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TOPONYMIC EDUCATION AND PRACTICE AND INTERNATIONAL COOPERATION: COOPERATION WITH INTERNATIONAL ORGANIZATIONS

ISO/TC 211 and Geographic Information Standards

(Submitted by ISO/TC 211)**

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** Prepared by Olaf Østensen, Chairman ISO/TC 211 Geographic information/Geomatics, and Chairman, Joint Steering Group on Spatial Standardization and Related Interoperabiltiy.

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Olaf Østensen, Chairman ISO/TC 211 Geographic information/Geomatics, and Chairman, Joint Steering Group on Spatial Standardization and Related Interoperability

e-mail: olaf.ostensen@statkart.no

Introduction

Who wants geographic information standards? The answer is that all businesses that produce, distribute, or utilise spatial information, either alone or in conjunction with non-spatial information, benefit from spatial standards. Environments supported by standards include geographic information, decision support – both in public and private sector, data mining, data warehousing, modelling and simulation. Application areas include – but are not limited to – automated mapping, geo-engineering, computer-aided drafting and design, entertainment, modelling, and simulation. These broad categories span the planning, design, construction, operation, and maintenance of facilities and their supporting infrastructures such as communications, transportation, and utilities.

Many industry sectors within the marketplace will benefit significantly from interoperable access to spatial information and services, including such areas as the travel and tourist industries, the mapping and routing industries, communications, utilities, transportation, national defence, agriculture, disaster management and public safety, location/mobile services, inventory management, real and synthetic environmental modelling and gaming, and the emerging needs of electronic commerce.

Achieving more interoperability requires proactive co-ordination of spatial standards at both the abstract and implementation levels. Proactive co-operation between spatial standards activities should also help to use available resources more efficiently by minimising technical overlap wherever this occurs. Such co-ordination and co-operation should lead to more market-relevant spatial standards, and could serve as a useful roadmap for all interested parties.

The Strategic Direction of an International Deployment of Geographic Information Standards

The International Standardisation Organisation (ISO) defines standards as documented agreements containing technical specifications or other precise criteria to be used consistently as rules, guidelines, or definitions of characteristics, to ensure that materials, products, processes and services are fit for their purpose [1]. Standards contribute to making life simpler, and to increasing the reliability and effectiveness of the goods and services we use.

ISO/TC 211 Geographic information/Geomatics was established in 1994 and is on of the technical committees of ISO. The mandate for ISO/TC 211 is to develop an integrated set of standards for geographic information. Equally important, if not more so, is the unstated strategic direction of the international deployment of such standards. Accordingly, the strategic directions for ISO/TC 211 can be viewed in terms of development, deployment, and the underlying co-ordinatiodconsensus process that integrates both these phases in successful standardisation.

In terms of *development,* the major issues include: the technical development of standards, the organisations developing geographic or related standards, the priorities within standards, standards and interoperability testing, and the speed of developing technical specifications. As to *deployment,* the key issues are: the implementation of standards, standards education/training, and the user communities supporting ISO/TC 211 standards.

Inherently present and all-pervasive throughout the standards-development process, the deployment of standards and their *co-ordination/consensus process* is consideration of the implementers and users of

geographic standards: such items as data transfer standards that are implemented by vendors, data cataloguing standards implemented by data producers, metadata standards implemented by vendors, data producers, and general users of geographic information. Implementers' and users' requirements need to be considered in conjunction with the standards development, deployment, and the process of integrating such requirements.

Traditionally, geographic information was produced and used by the geographic community. Increasingly, geographic information is being created and used by everyone else, especially people in the business community. Hence, the once all-important technical issues for experts are now being subordinated to the business issues confronting government and commercial organisations.

The participants in ISO/TC 211

Active members

Australia	Italy	South Africa
Austria	Japan	Spain
Belgium	Republic of Korea	Sweden
Canada	Malaysia	Switzerland
China	Morocco	Thailand
Czech Rep.	New Zealand	Turkey
Denmark	Norway	United Kingdom
Finland	Portugal	United States of America
Germany	Russian Federation	Yugoslavia
Hungary	Saudi Arabia	

Observing mebers

Argentina	Iceland	Pakistan
Bahrain (corr.)	India	Philippines
Brunei Darussalam (corr.)	Isl. Rep. of Iran	Poland
Colombia	Ireland	Slovakia
Cuba	Jamaica	Slovenia
Estonia (corr.)	Kenya	Tanzania
France	Mauritius	Ukraine
Greece	Netherlands	Uruguay
Hong Kong (corr.)	Oman	Zimbabwe

Liaison organizations

CEOS, Committee on Earth Observation Satellites
DGIWG, Digital Geographic Information Working Group
EPSG, European Petroleum Survey Group
FIG, International Federation of Surveyors
GSDI, Global Spatial Data Infrastructure
IAG, International Association of Geodesy
ICA, International Cartographic Association
ICAO, International Civil Aviation Organization
IEEE Geoscience and Remote Sensing Society
IHB, International Hydrographic Bureau
ISCGM, International Steering Committee for Global Mapping
ISPRS, International Society for Photogrammetry and Remote Sensing
JRC, Joint Research Centre, European Commission
OGC, Open GIS Consortium, Incorporated

UN Economic Commission for Europe, Statistical Division
UNGIWG, United Nations Geographic Information Working Group
WMO, World Meteorological Organization
PC IDEA, Permanent Committee on Spatial Data Infrastructure for the Americas
SCAR, Scientific Committee on Antarctic Research
UNGEGN, United Nations Group of Experts on Geographical Names
CEN/TC 287, Geographic information

From these tables, it is apparent that contributions to the work of ISO/TC 211 comes from all parts of the world, and a long range of important organizations. The UN contributions now consists of three direct UN organizations, the UN ECE, the UNGIWG, and one of our latest liaisons, the UNGEGN.

The Work Programme of ISO/TC 211

ISO/TC 211 is currently accomplishing a very challenging task in developing – mostly in parallel – the set of standards shown in the table below. The first standard was published in 2000, and several more will become available during 2002.

ISO 19101	Geographic information - Reference model
ISO 19102	Geographic information - Overview
ISO 19103	Geographic information - Conceptual schema language
ISO 19104	Geographic information - Terminology
ISO 19105	Geographic information - Conformance and testing (published)
ISO 19106	Geographic information - Profiles
ISO 19107	Geographic information - Spatial schema
ISO 19108	Geographic information - Temporal schema
ISO 19109	Geographic information - Rules for application schema
ISO 19110	Geographic information - Feature cataloguing methodology
ISO 19111	Geographic information - Spatial referencing by coordinates
ISO 19112	Geographic information - Spatial referencing by geographic identifiers
ISO 19113	Geographic information - Quality principles
ISO 19114	Geographic information - Quality evaluation procedures
ISO 19115	Geographic information - Metadata
ISO 19116	Geographic information - Positioning services
ISO 19117	Geographic information - Portrayal
ISO 19118	Geographic information - Encoding
ISO 19119	Geographic information - Services
ISO/TR 19120	Geographic information - Functional standards + new revision started
ISO/TR 19121	Geographic information - Imagery and gridded data (published)
ISO/TR 19122	Geographic information - Qualifications and certification of personnel
ISO 19123	Geographic information - Schema for coverage geometry and functions
ISO 19124	Geographic information - Imagery and gridded data components
ISO 19125-1	Geographic information - Simple feature access - Part 1: Common architecture
ISO 19125-2	Geographic information - Simple feature access - Part 2: SQL option
ISO 19125-3	Geographic information - Simple feature access - Part 3: COM/OLE option
ISO 19126	Geographic information - Profile - FACC Data Dictionary
ISO 19127	Geographic information - Geodetic codes and parameters
ISO 19128	Geographic information - Web map server interface
ISO 19129	Geographic information - Imagery, gridded and coverage data framework
ISO 19130	Geographic information - Sensor and data models for imagery and gridded data
ISO 9131	Geographic information - Data product specification
ISO 9132	Geographic information - Location based services possible standards
ISO 9133	Geographic information - Location based services tracking and navigation
ISO 9134	Geographic information - Multimodal location based services for routing and navigation

ISO 19135 Geographic information - Procedures for registration of geographic information items
ISO 19136 Geography Markup Language (GML)
ISO 19137 Generally used profiles of the spatial schema and of similar important other schemas
Further information on this work is available at: ISO/TC 211, *Geographic information/Geomatics*, www.isotc211.org .

ISO/TC 211 and the UNGEGN

UNGEGN applied for Class A liaison status in April 2002, and this was approved at the ISO/TC 211 plenary meeting in Bangkok at the end of May 2002. The Class A liaison status enables an organization to take full part in the work, i.e. to participate in working groups and projects, to comment upon draft standards asn to have full access to all information of the technical committee it is associated with. The only limitation is that of voting which is restricted to national member organizations (like DIN, ANSI, BSI etc.)

In the letter from UNGEGN when applying for Class A liaisonship it was said:

"In 1998, the 7th UN Conference on the Standardization of Geographical Names resolved to forge closer ties with the International Standardization Organization, recognizing that data and technology standards that facilitate compatibility and sharing toponymic data are crucial to the success of UNGEGN. Programs initiated by the Group of Experts, including dissemination of toponymic data through publication of national gazetteers and development of national automated geographic information processing capabilities, are directly associated with the activities of ISO/TC211.

> Therefore, on behalf of the members of UNGEGN, I would like to seek ISO/TC211 approval of UNGEGN for Class A Liaison status so that our activities are aligned with those of ISO/TC211, a critical step in the successful fulfillment of UNGEGN's aims."

ISO/TC 211 is very happy to have UNGEGN as a liaison. Of particular interest to UNGEGN is perhaps our standard "ISO 19112 Geographic information - Spatial referencing by geographic identifiers" which is dealing with determination of location without using coordinate systems, but by other means of spatial referencing, e.g. geographic names. As a part of this standard, there is a generic gazetteer description.

Here it is relevant also to point to the OGC (see below) work on gazetteer service specifications. These aim to define a uniform, standard way of accessing gazetteer services (or databases of geographical names). There is now an immense amount of databases of geographical names in use, even on the internet. But there is now uniform way of accessing these, not to say combine a search across the databases. **A** gazetteer service standard is intended enable such functionality.

A large set of the other work items of ISO/TC 211 are also interesting to the community of UNGEGN. The standards on metadata, quality in a broad sense, temporal aspect, geometry and topology, terminology, encoding (e.g. for data transfer) etc. Also the topic of registries (ISO 19135) could be of great interest in the future.

Cultural and linguistic adaptability (CLA) is recognized as an obvious requirement in ISO/TC 211, for instance leading to full endorsement of multi-octet character sets (ISO 10646).

Co-operation and co-ordination in Geomatics Standards

The increasing recognition of the value of spatial data and geographic information has spawned the entry of new players into the spatial standardisation arena, both from within the ISO orbit and externally. This has resulted in a co-operative agreement in the form of the **Open GIS Consortium (OGC)** and a **Joint Steering Group on Spatial Standardization and Related Interoperability,** chaired by the ISO/TC 211 Chairman. Consequently, a new agenda is emerging for international spatial standardisation that includes traditional and new innovative applications across a spectrum of disciplines. For ISO/TC 211, these developments are resulting in new strategic directions.

The co-operative agreement with the Open GIS Consortium was established in 1999. The Open GIS Consortium is an eight-year-old non-profit membership organisation dedicated to the development of interface specifications that support open access to geographic information and geospatial processes. Membership is open to all entities. A list of the currently over 220 members may be found at http://www.opengis.org.

The Open GIS Consortium develops and provides, through a membership submission and consensus process, implementation-level technical specifications for interfaces to geospatial processes and geospatial information. These interfaces deliver support for interoperability in geospatial solutions.

The co-operation between the OGC (Open GIS Consortium) and ISO/TC 211 has so far led to four standards under development that are direct adoptions of corresponding OGC specifications. And conversely, OGC has adopted the ISO 19107 Spatial schema as their abstract specification for geometry and topology – and present policy is to adopt others. In addition, a large number of co-ordination and harmonisation efforts have emerged from this close collaboration. This co-operation is found, for instance, in service architecture, conceptual schema language, imagery and gridded data, as well as in other work.

One of the most important activities of the OGC has been their work on XML-encoding of geographic information. This specification is known under the acronym GML, Geography Markup Language. This is an important specification by itself, but also fundamentally underpins other specifications such as Web Feature Services. There has been a long discussion about the relationship between GML and the corresponding activity ISO 19118 Encoding in ISO/TC 211. During the autumn 2001 and winter 2002 these activities were aligned, resulting in a new work item in ISO also called GML based upon the OGC specification.

Of equal importance are the discussions going on and influences that are in play at the strategic level, in particular the fruitful co-operative activity in emerging technologies such as location-based services.

A Unified Approach to addressing Global Ecological and Humanitarian Problems

The goal of international standardisation in the field of geographic information is to develop a family of standards that will:

- support the understanding and usage of geographic information
- increase the availability, access, integration, and sharing of geographic information, enable inter-operability of geospatially enabled computer systems
- ease the establishment of geospatial infrastructures on local, regional and global level
- contribute to a unified approach to addressing global ecological and humanitarian problems
- contribute to sustainable development

ISO/TC 211 is about to finalise its first massive, parallel effort in establishing the fundamental standards in this field. The development has attracted the resources of more than 500 individuals on a global basis. A large number of organisations have followed, influenced and participated in the work. ISO/TC 211 has acted as a huge "meeting point" for expertise from users, academia, producers, and vendors in the field of geographic information and geomatics.

Work will continue in the traditional and basic fields, but will also be extended to new application areas and new technologies. Geomatics is still a young application field!