Class A Laison Seminar

ISO/TC 211 and Qualifications and Certification of Personnel - TR 19122

Hans Knoop

October 29, 2003, Berlin
Agenda

- Standardization - ISO/TC 211
- Qualifications and Certification - TR 19122
- Benefits of Standardization
Standardization - ISO/TC 211

• General Aspects and Definitions
• Development of Standardization
• Outreach Activities
• Benefits of Standardization
• Example (SDI/Geobasisdata)
## Standards

### Worldwide Confusion

### Definitions

<table>
<thead>
<tr>
<th>German</th>
<th>English/Internationally</th>
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<tbody>
<tr>
<td>Norm</td>
<td>Standard</td>
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<tr>
<td>Standard</td>
<td>“Defacto“-Standard</td>
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</table>

### Authorized Standardization Bodies

Standardization Pyramid

Problem-oriented generic solutions requiring general acceptance

Closest approximation to the state of the art

Binding within the company

Consensus-oriented Importance

International Standards
ISO, IEC

European Standards
CEN, CENELEC, ETSI

National Standards
DIN, AFNOR, BSI, SNV, ANSI...

„Defacto“-Standards
Inhouse-Standards

## Standardization in Figures

### International, European and National

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ISO / TC 211, Geographic information

Chairman
Olaf Østensen
Secretary
Bjørnhild Sæterøy
Norway

AG Outreach
MHT

AG Strategy

Geospatial services
WG 4
Morten Borrebæk
Norway

Imagery
WG 6
Douglas O’Brien
Canada

Information communities
WG 7
Antony Cooper
South Africa

Location based services
WG 8
UK

Information management
WG 9
Hiroshi Imai
Japan

ISO/TC 211 Advisory Group on Outreach

**Tasks**

- Create awareness
- Enable education and training
- Facilitate adoption and implementation
- Capture user requirements and feedback
- Generate outreach resources
- Maintain the ISO/TC 211 Business Plan
Ongoing Activities

2003 Outreach Conferences & Events
  9th EC GI & GIS Workshop, ICA Meeting, Digital Earth Conference, FIG
Dissemination of Outreach material
  ISO/TC 211 Website
GSDI Cookbook Chapters
  Introduction, Terminology
Tutorial on Standards
  Berlin, Germany
ISO/TC 211 Advisory Group on Outreach

New Activities

Outreach Newsletter
PowerPoint presentations on ISO / TC 211 standards
Establish joint outreach efforts with international organizations
Hot links between ISO/TC 211 and Class A Liaison websites
Class A Liaison Seminar
Class A Liaison Questionnaire
Standardization Benefits

Benefits of using GIS Standards

ISO/TC 211 has pointed out some objectives

- Increase the understanding and usage of geographic information
- Increase the availability, access, integration, and sharing of geographic information
- Promote the efficient, effective, and economic use of digital geographic information and associated hardware and software systems
- Contribute to unified approach to addressing global ecological and humanitarian problems
Standards & Spatial Data Infrastructure

National - Regional - Global

Standards Infrastructure

Standards

Spatial Data Infrastructures

Standards
Technology
Data Policy
Institutional Framework
Main Criteria for Systems

- Philosophy
- Laws/Regulations
- Organisation
- Techniques
- Qualified Staff

- Economicalness
- Standardization
Criteria for Data Quality

- Completeness
- Up-to-Dateness
- Availability/Supply
- Accuracy

- Economicalness
- Standardization

- Establishment
- Actualisation
- Availability/Supply
Uniform geospatial base datasets for Germany

Only one data model for

- Spatial Reference System: AFIS
- Real Estate Cadastre: ALKIS
- Topography: ATKIS

3A - base schema, one 3A - application schema

NAS = standard-based data exchange format

Co-ordinated data capture, maintenance and supply/delivery

Geospatial Base Data Information Management (GIM) Implementation (stage-wise realisation)
Paradigm Shift

Since 1997: Concept of AdV for Modelling of Geoinformation of the Official Surveying and Mapping

- Integration of Cadastre Map and Register (ALK and ALB)
- Harmonisation of Cadastre and Topographic Mapping (ALKIS-ATKIS)

Cornerstones

- Integrated maintenance of graphic data and descriptive data
- Constant object view
- Data maintenance without redundancies
- User profile according to data protection legislation
- Focus on customers
- Economicalness of the concept
- Metadata for cadastre according to ISO
- Integration of cadastre information into topographic mapping, e.g. generalisation of buildings
- Customer needs for spatial planning
- INSPIRE principles for European Spatial Data Infrastructure
- **MODELLING OF CADASTRE ACCORDING TO FUTURE SDI NEEDS**
Qualifications and Certification - TR 19122

- Outline
- Process and Products
- Recommendations
- Structure
- Lessons along the way
- User Communities (Education)
Standards for Spatial Data Infrastructures

ISO 19103 - Conceptual schema language
ISO 19107 - Spatial schema
ISO 19108 - Temporal schema
ISO 19109 - Rules for application schema
ISO 19110 - Feature cataloguing methodology
ISO 19111 - Spatial referencing by coordinates
ISO 19112 - Spatial referencing by geographic identifiers
ISO 19113 - Quality principles
ISO 19114 - Quality evaluation procedures
ISO 19115 – Metadata
ISO/TR 19121 - Imagery and gridded data
ISO 19123 - Schema for coverage geometry and functions
ISO 19124 - Imagery and gridded data components
ISO 19126 - Profile - FACC Data Dictionary
ISO 19127 - Geodetic codes and parameters
ISO 19129 - Imagery, gridded and coverage data framework
ISO 19130 - Sensor and data model for imagery and gridded data
ISO 19131 - Data product specification
ISO 19137 - Generally used profiles of the spatial schema and of similar important other schemas

ISO/TR 19122 - Qualifications and certification of personnel
Foreword

- ISO/TC211 finished the Technical Report of Project 19122 Qualifications and certification of personnel

- Qualified national case study representation from North America (Canada, USA), Europe (Austria, Finland, Germany, Portugal and the UK), Africa (South Africa), Australasia (Australia and New Zealand), Near East (Saudi Arabia) and Far East (China, Japan, Korea),

- Also international input by the respective global organizations (e.g. FIG)
Outline (1)

• The Process
  – History
  – Future
• The Products
  – Work Item
  – Questionnaire
  – Case Studies
Outline (2)

• The Plan
  – Recommendations (August 2001)
  – Draft report (November 2001)
  – New Case Studies
  – Final Report (June 2002)

• Perspectives

• Summary

• Lessons along the way
The Process

• **History**
  - proposed work item
  - questionnaire
  - case studies

• **Future**
  - new case studies
  - final report
  - ISO/TC211 decision
The Products

• **Work Item**
  - ISO/TC211 (N573 16/12/98)
  - Voting ISO/TC211 (N639 04/01/99)

• **Questionnaire**
  - completed 15/06/2000
  - questionnaire conclusions

• **Case Studies**
  – Australia, Canada, Germany, Japan, Korea, Saudi Arabia, United Kingdom, United States
  – FIG
  – Completed by August 2001 Workshop
Demand of Landinformation

finance/tax  state survey  cadastrere/landregister  landconsolidation
licensed surveyer  road-construction
municipality  soil research
building office  water
mining office  railway
environment protection  post
communication  energy supply
des
gas
forestry  water
health  insurance
owner
economy  broadcasting
architecture  cooperation
planning  statistic
research
engineering  science
construction company  fire-rescue
mining company  police
nature protection  politicians
privacy  settlement company
Different study-systems

- Dipl.-Ing.
  - Increasing specialisation
  - one-step 'German' system

- Maitre
  - Once-through system
  - two-steps 'French' system
  - Examination for all students, exit for license

- Master
  - two-steps 'Anglo-american' system
  - Bachelor
  - continuation
  - profession
Education and Qualification of 'Surveyors' in Germany

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<th>Practice Year</th>
<th>Preparatory service 2 years</th>
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<td>according to Federal Law as a technician 'surveyor' 3 years</td>
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<th>Technician</th>
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<tr>
<td>Professional maturity</td>
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Questionnaire Conclusions

• Qualifications for personnel is of interest to all respondents, in all countries curriculum is under development, no perfect solution is available.

• Legislation for certification of personnel may occur at national or regional level, particularly in the domain of Surveying Engineering, especially in some European countries.

  The importance of e.g. geobasis-data to be shown by the testbeds.

• Accreditation of programa is part of normal academic evaluation process.

• Status and graduation on national level are very different.

• No international exchange of information.
The Plan

• **Recommendations from August 2001 Workshop**

  “Given the range of approaches, definitions and solutions identified by this limited set of case studies, this project team concludes that it is not possible, within the context of the ad hoc set of technical experts to achieve the original goals of the project.”

  “…. However the project team presents the following recommendations.”
Recommendations

#1

“An effective and feasible system for the qualifications and certification of personnel in geographic information/geomatics should be advanced by a broadly based international professional organization which promotes the wide range of qualifications and certification systems in place in individual countries. Such a system would support national and international mobility of properly trained and educated personnel in the field of geographic information/geomatics.”
Recommendations

• #2

“The domain embraced by this organization must be inclusive and extend to all disciplines encompassed broadly by the TC211 definition of the field. This organization shall invite representation from all relevant international associations, including members of the TC211 community as well as other related international and national organizations.”
Recommendations

• #3

“At all times, this organization must acknowledge the dynamic and evolving nature of the domain and related technologies and thus should take care not to institute any procedures or requirements which would make it difficult for professionals to advance the knowledge and skill sets required.”
Recommendations

• #4

“A preliminary charge of this organization should be to extend and further investigate the findings of the project team, building upon the framework outlined here in order that similarities and differences between national and regional systems can be identified and equated. Examples of national or regional qualifications and certification systems, which may act as examples for implementation in or comparison among other countries and regions, should be documented.”
Summary

• ISO/TC211 finished the Technical Report of Project 19122 Qualifications and certification of personnel

• Between 1998 – 2002 Project 19122 has moved from New Work Item through to Final Report

• Intermediate steps have included work item voting, questionnaire, case studies to Final Report

• With any research endeavour, the quality of the report depends on the number and type of the input and the rigor of the analysis.
Lessons along the way (1)

- Geographic Information / Geomatics is a broad, loosely defined domain.
- Geographic Information / Geomatics is an integral component in a changing science and information technology context.
- No existing institutional structure can address the full scope.
- FIG is addressing the needs of its member professionals.
Lessons along the way (2)

- ISO/TC211 may offer the best context for the continued organization of knowledge and understanding on this subject.
- It will require an extensive network of professionals across disciplines in many countries and with a membership to the key international professional associations.
- Qualifications and certification of personnel is a basic topic for all professionals. Further research and cooperation of all involved parties is requested.
Benefits of Standardization

- Reports and Examples
- Factors Contributing to Economic Growth
- Influence of Company and National Standards
- Summary of Results
The joint research project on the „Economic benefits of Standardization“ was initiated by DIN, the German Institute for Standardization, and the German Federal Ministry of Economic Affairs and Technology (BMW) in 1997 and completed in May 2000.

The study have been undertaken by the Technical University Dresden (TUD) and Frauenhofer Institute of Systems and Innovations (ISI).

The following organizations and companies also contributed to the financing of the project: DaimlerChrysler, Siemens AG, Hans L. Merkle Stiftung, ThyssenKrupp AG, German Electronical Commission in DIN and VDE (DKE), the Austrian Standardization Institute (ON) and the Swiss Standard Association.
Factors Contributing to Economic Growth

- **Capital**: 1.6%
- **Work**: 0.2%
- **Patents**: 0.5%
- **Licences**: 0.9%
- **Standards**: 3.3%

**Economic growth**

Economic Benefits of Standardisation
- Summary of results -

• The benefit to the national economy amounts to more than US $ 15 bn per year
• Standards contribute more to economic growth than patents and licences
• Companies that participate actively in standards work have a head start on their competitors in adapting to market demands and new technologies.
• Transaction costs are lower when European and International Standards are used.
• Research risks and development costs are reduced for companies contributing to the standardization process.
User Communities

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
User Communities

PCGIAP, Permanent Committee on GIS Infrastructure for Asia and the Pacific
UN Economic Commission for Europe, Statistical Division
UN Food and Agriculture Organization
UNEGEGN, United Nations Group of Experts on Geographic Names
UNGIWG, United Nations Geographic Information Working Group
WMO, World Meteorological Organization
PCIDEA, Permanent Committee on Spatial Data Infrastructure for the Americas
SCAR, Scientific Committee on Antarctic Research
CEN/TC 287, Geographic Information

All these enumerated user communities are the external liaison organizations to ISO/TC 211 Geographic Information / Geomatics
Thank you!

Questions & Discussion

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