

Specification for the production of 1:50,000 scale
topographical maps ver. 1

1st July 2007

Survey of Kenya, Ministry of Lands

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1 Outline

1.1 Creation of information for the spatial data product specification

Title: Specification for the production of 1:50,000 scale topographical maps ver. 1

- Date: 1st July 2007
- Author: Survey of Kenya
- Language: English
- Application field: Topographic map
- Document format: PDF

1.2 Purpose

The purpose of this specification which conforms to KSISO geographical information standard is to show and concretely designate the file constitution of 1:50,000 spatial data bases which were drawn up as application schema and metadata profile.

1.3 Spatial extent

The spatial extent of the spatial data product makes the range where all territory of Kenya is included.

1.4 Temporal extent

- The original maps have been created from April 1950 to June 1965.
- Digitization work has been done from April 2007 to November 2007

1.5 Reference standards

This specification adopts the following profile:

- Kenya profile for geographic standards (KPGIS) Ver.1.0
- ESRI white paper shape file format definition, June 1998, Environmental Systems Research Institute. Inc.

1.6 Terminology and definitions

Terminology and definitions used in this document are as follows;

- Kenya profile for geographic standards (KPGIS) Ver.1.0

1.7 Abbreviations

Abbreviations that have been used in this document are as follows;

- NSDI: National Spatial Data Infrastructure
- KNSDI: Kenyan National Spatial Data Infrastructure
- UML: Unified Modeling Language

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- KPGIS: Kenya profile for geographic standards
 - KMP: Kenyan Metadata Profile

2 Domain of Validity

Domain of validity of the specification is as follows:

2.1 Identification of domain of validity

In this specification the topographic map which conforms to KPGIS 50,000 (National spatial data infrastructure) is applied.

2.2 Applicable level

Dataset

3 Data Product Identification

Identification of domain of validity for the data products specification is as follows:

3.1 Name of spatial data product

Specification for the production of 1:50,000 scale topographical maps ver. 1

3.2 Date

1st July 2007

3.3 Contact information

- Contact: Survey of Kenya, Ministry of Lands
- Telephone: +254(0)208562902
- E-mail: knsdi_secretariat@yahoo.com

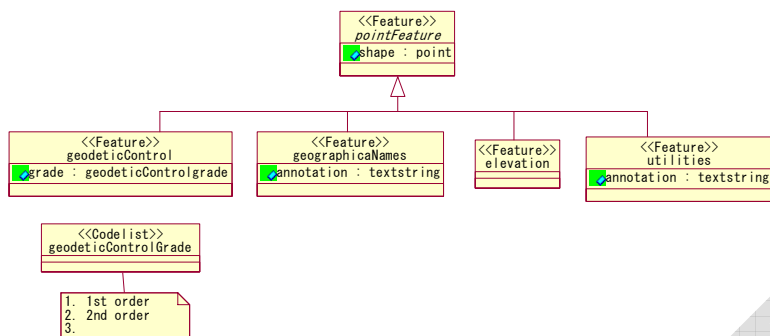
3.4 Geographical description

The whole of Kenyan territory

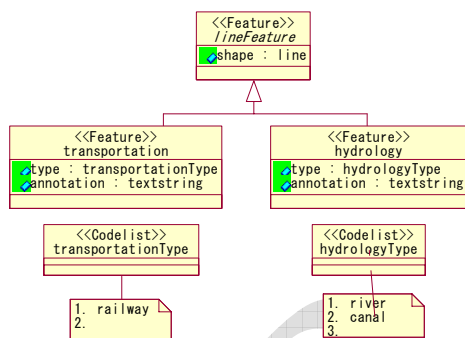
4 Data contents and structure

4.1 UML static class diagram for application schema

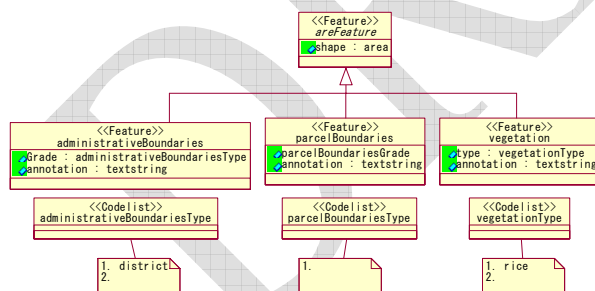
4.1.1 pointFeature



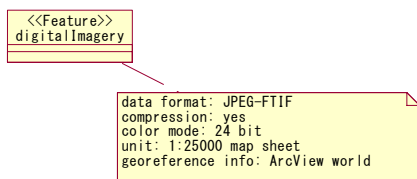
4.1.2 lineFeature



4.1.3 areaFeature



4.1.4 digitalImagery



4.2 Documents for application schema

4.2.1 pointFeature

Feature	pointFeature		
Definition	Geodetic control points, geographical names, elevation, utilities		
Parent class	None		
Abstract / Concrete	abstract		
Attributes			
Name	Definition	Collection condition	Domain
Shape: Point	Center line of feature	-	Within geographic extent

Feature	geodeticControl		
Definition	Trigonometric controls, cadastral controls, level controls.		
Parent class	pointFeature		
Abstract / Concrete	Concrete		
Attributes			
Name	Definition	Collection condition	Domain
Shape: Point	-	-	Within geographic extent
Grade: geodeticControlGrade	1. 1 st order 2. 2 nd order 3. 3 rd order 4. 4 th order	-	Within number from code list of geodeticControlGrade

Feature	GeographicalNames		
Definition	Annotations		
Parent class	pointFeature		
Abstract / Concrete	Concrete		
Attributes			
Name	Definition	Collection condition	Domain
Shape: Point	-	-	Within geographic extent
Annotation: textstring	-	-	

Feature	Elevation		
Definition			
Parent class	pointFeature		
Abstract / Concrete	Concrete		
Attributes			
Name	Definition	Collection condition	Domain
Shape: Point	Height above mean sea level	-	Within geographic extent

Feature	utilities		
Definition	airports/airfields, postoffices, schools, hospitals, clinics, police stations,		
Parent class	pointFeature		
Abstract / Concrete	Concrete		
Attributes			
Name	Definition	Collection condition	Domain
Shape: Point/centre line of feature	Center line of feature	-	Within geographic extent
Annotation: textstring			

4.2.2 lineFeature

Feature	lineFeature		
Definition	Transportation, hydrology		
Parent class	None		
Abstract / Concrete	Abstract		
Attributes			
Name	Definition	Collection condition	Domain

Shape: Line	-	-	Within geographic extent
Annotation: textstring	-	-	

Feature	Transportation		
Definition			
Parent class	lineFeature		
Abstract / Concrete	Concrete		
Attributes			
Name	Definition	Collection condition	Domain
Shape: line	-	-	Within geographic extent
Type: transportationtype	<ol style="list-style-type: none"> 1. Railway 2. Roads 		
Annotation: textstring			

Feature	Hydrology		
Definition			
Parent class	lineFeature		
Abstract / Concrete	Concrete		
Attributes			
Name	Definition	Collection condition	Domain
Shape: line/polygon	-	-	Within geographic extent
Type: hydrologytype	<ol style="list-style-type: none"> 1. River 2. Canal 3. Stream 		
Annotation: textstring			

4.2.3 areaFeature

Feature	areaFeature		
Definition	Administrativeboundaries, parcelBoundaries, vegetation		
Parent class	None		
Abstract / Concrete	Abstract		
Attributes			
Name	Definition	Collection condition	Domain
Shape: area	-	-	Within geographic extent

Feature	administrativeBoundaries		
Definition			
Parent class	areaFeature		
Abstract / Concrete	Concrete		
Attributes			
Name	Definition	Collection condition	Domain
Shape: area	-	-	Within geographic extent
Grade: administrativeBoundaryGrade Type: administrativeBoundaries	<ol style="list-style-type: none"> 1. International 2. National 3. Provincial 4. District 5. Division 6. Location 7. Sublocation 		

Annotation: textstring			
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Feature	parcelBoundaries		
Definition			
Parent class	areaFeature		
Abstract / Concrete	Concrete		
Attributes			
Name	Definition	Collection condition	Domain
Shape: area	-	-	Within geographic extent
Grade: parcelBoundariesGrade Type: parcelBoundaries	<ol style="list-style-type: none"> 1. Urban 2. Rural 		
Annotation: textstring			

Feature	vegetation		
Definition			
Parent class	areaFeature		
Abstract / Concrete	Concrete		
Attributes			
Name	Definition	Collection condition	Domain
Shape: area	-	-	Within geographic extent
Type: vegetationType	<ol style="list-style-type: none"> 1. Rice 2. Forest 3. Thicket 4. Bamboo 5. Riverine Trees 6. Coffee 7. Sisal 8. Sugarcane 9. Coconut 10. Palm 11. Wattle 12. Cashewnut 13. Woodland 14. Scrub 15. Mangrove Swamp 16. Tree Swamp 17. Papyrus Swamp 		
Annotation: textstring			

4.2.4 digitalImagery

Feature	digitalImagery		
Definition			
Parent class	None		
Abstract / Concrete	Abstract		
Attributes			
Name	Definition	Collection condition	Domain
	-	-	Within geographic extent

Feature	digitalImagery		
Definition			
Parent class			
Abstract / Concrete	Concrete		
Attributes			
Name	Definition	Collection condition	Domain

data format: JPEG compression: Yes colour mode: 24 bit unit: 1:50,000 map sheet georeference info: ArcView world	-	-	Within geographic extent

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5 Reference System

5.1 Spatial reference system

Compound coordinates reference system	
Identical name	Clarke 1880, Mean sea level (Mombasa) UTM zone37
Coordinates reference system 1 (Horizontal component)	
Identical name	Clarke 1880, UTM zone 37
Domain of validity	Nairobi
Datum	
Identical name	New (1960) Arc
Type	Geodetic
Fixed (False) origin	500,000m Easting, 10,000,000m Northing
Ellipsoid	
Identical name	Clarke 1880 (Modified)
Semi major axis	6378249.145
Inverse flattening	1 / 293.465....
Prime meridian	
Identical name	Greenwich meridian
Greenwich longitude	39deg 00min East of Greenwich
Coordinate system	
Identical name	UTM zone 37
Type	Projected
Number of dim	2
Coordinate axis	
Name	Northing
direction	Positive to true north at origin
Unit identifier	Meter
Coordinate axis	
Name	Easting
Direction	Positive to true east at origin
Unit identifier	Meter
Coordinates reference system 2 (Vertical component)	
Identical name	Mean sea level (Mombasa)
Domain of validity	Nairobi
Datum	
Identical name	Mean sea level (Mombasa)
Type	Altitude
Fixed origin	0.00.
Coordinate system	
Identical name	Altitude
Type	Gravity
Number of dim	1
Coordinate axis	
Name	Altitude
Direction	Vertical from geoidal surface
Unit identifier	meter

5.2 Temporal reference system

- GC: the Gregorian calendar
- EAST: East African Standard Time

6 Data quality

6.1 Quality requirements and evaluation procedure

6.1.1 Completeness

(1) Excess

Domain of validity	Data quality evaluation index	
geodeticControl, geographicalName, utilities, transportation, hydrology, administrativeBoundaries, parcelBoundaries, vegetation	Name	Excess percentage
	Definition	Manually compare visible features in the area by referencing ortho photo on prints. And compare invisible features with existing information
	Quality conformity level	Correctness: 2σ (95.44%)

Quality evaluation procedure

Manually compare visible features in the area by referencing ortho photo on prints. And compare invisible features with existing information.

Exterior: Use other data source,

Manual: Require manual examination, Quantitative: Calculate percentage of error,

Sampling: Evaluate 10% (Percentage of Area) or more randomly extracted on each map sheet.

(2) Omission

Domain of validity	Data quality evaluation index	
geodeticControl, geographicalName, utilities, transportation, hydrology, administrativeBoundaries, parcelBoundaries, vegetation	Name	Omission percentage
	Definition	Manually compare visible features in the area by referencing ortho photo on prints. And compare invisible features with existing information
	Quality conformity level	Correctness: 2σ (95.44%)

Quality evaluation procedure

Manually compare visible features in the area by referencing ortho photo on prints. And compare invisible features with existing information.

Exterior: Use other data source,

Manual: Require manual examination, Quantitative: Calculate percentage of error,

Sampling: Evaluate 10% (Percentage of Area) or more randomly extracted on each map sheet.

6.1.2 Logical consistency

(1) Conceptual consistency

Not adopted

(2) Domain consistency

Domain of validity	Data quality evaluation index	
All features except digitalImagery	Name	Feature item range error percentage
	Definition	Examines field name, field type, field size, multiplicity, record valid range.
	Quality conformity level	Feature item range error: 0%
Quality evaluation procedure		
Execute check program which examines field name field type, field size, multiplicity, record valid range. <u>I</u> nterior: Use only dataset itself, <u>A</u> utomatic: Computerized processing, <u>Q</u> uantitative: Calculate percentage of error, <u>F</u> ull: Evaluate all contents.		

Domain of validity	Data quality evaluation index	
All features	Name	Geographical extent error percentage
	Definition	Check Dataset extent is only inside map sheet border
	Quality conformity level	Geographical extent error: 0%
Quality evaluation procedure		
Check Dataset extent is only inside map sheet border using GIS software functions. <u>I</u> nterior: Use only dataset itself, <u>A</u> utomatic: Computerized processing, <u>Q</u> uantitative: Calculate percentage of error, <u>F</u> ull: Evaluate all contents.		

(3) Formal consistency

Domain of validity	Data quality evaluation index	
All features	Name	Omission percentage
	Definition	Data can be opened by ArcGIS as shape format with no opening error. Data can be opened by ArcGIS as GeoTiff format with no opening error (for raster).
	Quality conformity level	Error: 0%
Quality evaluation procedure		
Data can be opened by ArcGIS as shape format with no opening error. Data can be opened by ArcGIS as GeoTiff format with no opening error (for raster). <u>I</u> nterior: Use only dataset itself, <u>A</u> utomatic: Computerized processing, <u>Q</u> uantitative: Calculate percentage of error, <u>F</u> ull: Evaluate all contents.		

(4) Topological consistency

Not adopted

6.1.3 Positional accuracy

(1) Absolute exterior positional accuracy

Not adopted

(2) Relative interior positional accuracy

Domain of validity	Data quality evaluation index	
utilities, transportation, hydrology	Name	XY coordinate error
	Definition	Manually compare visible features by referencing ortho photo (or re-observation) at least 100 places on prints.
	Quality conformity level	XY error Max: 0.7mm or less
Quality evaluation procedure		
Manually compare visible features by referencing ortho photo (or re-observation) at least 100 places on prints. <u>Exterior</u> : Use other data source, <u>Manual</u> : Require manual examination, <u>Countable</u> : Count total number of error <u>Sampling</u> : Evaluate 10% (Percentage of Area) or more randomly extracted on each map sheet		

(3) Gridded data positional accuracy

Not adopted

6.1.4 Temporal accuracy

(1) Accuracy of a time measurement

Not adopted

(2) Temporal consistency

Not adopted

(3) Temporal validity

Not adopted

6.1.5 Thematic accuracy

(1) Thematic Classification Correctness

Domain of validity	Data quality evaluation index	
geodeticControl, geographicalName, elevation, utilities, transportation, hydrology, administrativeBoundaries, parcelBoundaries, vegetation	Name	Thematic classification correctness
	Definition	Comparison between collected information and dataset
	Quality conformity level	Correctness: 2σ (95.44%)
Quality evaluation procedure		
Comparison between collected information and dataset Manually compare all visible features in the area by referencing ortho photo on prints. <u>Exterior</u> : Use other data source, <u>Manual</u> : Require manual examination <u>Quantitative</u> : Calculate percentage of error, <u>Sampling</u> : Evaluate 10% (Percentage of Area) or more randomly extracted on each map sheet		

(2) Non Quantitative Attribute Accuracy

Not adopted

(3) Quantitative Attribute Accuracy

Not adopted

7 Data product distribution

7.1 Format name

- ArcView shape file format

7.2 Encoding rules

- ESRI white paper shape file format definition, June 1998, Environmental Systems Research Institute. Inc.

7.3 Language encoding method

- UTF-8

7.4 Language

- English

7.5 Unit of product

- Map sheet of topographic map 1:50,000

7.6 Media name (Option)

- CD-ROM

8 Metadata (Option)

The Metadata for this product shall be prepared based on the following conditions;

8.1 Metadata format

- Specified profile is KMP2.0.

8.2 Description of the detailness (Option)

Describe as many option items as possible especially “delivery information” elements and “data quality information” elements. These are mandatory.

8.3 Metadata creation unit

Metadata shall be prepared for each map sheet unit

9 Others

9.1 Portrayal schema (Option)

Not adopted

9.2 Maintenance of spatial data products (Option)

The products shall be maintained every 5 years.