# 2004, the beginning of a new era for European standards

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## Summary

In the Geo ICT environment, access to different datasets and grid computing becomes more applicable using the Internet for cross-border datasets. However, still, in many applications, one suffers from the possibility the transfer meaningful data to each other's applications. As early as 1992 CEN/TC 287 recognised this problem and started to develop a set of standards for the transfer of geographic information. With the beginning of the work by ISO/TC 211 and due to the Vienna Agreement between CEN and ISO, CEN/TC 287 finished its 1995 Work Programme in 1999 and left new items to be developed to ISO/TC211; CEN/TC 287 went 'dormant' in 1999, awaiting the outcome of ISO/TC 211.

Now that ISO/TC 211 has issued about 20 standards for Geographic Information transfer and management, the time has come to harmonise the CEN/TC 287 standards, which are contemporary still obligatory for the 20 CEN-members, with the ISO standards. Following the CEN procedures CEN/TC 287 has been revived (something that is rather unique within the CEN) under chairmanship of the author and the secretariat of the Netherlands normalisation institute NEN.

This article gives the state of the art for the European standardisation with a short introduction to the history of CEN/TC 287 and the presently involved, international players in Europe in the field of geographic information and a rationale, seen from the European perspective, to start the harmonisation of the CEN and ISO geographic information standards, based on the goals of the European INSPIRE project and the wish of many CEN members to go for the international standards.

This will be followed by the results of the first CEN/TC 287 meeting in Delft after the revival of CEN/TC 287:

- to abandon the existing CEN/TC 287 standards by a review process;

- to implement the ISO standards for CEN-members, either as the ISO standards exists, or as a subset of the ISO standard, or add specific European aspects to the ISO standard. The first situation will be achieved by an UAP, while in the other two cases a Working Group will be established to develop this;

- to set up a Working Group to develop specifications for the INSPIRE project;

- to initiate a Ad-hoc Group 'Outreach' for the promotion of the application the new CEN standards and as well as to promote training for their use.

So, all in all, 2004, the year for the review process and the UAP, will be an exiting year for the European standards arena.

# History in European GI standards development

Geographic Information (GI) is often perceived as accessible for experts in that field only and GI standardisation was originally only considered as a national concern. In 1989, AM/FM European Division organised a workshop in Montreux, dealing with transfer standards and that workshop was an example of this statement. It also showed that the challenge was national or discipline specific at the time:

- national solutions presented there were:
  - National Transfer Format (NTF) from the United Kingdom;
  - SUF (Standaard UitwisselingsFormaat) in the Netherlands later becoming NEN 1878;
- discipline-oriented presented were:
  - 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 [DIGEST, 2003].

#### CEN

Following this, in 1991, on proposal of AFNOR (Association Française de Normalisation, [AFNOR, 1992], a specific Technical Committee at the European level within the European Committee for Standardisation (CEN, Comité Européen de Normalisation) was set up: CEN/TC 287 - Geographic Information [CEN, 1992]. The technical committee finished its work in 1999 resulting in a set of ENV (European experimental standards) in the field of Geographic Information (see table 1 and 2).

CEN/TC 287 was in operation from 1992-02 until 1999-09, when it was recorded as 'dormant' by the CEN Technical Board. During this dormant period the SNV (Schweizerische Normen-Vereinigung) took over the responsibility from AFNOR for the CEN/TC 287.

#### EuroGeographics

CERCO (Comité européen des Responsables de la Cartographie Officielle) was the European forum for the official National Mapping Agencies (NMAs). In co-operative activities of exchanging information on mutual problems and in collaborative initiatives towards a better integration of the products of its members, CERCO depended on periodic assemblies and working groups, from its start in 1980. In 1991, CERCO created its Permanent Technical Group to conceptualise a Multi-purpose European Ground Related Information Network (MEGRIN). In 1993, 18 CERCO's National Mapping Agencies decided to create the MEGRIN Group, which further developed into the GIE MEGRIN (Economic Interest Group).

CEN number	Name
ENV 12009: 1997,	Geographic Information - Reference Model <sup>1</sup> ;
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

Table 1. Published European norms

1: ENV stands for European Norme Vorläufig (an combination of an English, French and German word, the three official languages within the CEN) representing a temporal CEN standard.

CEN number Name
CR 12660: 1998, Geographic Information - Processing - Query and update: spatial aspects;
CR 13425: 1998, Geographic Information - Fundamentals - Overview;
CR 13435: 1998, Geographic Information - Vocabulary;
CR 13568: 1999, Geographic Information - Conceptual schema language.

#### Table 2. Published European reports.

As of first January 2001, CERCO and MEGRIN decided to fuse into EuroGeographics [Eurogeographics, 2003] composed of more than 30 European NMA's. Metadata is a central activity in their developments.

#### EC DG XIII

In 1990, the DG XIII (Directorate General XIII, in charge of Telecommunications, Information Market and Exploitation of Research) of the European Commission (EC) organised a workshop in Brighton, U.K., on the activities that the Commission could undertake in the field of Geographic Information. (DG XIII is now renamed to DG Information Society with slightly different remits). At the meeting, there was consensus on the possible benefits that could be gained by the Geographic Information economical sector from the creation of a European umbrella organisation. A team of four prominent experts worked between 1991 and 1993 to investigate the feasibility, desirability and practical details of creating such an organisation.

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

In the last decade, the DG XIII of the EU (European Union) has set up framework programmes for the stimulation of the use of digital techniques and is now executing the fifth and sixth framework programmes for Research and Development (FP-5 and FP-6) [EU, 2003]. The European Union stimulated the use of digital information by the INFO2000 programme, which was supported by EUROGI for the field of Geographic Information.

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

- stimulating demand and raising awareness;
- exploiting Europe's public sector information;

- triggering European multimedia potential;
- Support Actions.

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

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

#### EUROGI

In 1993, EUROGI, the European umbrella Organisation for Geographic Information, was set up as a consequence of the 1990 Brighton workshop [EUROGI, 1993]. Amongst others, the promotion of standardisation and use of spatial data infra structures using metadata standards are their activities, realising present-day economic development, modern countries demand, accurate and detailed geographic information to maximise the value of promising new geographic technologies such as Global Positioning Systems (GPS) and Geographic Information Systems (GIS). To realise all the potential benefits of geographic technologies at the European level, EUROGI stimulates the harmonisation of required geographical data by European co-operation, complementing the same efforts at the national level, trying to improve:

- transfer and integration of geographic information;
- sharing of experience gained by the numerous national and international geographic technologies research initiatives;
- contribute to the reduction of the costs of geographic information and geographic technologies and to their more widespread use.

The mission of EUROGI is to maximise the effective use of geographic information for the benefit of the citizen, good governance and commerce in Europe and to represent the views of the geographic information community. EUROGI achieves this by promoting, stimulating, encouraging and supporting the development and use of geographic information and technology. EUROGI tries to achieve this mission by the following objectives to:

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

#### ISO/TC 211

It had been widely held, until recently, that ISO/TC 211 (International Organisation for Standardisation (ISO is not an acronym; the International Organisation for Standardisation uses ISO as the Greek word meaning "equal" indicating the fitting of co-operating parties using standards in the exchange of data or tools as in isobar, isoline, isometric, isonomy.)) had absorbed the European Work Programme and that there was no need to have both Technical Committees. This was certainly true in the beginning of ISO/TC 211 but now the International standards are being published, Europe needs to decide how to adopt them and apply them in Europe. In Spring 1995, when ISO was founded, ISO/TC 211 and CEN/TC 287 had agreed that CEN/TC 287 would finish its work programme as it was at the time and would bring new work items to the ISO/TC 211 programme.

Contemporary, ISO/TC 211 has an enormous work programme of 40 work items. However many of them are finished and International standards are published. (see table 3).

ISO nr Name	status	
ISO <u>19101</u> : Geographic information - Reference model	IS	
ISO 19102: Geographic information - Overview	Deleted	
ISO 19103: Geographic information - Conceptual schema language	$\rightarrow \text{DTS}$	
ISO 19104: Geographic information - Terminology	IS	
ISO 19105: Geographic information - Conformance and testing	IS	
ISO 19106: Geographic information - Profiles	IS	
ISO 19107: Geographic information - Spatial schema	IS	
ISO 19108: Geographic information - Temporal schema	IS	
ISO 19109: Geographic information - Rules for application schema	$\rightarrow$ FDIS	
ISO 19110: Geographic information - Feature cataloguing methodology	$\rightarrow$ FDIS	
ISO 19111 Geographic information - Spatial referencing by coordinates	IS	
ISO 19112 Geographic information - Spatial referencing by geographic identifiers	IS	
ISO 19113: Geographic information - Quality principles	IS	
ISO 19114: Geographic information - Quality evaluation procedures	19	
ISO 19115: Geographic information Metadata		
ISO 19116: Geographic information – Resitioning services		
ISO 19117: Coographic information – Postcorling Scivices	→ 13 	
ISO 10119: Coographic information - Encoding	$\rightarrow 13$	
ISO <u>19110. Geographic information</u> - Encouring		
ISO 19119. Geographic information - Services		
ISO 19120: Geographic mormation - Functional standards		
ISO <u>19120/Amendment 1: Geographic information - Functional standards -</u>	NP	
Amendment 1	TD	
ISO <u>19121: Geographic Information - Imagery and gridded data</u>		
ISO <u>19122: Geographic information/Geomatics - Qualifications and Certification of</u>	IR	
Personnel	510	
ISO <u>19123: Geographic information - Schema for coverage geometry and functions</u>	$\rightarrow \text{DIS}$	
ISO <u>19124: Geographic information - Imagery and gridded data components</u>		
ISO 19125-1: Geographic information - Simple feature access - Part 1: Common		
architecture		
ISO <u>19125-2: Geographic information - Simple feature access - Part 2: SQL option</u>		
ISO 19125-3: Geographic information - Simple feature access - Part 3:COM/OLE		
option		
ISO <u>19126: Geographic information - Profile - FACC Data Dictionary</u>	WD	
ISO <u>19127: Geographic information - Geodetic codes and parameters</u>	DTS	
ISO <u>19128: Geographic information - Web Map server interface</u>	$\rightarrow DIS$	
ISO <u>19129: Geographic information - Imagery, gridded and coverage data framework</u>	WD	
(TS)		
ISO 19130: Geographic information - Sensor and data models for imagery and	WD	
gridded data		
ISO 19131: Geographic information - Data product specifications	CD	
ISO 19132: Geographic information - Location based services possible standards	RS	
ISO 19133: Geographic information - Location based services tracking and navigation	$\rightarrow \text{DIS}$	
ISO 19134: Geographic information - Multimodal location based services for routing	WD	
and navigation		
ISO 19135: Geographic information - Procedures for registration of geographical	CD	
information items		
ISO 19136: Geographic information - Geography Markup Language (GML)	WD	
ISO 19137: Geographic information - Generally used profiles of the spatial schema	WD	
and of similar important other schemas		
ISO 19138: Geographic information - Data quality measures	NP	
ISO 19139: Geographic information - Metadata - Implementation specifications	NP	
ISO 19140: Geographic information - Amendment to the ISO 101** Geographic		
information series of standards for harmonization and enhancements		

Table 3. Overview of ISO/TC 211 projects and their status as per November 17, 2003

Legend: IS - International Standard DIS - Draft International Standard FDIS - Final Draft international Standards TR - Technical Report TS - Technical Specification DTS - Draft Technical Specification CD - Committee Draft WD - Working Group Draft RS - Review Summary NP - New Project -> Ready for

#### INSPIRE

The main present driver of the standards implementation is the INSPIRE initiative (Infrastructure for Spatial Information in Europe). INSPIRE is currently being prepared by the Commission to support the availability of spatial information for the formulation, implementation and evaluation of Union policies [INSPIRE, 2003]. It intends to set the legal framework for the gradual creation of a spatial information infrastructure throughout Europe. INSPIRE will initially focus on environmental policy needs but, being a cross-sectoral initiative, will gradually be extended to other sectors (e.g. agriculture, transport, ...) as other interested Commission services participate.

# Market, Environment of GI in Europe

Europe has a strong history in being involved in the original development of geographic information technologies. These were originally centred on GI Systems - toolkits for capturing, storing, accessing and analysing spatial data - but are steadily evolving into Internet ready, openweb ready software components. While Europe is renowned for its research and development capabilities, North America is renowned for its ability to turn the results of this effort into market ready goods.

Political, economical, social, technical, legal and international factors in Europe, between nations within Europe and the EC, as well in relation to international developments, require the standardisation activities as will be proposed by the CEN/TC 287.

#### Political

Political attention of the EC is touching the GI spectrum in several ways, by implementing the new computer and communications technologies for high profile 'business' areas such as:

- homeland defence;
- Spatial Planning;
- Civil Emergencies;
- Environmental issues including Disaster Management for Public Sector Information, R&D funding (through the Sixth Framework 2003-2006);
- major initiatives as GALILEO, GMES providing new spatial data resources;
- the INSPIRE initiative to develop a European Spatial Data Infrastructure (ESDI).

In addition, Europe is in the process of further enlargement, making it is necessary to ensure that new accessing countries have an affordable route to participate in standards development. CEN/TC 287 and will play a substantial role to achieve sustainability and interoperability in the

environment, which includes e-government (See Commission Action Plan communication "eEurope 2005 - An Information society for all").

According to the action plan eEurope 2005, CEN/TC 287 will play a role of implementing the results of eEurope 2005, in support of action line to stimulate the use of the internet through:

"3 (b) government on-line: electronic access to public services, which has an action on member states: essential public data online including legal, administrative cultural, environmental and traffic information;

3 (e) intelligent transport systems, stating the role of eEurope to start new solutions and accelerate their deployment."

#### Economical

With EU legislation in view, it is paramount to have appropriate profiles of international standards in Europe as well as implementation guidelines. The sustainability and interoperability for this work will have a high impact on other areas such as medical emergencies.

#### Social

The majority of 'life events' involve a spatial context, whether this is simply the recording of a physical address or implies a strong interest such as proximity to schools or flood risk. By ensuring that the 'geography' about citizens and their environment, stored in digital form, is recorded in a sufficiently consistent manner, government can deliver enormous social benefits to its citizens. Increasingly, the citizens of the members of the EU are becoming European citizens: consequently, information held about citizens needs to be as consistent as possible across Europe.

#### Technical

When first identified, the term 'geographic information' was proposed (to distinguish this scientific area as being much more than 'digital cartography'). The idea that geographic information is the result of spatial analysis of sometimes totally different types of datasets, that can be portrayed in all kinds of forms, has grown enormously since the original start-up of CEN/TC 287. For example most data has a location and are essential for an eEurope to happen as:

- new technology, especially mobile communication based, that depends on geographic information but delivers the results of spatial analysis and queries in appropriate or technology dependent form: this may be a map but it could be a list of instructions or a simple statement;
- specific markets such as 'environment', 'transport', 'civil emergencies', 'spatial planning', and 'healthcare' not only benefit economically from sharing the cost of data resources but also provide a higher quality, more consistent service to citizens.
- geographic information uses desktop computing, large databases, the Internet or wired data communication services. It is also exploits all forms of mobile technology, including satellite telephone, mobile telephony and mobile Internet. It is collected through mobile computers using GPS positioning technologies (across a range of accuracies, using multispectral earth observation satellites and low-flying aircraft. Every movement event potentially captures a new spatial instance whether this is a location of a specific hazardous load in the highway system or an individual passing through a security check. Other new technologies such as Smart cards and personnel identification are potentially involved in tracking people and goods spatially.

The scope and content of the (recently adopted - June 5, 2002) draft Directive on the re-use and exploitation of Public Sector Information is of considerable importance. The development of this Directive may be traced directly back to the Green Paper on Public Sector Information in the Information Society (DG XIII 1999). Two key principles in these proposals are that all documents held by public sector bodies that are generally accessible should, with certain exceptions, be re-usable for commercial or non-commercial purposes, and that charges for the re-use of documents shall be the same for all [INSPIRE, 2002].

# Present status of European GI standardisation

Following the proposal CEN/Technical Board decision, numbered BSI IST/36, the activity of CEN/TC287 on Geographic Information will be revived to achieve the harmonisation of CEN/TC 287 standards, developed in the nineties (1992-1999) and ISO/TC 211 (Geographic Information/Geomatics) suite of standards [ISO, 2003] developed since 1995 (often indicated by ISO 191xx) under the secretariat of NEN (the Netherlands Normalisation Institute) from May 2003 onwards.

## Scope of the new CEN/TC 287

At its first meeting in Delft (NL), after the revival of CEN/TC 287, the TC decided to formulate a business plan with a scope as indicated above (The scope as formulated in Resolution 40 of the Delft meeting of CEN/TC 287 in November 2003):

"Standardisation in the field of digital geographic information for Europe:

The committee will produce a structured framework of standards and guidelines, which specify a methodology to define, describe and transfer geographic data and services. This work will be carried out in close co-operation with ISO/TC 211 in order to avoid duplication of work.

The standards will support the consistent use of geographic information throughout Europe in a manner that is compatible with international usage. They will support a spatial data infrastructure at all levels in Europe."

# Review of existing CEN and ISO standards and future standardisation process

An important proposal was made during the Delft, November 2003 meeting about the existing ENVs and CEN/CRs: the secretariat was requested to offer them all for review by the CEN members, hoping that all member countries will propose not to accept them anymore as ENVs and so creating a free way for the harmonisation of the ISO 191xx suite of standards within Europe.

Simultaneously, the ISO 191xx suite of standards will be subject for an UAP (Unique Acceptance Procedure) within the CEN, following the Vienna Agreement between ISO and CEN, to adopt the ISO 191xx suite of standards as ENs. Possible outcome of this UAP, that will take place beginning 2004, will be that some standards may become subject for a European profile according to ISO 19106 conformance level 1 (being a subset of the respective ISO standard) or conformance level 2 (being an addition to the respective ISO standard).

As far as new standards from ISO/TC 211 is concerned parallel voting is proposed within ISO and CEN to accept new ISO 191xx standards also as ENs at the same time.

#### Liaisons

Also, CEN/TC 287 decided to create liaisons with ISO/TC 211 (Geographic Information), CEN/TC 278 (Road Transport and Traffic Telematica), Eurogeographics, OGC (Open GIS Consortium), JRC (Joint Research Council of the EC) and with the IHO (International Hydrographic Organisation), European Commission Directorate General Enterprise and AGILE (Association of Geographic Information Laboratories in Europe), if they will desire so.

#### Working groups

Seen the need for standardisation within the INSPIRE project, the CEN/TC 287 installed a Working Group 1, on "European Spatial Data Infrastructure Coordination" with the following scope:

- identify material required to implement the European Spatial Data Infrastructure by drafting:
  - Technical Report: "Standards, specifications, technical reports and guidelines required to implement the European Spatial Data Infrastructure";
  - support the implementation of the INSPIRE initiative:
- stimulate interoperability between national and European SDI developments by drafting:
  - Technical Report: "ESDI Cookbook with technical interoperability guidelines".

The secretariat is asked to find a convenor and members for this working group to be appointed by the CEN-members in beginning 2004 and have this working group started with its developments as soon as possible.

In order to improve the awareness of the standards to be developed by CEN/TC 287 as well as the education, training and use of standards in the field of Geographic information an ad hoc Outreach group is initiated. This group will work in close co-operation with the ISO/TC 211; in order to achieve this, the Outreach group will be co-chaired by two persons, one of them also being the co-chair in the ISO/TC 211 Outreach group (Prof. Hans Knoop of Germany).

# Conclusions

Although the standardisation in the field of Geographic Information within Europe was prior to the global standardisation, due to the Vienna Agreement between CEN and ISO the standardisation by the CEN was finished in 1999, according to the result of the meeting between CEN/TC 287 and ISO/TC 211 in Paris in Spring 1995, stating that the CEN standards in the process of development would be finished within CEN/TC 287 and would serve as input for the ISO 191xx suite of standards and that new work items for CEN would be transferred to the ISO/TC 211.

Unfortunately the new ISO 191xx suite of standards were not offered to CEN members for parallel voting, leading to the necessity of the revival of CEN/TC 287 (something that hardly happens within CEN) in order to harmonise the existing ENVs and CEN/CRs with the new ISO 191xx suite of standards.

According to the CEN/TC 287 meeting in Delft in November 2003 most CEN members want to abandon the existing ENVs and CEN/CRs in favour of the new ISO 191xx suite of standards to be applicable within Europe. The review process for the existing ENVs and CRs and the UAP process for the ISO 191xx standards, that is set up to achieve this, will show whether this is possible or whether specific European profiles of the ISO 191xx standards are necessary.

So, 2004 will be an exiting year in the European standards arena, since then CEN-members will decide upon the direction of the standards development within in Europe.

# Literature

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