Arbeitsgemeinschaft GIS (AGIS)
Seminar ”GIS & Internet” vom 15.- 17. September 2004
an der Universität der Bundeswehr in Neubiberg

Normung und Standardisierung von Geoinformation

Hans Knoop, Germany
Technische Universität Braunschweig
DIN • Deutsches Institut für Normung, Leiter Fachbereich 03
Head of Delegations and Co-Chair, Advisory Groups on Outreach,
to ISO/TC211 and CEN/TC287

Agenda

- **Normung/Standardisierung**
- **Geobasisdaten und GSDI**
- **Vorteile der Normung**

Agenda

Normung/Standardisieurng

- Allgemeine Aspekte und Definitionen
- Entwicklung der Normung (DIN,CEN)
- ISO/TC211 – 191xxx Serie
- Vorteile der Normung

Weltweite Unklarheiten

Definitionen

Deutschland	England/International
Norm	Standard
Standard	“Defacto“-Standard

Autorisierte Normungsorganisationen

DIN • CEN • ISO

Standardization Pyramid

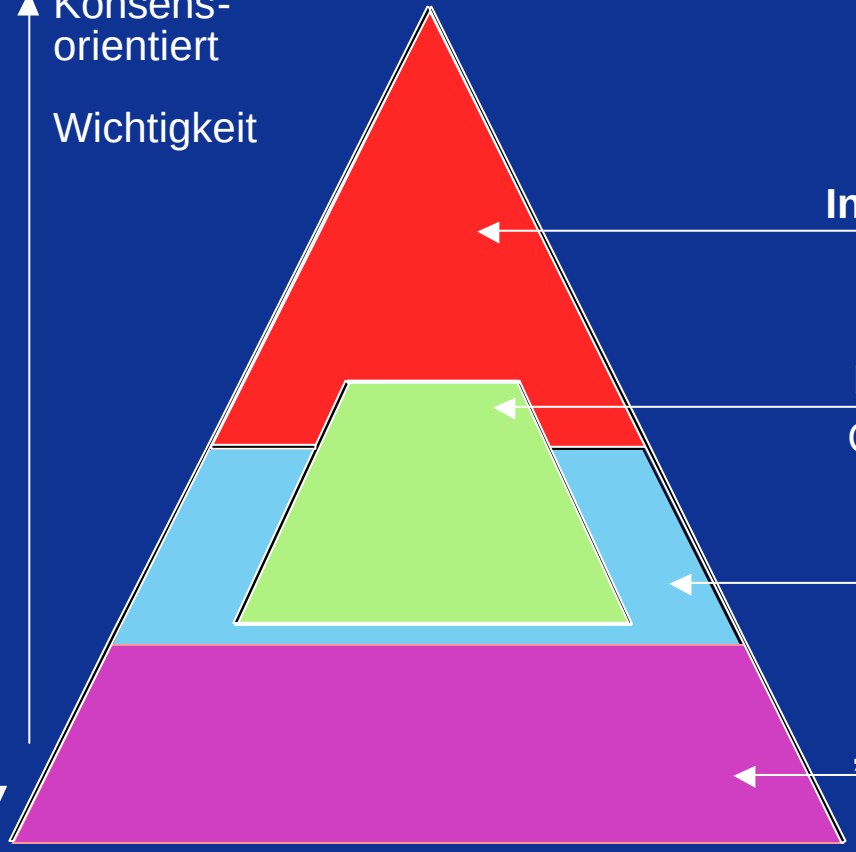
Problemorientierte Lösungen mit allgemeiner Akzeptanz

Konsens-orientiert

Wichtigkeit

Höchster fachlicher Bezug

Bindung bis in die Betriebe



Internationale Normen
ISO, IEC

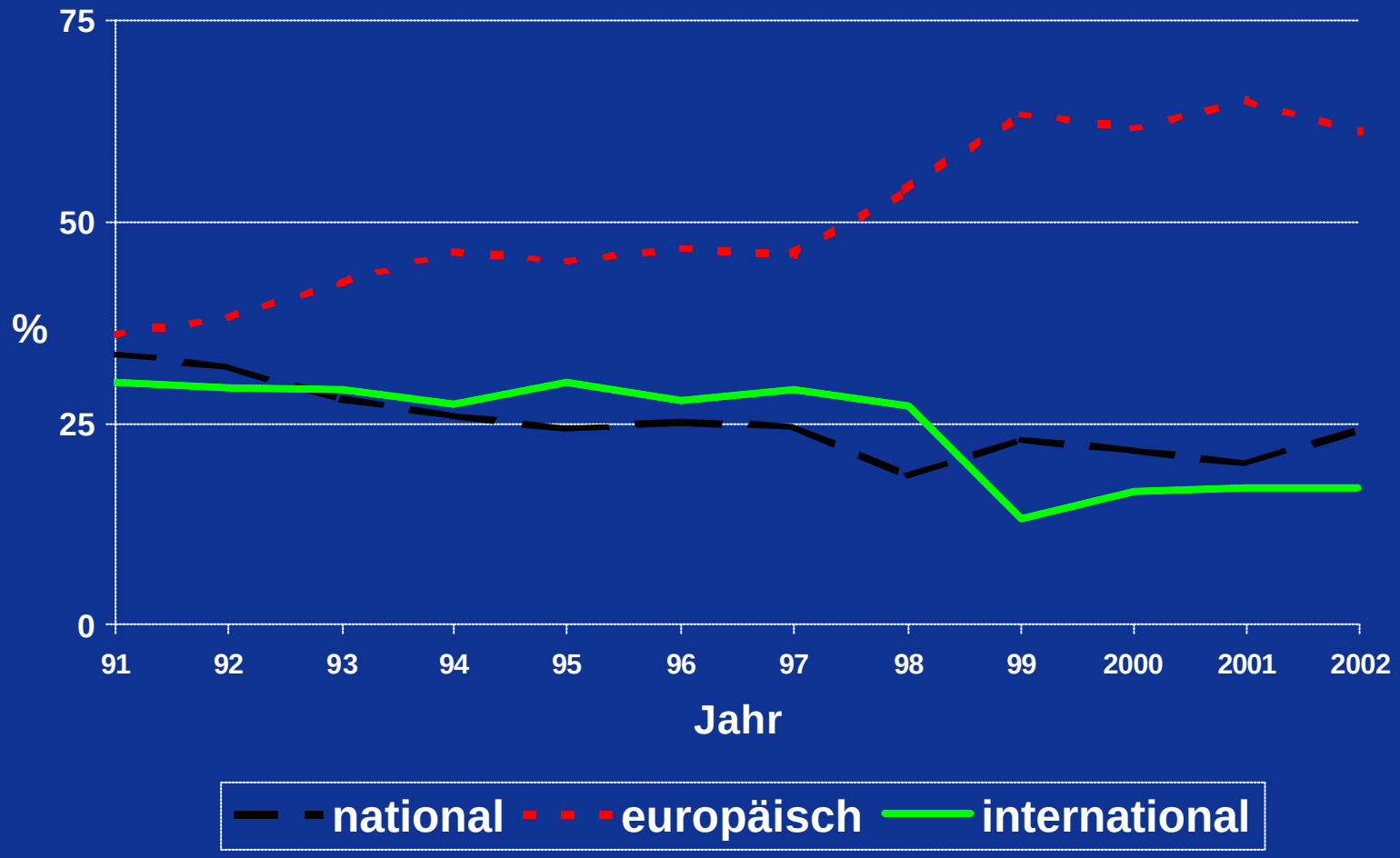
Europäische Normen
CEN, CENELEC, ETSI

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

„Defacto“-Standards
Inhouse-Standards

Normungsaktivitäten von DIN

Anzahl der begonnenen Projekte (%)

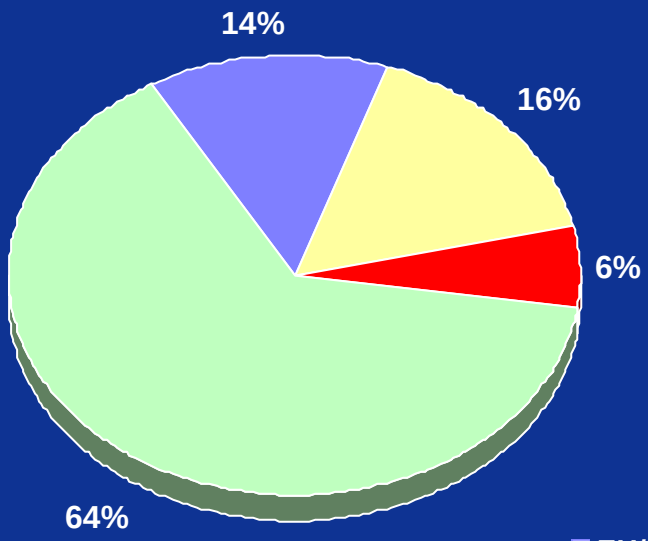


International, europäisch und national

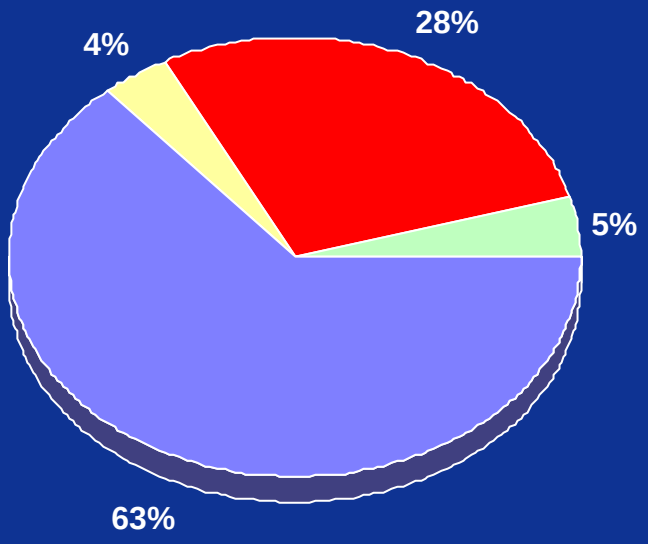
	1980	1990	1999	2000	2001	2002
International Standards	6 000	10 778	16 952	17 630	17 572	18 289
Working bodies ISO/IEC	288	3 420	3 729	3 808	3 867	3 625
TC/SC in ISO/IEC	984	1 023	945	929	917	912
German Secretariat	137	171	165			147
European Standards	490	1 648	10 263	11 934	13 475	13 514
European Draft Standards	250	1 462	4 726	5 130	4 821	4 433
Working bodies CEN/CENEL	280	1 620	2 417	2 376	2 208	2 358
TC of CEN/CENELEC	87	298	350	349	352	346
German Secretariat	25	83	93	95	96	98
DIN Standards	19 900	20 988	26 597	25 560	26 130	27 179
DIN TC/Commissions	121	107	84	83	83	83
Working bodies DIN	3 700	3 960	4 287	4 099	4 182	3 672

Beteiligung an internationalen Normungsaktivitäten

Mitglieder in ISO



Sekretariate in ISO



- EU/EFTA
- Europe without EU/EFTA
- Industrial Countries without Europe
- Others

Benutzergruppen

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
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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

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PCGIAP, Permanent Committee on GIS Infrastructure for Asia and the Pacific

UNECE Economic Commission for Europe, Statistical Division

UNFAO Food and Agriculture Organization

UNGEGN, 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

Normen und Spatial Data

National - Regional - Global

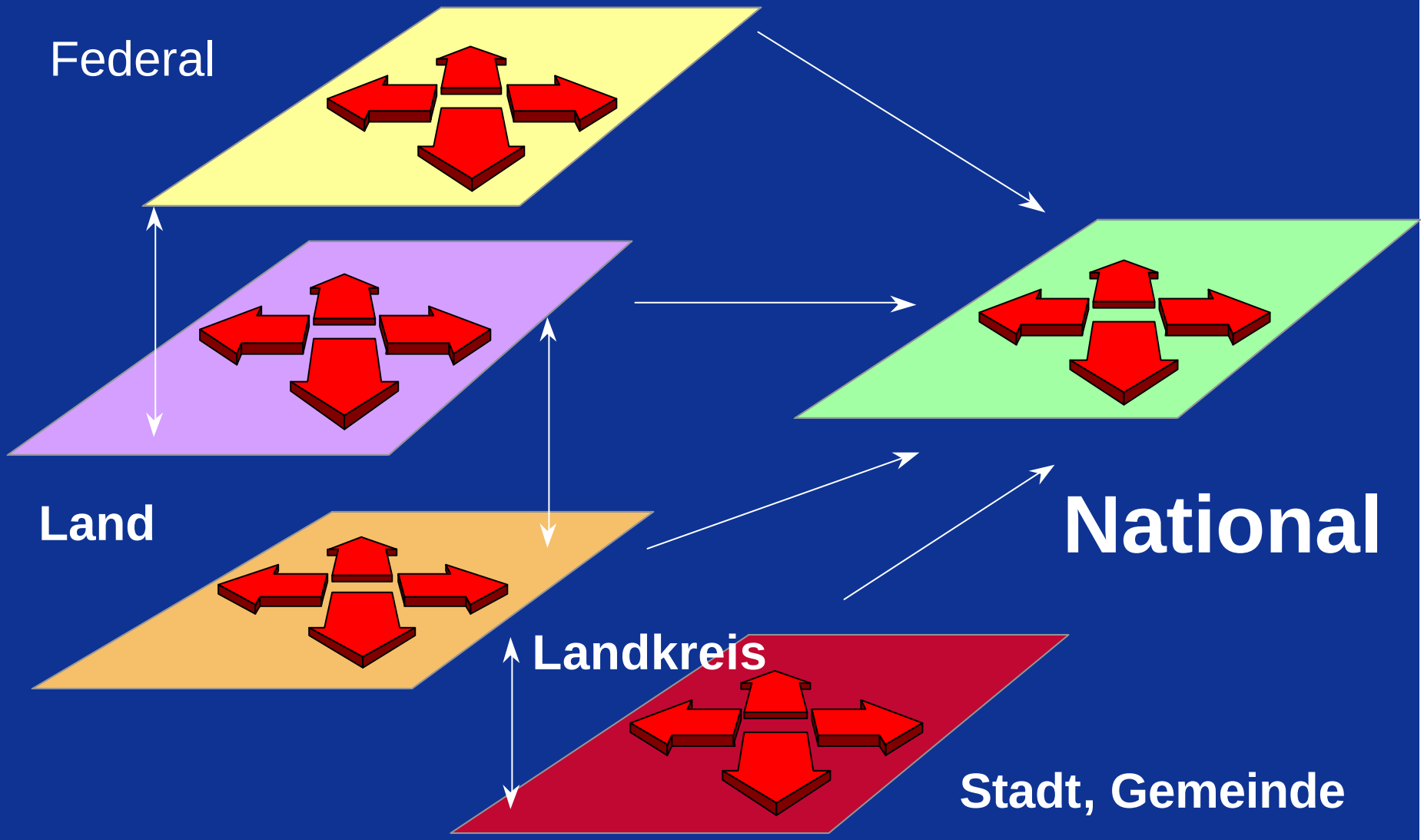
NORMEN-INFRASTRUKTUR

SPATIAL DATA INFRASTRUKTUREN

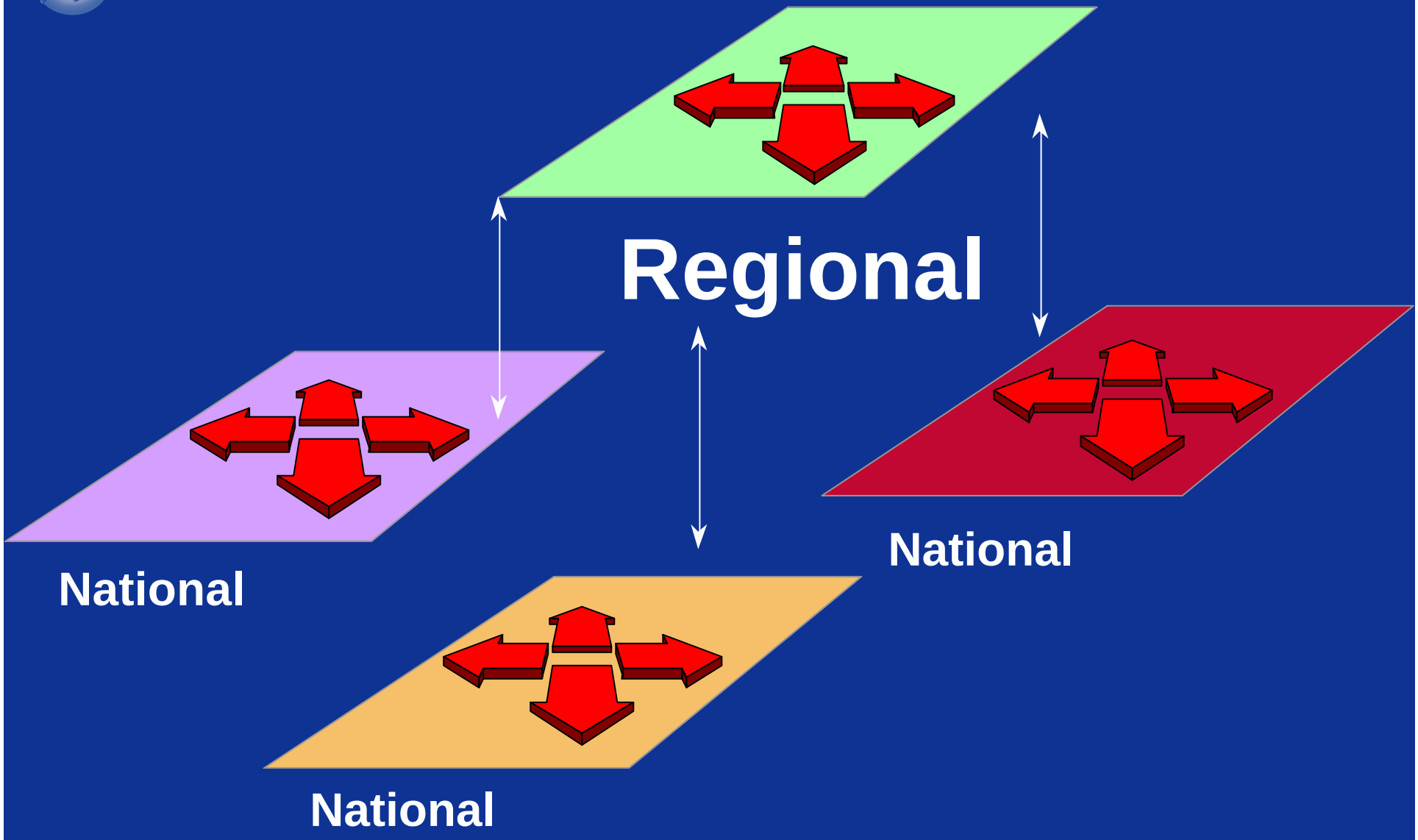
Normen

Normen
Technologie
Daten-Politik
Institutional Framework

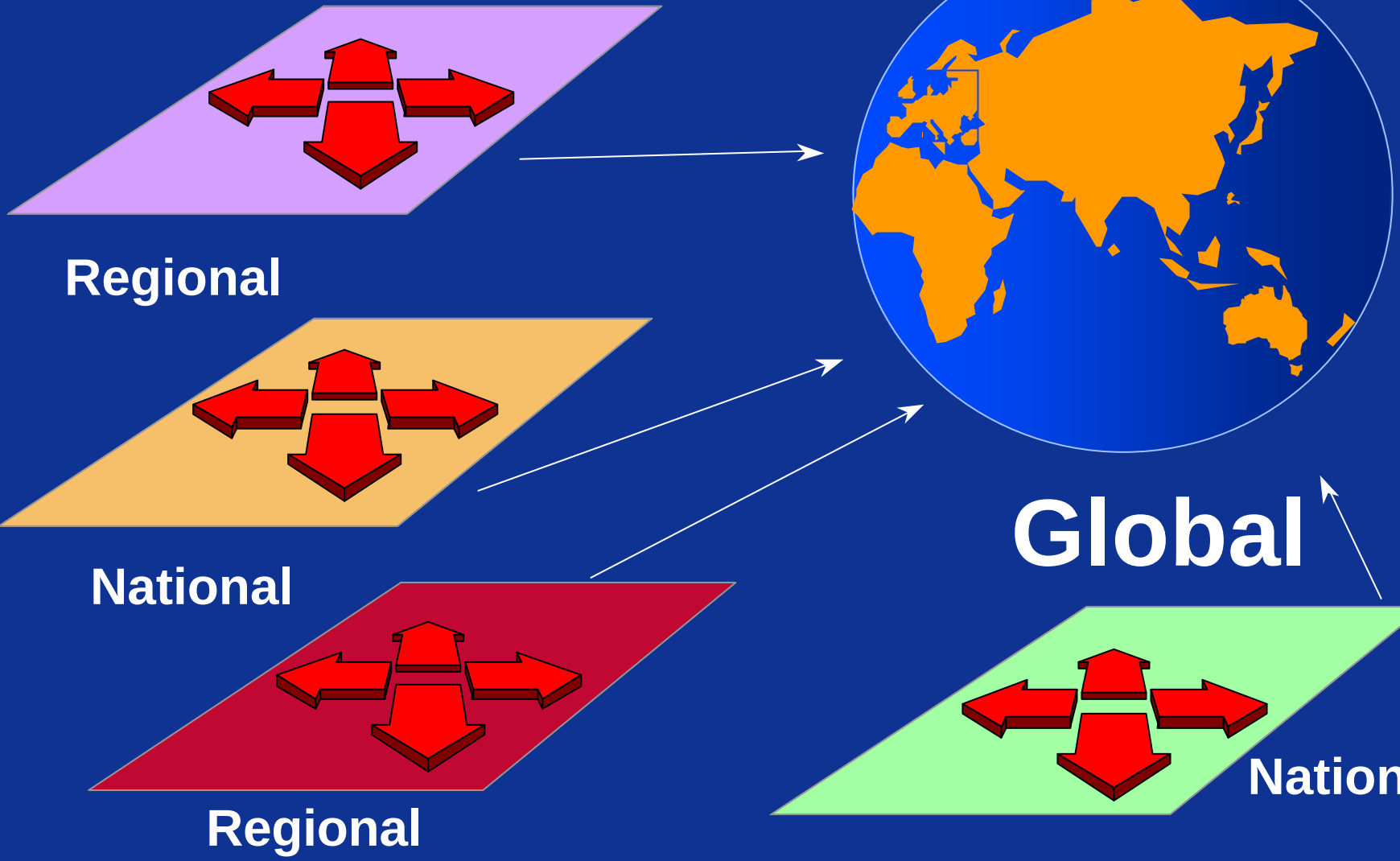
Standards & Spatial Data Infrastructure



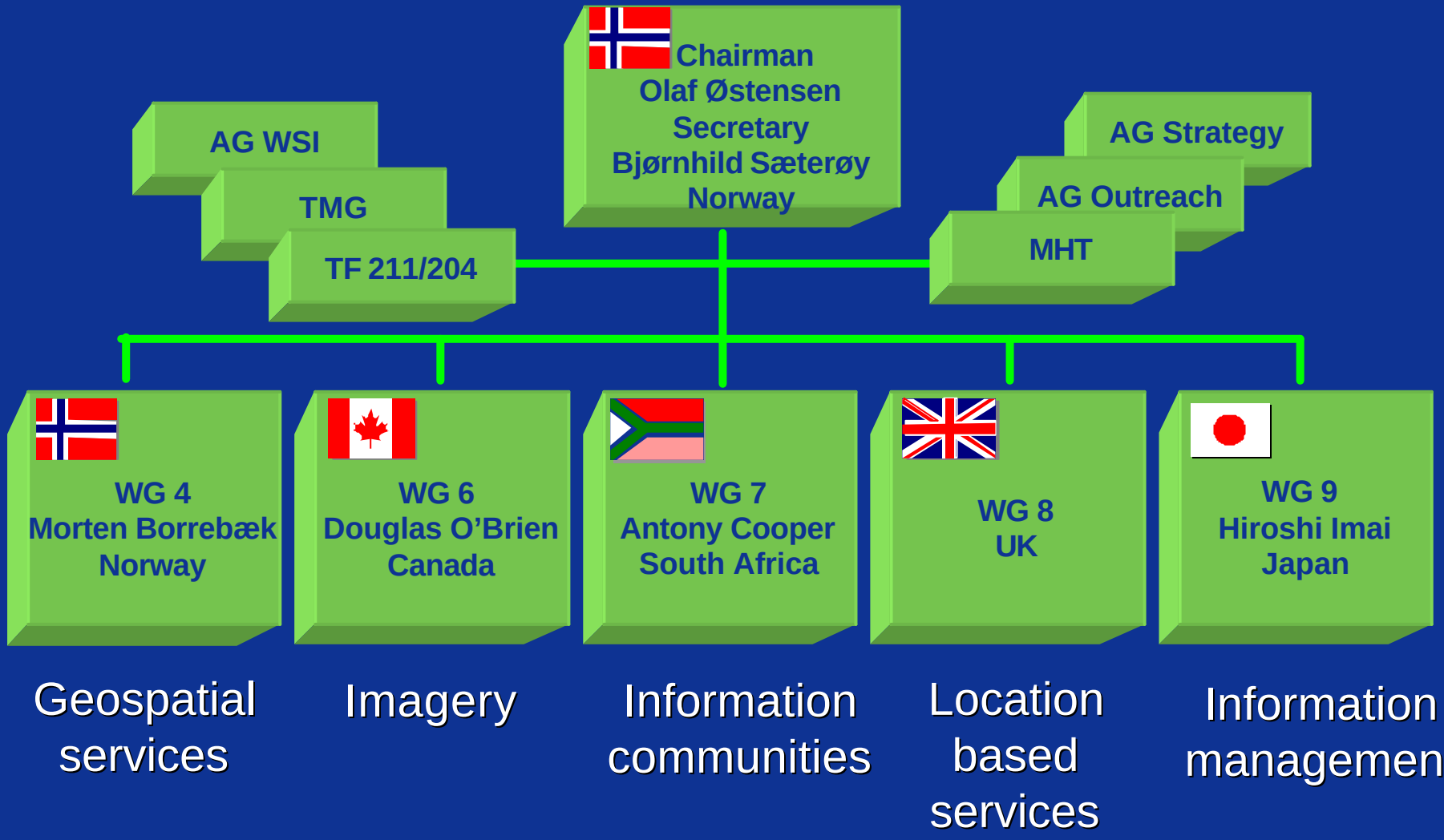
Normen & SDI



Normen & SDI



ISO / TC 211, Geographic information



Standards for Spatial Data Infrastructures

Standards | Access, technology | Content (data) | Organization | Education

Documentation

Standards

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

Standards for Spatial Data Infrastructures

Access and services

ISO 19116 - Positioning services
ISO 19117 – Portrayal
ISO 19118 – Encoding
ISO 19119 – Services
ISO 19125-1 - Simple feature access – Common architecture
ISO 19125-2 – SFA – SQL option
ISO 19125-3 – SFA – COM/OLE
ISO 19128 - Web Map Server Interface
ISO 19132 - Location based services possible standards
ISO 19133 - Location based services tracking and navigation
ISO 19134 - Multimodal location based services for routing and

Standards

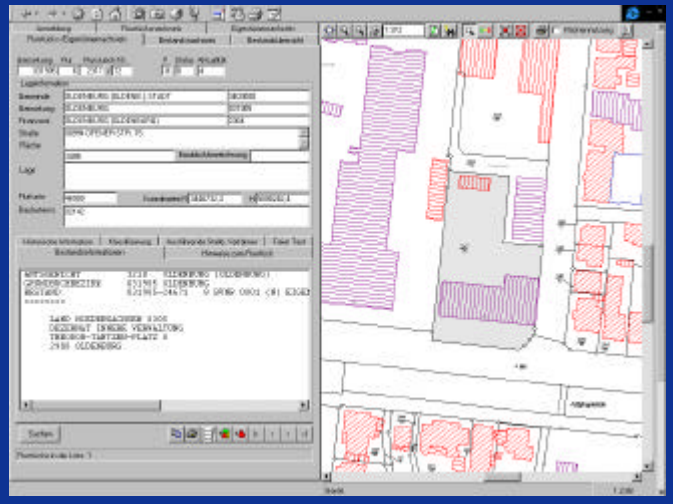
ISO 19101 – Reference model
ISO 19104 – Terminology
ISO 19105 – Conformance and testing
ISO 19106 – Profiles
ISO/TR 19120 – Functional standards
ISO 19135 – Procedures for registration of geographic information items

Agenda

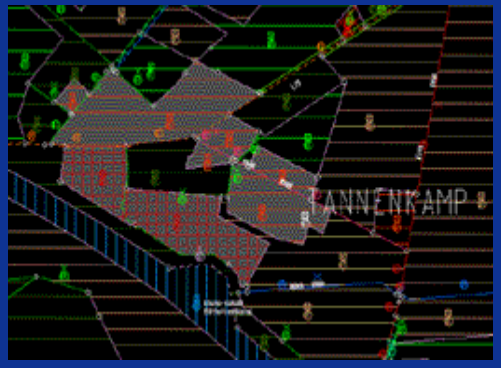
Geobasisdaten und GSDI

- Entwicklung in Deutschland
- Erste Generation von Geoinformationssystemen
- Zweite Generation (AFIS/ALKIS/ATKIS) mit Paradigmashift
- Anwendung von ISO/TC211 Normen

AFIS



ALKIS



ATKIS

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**

Zielsystem

Einheitliche raumbezogene Basisdaten für ganz Deutschland

Nur ein Datenmodell für

- Raumbezugssystem ➢ **AFIS**
- Liegenschaftskataster ➢ **ALKIS**
- Topographische Karten ➢ **ATKIS**

3A-Basisschema, **ein** 3A-Anwendungsschema

NAS = Standard-basiertes Datenaustauschformat

Koordinierte Datenerfassung, Fortführung und Bereitstellung

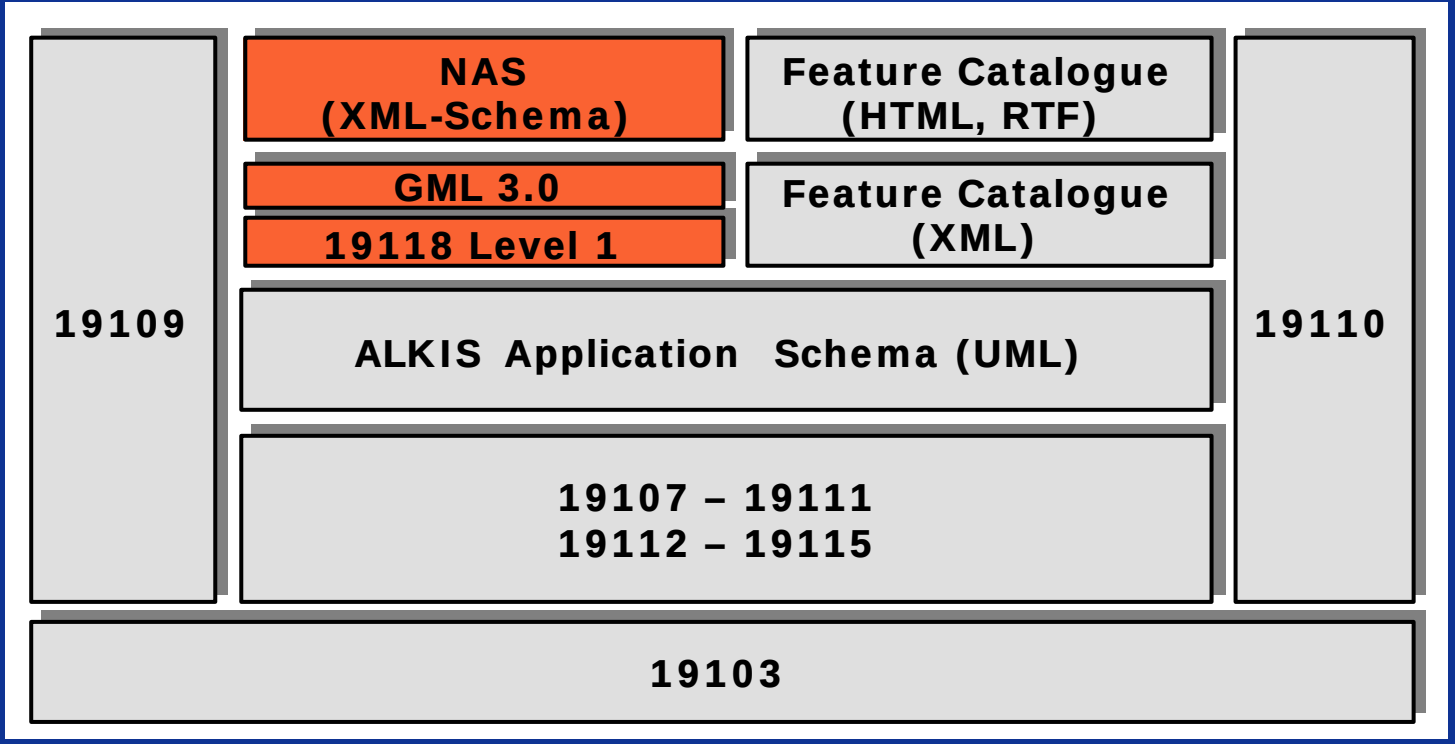
Basisbezogenes Dateninformationsmanagement (GIM)

(Stufenweise Implementierung)

3A - Framework

- Project of the AdV
- Involvement of GIS industry (Workshops)
- Integration of customers interests
- Use of draft ISO-standards and OGC-specifications
- Use of GI-Systems available on the market
- System-independent data exchange format for AFIS/ALKIS/ATKIS: NAS

Ableitung der NAS encoding rules



ISO 19100 - Using

- 19103 Conceptual schema language
- 19107 Spatial schema
- 19109 Rules for application schema
- 19110 Feature cataloguing methodology
- 19111 Spatial referencing by coordinates
- 19112 Spatial referencing by geographic identifiers
- 19113 Quality principles
- 19114 Quality evaluation procedures
- 19115 Metadata
- 19118 Encoding
- 19123 Schema for coverage geometry and functions

ISO 19100 - Using

- 10105 Conformance and testing
- 19108 Temporal schema
- 19127 Geodetic codes and parameters
- 19135 Registry
- 19136 GML
- 19138 Data quality measures
- 19139 Metadata implementation

ISO 19100 – using in future

- 19117 Portrayal
- 19121 Imagery and gridded data
- 19124 Imagery and gridded data components

Agenda

Ausgewählte Normungsaufgaben

- Nutzen der Normung
- Qualifikation und Zertifizierung von Personal
- Outreach activities
- Europäische Aktivitäten
- Nutzen der allgemeinen Normung

Standards for Spatial Data Infrastructures

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ISO/TR 19122 - Qualifications and certification of personnel

Benefits of using GIS Standards

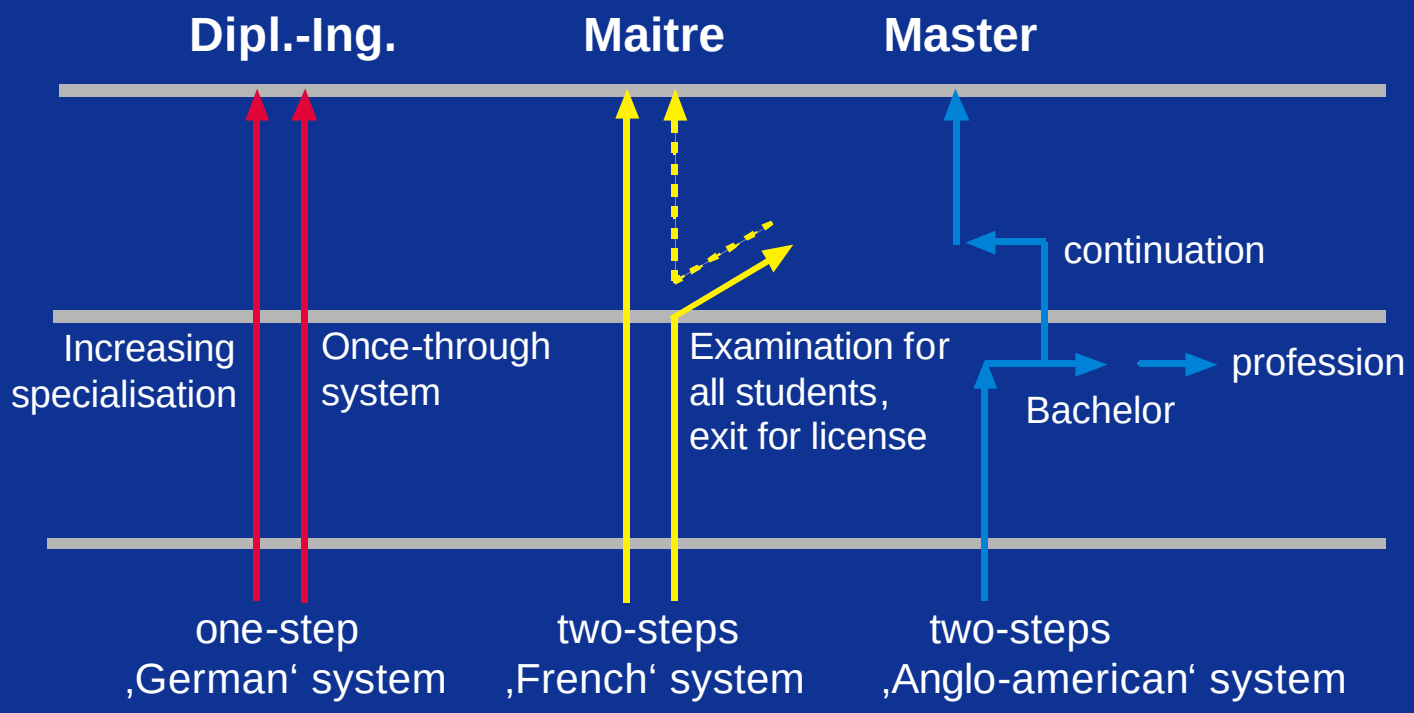
ISO/TC 211 has pointed out some objectives

- Increase the understanding and usuage of geographic information
- Increase the availability, acces, 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

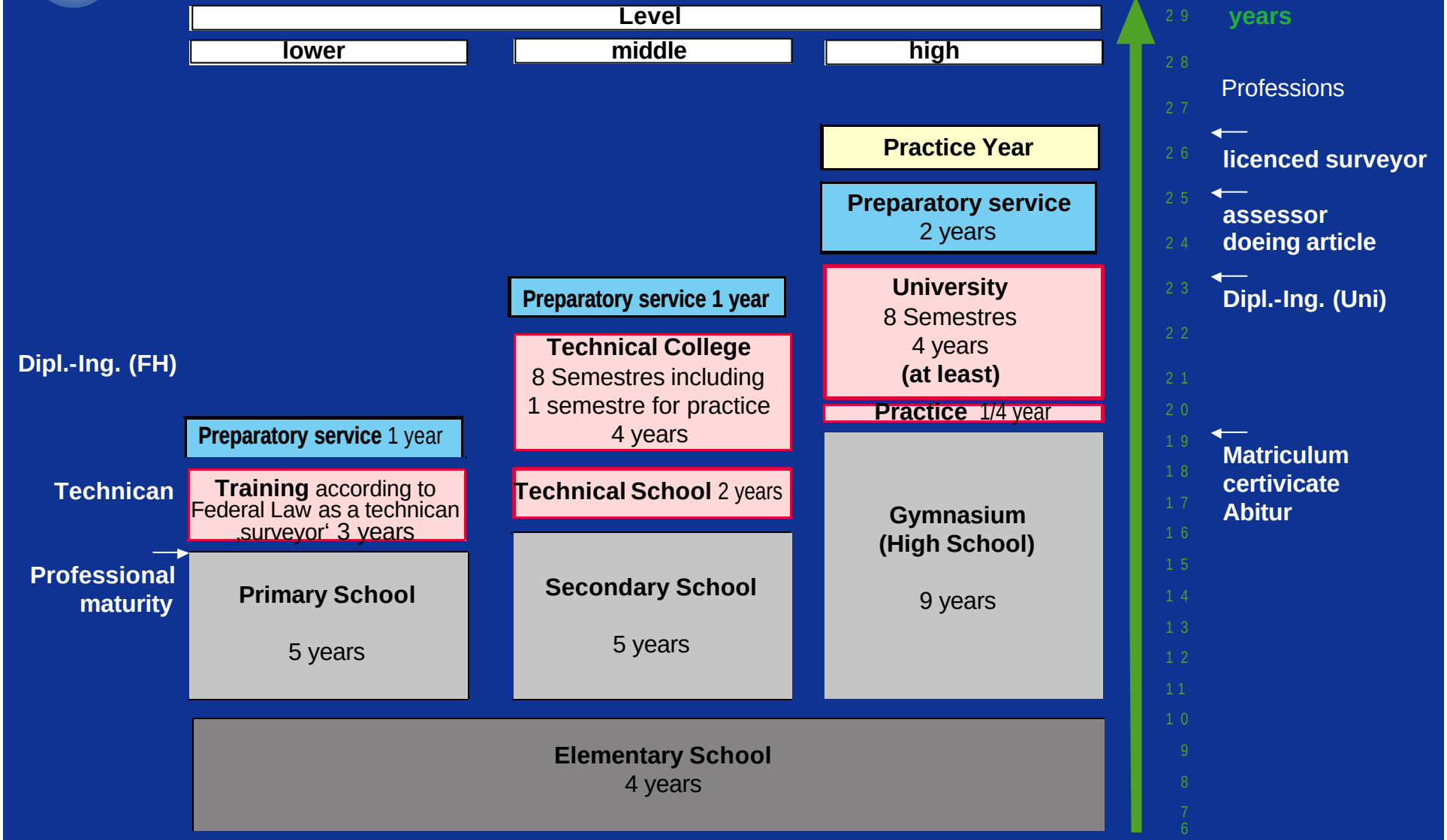
Summary

- **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.

Verschiedene Studiensysteme



Ausbildung und Qualifikation des “Geodäten” in Deutschland



Duales System beruflicher Ausbildung (1)

Transition from the world of young people (school) into the world of grown-ups (business/working)

Acquaintance of

- New forms of work and organisation
- Changed structures of hierachy
- Minimized number of interfaces
- More responsibility for quality and processing

Duales System beruflicher Ausbildung (2)

Aspired Aims

- Process-orientated analytical way of thinking
- Learning of foreign languages
- Unablement for independent and responsible acting
- Systematical development of communicative skills

→ **Entwicklung einer umfassenden Einsatzfähigkeit als Ergebnis**

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 coorporation of all involved parties is requested

ISO/TC 211 Advisory Group on Outreach

Tasks

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

ISO/TC 211 Advisory Group on Outreach

Ongoing Activities 2004

INTER**GEO** East	Belgrade	March
AGILE Conference	Crete	April
ISO/TC 211 Plenary	Kuala Lumpur	May
EC Workshop	Warsaw	June
ISPRS Congress	Istanbul	July
Map Asia 2004	Peking	August
ISG 2004	Kuala Lumpur	September
ISO/TC 211 Plenary	Pallenza	October
CEN/TC 287 Plenary	Ispra	October
INTER**GEO**	Stuttgart	October
AARSE Conference	Nairobi	October

…

Workshops, Tutorials, Presentations, etc.

Benutzergruppen

CEOS, Committee on Earth Observation Satellites
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Open GIS Consortium (OGC)

OGC
Open GIS Consortium, Inc.

OGC Mission

"Our core mission is to deliver interface specifications that are openly available for global use"

OGC is an international industry consortium of 258 companies, government agencies and universities participating in a consensus process to develop publicly available geoprocessing specifications.

ISO/TC 211 & OGC

1994

- ISO/TC 211 - de jure formal standards technical committee
- OGC - de facto industry technical specifications
- 1999 - OGC - ISO/TC 211 Class A Liaison status
- ISO/TC 211 & OGC Joint Advisory Group (JAG)
- ISO standardization of OGC specifications: Simple Features Access, Web Mapping Server Interface
- Jointly develop the Imagery & gridded data Reference Model, Framework, and the OGC Sensor Markup Language
- Geography Markup Language (GML)

ISO Metadata Registry

Cross – reference to other ISO Metadata Profiles e.g.,

- UN Geographic Information Working Group (UNGIWG)
- UN FAO GeoNetwork
- other non-governmental organizations

Adoption of ISO Standards:

Asia Pacific Region

Permanent Committee on GIS Infrastructure for Asia and the Pacific (PCGIAP)

International Steering Committee for Global Mapping (ISCGM)

UNFAO - UN/Foot and Agricultural Organisation

LCCS

Land Cover Classification System

GLCN

Global Land Cover Network

Europäische Aktivitäten

- **INSPIRE**
- **EUROGEOGRAPHICS**
- **CEN/TC 287**
  reestablished
  10./11. November 2003 Plenary
  1 Working Group
  Advisory Group on Outreach

Implications of Standards

Initial International Interoperability

INSPIRE
INfrastructure for SPatial InfoRmation in Europe

European Spatial Data Infrastructure

ISO/TC 211 & Open GIS Consortium standards & specifications

Europe - initial interoperability testing ground

International Interoperability

Comité Européen de Normalisation

Revival - CEN/TC 287 Geographic information

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CEN/TC 287 Secretary
Tel.: +31-15-2 690 286
Fax: +31-15-2 690 253
email: annet.vanderhorn.nen.nl

CEN/TC 287 first period 1992-1999

- **Secretariat** (France, AFNOR, chair François Salgé)
- **became dormant in 1999**

  under secretariat of SNV, Schweizerische Normen-Vereinigung

CEN/TC 287 first period organisation

4 Working Groups

WG1 (Norway, later Netherlands)
Framework for standardization in Geographic Information

WG2 (France)
Models and Applications for Geographic Information

WG3 (UK)
Geographic Information Transfer

WG4 (Germany)
Locational reference systems for Geographic Information

CEN/TC 287 first period results

- **8 ENVs:**
- Reference Model, Spatial Schema, Quality, Metadata, Transfer, Geographic Identifiers, Position, Rules for Application Schema

- **4 reports:**
- Query and Update: Spatial Aspects, Overview, Vocabulary, Conceptual Schema Language

Aktuelle Arbeiten

- **Proposal JRC of EU** (November 2002)
- **CEN enquiry spring 2003**
- **Result**
  - CEN/TC 287 revived
  - Secretariat NEN, the Netherlands
- **First meeting of revived CEN/TC287 in Delft, the Netherlands, on 10-11 November 2003**
  - Chair: Prof. In. Henri Aalders
  - Updated scope
  - Revised business plan
  - Enquiry for WG1, Spatial Data Infrastructures
  - Co-chair Advisory Group on Outreach: Prof. Dr. Hans Knoop
  - Withdrawal of CEN/TC 287 ENVs
  - and other Resolutions

Unterschiede ISO - CEN

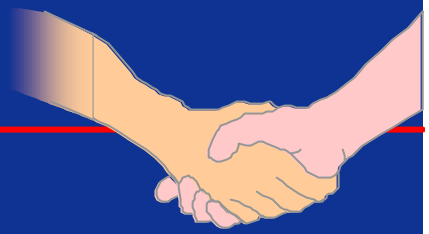
ISO International Organization for Standardization

- P and O members
- DIS ? FDIS ? IS
- Voluntary standards
- Conflicting national standards possible

CEN

- All member bodies voting obligation
- Enquiry ? Formal Vote ? EN
- Compulsory standards
- Withdrawal of conflicting national standards

Scope CEN/TC 287



- Standardisation in the field of **digital geographic information** for Europe:

  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 which is compatible with international usage. They will **support a spatial data infrastructure** at all levels in Europe.

Agenda

Nutzen der Normung

- Berichte und Beispiele
- Einflussfaktoren für Wachstum
- Ergebnisse

Wirtschaftlicher Nutzen - generell - Ergebnisse -

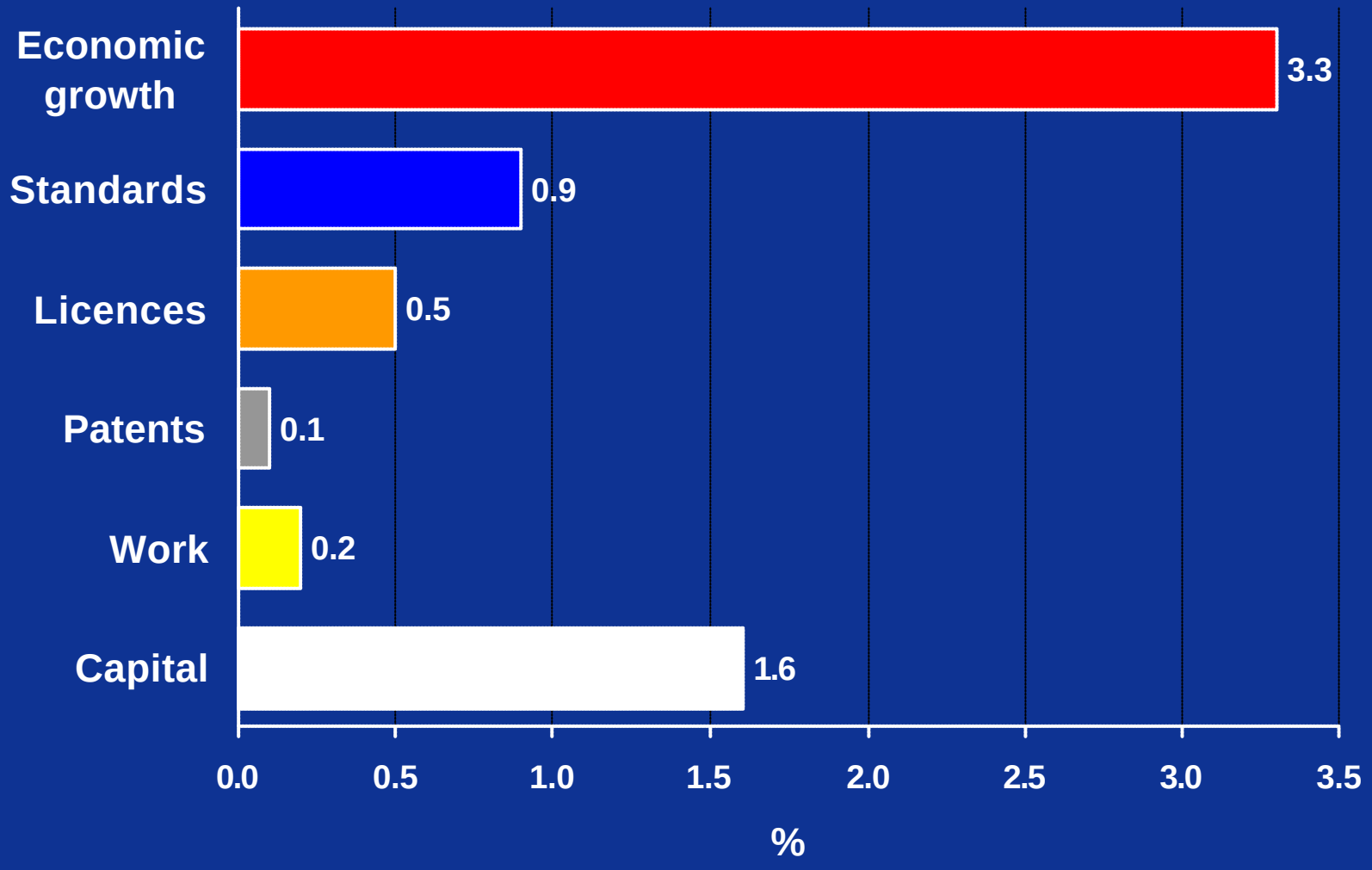
Final report and pratical examples (April 2000)

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.

Einflussfaktoren



Ergebnisse

- 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.

Danke!

Fragen & Diskussion

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