Slides 4: Presentation of Interim Report

The Establishment of Geographic Database for National Rehabilitation and Development Programme in The Union of Myanmar

Presentation of Interim Report

4 February 2003
Yangon, Myanmar

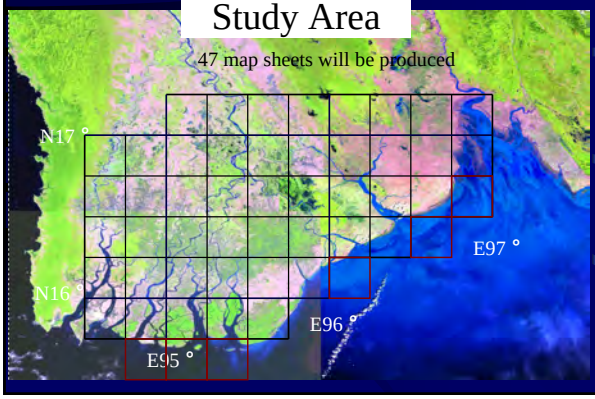
Objective of the Study

- To make Topographic maps
- To prepare Geographic database
- To make a Guideline for GIS
- To transfer advanced mapping technology

Final results(products)

- Aerial photographs
  - Negative Film, Positive Films, Index Map
  - Contact Prints, 2 times enlarged Photos
- Printed Topographic Maps
  - Offset Printed Maps with 6 colors : 47 sheets
  - Edition films for print
- Digital data
  - GIS basic database file
  - Topographic data files

Study Area



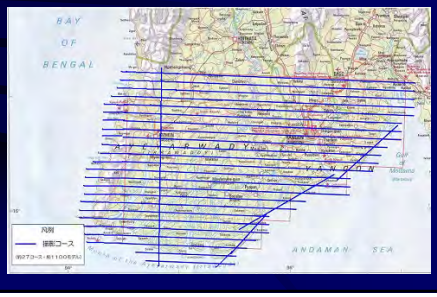
Aerial photography

Specifications of Aerial photography

- Photo scale : 1/50,000
- Length of photography: 4,548 line-km(28 courses)
- Area of photography : 44,700km2
- Over-lap : 60%
- Side-lap : 30%
- Type of photo : Panchromatic

Execution of aerial photography

28 flight courses were taken to cover the whole study area.



3-Dimentional Exposure Position

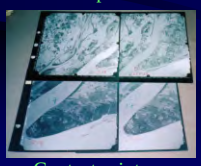
Exposure positions were calculated at 3-dimentional coordinates based on the reference ellipsoid.

001	2	17.243316539	94.452050135	7708.887	447417.622810	0.130	0.130	0.156
001	2	17.244969107	94.495498038	7709.192	447454.655089	0.086	0.086	0.105
001	3	17.245944728	94.538733860	7709.272	447491.409670	0.089	0.090	0.110
001	4	17.246913137	94.582060754	7710.381	447528.163838	0.095	0.095	0.119
001	5	17.247679748	94.625429303	7710.816	447564.360688	0.091	0.091	0.112
001	6	17.248757037	94.668615513	7711.865	447599.722777	0.092	0.092	0.112
001	7	17.249694974	94.711832042	7712.536	447634.527910	0.096	0.097	0.119
001	8	17.250597760	94.754970827	7711.212	447668.776211	0.093	0.093	0.113
001	9	17.251304590	94.798300616	7708.216	447702.746127	0.116	0.116	0.143
001	10	17.252962690	94.841498208	7709.184	447736.437337	0.107	0.107	0.130
001	11	17.253689530	94.885017492	7707.868	447770.129081	0.093	0.093	0.114
001	12	17.254412986	94.928141777	7706.266	447803.263638	0.099	0.099	0.126
001	13	17.255471485	94.971590261	7705.258	447836.398180	0.089	0.089	0.112
001	14	17.256509827	95.014689675	7707.022	447869.254952	0.076	0.076	0.093
001	15	17.257087819	95.057950676	7704.319	447902.110659	0.097	0.097	0.119
001	16	17.257812035	95.101153596	7707.391	447934.967254	0.103	0.103	0.153
001	17	17.258356501	95.144204092	7705.017	447967.545319	0.098	0.099	0.123
001	18	17.259257814	95.187797077	7704.887	448000.401499	0.073	0.073	0.086
001	19	17.260143107	95.230984624	7707.324	448032.980032	0.094	0.095	0.142
001	20	17.260856929	95.273997575	7705.952	448065.279684	0.072	0.073	0.086
001	21	17.261561295	95.317164700	7705.067	448097.579735	0.072	0.072	0.089

Products of aerial photography

Contact printer

Print processor



Contact prints

2-times enlarged prints

Preparation of Digital Image Data

Digital image data was converted to from negative film by high precision scanner and stored on CD-ROMs.

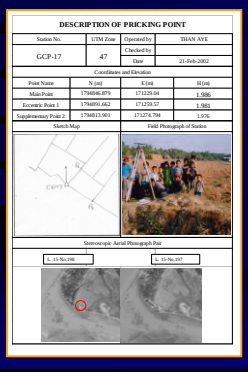
Ground control Survey

Densification of Ground Controls

Observation of GPS

Select point to be able to prick easily.

Result of GPS Survey



DESCRIPTION OF PRICKING POINT

Station No.	UTM Zone	Operated by	THAN AYE
GCP-17	47	Checked by	
		Date	21-Feb-2002

Coordinates and Elevation

Point Name	N (m)	E (m)	H (m)
Main Point	1784846.879	171229.04	1.986
Eccentric Point 1	1784891.662	171259.37	1.981
Supplementary Point 2	1784811.961	171274.784	1.976

Sketch Map | Field Photograph of Station

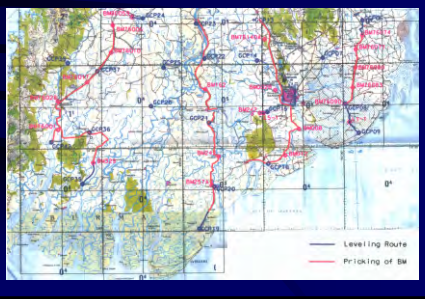
Stereoscopic Aerial Photograph Pair

GPS Survey result and Description of point

Point	Geographical coordinates		Ellipsoidal Height
	Latitude	Longitude	
CP1	17 17 47.59278	96 54 04.66392	12.968
CP2	17 12 27.33679	96 49 13.34660	13.569
CP3	17 06 16.33948	96 49 54.83889	12.210
CP4	16 58 30.15540	96 48 22.77351	11.363
CP5	16 49 07.28353	96 45 20.26332	11.576
CP6	17 15 30.93444	96 38 04.77391	9.459
CP7	17 02 09.32125	96 22 56.96203	5.715
CP8	16 45 29.42592	96 31 04.40737	7.153
CP9	16 34 55.01365	96 35 59.93285	9.286
CP10	16 31 27.61514	96 21 29.28448	6.575

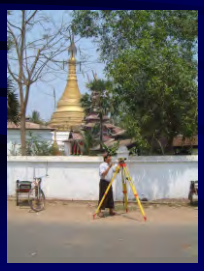
Leveling Route

Four leveling routes were added to keep vertical accuracy which bridging distances is 12.

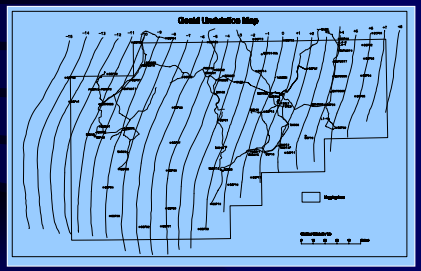


Leveling

Leveling was carried out using Digital Level.



Geoid Undulation Map



Geoid undulation map was prepared by interpolation between observed points.

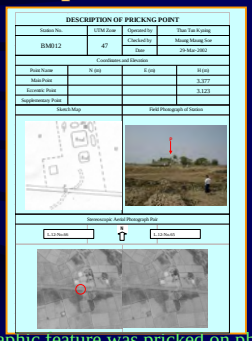
Final results of GCP

Point	Latitude	Longitude	Elevation
CP1	17 17 47.59278	96 54 04.66392	6.838
CP2	17 12 27.33679	96 49 13.34660	8.039
CP3	17 06 16.33948	96 49 54.83889	6.440
CP4	16 58 30.15540	96 48 22.77351	5.563
CP5	16 49 07.28353	96 45 20.26332	5.818
CP6	17 15 30.93444	96 38 04.77391	5.666
CP7	17 02 09.32125	96 22 56.96203	3.674
CP8	16 45 29.42592	96 31 04.40737	3.255
CP9	16 34 55.01365	96 35 59.93285	4.091
CP10	16 31 27.61514	96 21 29.28448	3.205

Finally coordinates of Control points on the reference ellipsoid were determined corrected by Geoid map.

Pricking of Ground Controls

Description of Pricking


DESCRIPTION OF PRICKNG POINT

Station No.	UTM Zone	Operated by	Than Tun Kyaing
BM012	47	Checked by	Maung Maung Soe
		Date	29-Mar-2002

Coordinates and Elevation

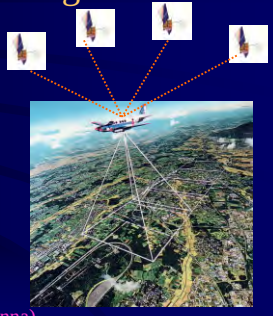
Point Name	N (m)	E (m)	H (m)
Main Point			3.377
Eccentric Point			3.123
Supplementary Point			

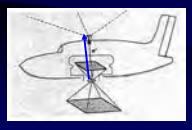
Sketch Map | Field Photograph of Station

Stereoscopic Aerial Photograph Pair

Topographic feature was pricked on photo to identify ground controls and arranged on description of Pricking.

Airborne GPS support aerial triangulation





d(Offset of antenna)

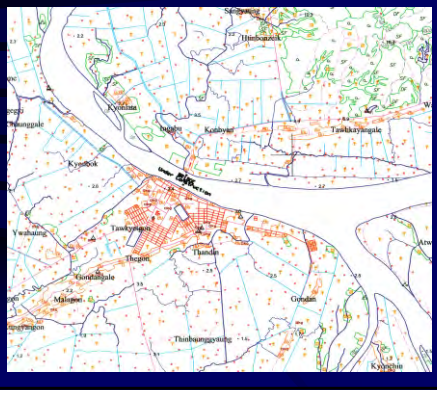
Aerial triangulation

	Axes	Mean	Maximum
Zone46	X	0.602	1.686
	Y	0.828	1.547
	Z	0.006	0.023
Zone47	X	0.375	0.678
	Y	0.585	1.058
	Z	0.007	0.019

Digital plotting

In Japan **In Myanmar**

Plotted features



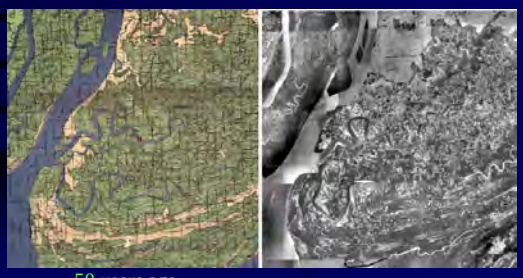
Checking quality of plotting

Field verification

Collection of map annotation

Location survey

Secular change of land use



50 years ago

Current

Land use

Salt field

Cultivated field

Field survey

Classification of road

Classification of bridge

Annotation survey by hearing

Field verification

Technology Transfer

Technology Transfer 1

Technology transfer was carried out OJT.

- Signalization
- GPS Survey

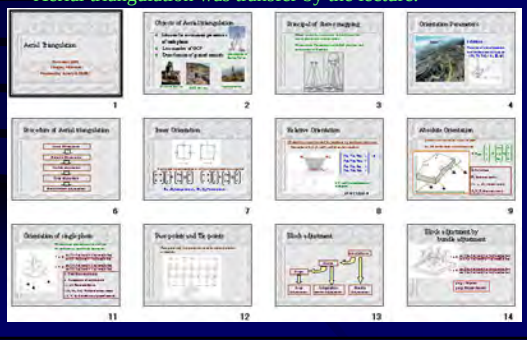
Technology transfer 2

- Leveling
- Pricking

Technology transfer 3
Aerial triangulation

Lecture of aerial triangulation

Aerial triangulation was transfer by the lecture.



Technology transfer 4
Digital Plotting

Counterpart training in Japan

- Roles for survey and mapping agency in Japan
- Roles for private survey company in Japan
- Inspection of this year work in Japan
  - Aerial triangulation
  - Digital plotting
- GIS operation by Arc/View

Aerial triangulation operation

Seminar

Seminar will be held on February 14, 2003.

1. Outline of JICA Project

- Current and future policy of SD
  - Map making of whole land
  - Construction of NSDI
- Rank of JICA project in SD
  - Outline of JICA project
- Reinforcement of digital mapping technology
  - Training of advance mapping technology
  - Promotion of GIS

2. Final results and interoperability

- Explanation of product on the JICA study
  - Paper maps
  - GIS basic database
- Interoperability of GIS basic database(NSDI)
  - Promotion of GIS
  - NSDI used by different user
  - Presentation of standardization for Geographic information in ISO

3. Application of GIS in Japan

- Necessity of GIS
- Introduction of GIS application in Japan
- One application using JICA project data

4. Survey manual

Explanation of advanced technology in mapping

- Ground control survey
- Aerial triangulation
- Digital plotting
- Field identification

The Third year's work

Work items of third year

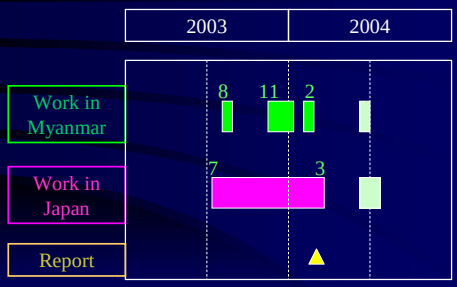
In Myanmar

- Digital compilation
- Map symbolization
- Field completion
- Digital compilation after field completion
- Discussion of Progress report3

In Japan

- Digital compilation
- Digital compilation after field completion
- Map symbolization
- Preparation of Progress report3

Study Work in 2003



Thank you for listening !

Products by the JICA Study and that Interoperability

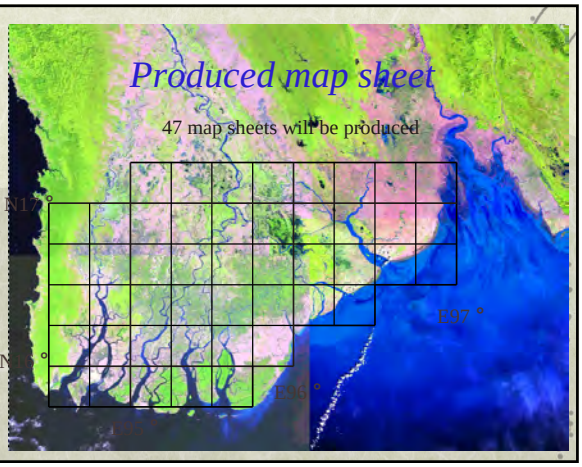
Asia Air Survey Co. LTD.
Junichi KOSEKI

Products in this Study

- Topographic Maps
- Geographic Database
- Manuals

Produced map sheet

47 map sheets will be produced



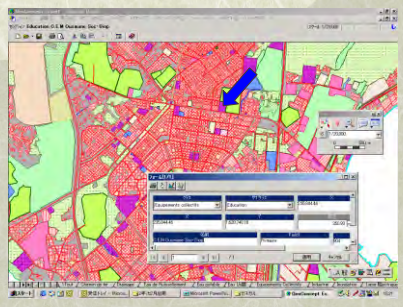
Geographic Database

- Topographic data
- Basic database for GIS

Topographic Data

GIS Basic Database

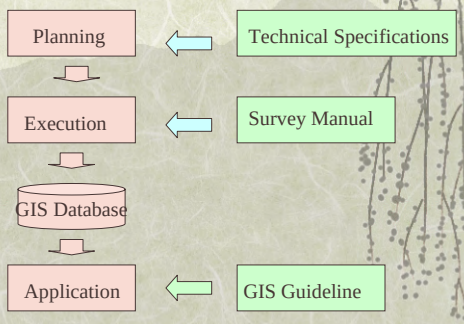
Graphic data with attribute data



Manuals

- Technical Specifications
- Survey Manual
- GIS Guideline

3 Types of Manuals



The Technical Specifications

- To make the work plan to prepare maps
- To control the quality to produce topographic maps
- To standardize map symbols and application rules

The Survey Manuals

The Survey manual contains following work items

- Ground control survey
  (Horizontal control and Vertical controls)
- Aerial triangulation
- Digital plotting
- Field verification

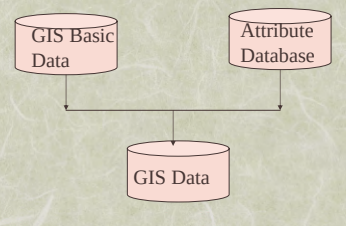
- Digital compilation
- Field completion
- Preparation of maps (Map symbolization)
- Preparation of GIS basic data (Stracturization)

The guideline for GIS

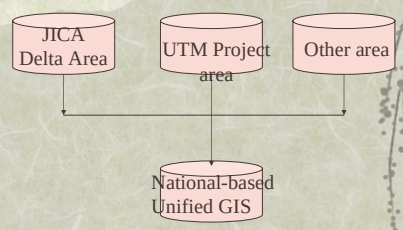
The guideline includes following items.

- Generic explanation of GIS
- Description of necessary specifications for hardware and software
- Description of geographic database
- How to expand geographic database
- How to integrate with existing geographic database

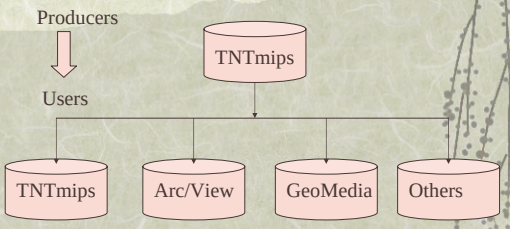
Addition of Attribute Data



Unification of GIS Database



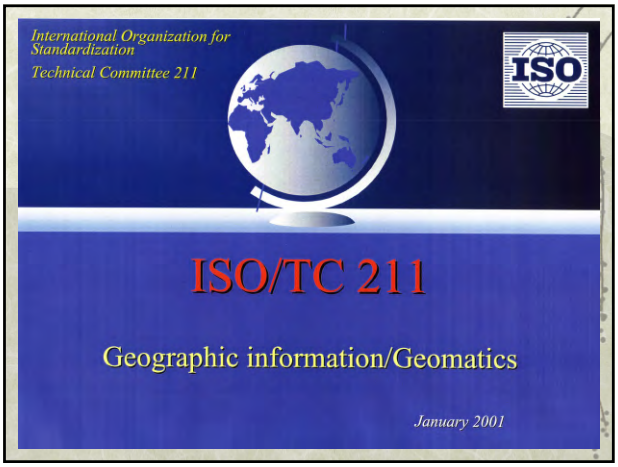
Data-exchange of GIS Data

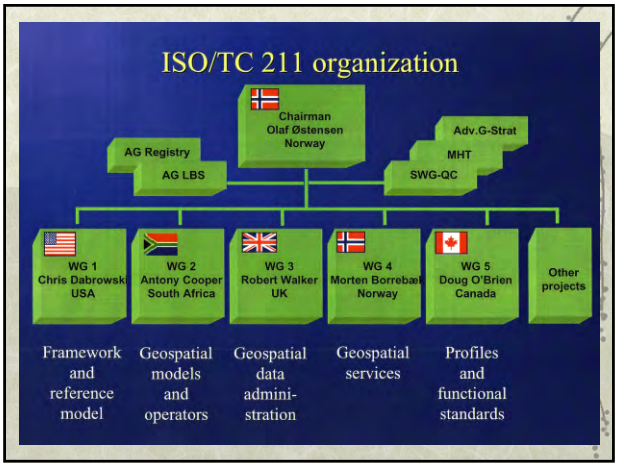


Construction of National Spatial Data Infrastructure

The spatial data infrastructure is necessary

- Policy to utilize the Information infrastructure
- Full equipment for Information and Communication
- Construction of standard to distribute information
- Cooperation among Government, Education and industry
- Preparation of interoperable frame of spatial data





Member list

Observing members 24 (20 O-members, 4 corresponding members)

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

Meeting schedule, 1 of 2

Meeting	Place	Date
1st plenary	Oslo, Norway	November 10-11, 1994
2nd plenary	Reston, VA, USA	August 30-31, 1995
3rd plenary	Seoul, Rep. of Korea	May 30-31, 1996
4th plenary	Sydney, Australia	January 23-24, 1997
5th plenary	Oxford, UK	October 2-3, 1997
6th plenary	Victoria, Canada	March 5-6, 1998
7th plenary	Beijing, China	September 24-25, 1998
8th plenary	Vienna, Austria	March 4-5, 1999
9th plenary	Kyoto, Japan	September 29-30, 1999
10th plenary	Cape Town, South-Africa	March 9-10, 2000

Meeting schedule, 2 of 2

Meeting	Place	Date
11th plenary	Reston, VA, USA	September 7-8, 2000
12th plenary	Lisbon, Portugal	March 8-9, 2001
13th plenary	Adelaide, Australia	October 25-26, 2001
14th plenary	Bangkok, Thailand	May 23-24, 2002
15th plenary	Gyeongju, Rep. of Korea	November 14-15, 2002
16th plenary	Switzerland	May 22-23, 2003
17th plenary	Germany	October/November, 2003
18th plenary	Canada	May, 2004
19th plenary	Kuala Lumpur, Malaysia	November, 2004
20th plenary	Stockholm, Sweden	May/June, 2005

Working Group 1

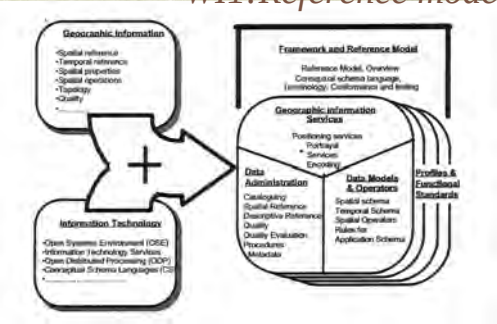
WI:1 Reference model
Discussion of modeling

WI:2 Overview
Explanation of structure of ISO19100 series

WI:3 Conceptual schema languages
UML will be used (Unified Modeling Language)

WI:4 Terminology
WI:5 Conformance and Testing

WI1:Reference model



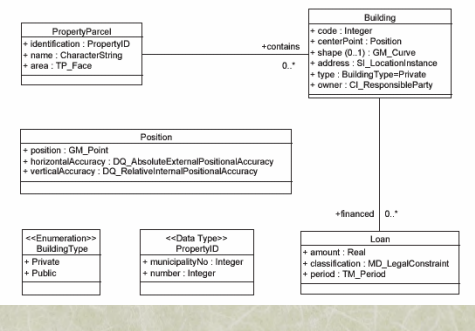
Working Group 2

WI:7 Spatial schema
Definition of position

WI:8 Temporal schema
Definition of time

WI:9 Rules for application schema
Explanation of data structure

Example of UML implementation of feature type



Working Group 3

WI:10 Feature cataloguing methodology
Explanation of how to make geographic features catalogue
WI:11 Spatial referencing by coordinates
Definition of reference ellipsoid and Coordinate system
WI:12 Spatial Referencing by geographic identifiers
Definition of Geo-coding
WI:13 Quality principles
Discussion of Quality
WI:14 Quality evaluation procedures
How to evaluate quality of
WI:15 Metadata
Data file for explanation of detail of database

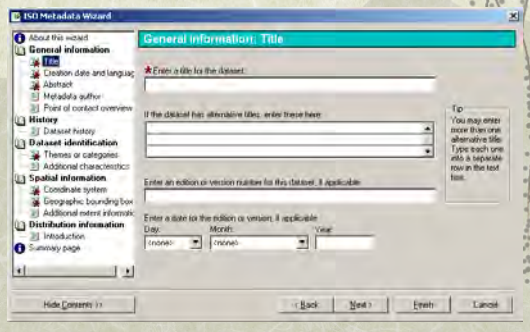
Quality principles

Non-quantitative quality information	Quantitative quality information
Purpose	Completeness
Usage	Logical consistency
Lineage	Positional accuracy
User defined	Temporal accuracy
	Thematic accuracy
	User defined

Metadata

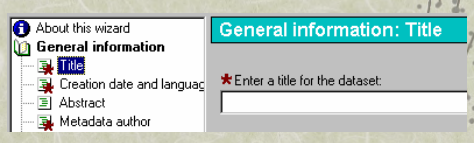
- To adequately describe data we need to use many ISO standards, e.g.
  - 19110: Feature cataloguing methodology
  - 19111: Spatial referencing by coordinates
- No clear way to integrate information defined by multiple parts of ISO 19xxx standards
  - If there isn't a standard XML DTD, the information isn't interoperable

ISO metadata editor

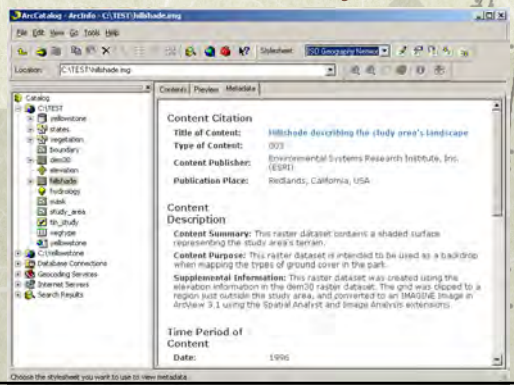


ISO metadata editor

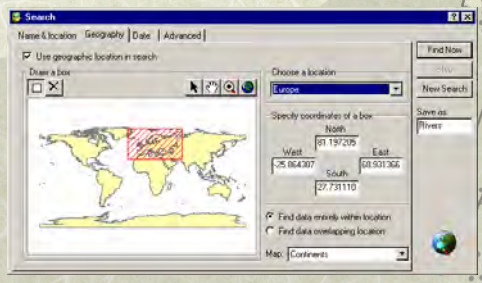
- Red asterisks indicate mandatory elements
  - Which pages have mandatory elements
  - Which elements on a page are mandatory
  - Disappear when information is provided



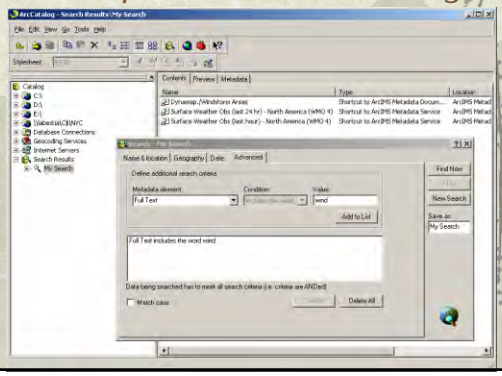
ISO stylesheets



Search for data in ArcCatalog



Search for data in ArcCatalog



Working Group 4

WI:16 Positioning Service
Discussion of GPS

WI:17 Portrayal
How to draw topographic data

WI:18 Encoding
XML will be used to exchange data (eXtended Markup Language)

WI:19 Services
Explanation of Geographic information service

Example of XML

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema version="1.0" xmlns:xs="http://www.w3.org/2001/XMLSchema">

<!--PART 1 - Objects with identity-->
  <xs:group name="Object">
    <xs:choice>
      <xs:element name="Road" type="Road"/>
      <xs:element name="Intersection" type="Intersection"/>
    </xs:choice>
  </xs:group>
  <!--PART 2 - Type declarations-->
  <xs:complexType name="Road">
    <xs:sequence>
      <xs:element name="roadNo" type="Integer"/>
      <xs:element name="situation" type="Sequence_RoadSituation_"/>
      <xs:element name="segment" type="GM_Curve"/>
      <xs:element name="intersection" type="ref_Intersection" minOccurs="2" maxOccurs="2"/>
    </xs:sequence>
    <xs:attributeGroup ref="IM_ObjectIdentification"/>
  </xs:complexType>
  <xs:complexType name="Intersection">
    <xs:sequence>
      <xs:element name="pos" type="GM_Point"/>
    </xs:sequence>
    <xs:attributeGroup ref="IM_ObjectIdentification"/>
  </xs:complexType>
```

Working Group 5

WI:6 Profile
How to make specifications to obey the ISO19100's

WI:20 Functional standards
Existing standards are also contained in the ISO19100's family.

DIGEST by NATO
S-57 by IHO
GDF by Digital road database

Conclusion

The goal of ISO/TC 211 is to develop a family of international 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
- and ease the establishment of geospatial infrastructures on local, regional and global level.

… and cooperate with others in achieving this !