII** 27

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29
30 One of the EU funded projects from the fourth and the fifth framework programmes (FP-4 30
31 and FP-5) is ETeMII (European Territorial Management Information Infrastructure), aiming 31
32 at organising a network of excellence, bringing together most of the stakeholders of the Ter- 32
33 ritorial Management Information market, coming from research, industry and public sector. 33
34 Territorial management means any management activity, related to the territory; it covers a 34
35 wide scope of activities, including agriculture, transport, utility management, land planning, 35
36 environment, fisheries, geo-marketing, etc. Particular attention will be given to user participa- 36
37 tion within this project, to ensure that all tasks are based on users needs. Awareness activities 37
38 are an important component of the project. 38

39
40 Such a network will build consensus on the most important technical issues that are the 40
41 foundation of ETeMII: 41

- 42 ● reference data; 42
- 43 ● data access policy; 43
- 44 ● interoperability, standards implementation, including metadata; 44
- 45 ● research and development challenges; 45

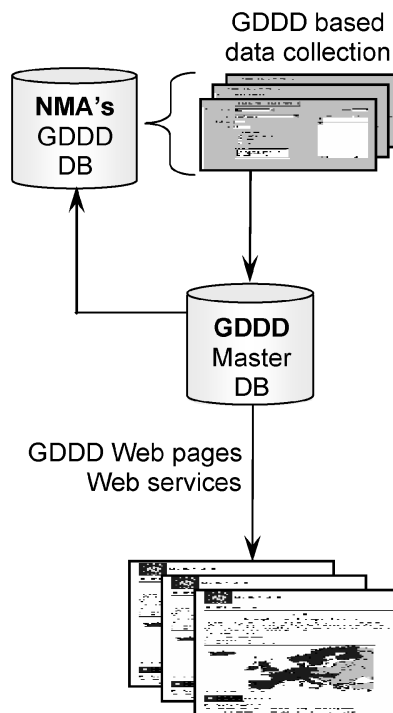
- 1 • integration of space tools: positioning systems, Earth Observation and telecommunications;
- 2 • active participation into global initiatives: ISO, GSDI, OGC, etc.

3 To move a step towards the creation of a European Information Infrastructure three themes of
 4 ETeMII are promoted: to be able to advertise best practice and promote contribution to and
 5 use of GI infrastructure issues.
 6

7 2.2. GDDD and La Clef

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 9 As a commercial organisation MEGRIN represents, and is funded by, a group of 19 NMA's.
 10 It aims are to bring a European dimension into NMA national activities and to meet the in-
 11 creasing demand for pan-European data by improving international users access to national
 12 datasets (see Figure 1).
 13

14 It does this by providing information about the digital data available now in 23 countries
 15 (see Figure 2), and is creating harmonised pan-European datasets. Although MEGRIN com-
 16 prises only 19 full members, its everyday partners are all European NMA's, i.e., 30 CERCO
 17 members.
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 42 Fig. 1. As an example: Geographical Data Description Directory (GDDD), the central data-
 43 base at Multi-purpose European Ground-Related Information Network (MEGRIN), which is
 44 updated with data collected from National Mapping Agencies (NMA's) and from which static
 45 web pages are derived.



Fig. 2. The Geographical Data Descriptive Directory (GDDD) coverage: GDDD provides metadata covering the countries with dark colour.

Recognising the growing pan-European market demand, MEGRIN has been established to focus on two areas of activity: providing metadata and creating new harmonised digital datasets.

As of first January 2001, CERCO and MERGIN decided to fuse into EuroGeographics composed of more than 30 European NMA's. Metadata is a central activity.

2.2.1. GDDD

MEGRIN GDDD metadata service (Geographical Data Description Directory) provides information about 250 digital datasets available from the NMA of 23 countries of Europe. The GDDD was also the first pilot implementation of the pre European metadata standard prENV 12657 of CEN/TC 287. Its current structure has existed since its introduction in November 1994. In 1996, it became more accessible as the widespread use of World Wide Web (WWW) browser came more commonly into use.

Metadata information in the GDDD falls into the following categories:

- overview: short abstract, including contact address (organisation, web-site address and person);
- commercial information: containing some commercial details of coverage, copyright, format, price and other conditions related to the use of the datasets;

- 1 ● technical information: describing the technical specifications of data sources, features and 1
- 2 content, updates, data accuracy and other data quality parameters; 2
- 3 ● descriptions of the provider are also held in organisation details. 3

4 **2.2.2. LaClef: developing GDDD to a future One-Stop geographic information shop** 4

5 Users require data which is ever easier to access, and would ideally like to use a ‘one stop 5

6 shop’ to view, purchase, and be supplied with a wide range geographical data, including topo- 6

7 graphic data, remotely sensed imagery, geological and demographic data. So, LaClef must be 7

8 a four-sided solution covering: 8

9

- 10 ● semantic issues; 10
- 11 ● distributed architecture; 11
- 12 ● a wide range of services related to the metadata offered on LaClef; 12
- 13 ● e-commerce facilities. 13

14 It is likely that such shops will be created incrementally. For the development of this meta- 14

15 data service the next steps should be: 15

16

- 17 1. distributed metadata systems will initially link the various (existing) national databases of 17
- 18 metadata; 18
- 19 2. databases of metadata will then develop to enable on-line data sales. 19

20 **Stage 1: Distributed systems** 20

21 Although metadata systems such as the GDDD have large numbers of users, they tend to 21

22 be nationally based and are often specialist restricted to services for specialist in a specific 22

23 discipline (and, maybe a specific provider, such as topographic data from the government). In 23

24 their current form, they do not allow users to access the geographic information directly, but 24

25 are directories, which enable users to discover what exists. Accesses to the data itself need 25

26 to be developed to enable an as wide audience as possible to reach geographic information. 26

27 In the European context, a distributed metadata system will face many challenges to over- 27

28 come the integration of various services, as well as different languages, application fields and 28

29 standards. This section aims to provide an overview of the issues that will be important in 29

30 developing distributed systems. All metadata systems need to provide information, which is 30

31 easily accessible, reliable, and up-to-date. The following will have significant impacts on the 31

32 success of distributed systems: 32

33

- 34 ● semantics (terminology); 34
- 35 ● (meta) data model; 35
- 36 ● future data transfer formats. 36

37 Within LaClef, these topics will be investigated by connecting, e.g., GEIXS, the meta- 37

38 data service of EuroGeoSurveys (European National Geological Surveys, on-line see: 38

39 <http://www.eurogeosurveys.org>), to the system. GEIXS is under development; a prototype 39

40 is already accessible in the web. These topics were also addressed in the INFO2000 Project 40

41 ESMI, co-funded by the European Commission DGXIII, where MEGRIN, a partner in the 41

42 Consortium, will bring its practical experience in running a ‘pre-distributed-metadata system’. 42

43

44 LaClef will use the XML standard to enable easy metadata transfer from the data provider 44

45 to the central database, or alternatively offer a linked service to another metadatabase. The 45

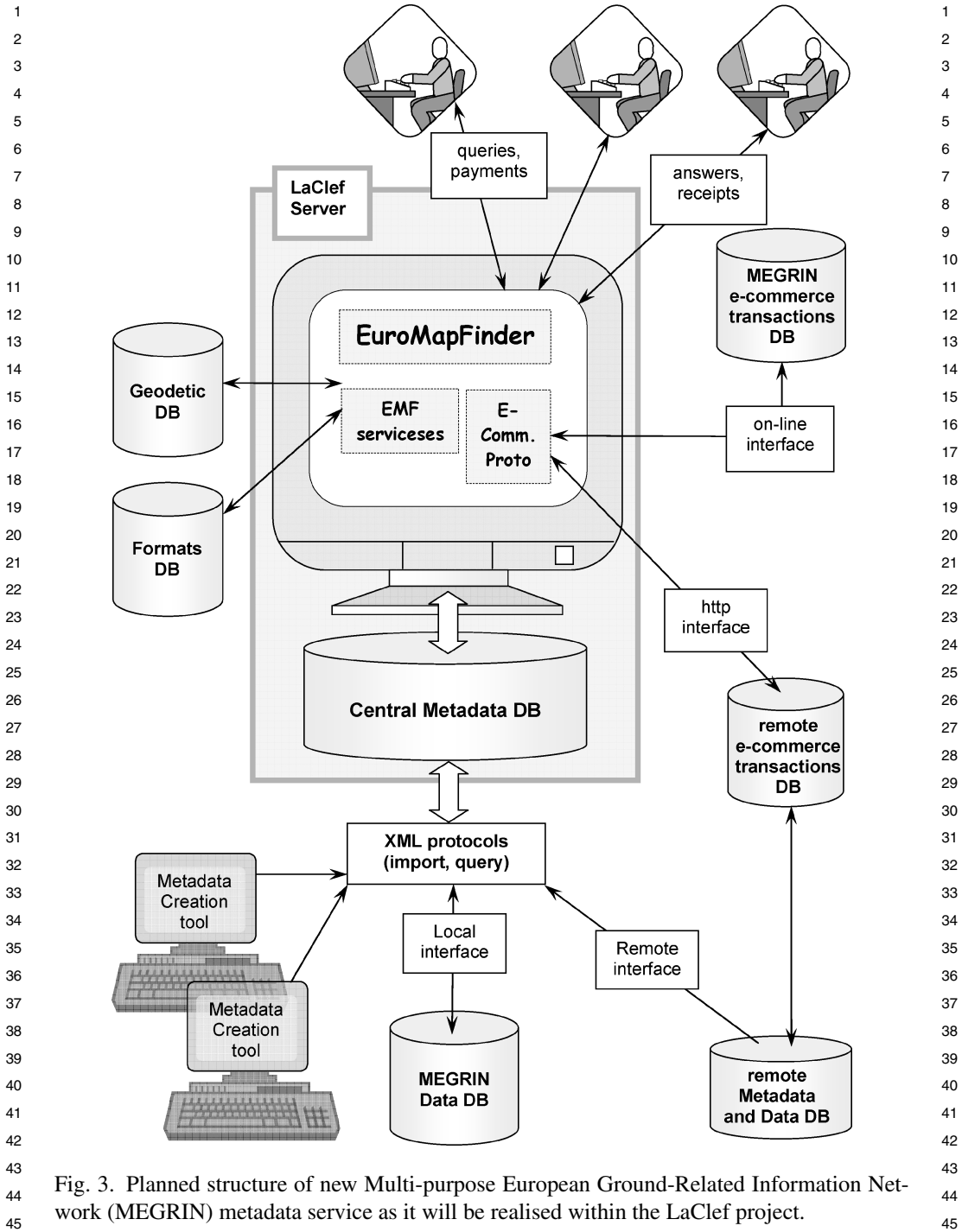


Fig. 3. Planned structure of new Multi-purpose European Ground-Related Information Network (MEGRIN) metadata service as it will be realised within the LaClef project.

1 data producer will be able to extract XML-formatted metadata from his own metadata in his 1
2 own local metadatabase. The XML-formatted metadata will be sent to the LaClef metadata 2
3 service where they will be imported with an import tool. From LaClef, they are available by 3
4 dynamic HTML-pages to the users. 4

5 **Stage 2: On-line data sales** 5

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7 Although the immediate aim is to connect metadata systems, there is growing demand 7
8 for on-line access to data. To be truly useful, metadata services will need to be more closely 8
9 integrated with the data purchasing process. Ultimately, users are interested in accessing actual 9
10 geographic data. *Metadata is the means to achieve the end, not an end in itself.* 10

11 On-line supply is currently hindered by various factors; including the wide range of geo- 11
12 graphical data transfer formats. If on-line supply is to be successful, the interoperability be- 12
13 tween different systems needs to be improved. Various investigations are underway to include 13
14 the formats of OpenGIS® and OGD (OpenGIS® Data Interchange) consortia, standardisa- 14
15 tion bodies, while software vendors are developing products, which can change formats on 15
16 the fly without the user needing to know. There are also the issues of data security, secure fi- 16
17 nancial transactions and a range of marketing topics. For example, the existence of a network 17
18 of agents and distributors acting for an NMA may make it only possible to introduce direct 18
19 on-line sales slowly, due to existing long term commercial contracts which must be honoured. 19
20

21 **2.3. GEIXS** 21

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23 This Geo-Scientific Electronic Information Exchange System (GEIXS, on-line see: [http:// 23](http://geixs.brgm.fr/)
24 geixs.brgm.fr/) will help in all European languages to find out, whom to approach for infor- 24
25 mation on minerals, oil- and gas, groundwater, geology, natural disasters and geo-techniques 25
26 anywhere in Europe. GEIXS is the European Geological Data Catalogue. It gives a dataset 26
27 description through: 27

- 28 ● geographic coverage of the data; 28
- 29 ● key words from lexicons; 29
- 30 ● free text. 30

31
32 Its aim is to provide a single point access to geological metadata because geology crosses 32
33 borders. It also aims at reducing language difficulties. It is useful for: 33

- 34 ● land use planners; 34
- 35 ● minerals industries; 35
- 36 ● civil engineering; 36
- 37 ● waste disposal monitoring; 37
- 38 ● energy sectors; 38
- 39 ● water industries; 39
- 40 ● environmental sectors; 40
- 41 ● insurance and banking; 41
- 42 ● pollution control; 42
- 43 ● government infra-structural strategy; 43
- 44 ● coastal flooding studies; 44
- 45 ● global change; 45

- 1 ● health studies (e.g. radon);
- 2 ● research in schools, colleges and universities.

3 Geographic search allows the selection of geographic data using both geographic and thematic
4 criteria. It is also possible to display the geographic data coverage. Thematic search allows
5 to search data using more extensive thematic on top of the geographic search. GEIXS is a
6 EuroGeoSurveys product and the European Commission has supported its development.
7

8 **2.4. AVID**

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10 A wealth of information about the sea is stored in the databases of public hydrographic of-
11 fices. AVID (Added Value Information Dissemination for hydrographic datasets, on-line see:
12 <http://www.ec-gis.org/avid.htm>) will develop a prototype on-line service to provide access
13 to this information for both general and specialised users. Data on bathymetry (depth mea-
14 surement), coastal topography, sedimentology, waves, currents, tides, landmarks, buoys and
15 beacons, lights and sea-limits will be made available.

16 AVID aims to demonstrate the effectiveness of European information service based on hy-
17 drographic data. An essential objective is to add value for potential users by providing for the
18 integration of different sources of hydrographic data.

19 Additional objectives of the project are to:

- 20
- 21 ● study user requirements (with special focus on fishery and coastal management);
- 22 ● define products which will supply added-value information to end users;
- 23 ● develop a prototype service for information delivery, including catalogues of available data;
- 24 ● promote the use of the service and assess its performance.

25 A pilot, web-based system will be demonstrated in two application fields, which will be cho-
26 sen for their applicability to the world of business. The service will include an on-line in-
27 ventory of hydrographic data sources for at least three European countries. In addition, the
28 AVID team will study and publish written reports on legal and copyright issues, pricing pol-
29 icy and charging systems, which will make the exploitation of public sector information easier
30 to achieve. Workshops and web-based information will be targeted at potential users, in order
31 to raise awareness.

32 **2.5. CLEAR**

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34
35 When an infrastructure development or a business project crosses national boundaries, there
36 can be particular problems in assembling all the geographic (and environmental protection)
37 information needed. It is in the interests of both providers and potential users of this data that it
38 is easily accessible, up-to-date and comprehensive. The CLEAR project (spatial data CLEAR-
39 ing house, on-line see: <http://www.ec-gis.org/clear.htm>) focuses on the Saar-Lor-Lux region,
40 which includes the German Länder of Rheinland-Pfalz and Saarland, the Grand Duchy of
41 Luxembourg, the French region of Lorraine and the Belgian Province Luxembourg, encom-
42 passing an area with some eight million inhabitants. The project team will develop a system
43 giving information about available geographical data (a metadata system) including owner-
44 ship, price and technical quality held in the participating countries. It will also provide a
45 means to access the data itself.

1 The key objective of CLEAR is to develop a central, bi-lingual French/German information 1
2 system for geographical data in the region (a metadata service) as well as a functional delivery 2
3 system to provide direct access to information resources held by the public sector. The creation 3
4 of a separate vehicle to market the spatial data will be considered. The project will produce: 4

- 5 ● catalogue of digital spatial data for the region (the metadata system); 5
- 6 ● definition of user requirements based on research through questionnaires and workshops; 6
- 7 ● proposals for operational standards for the transfer, conversion and integration of data 7
- 8 across national borders; 8
- 9 ● proposals for a legal, organisational and political framework for a spatial data clearing- 9
- 10 house for the region; 10
- 11 ● bi-lingual information and delivery system for the region based on CD-ROM or Internet 11
- 12 technology. 12

13
14 The CLEAR project will link users of digital geographic information: businesses, government 14
15 departments, research and educational institutions as well as private individuals. 15
16

17 **2.6. ESMI**

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19 The use of geographic information in all parts of European society is growing. Private busi- 19
20 ness, government, research and educational institutions as well as private individuals are in- 20
21 creasingly using geographic information as a key component in their activities. Increased 21
22 international co-operation and competition means that there is a need to determine what ge- 22
23 ographic information is available in other countries or organisations and how to obtain it. 23
24 The proposed European Spatial Metadata Infrastructure (ESMI, on-line see: [http://www.ec- 25](http://www.ec- 24
25 gis.org/esmi.htm)
26 gis.org/esmi.htm) is an initiative to establish a framework for the distribution of geographic 26
27 information by creating a universal metadata service. It is set up by several European public 27
28 and private organisations (including CNIG in Portugal, Geodan in the Netherlands, University 28
29 of Valencia in Spain, MEGRIN in Paris, France and Ordnance Survey of the United Kingdom). 29

30 There are already a number of existing metadata services in Europe and elsewhere. How- 30
31 ever, these systems are specific, nationally oriented and rely on central servers which may be 31
32 separate from the actual geographic data. They do not communicate, so there is some dupli- 32
33 cation, which gives rise to inconsistency. ESMI has the objective to link these existing and 33
34 future metadata systems. ESMI will create a European spatial metadata infrastructure by pro- 34
35 viding mechanisms to link spatial data users with metadata services using Internet. However, 35
36 by allowing metadata services to communicate between themselves, a single access to the 36
37 service by World Wide Web will allow access to all existing, connected metadata servers and 37
38 provide multimedia tools to explore, search and compile relevant information. Links to data 38
39 provision services will be made available where possible. ESMI intends to bring together ex- 39
40 isting technologies to add value to previous work. ESMI will develop interfaces for the user 40
41 (to browse and query metadata) and the provider (to make metadata available and to maintain 41
42 those metadata) as well as the system to connect the two. In addition, ESMI will simplify 42
43 access and maintenance of metadata taking account of different systems, languages, etc. The 43
44 participants who have wide experience and skills in these fields will bring all these compo- 44
45 nents and functions together. Obviously, the implementation of ESMI can only be successful 45
if national and international data providers are involved.

2.7. GEOSERVE

Europe has a wealth of high quality digital geographic information. The variety of data formats, reference systems, projections and quality standards reflect the wealth of Europe's history; but it is an obstacle to cross-border transfer and integrated use of geographic data. The access mechanisms are poorly developed. The GeoServe (Geographic Data Access Services, on-line see: <http://www.ec-gis.org/geoserve.htm>) project develops a brokering system that allows the user to identify the geographic data from a data catalogue of many providers in Europe and to order it in formats required by the users' applications. Additionally geographic services can be ordered. The system is based on distributed metadatabases that implement the CEN/TC 287 standard. Communication is done on Internet and Intranets. For casual users and simple Web clients, information kiosks are provided, interfacing a variety of geographic viewers, as well as GIS supports for professional users. Providing access to geographic information and geographic services is an important step on the road towards interoperability of GIS and geographic applications. GeoServe is a Research and Development project supported by the EC DGXIII Telematics for Administrations Programme. Siemens Nixdorf leads an international consortium of industry and data user administrations.

The project GeoServe aims to develop a network of Geographic Data Access Services for European Administrations and Data Providers. The Services shall support the identification, selection, and timely access to geographic data for data users on a European scale. For the provider of geographic data, the system will enable the marketing of geographic data internationally to a large user group.

The objectives of the project GeoServe are to:

- harmonise the requirements of European data providers and data users;
- develop a concept for a European geographic data access services network;
- guarantee that the user needs and user participation drive the project;
- build demonstrators for the network service nodes and for the data provider client, the geographic data user client and information-desk client;
- assure openness and flexibility of the system by interfacing with GIS's, geographic data formats, geographic viewers and application areas.

The project is driven by user demands. A consortium of leading IT industrial partners, service organisations, geographic data provider administrations and data user administrations shall develop the concepts and services and validate and test them with pilot applications. Pilot sites will demonstrate regional and international transfer of geographic data. The GeoServe system will provide Geo-Data service nodes, Geo-clients, and added-value functions on Wide Area Networks. The demonstrators in Finland, Greece, Germany, and Italy will link various international and regional data providers and users. They will support different geo-clients for data users in administrations based on PC/Windows and citizen information kiosks.

2.8. GISED I

The GISED I Europe project (Electronic Trade for Geographic Information, on-line see: <http://www.ec-gis.org/gisedi.htm>) aims to develop a European commercial and technical network infrastructure which will both facilitate and accelerate the transfer and trading of geographic information at the local, regional, national and international level. This requires the

1 development of web-based GI query, view and retrieval functionality, integrated with secure 1
2 transactional procedures (EDI and e-commerce solutions), which will be tried in four Eu- 2
3 ropean countries. The principal output of the project will be the development of a Book of 3
4 Specifications, which will provide the technical basis for development of GISED I systems in 4
5 other European and worldwide locations. 5

6 GISED I is a project involving eight organisations from seven countries in Europe. These 6
7 are the European Umbrella for Geographical Information EUROGI, Cara Broadbent & Jegher 7
8 and URBA 2000 in France, Walter Research Centre from the United Kingdom, Instituto En- 8
9 genharia de Sistemas e Computadores in Portugal, Ususimaa Regional Council from Finland, 9
10 EDI Hellas SA from Greece, Indra SSI SA from Spain. Its main purpose is to provide a model 10
11 for a trading infrastructure to help users to locate and purchase geographic information and 11
12 suppliers to find a larger market for their data. For this open and flexible electronic market, 12
13 the concept of a broker has also arisen. 13

14 The GISED I Europe system will be demonstrated in several countries (e.g.: Greece and 14
15 Finland). The users of the GI market are divided into three broad types: 15

- 16 • GI data suppliers (enterprises or institutional organisations); 16
- 17 • GI data users (either businesses or individuals); 17
- 18 • GI data brokers (enterprises or institutional organisations). 18

19
20 The GI data broker is a new entity, emerging with the development of GI electronic inter- 20
21 change systems. The GI data supplier and GI data user are relatively well-defined entities, 21
22 although single organisations may act as both a user and supplier. The GI data broker, as a 22
23 facilitator of data transfer between suppliers and users, is not well defined; indeed, it is an 23
24 objective of the GISED I project to define this role more closely. The survey of users and 24
25 suppliers produces profiles that are real since these are based on organisations that have well- 25
26 defined activities and characteristics. The survey of brokers is based mainly on organisations 26
27 that have a perceived future role in this activity and hence the profile varies with these percep- 27
28 tions. 28

29 **2.9. MADAME** 29

30
31 The MADAME project (Methods for Access to Data and Metadata in Europe, on-line see: 31
32 <http://www.ec-gis.org/madame.htm>) will identify solutions and best practices for making pub- 32
33 lic sector data available across Europe. Focusing on geo-statistical and cadastral information 33
34 in particular, it will evaluate current services, providing access to data and metadata from the 34
35 perspective of current and potential users. The overall objective is to move from services that 35
36 are producer-oriented to user-oriented services. An important strength of this project is that 36
37 it will examine data provision at (and across) three levels: European, national and local. This 37
38 approach will be critical to developing transferable guidelines of best business practice. It will 38
39 inform public sector agencies in their approach to making their datasets more accessible to 39
40 others. The objectives of the project are to: 40
41

- 42 • evaluate the current strengths and limitations of metadata service provision at European, na- 42
43 tional and local level. The project will consider the issues of copyright, data documentation, 43
44 data access and pricing, data security, confidentiality and liability; 44
- 45 • compare the relevant institutional and legal frameworks in participating countries; 45

- 1 ● identify the data needs of key users in public, private and academic sectors; 1
- 2 ● develop a compendium of best business practice; 2
- 3 ● increase the quality of support services based on best business practice; 3
- 4 ● raise awareness of the results achieved and practical steps needed for further development. 4

5 The MADAME project has delivered: 5

- 6 6
- 7 ● compendium of best business practice for access to data and metadata in Europe; 7
- 8 ● comparative evaluation of data access policies and data infrastructures in the four partici- 8
- 9 pating countries at European, national and local levels; 9
- 10 ● two manuals addressing respectively organisational and institutional issues and legal and 10
- 11 economic issues affecting the increased exploitation of the public sector; 11
- 12 ● user needs study in evaluating current service provision for data and metadata in each partici- 12
- 13 pating country; 13
- 14 ● web-based data and metadata reference site for transfer of methodologies and practice in 14
- 15 data documentation. 15

16 As follow-up of MADAME, the findings of several of the previous projects were proposed to 16

17 develop: 17

- 18 18
- 19 ● increasing awareness of the value of information as an organisational asset and metadata as 19
- 20 the key to unlocking it; 20
- 21 ● identification of specific user needs, and offer pragmatic solutions to the development of 21
- 22 sustainable information policies; 22
- 23 ● fostering interoperability through the adoption of international standards, in liaison with 23
- 24 ISO and CEN, and national associations for geographic information. 24

25 This is particularly aimed at local government across Europe, focusing on geographic infor- 25

26 mation as an important part of public sector information. It will be executed through a series of 26

27 eight workshops and focus groups to gather user needs and disseminate findings, and guide ac- 27

28 tivities with International standardisation bodies, the European Commission's Joint Research 28

29 Centre, and OGC. 29

30 31 **2.10. INSPIRE** 31

32 32

33 The background of INSPIRE (Infrastructure for Spatial Information in Europe) (see [http://](http://www.jrc.cec.eu.int) 33

34 www.jrc.cec.eu.int) is the complexity of environmental problems in Europe with many dis- 34

35 tributed datasets, requiring an integral approach. Geo-information becomes an important fac- 35

36 tor for the European policy in the 6th Framework Program of the EC (FP-6). INSPIRE aims at 36

37 well-functioning national geo-information infrastructures, based on common standards. There 37

38 are 17 projects defined within INSPIRE as a EC project by the DG JRC, containing techni- 38

39 cal standards and protocols, organisational aspects, information policy and management and 39

40 access to geo-information both for policy makers and the citizens. 40

41 From technological point of view INSPIRE relies on the following principles: 41

- 42 42
- 43 ● data collection and management at one site; 43
- 44 ● seamless access from different sources; 44
- 45 ● application at different scales; 45

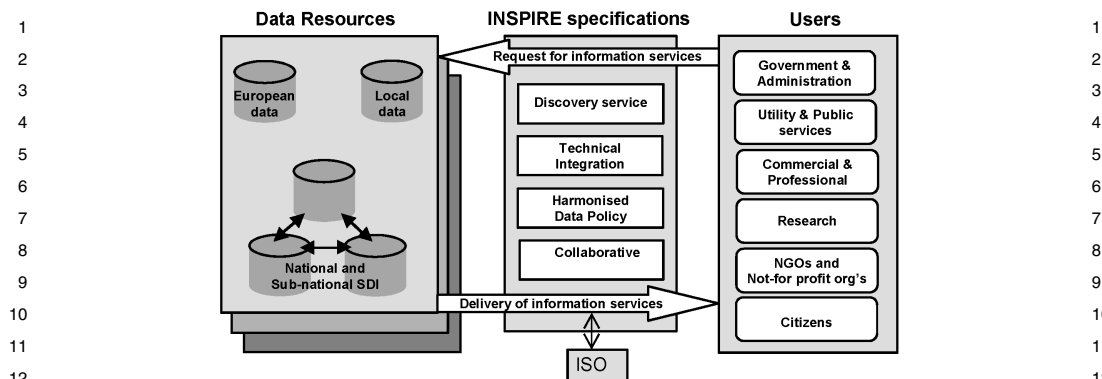


Fig. 4. INSPIRE information flow.

- access for all policy makers under acceptable conditions;
- easy to find by good metadata;
- easy to understand and interpretation.

The first expert groups to establish INSPIRE were founded in 2001, resulting in a position paper in 2002. This proposal was accepted by the EC in 2003, sending it to the European Parliament. The kernel of INSPIRE is the ability of two or more autonomous authorities with different systems, applications or data to communicate with each other in a meaningful manner, despite the differences in language, context or content. This should be achieved by the formulation of an ESDI (European Spatial Data Infrastructure), linked to national SDI's, which are the responsibility of the national EU members states, including metadata, reference data, thematic data and derived products. Also technical specifications, an EU portal and procurement guidelines will be created.

Because many large scale IT projects have proved to fail, the strategy in INSPIRE is to formulate many small manageable projects and learn from the successes and failure of these projects. The project is made in two phases:

- 2003–2007 – pre-implementation phase, creating and central information counter, demonstrating the interoperability, testing the process of intra-community consensus building, develop GI standards and broaden the activity field with extensions to e-Europe and e-Government;
- 2007–2015 – implementation phase.

To achieve the goals of the first phase an action plan has been enacted:

- create an INSPIRE metadata profile for discovery through a study and workshop by EU-ROSTAT and Joint Research Council;
- Revive CEN/TC 287 and CEN Workshop Agreements;
- Establish relationship with the e-Europe Steering Group;
- EuroSpec second workshop;
- FP-6 Integrated Project with applications based on INSPIRE principles.

2.11. Summary

Many different projects are developed or are being developing in Europe to enable the easy access of spatial data that are available in so many different countries with so many different types of data and systems and using different languages. The projects focus on such aspects, i.e., to make spatial data available despite the different languages and systems used within the Europe countries. The conclusions from the various European projects emphasise the need for providing mechanism to map ISO/TC 211 metadata standard with the Dublin Core for discovery purposes. In addition, the migration of present metadata databases created under CEN/TC 287 standards towards a system using the ISO/TC 211 international standard when available is well underway. Another main aim of the EU in funding these projects is to bring the data to the civilians and commercialise the data. However, these objectives are not GI specific but linked to general IT programmes. It is then up the GI sector to itself to propose projects connected to GI. This means that all these projects do not serve any European GI policy but are initiatives benefiting from funding opportunities.

Nonetheless, GI actors failed to obtain the political support from senior European Union decision makers although a position paper (called GI2000) almost reached the 'communication of the European commission' status. The new strategy of the GI sector is to channel the European GI infrastructure concept through applications area such as Environment: a new EC initiative (starting September 2001) is on its way to define a European Environmental GI infrastructure. Similarly, the GINIE project (Geographic Information Network In Europe), funded by the European Commission, will contribute to the development of the European GI infrastructure, in implementing EUROGI strategy paper.

3. National developments in the field of SDI in Europe

Apart from activities and developments by co-operating countries in Europe as described above, in many European countries also National Geographic Information Infrastructures (NGII) are set up to increase the interoperability between producers and users of geographic information. In this section, these developments are described for those countries contributing to this book. These countries were Republic of Croatia, Czech Republic, Germany, Ireland, the Netherlands, Poland, Romania, Spain, Turkey, and the Nordic countries, i.e., Denmark, Finland, Iceland, Norway and Sweden.

3.1. Croatia

The major national mapping organisations in the Republic of Croatia are:

- State Institute for Standardisation and Measuring (Drzavni Zavod za Normizaciju i Mjeriteljstvo);
- State Geodetic Administration (Drzavna Geodetska Uprava);
- Civil Engineering and Environment Protection Administration of the Ministry of Defence of the Republic of Croatia (Uprava za Graditeljstvo i zastitu okolisa Ministarstva obrane Republike Hrvatske);
- Croatian Hydrographic Institute (Hrvatski Hidrografski Institut).

1 The international spatial data organisations in which the Republic of Croatia actively partici- 1
2 pates are: 2

- 3 • Comité Européen des Responsables de la Cartographie Officielle – CERCO and the Mul- 3
4 tipurpose European Ground Related Information Network – MEGRIN; the national repre- 4
5 sentative is the State Geodetic Administration; 5
6 • International Hydrographic Organisation (IHO) and International Maritime Organisation 6
7 (IMO), where the national representative is the Croatian Hydrographic Institute. 7
8 8

9 Croatian metadata activities are at the very beginning. In 1994, the State Geodetic Admin- 9
10 istration founded six technical committees with the aim to propose priority to standards for 10
11 the Croatian geodetic and spatial system. In 1998, the State Geodetic Administration together 11
12 with the State Institute for Standardisation and Measuring changed the structure of the six 12
13 technical committees into only one committee, having the same purpose but established for- 13
14 mally according to the ISO/TC 211 and CEN/TC 287. 14

15 The Croatian maritime spatial system attempts to take over the metadata standard of IHO 15
16 (S-57) and DGIWIG (DIGEST) as well as of other international organisations such as ISO/TC 16
17 211, SQL/MM of the OpenGIS® Consortium. The plans for metadata in Croatia are to learn 17
18 about the spatial metadata from other European countries and international organisations and 18
19 to design the national standards that will confirm the CEN and ISO directions. 19
20 20

21 **3.2. Czech Republic** 21 22 22

23 In the Czech Republic, the following organisations provide geographic information: 23
24 24

- 25 • Land Survey Office with the following datasets: 25
26 – ZABAGED/1: containing vectorised features of the basic topographic maps 1 : 10 000, 26
27 finished for about 80% of the Czech Republic; 27
28 – ZABAGED/2: geo-referenced images of the basic topographic maps 1 : 10 000; 28
29 – Geo-referenced images of base topographic maps 1 : 50 000; 29
- 30 • Military Topographic Institute with: 30
31 – DMU200 containing vectorised features of (military) topographic maps 1 : 200 000; 31
32 – DMU25 with vectorised features of (military) topographic maps 1 : 25 000; 32
33 – DMR1 (DEM with 1 km grid); 33
34 – DMR2 (DEM with 100 m grid); 34
35 – archive of aerial images; 35
- 36 • Forest Management Institute, having: 36
37 – Geo-referenced images of basic forestry maps 1 : 5000; 37
38 – archive of aerial images of forests; 38
- 39 • Czech Geological Survey completed vectorised features of geological maps 1 : 50 000; 39
40 • many local GIS providers and local governments hold geographic data. 40

41 The application of metadata by providers is on a voluntary basis by using the central ser- 41
42 vice of the Czech Association for Geographic Information (CAGI), where each provider can 42
43 insert data record in system through the World Wide Web. CAGI Meta information system 43
44 is an implementation of the CEN prEN 12657. Contemporary query services of CAGI Meta 44
45 information system work on: 45

- 1 ● text search in record name or abstract within selected system entity (i.e., dataset, person, 1
- 2 project, event, organisation, software, etc.); 2
- 3 ● selection of administrative unit in map; 3
- 4 ● text search in dataset name and abstract within selected dataset class (i.e., topography, plans, 4
- 5 DEM, aerial image, etc.). 5

6 3.3. Denmark (including Greenland and the Faeroe Islands) 7

8
9
10 In Denmark, since April 1997, the National Survey and Cadastre (KMS-DK) has developed a 10
11 metadata service for spatial information on the web (on-line see <http://www.geodata-info.dk> 11
12 some of the data descriptions are in English). The service aims at the Geo-ICT sector itself 12
13 as well as professional GIS-users. Its purpose is to give an overview of the most important 13
14 spatial datasets and data-collections within the private as well as the public sector. Hence, the 14
15 datasets described are both public datasets made for administrative purposes and commercial 15
16 products provided by private companies and both, direct and indirect referenced datasets. The 16
17 service is free of charge for the users as well as for the data providers, and it is up to the data 17
18 providers themselves to decide if they want to participate. 18

19 The Danish metadata-service is built as an implementation of the CEN GI-metadata stan- 19
20 dard (CEN ENv 12657); the majority of the CEN standard elements are supported, except 20
21 the very detailed, descriptive elements in the ‘data description’ part of the standard. Data 21
22 is stored in a relational database (at present MS-Access) and all the web pages are static 22
23 HTML-documents, produced by an RDB-to-HTML application (developed by KMS-DK). 23
24 Future developments encompass XML transfer procedures between heterogeneous systems, 24
25 and change over from CEN to the ISO range of geographic standards. 25

26 In Greenland, the metadata-service is based on the same concept as the Danish one. A sim- 26
27 ilar service for the Faeroe Islands has been considered. 27

28 3.4. Finland 29

30
31 The National Land Survey (NLS) has been responsible in the past decade for the maintenance 31
32 of the National Geographic Dataset Directory (on-line see: <http://www.nls.fi/ptk/aineistot>). 32
33 Finland has no national metadata standard. For the public administration, Finland has a rec- 33
34 ommendation describing data products called ‘JHS 137 Data Product Description’ and an 34
35 additional part, specific for GI, called ‘JHS 137A Data Product Description – Geographic 35
36 Information’. Presently the Geographic Dataset Directory contains descriptions of over 300 36
37 geographic datasets of approximately 20 national organisations and more than 40 local and 37
38 regional authorities. The dataset description in the National Geographic Dataset Directory 38
39 consists of HTML-files, which are automatically generated from the ASCII source files. 39

40
41 Currently the Finnish Environment Institute (FEI) is developing a metadata system specifi- 41
42 cally for the environmental sector. The development work is carried out in collaboration with 42
43 the Statistics of Finland and NLS. The FEI metadata-service will be able to communicate with 43
44 the Statistics Finland’s metadata service and national geographic dataset directory services in 44
45 the future, possibly using XML. 45

	Major Finish players in the GI field	Web site	
1	Finland Post Ltd.	http://www.posti.fi/	1
2	Finnish Environment Institute	http://www.vyh.fi/syke/syke.html	2
3	Finnish Forest Research Institute	http://www.metla.fi/	3
4	Finnish Game and Fisheries Research Institute	http://www.rktl.fi/	4
5	Finnish Geodetic Institute	http://www.fgi.fi/	5
6	Finnish Maritime Administration	http://www.fma.fi/	6
7	Finnish Meteorological Institute	http://www.fmi.fi/	7
8	Finnish National Road Administration	http://www.tieh.fi/	8
9	Finnish Population Register Centre	http://www.vaestorekisterikeskus.fi/	9
10	Forest and Park Service	http://www.metsa.fi/	10
11	Geological Survey of Finland	http://www.gsf.fi/	11
12	Ministry of Justice	http://www.om.fi/	12
13	National Land Survey of Finland	http://www.nls.fi/	13
14	Statistics Finland	http://www.stat.fi/	14

16 3.5. France

17
18 Key players in the provision of geographic data are the National Statistical Institute (INSEE) 18
19 in charge of gathering statistics at the commune level, the National Tax Office (DGI), respon- 19
20 sible for the cadastre, the National Geographic Institute (IGN) for topographic mapping and 20
21 the military hydrographical service (SHOM) carrying out nautical charting and several local 21
22 governments. 22

23 The DGI launched in the early 90's a Digital Cadastral Plan (PCI) project to digitise its 23
24 paper-based holdings through a series of partnerships with local authorities and utilities. This 24
25 programme has been developed for the main urban areas and agglomerations but also in some 25
26 departments such as Vendée or Haute-Savoie. Given the size of the task, over 100 million 26
27 land parcels on 560 000 sheets, recently a decision has been taken to expedite the process by 27
28 moving to raster images of most of the cadastral sheets with seed points for each land parcels. 28

29 The IGN has traditionally been responsible for the topographic maps at 1 : 25 000 scale 29
30 or less. As an increasing number of digital products have become available, the government 30
31 commissioned a thorough review of the IGN operations in April 1999. The result of this, the 31
32 'Lengagne' report of September 30, 1999 (on-line see: <http://www.cnig.fr>), recommended to 32
33 focus on the completion and maintenance of national digital coverage for key datasets (i.e., 33
34 Référentiel Géographique à grande Échelle, RGE, considered as the large-scale dataset for 34
35 France) in partnership with the relevant organisations. 35

36 February 19, 2001, the French government issued an inter-ministerial decision following 36
37 the instruction of the Lengagne report. Among the nine items one can find the assignment 37
38 to IGN of the task of producing, integrating and distributing by 2007 the RGE composed 38
39 datasets, containing four components. These are: imagery (i.e., ortho-photo colour, 50 cm 39
40 pixel, 1m accuracy in rural area up to 12.5 pixel, 25 cm accuracy in dense urban area), topog- 40
41 raphy (in its wider sense with a 1 m accuracy), land parcels and addresses. There is also a 41
42 clear commitment to set strong relationships between DGI and IGN for the joint production 42
43 of seamless version of the raster cadastral maps over the country and also about the integration 43
44 of the vector cadastral map where agreements have been signed by DGI and local authorities 44
45 or facility management companies. Beyond its role of integrating data from diverse sources 45

1 including local government, IGN has the remits to facilitate the dissemination of RGE and the
2 development of value adding services using the RGE data. The last decision is the signature
3 of a contract between IGN and the government setting objectives for IGN with the appropriate
4 governmental grant. The consequence of the agreement is that the RGE will be made avail-
5 able to users at a cost including the marginal cost of reproduction and a licence fee. This is to
6 maximise the number of users and minimise the costs for the user, yet enabling a long term
7 sustainable funding of the RGE creation and maintenance.

8 At present, the situation in relation to a GI infrastructure appears as follows:

- 9
10 ● core datasets: the RGE is the answer to core dataset requirements at 1 m accuracy. Socio-
11 economic and topographic data with 10 m and 100 m accuracy are in place including raster
12 seamless datasets of the 1 : 25 000 topographic maps of France. Large urban areas and few
13 departments are already covered by core datasets. These core datasets will be made avail-
14 able to populate the RGE concepts. Simplified street surveys with few cm accuracy are
15 now considered to be in the RGE concept in dense urban areas. Main current issues are the
16 setting up of agreements between IGN in its role of integrator for the RGE and contributors
17 to the RGE with data they have or will fund to meet their own requirements;
- 18 ● co-ordination: GI policies are co-ordinated through the National Council for Geographic
19 Information (CNIG), which is an inter-ministerial council established in 1985 with repre-
20 sentatives from all major government departments and GI-related agencies, and AFIGÉO,
21 the French association for GI which includes representatives from the user community and
22 the private sector. The February 19, 2001 inter-ministerial decision clearly states the role
23 of CNIG to voice the user requirements for core datasets including the RGE. A significant
24 co-ordinating role in matters of information policy is however played directly by the gov-
25 ernment through the office of the Prime Minister and the Ministry of Planning. An action
26 Plan for the Information Society (PAGSI) was presented in January 1998. In conjunction,
27 the French government funded the creation of information systems for departmental offices
28 of the ministries (Système d'information territorial) in which there are plans to provide the
29 10 m accuracy core datasets quoted above;
- 30 ● ENv 12657 Geographic Information – Metadata, the adopted CEN standard for metadata
31 has been published by AFNOR as an experimental standard in August 1999 asking for
32 comments by May 2002. Regardless the MEGRIN or the GEIXS activities (that are also
33 European, although hosted in France) most of the activities in France related to metadata
34 are co-ordinated by CNIG.

35 Under the CNIG umbrella, several Metadata activities took place, as:

- 36
37 ● publishing of an information sheet on metadata for the governmental departments and lo-
38 cal governments (on-line see [http://www.cnig.fr/commun/proserv/ficheamo/fserie3/fiches/](http://www.cnig.fr/commun/proserv/ficheamo/fserie3/fiches/23catal.htm)
39 [23catal.htm](http://www.cnig.fr/commun/proserv/ficheamo/fserie3/fiches/23catal.htm));
- 40 ● development of a cataloguing tool based on the CEN experimental standard available on-
41 line with CERTU (Centre d'Études sur les Réseaux, les Transports, l'Urbanisme et les
42 constructions publiques, on-line see [http://www.certu.fr/sitcert/geomat/minisi01/pg_home.](http://www.certu.fr/sitcert/geomat/minisi01/pg_home.htm)
43 [htm](http://www.certu.fr/sitcert/geomat/minisi01/pg_home.htm));
- 44 ● updating a catalogue of GI sources available in France (on-line see [http://www.cnig.fr/](http://www.cnig.fr/commun/proserv/source/source.html)
45 [commun/proserv/source/source.html](http://www.cnig.fr/commun/proserv/source/source.html));

- 1 ● raising awareness and assistance to local governments to set up ‘Region wide’ metadata 1
- 2 servers (Vendée, Provence Alpes Cotes d’Azur, Picardie, etc.); 2
- 3 ● setting up of a metadata service related to the coastal zone within the frame of one of CNIG 3
- 4 working parties. 4

5 3.6. *Germany* 5

6 In Germany, collecting and disseminating Geographic Information is mainly a task of the 16 6
 7 Länder (states) and not of the Federal State. On behalf of the Länder the Federal Institute of 7
 8 Cartography and Geodesy (Bundesamt für Kartographie und Geodäsie, BKG) is maintaining 8
 9 a Metadata Information Server for all available topographical maps, datasets, and images. It 9
 10 is based on the CEN Metadata Standard and an Oracle database. The emerging ISO Standard 10
 11 19115 Geographic Information – Metadata will be used in the future. By use of Internet, a 11
 12 possibility was created to allow all responsible institutions to update their parts of the metadata 12
 13 information and to have a central server for Germany for customers by accessing the German 13
 14 Metadata Server (on-line see <http://www.atkis.de>). 14
 15 15
 16 16
 17 17

18 3.7. *Iceland* 18

19 The National Mapping Agency of Iceland has adopted the Danish metadata concept. The 19
 20 service is in Icelandic. 20
 21 21

22 Iceland has a very ambitious national GIS co-ordination body, called ‘LÍSA’. It is a venue 22
 23 of co-operation in the field of geographical database development and has become a forum 23
 24 for discussion and development of GIS in Iceland. In addition, the system stores and uses 24
 25 spatial information. LÍSA’s main task is to promote co-operation between partners dealing 25
 26 with geographical information systems and encourage joint use of datasets by promoting: 26
 27 27

- 28 ● creation of joint rules of data transfer and communication; 28
- 29 ● technical co-ordination; 29
- 30 ● creation of standards for geo-coding; 30
- 31 ● definition of copyright and related rights of digital data; 31
- 32 ● availability of data and public access to it; 32
- 33 ● Iceland’s interests in international co-operation; 33
- 34 ● education, courses and general promotion of GIS; 34
- 35 ● forum for exchange of ideas and discussion between members; 35
- 36 ● information dissemination to members and others about LÍSA’s activities by reporting on 36
 37 LÍSA’s work in conferences and meetings, issuing a monthly newsletter ‘LÍSUFRETTIR’ 37
 38 and creating an information centre at LÍSA’s secretariat. 38

39 LÍSA’s activities is distributed over working groups for: 39
 40 40

- 41 1. inventory of the current status of geographical datasets in Iceland; 41
- 42 2. terminology, i.e., translation of words and concepts on GIS; 42
- 43 3. communication and standardisation, to get information about how GIS-partners transfer 43
 44 data today, what problems they have in communicating and make suggestions for a better 44
 45 data transfer; 45

1 4. technical aspects in GIS, which is founded by the IT sector board of the Icelandic Council
2 for Standardisation in co-operation with LÍSA, to structure future care for Iceland's
3 interests in international work within the field of GIS, especially standardisation.

4 3.8. Ireland

5 The national spatial data organisations in the Republic of Ireland are:

- 6 • Ordnance Survey Ireland (OSI, on-line see: <http://www.megrin.org>) for topographic map-
7 ping and aerial imagery;
- 8 • Geological Survey Ireland (GSI) for geological data;
- 9 • Environmental Protection Agency (EPA) for environmental data.

10 The Republic of Ireland actively participates in the regional (European) spatial data organisa-
11 tion MEGRIN GIE. In addition, other regional participation exists in:

- 12 • GDDD/LaClef: MEGRIN metadata service;
- 13 • EEA WebCDS: European Environmental Agency on-line metadata service (on-line see
14 <http://www.mu.niedersachsen.de/system/cds/>);
- 15 • GEIXS: metadata service run by EuroGeoSurveys, the representative body of European
16 Geological organisations;
- 17 • ESMI: European Spatial Metadata Infrastructure, distributed metadata service;
- 18 • European Committee for Standardisation (CEN/ISSS) Multimedia Metadata Initiative
19 (MMI) Dublin Core DC Workshop.

20 Currently, metadata 'discovery' is available at a national level. The Geospatial Information
21 Directory (GeoID), a pilot metadatabase for Ireland represents the most complete information
22 available regarding public and private sector data. Besides, Ordnance Survey Ireland has an
23 in-house metadata service based on CEN ENv 12657. Ordnance Survey Ireland datasets are
24 currently described within the MEGRIN GDDD service at European level, which in turn is
25 available through the ESMI service. As part of MEGRIN, Ordnance Survey Ireland is actively
26 involved in the development of the GDDD service within the LaClef project and plans to
27 implement the LaClef Fundamental Metadata, a GI core metadata description.

28 3.9. Netherlands

29 The main actors dealing with geographic information in the Netherlands are:

- 30 • Topographic Service in the Netherlands (TDN) providing datasets for the topographic maps
31 at scales 1 : 10 000, 1 : 25 000, 1 : 50 000, 1 : 100 000, 1 : 250 000 and 1 : 1 000 000. Since
32 2004 the Netherlands Topographic Service and The Netherlands Cadastral Office has been
33 merged into one NMA;
- 34 • Dutch Cadastre maintaining the national cadastral dataset, being a continuous topological
35 dataset for the whole country of around 50 Gbyte with about 250 M vectors;
- 36 • Survey Department of the ministry of Traffic and Water Control, providing mainly road
37 databases and height information in the Netherlands;
- 38 • National Co-operative Foundation for the Large Scale Base Map of the Netherlands (Lan-
39 delijk SamenwerkingsVerband, Grootchalige Basiskaart van Nederland, LSV-GBKN) in

1 which co-operates the National Cadastre of the Netherlands, Society of Municipalities, 1
2 Utility Company Organisations and Union of Water Control Boards to maintain the large 2
3 scale topographic base map of the Netherlands; 3

- 4 ● Alterra, the institute collecting and disseminating agricultural, forestry and soils informa- 4
5 tion; 5
- 6 ● Council for Geographic Information (Stichting Overlegorgaan voor Vastgoedinformatie) 6
7 Ravi (on-line see <http://www.ravi.nl>) in which governmental bodies co-operate as min- 7
8 istries, provinces and municipalities but also utilities, cadastre, research institute NITG- 8
9 TNO, and the Chamber of Commerce. In addition (Dutch representatives of), GI produc- 9
10 ers, GI software houses, consultant bureaux in the field of GI, private land-surveying and 10
11 land-developing companies represent the private sector in the Ravi. The aim of the Ravi 11
12 is to promote the use and development of the Geographic Information Infrastructure, GI 12
13 Standardisation and GI policy development; 13
- 14 ● Netherlands Normalisation Institute (NEN) for development of (also GI) standards for 14
15 Dutch users; 15
- 16 ● private members of Ravi as listed above. 16

17 In 1996, on initiative of the Ravi project group on standardisation, the first phase of a 17
18 national GI metadatabase was developed by Geodan, called Idéfix, to make the many digital 18
19 geographic databases that existed in the country available to all users. Idéfix provided only a 19
20 metadata service on the Internet for the participating bodies. The system used the CEN prEN 20
21 12657 (the predecessor of the ENv 12657) as a basis (and by doing so, the Netherlands was 21
22 the first country applying this standard), together with specific Dutch requirements. Idéfix was 22
23 initiated by a development fund from the Ministry of Economic Affairs and was based imple- 23
24 mented in an MS-Access database using 15 pre-defined keywords and free text searches as 24
25 well as range searching. 25

26 In 1997, the system was named NCGI and started to operate privately. Since then, an inter- 26
27 nal investigation was performed on the operation of the system, resulting in a redesign in 2000 27
28 of the NCGI-site (on-line see <http://www.ncgi.nl>). The concept of the new design consists of: 28

- 29 ● application of a central search engine (capacity 1800 searches/hour) by visiting circularly 29
30 all connected providers, available through the Internet providing the same search possibili- 30
31 ties as in Idefix; 31
- 32 ● providing a central list of participating bodies that is updated continuously by the system; 32
- 33 ● de-central metadata systems with appropriate servers. The geographic data(bases) are not 33
34 available on the server: they reside on the participating institute's server. This server can be 34
35 linked to the NCGI-site (on the providers' request) to download data directly; 35
- 36 ● use of a ANSI Z39.50-1995 (ISO 10163-1995) protocol and metadata standard ENv 12657 36
37 (with specific changes as to the obligation to use certain elements). Also the system will use 37
38 a catalogue service and apply data integration by web mapping as specified by OpenGIS®; 38
39 ● de-central data protection by using CORBA servers and the allowance by the provider for 39
40 certain groups of users to log on its system. 40

41
42 In 2004 a project was started to revise the national standard NEN 3610 "Terreinmodel 42
43 Vastgoed" into the "Basismodel Geo-informatie", based on ISO 19109 – Geographic infor- 43
44 mation – Rules for Application Schemas. The revised NEN 3610 contains a feature catalogue, 44
45 a model structure and transfer model for the transport and feature definition of geographic data 45

1 within the Netherlands, based on XML/GML. The commenting process for this standard run
2 till July 1, 2005 (when this book was in press).

3 3.10. Norway

4
5 Within the framework of the National Geographic Information Centre (NGIS), ‘Statens
6 Kartverk’ (Norwegian Mapping Agency), Norway is setting up a system called ‘Geovekst’
7 (English: Geo-Growth), aiming at the co-operation between national and local government
8 (primarily at county level, but open to municipality level). In this way, it is ensured that national
9 and international standards are implemented and that procedures for co-operation on all
10 levels are optimised.

11 A prototype of a national spatial data catalogue (in Norwegian) is presented on the Internet.
12 This catalogue, in its present status, is primarily aimed at in-house products of Norwegian
13 Mapping Agency, but also ‘Geovekst’ projects will be shown.

14 One of NGIS outspoken goals is to implement the ISO range of geographic standards.
15 Norway has a leading role in the development of these standards, and NGIS expects to let the
16 expertise gained internationally give the Norwegian geographic society a great leap forward.

17 3.11. Poland

18
19 The Surveyor General of Poland is responsible for the creation and management spatial data
20 but several other institutes contribute to the scientific aspects and standardisation in Poland.
21 Therefore the Polish organisations dealing with spatial data are:

- 22 ● Head Office for Geodesy and Cartography, managing all aspects of spatial data administra-
23 tion for the whole country (e.g., cadastral data, basic map data for civil use, maintenance of
24 the reference system, etc.);
- 25 ● Polish Society for Spatial Data dealing with scientific and practical aspects of geographic
26 information management and use;
- 27 ● Committee of Geodesy of the Polish Academy of Sciences, Section of Geo-informatics
28 studying geographic information methodology;
- 29 ● Polish Standardisation Committee, Commission for Standardisation No. 255 ‘Geodesy
30 in architecture’, Sub-commission on Geographic Information, elaborating of Polish Stan-
31 dards, promoting of European and International Standards (this committee also represents
32 Poland in CEN/TC 287 and ISO/TC 211).

33
34 Now, no ‘de jure’ (so-called ‘norms’) metadata standards exist in Poland. However, there
35 are several technical regulations issued by the Head Office for Geodesy and Cartography
36 operating as ‘de facto’ standards. The most important amongst them is the regulation K-1,
37 which can be recognised as a metadata standard for the content of the basic map of Poland. It
38 comprises the following main issues:

- 39 ● definition, goals and functions of the basic map;
- 40 ● projection, system of co-ordinates and structure (partitioning in sections) of the basic map;
- 41 ● specification, scales and content of the basic map;
- 42 ● catalogue of objects and their symbols.

43
44 It is planned to adopt the CEN standard prEN-ISO 19115 Geographic Information – Metadata
45 in the near future (together with other CEN standards).

3.12. Romania

Spring 1997, on the initiative taken by a group of members of the Romanian Academy of Sciences, the 'Forum for Information Society' was created. The role of the Forum is to highlight theoretical and practical aspects of Information Society, to help to harmonise different views and initiatives, to inspire efforts and push them up for and with actors capable to determine the building of a knowledge-based society in Romania. Having in mind the creation of an Information Society in Romania, in 1997 the Romanian Government adopted the Government Decision on the National Information Strategy (NIS), approved in 1998. The NIS included an Action Program regarding the development and large-scale use of information technologies in Romania to aim at:

- national information infrastructure in the short run (till 2000) for public administration and develop a national information communication technology (ICT) industry;
- extend the applications in the medium and long-run (by 2005).

To achieve this, the National Agency for Communications and Information (NACI) is founded under Romanian Government and works as a professional body for central public administration and has the mission to assure the elaboration, implementation, monitoring and evaluation of the politics in the field of communication and information.

Organisational framework in the GI-field

The National Office of Cadastre, Geodesy and Cartography (NOCGC) is a public institution to organise, manage and co-ordinate the cartography, geodesy, photogrammetry, remote sensing and cadastral activities at national level and following the legal directives in these domains. The office is responsible for the development of standards, transfer mechanisms, in the field of Geodesy and Cartography and controls the work of the County Offices of Cadastre, Geodesy and Cartography (COCGC) and the Institute of Geodesy, Photogrammetry, Cartography and Cadastre (IGPCC) in Bucharest, financed from state budget.

3.13. Russia

In the nineties, the Russian Information Society is created. Each member of this Society will be able to obtain complete and actual information, including geographic information, at any point of geographical space, by means of Internet using electronic libraries of content, including electronic map libraries. Completeness, methods and form of geographic information, temporal factors of the information supply can be considered as the main criteria for evaluating quality of the electronic geographic information resources. In the process of creating the electronic geographic information resources, standardisation in the area of geographic information technologies plays the main role. The Institute for Information Problems (of the Russian Academy of Sciences) and 29 Defence Research Institute are elaborating theoretical fundamentals of the Global Geographic information Mapping (GCM).

The theoretical basis of developing the National Standard for digital and electronic maps in Russia rests upon the State System for Standardisation of Russian Federation that had been put into operation since 1993 by the State Standard of Russian Federation GOST R 1.0-92. This Standard determines purposes and tasks of the standardisation process, main principles

1 of standardisation in Russia, categories of normative documents and types of standards, main
2 theses on the international co-operation in the area of standardisation, application of standards
3 and technical terms, and state supervision of the observance of standards. The regulations of
4 the State System for Standardisation of the Russian Federation are obligatory to be guided by
5 for all enterprises, unions, joint-stock ventures, etc. (irrespectively of their forms of property
6 and subjection), private business, technical committees on standardisation, ministries (depart-
7 ments) and other authorities of the Russian Federation and scientific societies.

9 *Procedure for developing standards*

11 In Russia, the development of state standards is being carried out by Technical Committees
12 (TC) in accordance with assignments of state standardisation plans of Russian Federation, TC
13 working plans and contracts on the development of standards. The development of standards
14 is guided by the legislation of Russia, State System for Standardisation of Russian Federation
15 and other normative documents. It also takes into account the documents of international and
16 regional standardisation organisations, results of scientific and practical researches, patent
17 investigations and other information about the achievements of domestic and foreign science
18 and techniques. Then, the TC sets the deadline for all work and determines a sub-committee
19 in which the standard is to be developed, or a working group for developing the standard.
20 The development of standards for geographic information in mapping is being carried out
21 by TC 22 – Information Technologies including the Sub-committee 051 ‘Geo-information
22 Technologies’ (chaired by A.I. Martynenko). This Sub-committee deals with standardisation
23 in the field of GI, based on methods of acquisition, storage, analysis, displaying, processing
24 and retrieving spatial data for the digital mapping.

26 *International scientific co-operation*

28 International co-operation in the area of standardisation is being carried out together with
29 international and regional standardisation organisations, as well as on the base of bi- and
30 multi-lateral agreements with correspondent foreign authorities. The edicts of the President
31 of Russian Federation and decisions of the Government of Russia, international commissions
32 on economic and scientific co-operation and Russia’s participation in the activities of regional
33 and international standardisation organisations are regulating such co-operation. The interna-
34 tional co-operation between Russia and international standardisation organisations includes
35 collaboration in the development of international and regional standards and implementation
36 of these standards in business and interrelations with partner countries. The co-operation in
37 the area of standardisation, both bi- and multi-lateral, includes the joint development of stan-
38 dards, fulfilment of joint scientific researches, information interchange, mutual consultations,
39 education, etc.

40 The 29 Defence Research Institutes and the Central Research Institute of Geodesy, Aerial
41 Survey and Cartography carry out the work on standardisation in the field of digital mapping
42 in Russian Federation. Main efforts are directed towards the development of branch standards.

43 The work on standardisation in the area of terms and definitions of electronic and digital
44 maps (including metadata) are also carried out in co-operation with cartographic boards of
45 Ukraine and Belarus.

1 **Description of GOST R 51353-99** 1

2
3 *'Geoinformatic Mapping – Metadata of Electronic Maps: Composition and Content'* 3

4
5 TC 22 also includes committees on terminology, telecommunication and information trans- 5
6 fer, programming languages and system program interfaces, computer graphics and image 6
7 processing, encoding audio, image, multimedia and hypermedia information, automatic iden- 7
8 tification, methods and tools for data acquisition. Within the Sub-committee on Standards 8
9 for Geographic Information Technologies, the State Standard of Russian Federation GOST R 9
10 51353-99 'Geoinformatic Mapping – Metadata of Electronic Maps: Composition and Con- 10
11 tent' was developed. In November 1999, the Russian Federation State Committee on Stan- 11
12 dardisation and Metrology adopted this standard. The areas of application of GOST R 51353- 12
13 99 are information supply of state authorities, communication systems and tools, business, 13
14 transportation, navigation, ecological monitoring, state and private cartographic enterprises. 14
15 The need in development of GOST R 51353-99 grew from the necessity of: 15

- 16 ● acquisition of metadata about electronic (digital) maps and information used for creation 16
- 17 and storage of electronic (digital) maps; 17
- 18 ● effective application of metadata by customers for the acquisition, storage, analysing, 18
- 19 processing and transfer of geographic information; 19
- 20 ● increasing quality of electronic (digital) maps; 20
- 21 ● information compatibility of control, navigation systems and GIS; 21
- 22 ● transfer of digital map data and metadata both inside Russia and world-wide. 22

23
24 GOST R 51353-99 establishes requirements for the composition and content of common 24
25 metadata as well as metadata of geodetic, gravimetric, photogrammetric and cartographic 25
26 information used for creation, updating and application of digital maps. Electronic (digital) 26
27 maps are one of multiple forms of representing spatial data. The statements in this Standard 27
28 are liable to application by all authorities and organisations located in Russian Federation, 28
29 independently of their form of government, that are engaged in acquisition, systematisation, 29
30 analysis, processing and transfer of spatial data, creation and application of electronic (digi- 30
31 tal) maps, organisation of metadatabases and electronic (digital) cartographic databases. This 31
32 Standard refers to the following State Standards: 32

- 33 ● GOST 34.003-90 Automated Systems. Terms and Definitions; 33
- 34 ● GOST 22268-76 Geodesy. Terms and Definitions; 34
- 35 ● GOST 24284-80 Gravitational and Magnetic Exploring. Terms and Definitions; 35
- 36 ● GOST 23935-79 Air Photo Cameras and Photo Survey. Terms and Definitions; 36
- 37 ● GOST 21002-75 Photo-topography. Terms and Definitions; 37
- 38 ● GOST 21667-76 Cartography. Terms and Definitions; 38
- 39 ● GOST 28441-90 Digital Mapping. Terms and Definitions; 39
- 40 ● GOST R 50828-95 Geoinformatic Mapping. Spatial Data, Digital and Electronic Maps. 40
- 41 Common Requirements; 41
- 42 ● GOST R 52055-2003 Geoinformatic Mapping – Spatial Models of Terrain. General Re- 42
- 43 quirements. 43

44 Metadata of digital maps is data describing contents, spatial extents, quality (accuracy, com- 44
45 plexity, consistency and actuality) and other characteristics. This Standard operates with the 45

1 following terms and definitions: Common terms – according to GOST 34.003, GOST 22268, 1
 2 GOST 24284, GOST 23935, GOST 21002, GOST 21667, GOST 28441 and GOST R-50828. 2

3 GOST R 51353-99 provides cartographic representation of the real world and creation of 3
 4 Digital Earth that is based on strict geodetic base by means of using millions air- and space 4
 5 high-resolution images, electronic maps of various themes and scale, and textual reference 5
 6 information. GOST R 51353-99 allows synthesising the digital (electronic) image of the earth 6
 7 as a spatial and temporal representation of our planet. This representation is based on math- 7
 8 ematical and semantic modeling of spatial data changing dynamically and is realized as the 8
 9 aggregate of distributed electronic cartographic libraries (Electronic Maps Libraries) united 9
 10 in whole system by means of telecommunication technologies. 10

11 **3.14. Spain** 11

12 The national spatial data organisations operating in Spain are: 12
 13 13

- 14 • National Geographic Institute (Instituto Geográfico Nacional); 14
- 15 • National Centre for Geographic Information (Centro Nacional de Información Geográfica); 15
- 16 • General Directorate for Cadastre (Dirección General del Catastro); 16
- 17 • Geographic Centre of the Ministry of Defence (Centro Geográfico del Ejército, Ministerio 17
- 18 de Defensa). 18

19 Apart there are also several regional spatial data organisations as: 19
 20 20

- 21 • Cartographic Institute of Cataluña (Instituto Cartografía de Cataluña) in Barcelona; 21
- 22 • Grafcan (on the Canary Islands); 22
- 23 • Tracasa (Comunidad Foral de Navarra); 23
- 24 • Municipality of Madrid (Comunidad de Madrid); 24
- 25 • Agencia de Medio Ambiente de Andalucía. 25

26 All organisations work in the field of GI production at different scales and for different pur- 26
 27 poses and applications, so a small overlap exists among all jobs developed by them. 27

28 AENOR, the Spanish organisation for standardisation, is working on the development of a 28
 29 national standard, which includes data definition and metadata structuring. At this level, most 29
 30 of the organisations are represented in AENOR. Besides, there are some minor approaches to 30
 31 metadata, through local projects such as the DIGA National Geographic Institute project and 31
 32 the MERCATOR project (a more academic approach). 32
 33 33
 34 34
 35 35

36 **3.15. Sweden** 36

37 Sweden has for a number of years held geographic metadatabases on at least two levels: 37
 38 38

- 39 • national level being served by Nationella Databaskatalogen operated by Lanmäteriet 39
 40 (NMA); 40
- 41 • county level, some of the regional GIS partnerships has build own catalogue services. 41
 42 42

43 The latest development is a new national service based on a central CEN ENv 12657, based 43
 44 on an Oracle metadatabase and distributed access; the data collection modules are installed at 44
 45 the data producer's sites (on-line see <http://www.megi.lm.se/>). 45

1	3.16. Turkey	1
2	The General Command of Mapping (GCM) is the principal mapping organisation in Turkey	2
3	for the production and distribution of topographic maps required for both national defence	3
4	and development. The technical departments of GCM are:	4
5		5
6	• Geodesy, responsible for the establishment, maintenance and improvement of the National	6
7	Control Networks at horizontal and vertical level but also for Gravity, Magnetic and GPS	7
8	control;	8
9	• Photogrammetry for the photogrammetric dataset production with map-scales ranging from	9
10	1 : 1000 till 1 : 1 000 000;	10
11	• Cartography for map (re-)production and archiving;	11
12	• Information Systems and Support dealing with database creation for topographic data, dig-	12
13	ital elevation models, contour and raster maps;	13
14	• Flight Command Group for aerial photography;	14
15	• Survey Engineering School (for education in surveying and mapping).	15
16	In 1998, a modernisation program was initiated to create a national topographic databases at	16
17	the scales 1 : 25 000 and 1 : 250 000 by automated cartography.	17
18	Other organisations dealing with Geographic Information are:	18
19		19
20	• General Directorate of Land Registry and Cadastre, dealing with large scale cadastral map-	20
21	ping by geodetic and photogrammetric methods;	21
22	• General Directorate of Highways and General Directorate of Forestry for specific map	22
23	types;	23
24	• Private Sector with 4 to 5 big companies for digital photogrammetry, especially to produce	24
25	large-scale digital topographical and ortho-photomaps and DEM's and to design informa-	25
26	tion systems for municipalities.	26
27	On behalf of Turkey's society in the field of GI, CGM has the intention to participate in the	27
28	OEEPE project on 'Topographical Map Production with High Resolution Satellite Images'	28
29	(since 2004, OEEPE has been renamed into EuroSDR, European Spatial Data Research).	29
30	CGM will also participate in other EuroSDR projects such as 'Laser Profiling', 'GPS-INS	30
31	Integration' and 'Interferometric SAR' to improve our digital production capacity.	31
32		32
33	4. Summary and conclusions	33
34		34
35	In summary, there are many issues to be dealt with when developing a European metadata	35
36	service. Generally spoken they are of four levels:	36
37		37
38	• data model standardisation;	38
39	• semantic standardisation;	39
40	• languages;	40
41	• search queries.	41
42	4.1. Data model standardisation	42
43		43
44	It is likely that implementing databases of metadata according to standards will provide infor-	44
45	mation that is more reliable to users and help the data providers by:	45

- 1 ● reducing the duplication of effort which currently exists in different databases; 1
- 2 ● increasing access to their data descriptions, so increasing their possible sales (distributed 2
- 3 systems need to agree on a common standard transfer format for the on-line transfer of 3
- 4 information); 4
- 5 ● ensuring that suppliers are able to store the same information (whether they choose to do 5
- 6 so is another matter), possibly as a common core set of metadata. 6

7
8 Unfortunately, there are many metadata standards to choose from! Internationally, ISO/TC 8
9 211 is developing the metadata standard 19115 (which has been replaced in 2003 abandoned 9
10 CEN/TC 287 ENv 12657) and national standards in Europe. Finally, activities such as the 10
11 Dublin Core or the ETeMII recommendations may also provide useful input, as they propose 11
12 a very simple and limited set of metadata, easy to comply with, and easily open to several 12
13 sectors of data, while CEN and ISO are GI focused. 13

14 4.2. Semantic standardisation 14

15
16
17 The use of standard data structures will not necessarily ensure that the metadata is of con- 17
18 sistent quality, completeness and accuracy. Indeed, the quality of the metadata may be 18
19 more important than the data structure, since this is what users will see and use. With- 19
20 out reliable information, users are unlikely to use the service. All data providers and 20
21 system users must have the same understanding of terms. Without this, the search re- 21
22 sults, which are presented to users, will be meaningless and/or incorrect. This means that 22
23 all data providers must either attach standard keywords to their descriptions, or a the- 23
24 saurus mechanism needs to be created to provide a common view of individual imple- 24
25 mentations. The task of harmonisation is likely to be complex, as there is considerable 25
26 scope for differences to occur (for instance, between disciplines, within the same disci- 26
27 pline in different countries, and even between different organisations in the same coun- 27
28 try). 28

29 The need for semantic harmonisation is widespread: for example, there is not yet a standard 29
30 for location references, to combine with the geographic coded data and geographic informa- 30
31 tion. Moreover, where standards do exist, they are not always implemented! 31

32 Europe's experience indicates that a reliable metadata service depends on the quality of the 32
33 data descriptions. This is particularly significant in a multi-national environment. The initial 33
34 data collection exercise raised problems because different organisations had used different 34
35 keywords to describe datasets based on the same data model. This disagreement in choice 35
36 of keywords was significant for complex themes, e.g., 'topography' and 'land cover', while 36
37 straightforward keywords as 'road network' and 'railway network' were generally interpreted 37
38 consistently. This clearly illustrated the importance of having the same understanding of ter- 38
39 minology. 39

40 4.3. Languages 40

41
42
43 To propose a real solution for semantics consistency, the services aiming at covering all Eu- 43
44 rope, cannot be satisfied with only one language. Besides, other critical aspects indicate the 44
45 inadequacy of a uniquely English language service: 45

- 1 ● it may be expected that a fair number of technical experts are sufficiently fluent in English, 1
- 2 but that will not necessarily be the case for all potential users of GI. As it is the wish of 2
- 3 both the European Commission and European organisations to make GI, particularly public 3
- 4 sector in GI, more available to a larger range of users through the INSPIRE project, it is 4
- 5 desirable for the service to develop a friendly interface available in a number of national 5
- 6 languages; 6
- 7 ● for the best semantic comparability between countries using different languages, it is es- 7
- 8 sential that multilingual thesauri and keywords are developed and tested. Above being tools 8
- 9 for ensuring cross-border (and cross-language) metadata consistency, it will allow the easy 9
- 10 creation of multilingual interfaces, and the automatic on-line extraction and translation of 10
- 11 nationally based metadata are investigated. 11
- 12 12
- 13 13
- 14 14

15 4.4. Search queries 15

16 Ideally, the user who is looking for data would like to locate the data he is interested in, 16

17 by pointing at the area covered by the project he is working on. Solving the main seman- 17

18 tic and language issues should allow this possibility. A text based query such as ‘FIND 18

19 objects = roads’ IN area = ‘BENELUX’ ’ would be close to requests expressed in natural 19

20 language. There are a number of ways to develop such a relatively user-friendly search query. 20

21 Knowledge about regions or geographical locations can be stored by the way of geographical 21

22 keywords. Different relatively common solutions for look-up tables have to be considered, 22

23 when on the pan-European level, each having its strengths and weaknesses according to spe- 23

24 cific approaches: 24

25 25

26 26

27 27

- 28 1. geographical co-ordinates, based on a unique geodetic system, such as EUREF; 28
- 29 2. administrative units; 29
- 30 3. postal codes; 30
- 31 4. addresses. 31
- 32 32
- 33 33

34 Acknowledgement 34

35 35

36 We would like to thank the many scientists and commission members in Europe who provided 36

37 us with the information on metadata activities in their countries and regions, which we have 37

38 used to compile this overview (see list of contributors below). 38

39 39

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41 both the Department of Geodesy and the Research Institute of Housing, Urban and Mobility 41

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43 possible. 43

44 44

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53	Ravi, Netherlands	http://www.ravi.nl	53
	Statistics Finland	http://www.stat.fi/	
	Swedish Metadata Service	http://www.megi.lm.se/	

URL's in this chapter are accessed in May, 2005, unless otherwise stated in the text