Republic of Kosovo
Kosovo Cadastral Agency (KCA)

Human Resource Development Project on Geo-Spatial Information of Kosovo

Final Report

May 2015

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

PASCO CORPORATION
KOKUSAI KOGYO CO., LTD.

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1 euro = 129.83 yen (designated by JICA as of April 2015)

Photos

Counterpart (KCA)

Various Discussions with KCA

First Seminar

Second Seminar

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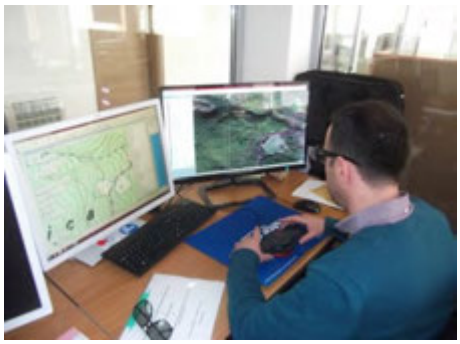
<tr><td> 
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Abbreviations

BKG	Bundesamt für Kartographie und Geodäsie (German Federal Agency for Cartography and Geodesy)
DeGAP	Department for Electronic Governance and Administrative Processes
DMC	Digital Mapping Camera
DTP	Desktop Publishing
EPA	Environmental Protection Agency
ETRS80	European Terrestrial Reference System 1980
EU	European Union
GCP	Ground Control Point
GIS	Geographical Information System
GML	Geography Markup Language
GNSS	Global Navigation Satellite System
GPS	Global Positioning System
GRS80	Geodetic Reference System 1980
IGN	Institut Géographique National (National Geographic Institute, France)
ISP	Institute of Spatial Planning
JPGIS	Japan Profile for Geographic Information Standards
KAS	Kosovo Agency of Statistics
KCA	Kosovo Cadastral Agency
KCLIS	Kosovo Cadastre Land Information System
KOPOS	Kosovo Positing System
MEI	Ministry of European Integration
MEP	Ministry of Environment Protection
MESP	Ministry of Environment and Spatial Planning
MI	Ministry of Infrastructure
MPA	Ministry of Public Administration
NSDI	National Spatial Data Infrastructure
NSII	National Spatial Information Infrastructure
USGS	Unite States Geological Survey

1. Outline of the Project

1 . 1. Background and Objectives of the Project

The Republic of Kosovo (hereinafter referred to as Kosovo), which was once an autonomous province of the Republic of Serbia, declared independence in 2008. It has an area of 10,887 km^2 and a population of approx. 1.82 million (World Bank statistics 2013).

The Government of Kosovo is addressing various issues including the establishment of a legal system and economic growth and is planning to formulate a master plan to develop the Spatial Plan of Kosovo for urban and regional development and conservation of the natural environment. Therefore, the government is in need of highly-reliable (1/25,000) national base maps for the formulation of such plan. However, the only national base maps (1/25,000) that the government had at the commencement of this project were printed maps created in the 1970s. In addition, the counterpart organization, KCA, has neither experience in creating topographic maps nor sufficient engineers, equipment or budget for collecting accurate topographic information.

The Government of Kosovo is also planning to introduce "E-Government" as part of the reform of public administration. Its introduction will enable online provision of public and administrative services and various types of information. Its introduction will also require the creation of digital topographic maps and GIS data and the establishment of NSDI and a Geo-Portal.

The purposes of this project are to develop 1/25,000 digital topographic maps and fundamental GIS data, which have a wide range of applicability, study ways to promote their utilization and enhance awareness of the maps and data, and to transfer the relevant technologies to KCA. The outputs of this project shall be the first step towards the solution of various problems faced by the Government of Kosovo.

The Project will be implemented for a period of approx. 20 months, from October 2013 to May 2015.

1 . 2. Project Purpose

The following purposes were adopted for the achievement of its objectives of the objectives mentioned above.

Project purpose:

- **Development of geo-spatial data***
- **Development of human resources (of KCA) to be engaged in geo-spatial data-related work**
- **Promotion of the utilization of geo-spatial data**

Outputs:

- **1/25,000 digital topographic map**
- **1/25,000-level GIS data**
- **Development of specifications necessary for the creation, revision and provision of geo-spatial data**
- **Development of human resources relating to geo-spatial data**

* Hereinafter, the combination of the digital topographic map and the GIS data will be referred to as "geo-spatial data".

1.3. Project Target Area

Figure 1-1 shows the original target area of the Project agreed during the Detailed Design Survey. KCA and the Project Team agreed that the area indicated in Figure 1-2 should be the target area in the discussion on specifications. The revised target area includes approx. 9,863 km^2 of the territory of Kosovo (of its total land area of 10,887 km^2).

The details of the discussion that led to the decision on the new target area are described in "[4] Discussion on Specifications" in Chapter 2.2 Details of Project Implementation.

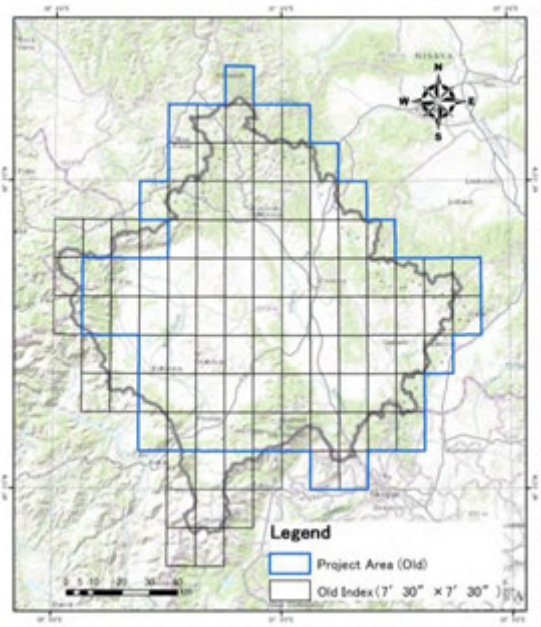


Figure 1-1 Target Area of the Project (Original)

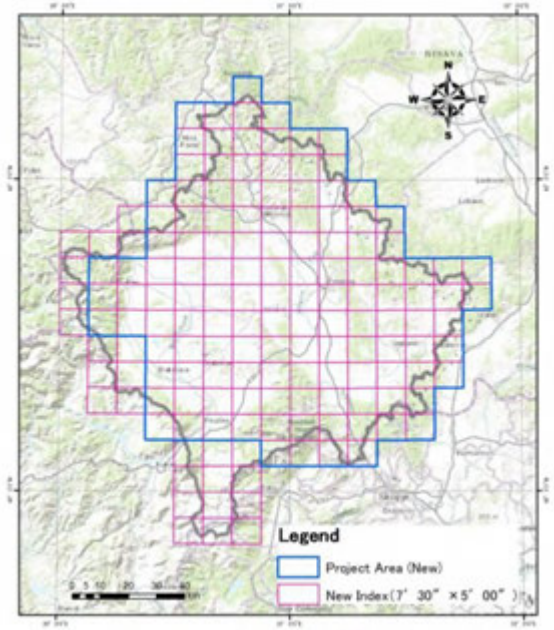


Figure 1-2 Target Area of the Project (After revision)

1.4. Project Workflow

The workflow of the Project is as shown in Figure 1-3.

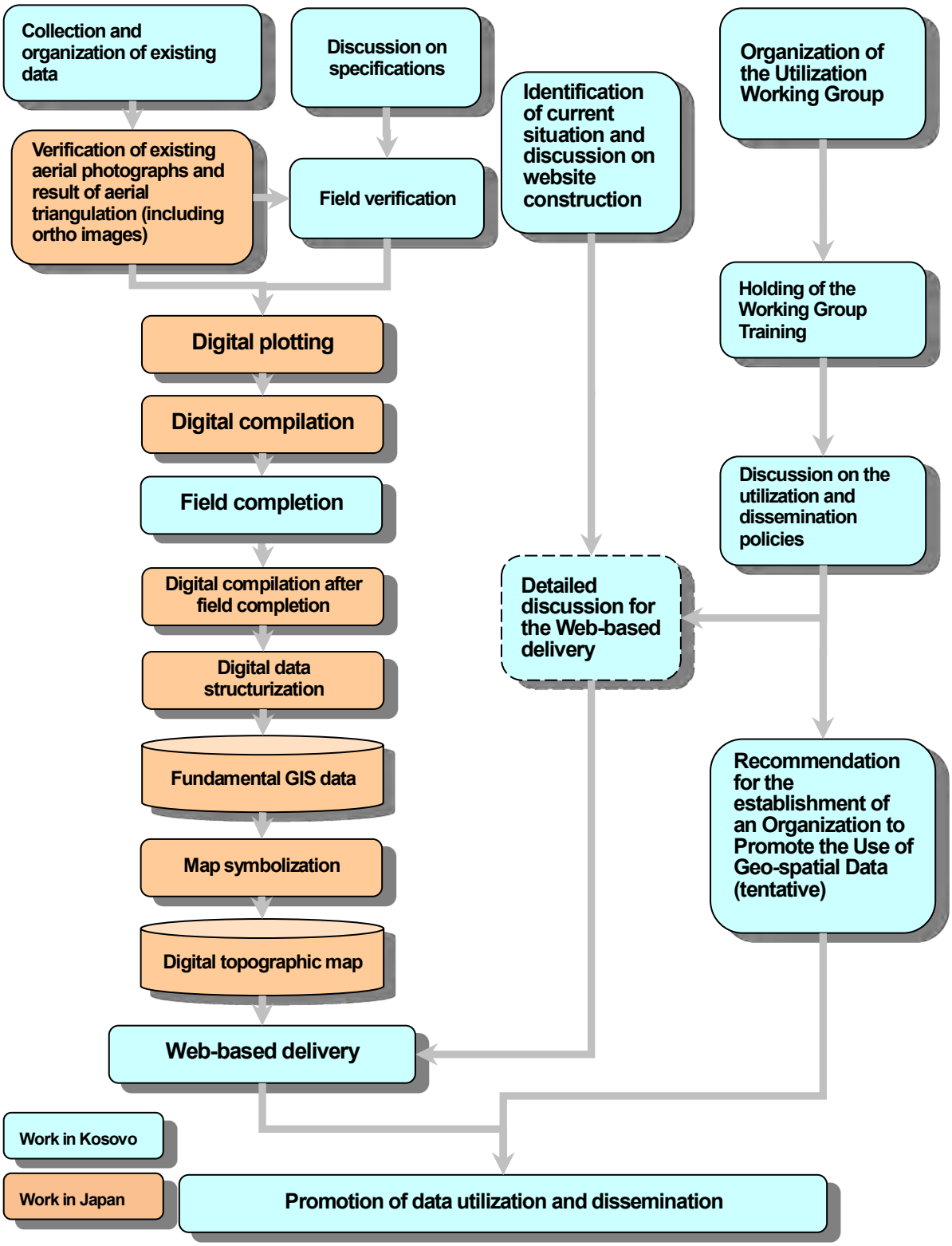


Figure 1-3 Workflow

1.5. Project Implementation Structure

The structures for the Project implementation on the Kosovo side and the Project Team are shown in Figure 1-4.

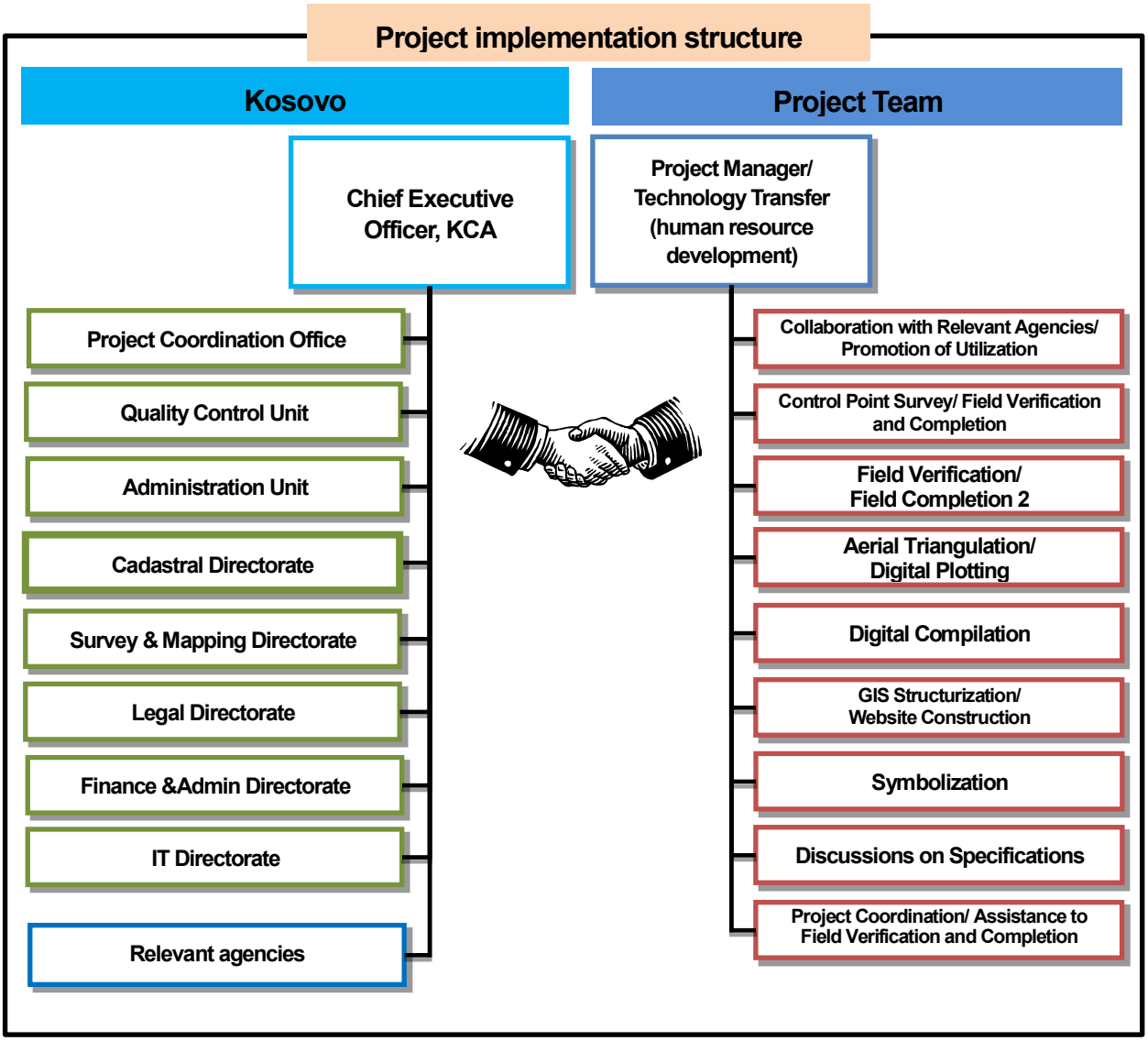


Figure 1-4 Project Implementation Structure

1.6. Composition of Project Team Members and their Responsibilities

The work details of each Project Team member are as shown in Table 1-1.

Table 1-1 Work Details of Each Project Team Member

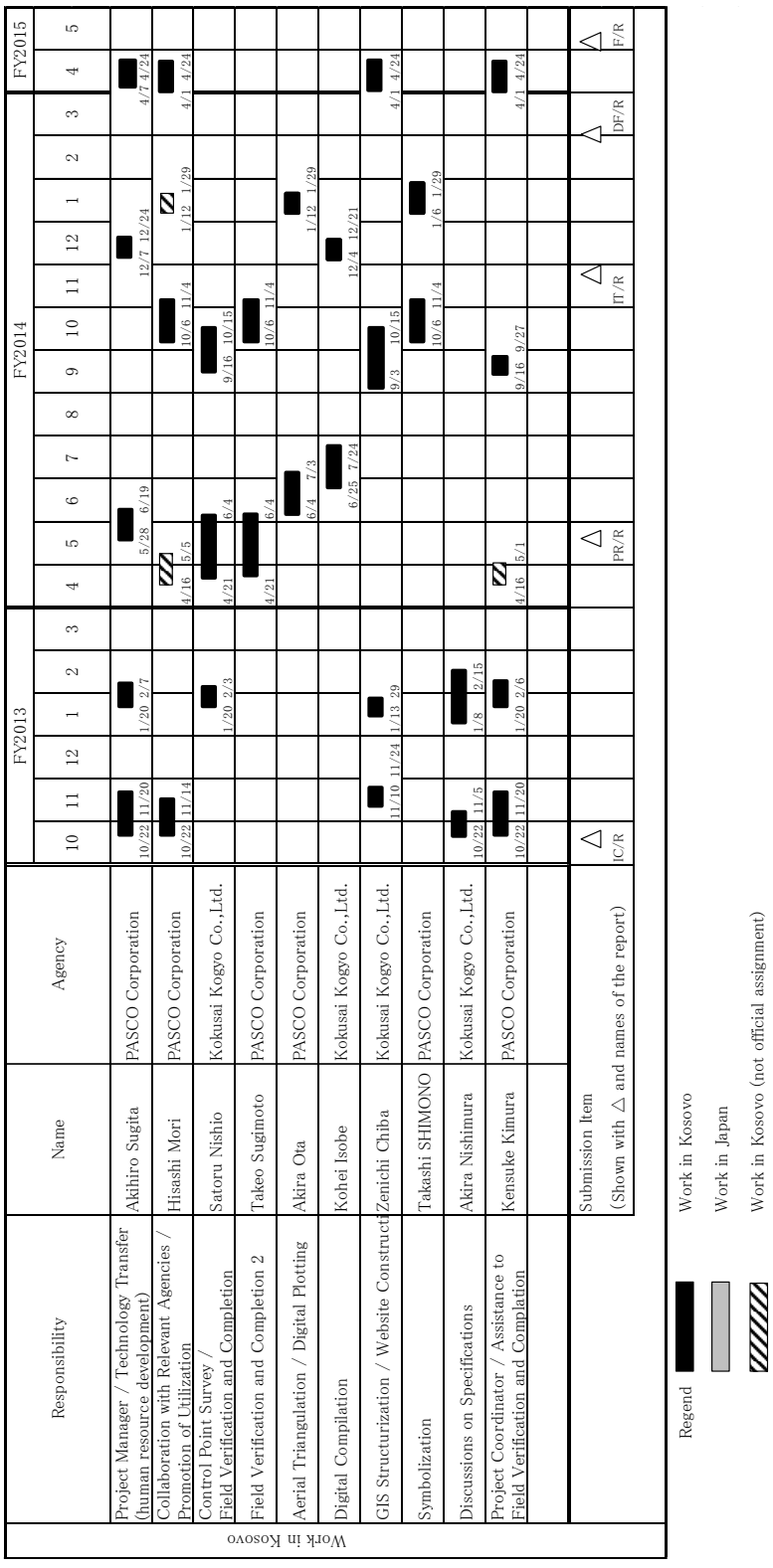
Name	Responsibility	Work details
Akihiro Sugita	Project Manager/ Technology Transfer (human resource development) Planning	Overall management of the work (in the field and in Japan)
		Formulation and overall review of technology transfer (human resource development) plan
		Discussions with relevant agencies
		Preparation for and holding of the utilization seminar
		Preparation of reports as well as explanation and discussion on the reports
Hisashi Mori	Collaboration with Relevant Agencies/ Promotion of Utilization	Discussions and technology transfer concerning promotion of the utilization of outputs
		Contact for discussions and collaboration with relevant agencies
		Preparation for and holding of the utilization seminar
		Preparation of reports as well as explanation and discussion on the reports
Satoru Nishio	Control Point Survey/ Field Verification and Completion	Implementation and management of local subcontracting (field verification and field completion)
		Creation of manuals and technology transfer concerning control point survey, field verification and field completion
		Preparation of reports as well as explanation and discussion on the reports
Takeo Sugimoto	Field Verification and Completion 2	Implementation and management of local subcontracting (field verification and field completion)
		Creation of manuals and technology transfer concerning field verification and field completion
		Preparation of reports as well as explanation and discussion on the reports
Akira Ota	Aerial Triangulation/ Digital Plotting	Creation of manuals and technology transfer concerning aerial triangulation and digital plotting
		Preparation of reports as well as explanation and discussion on the reports
Kohei Isobe	Digital Compilation	Creation of manuals and technology transfer concerning digital compilation
		Preparation of reports as well as explanation and discussion on the reports
Zenichi Chiba	GIS Structurization/ Website Construction	Creation of manuals and technology transfer concerning GIS structurization
		Discussions on website utilization policy and website construction
		Preparation of reports as well as explanation and discussion on the reports
Takashi Shimono	Symbolization	Creation of manuals and technology transfer concerning symbolization
		Preparation of reports as well as explanation and discussion on the reports
Akira Nishimura	Discussions on Specifications	Discussions on the specifications on the quality of outputs and map symbol rules
		Preparation of reports as well as explanation and discussion on

		the reports
Kensuke Kimura	Project Coordination/ Assistance to Field Verification and Completion	Arrangements and coordination with parties in Japan and in Kosovo
		Preparation for and holding of the utilization seminar
		Assistance to field verification/field completion
		Preparation of reports as well as explanation and discussion on the reports

1.7. Assignment Result of Project Team Members

Table 1-2 shows the assignment result of the Project Team members.

Table 1-2 Assignment Result of Project Team Members



1 . 8. Outputs of the Project

Outputs of the Project are as follows:

1 . 8 . 1. Development of Geo-spatial Data

Table 1-3 Data List

Item	Area/Quantity	Remarks
1/25,000 topographic map data	9,863 km^2	90 % of the total land area of Kosovo
1/25,000 fundamental GIS data	9,863 km^2	
1/25,000 topographic maps in PDF	130 map sheets	
Results of the field verification	1 set	Results of the verification of the information on topography, features, etc. and administrative boundaries and names

1 . 8 . 2. Study Report

Table 1-4 List of Reports

Item			Quantity	Remarks
Study report (including digital data (in PDF format))	Inception Report		5 copies in Japanese 15 copies in English	Including 10 copies in English to the Government of Kosovo
	Progress Report		5 copies in Japanese 15 copies in English	Including 10 copies in English to the Government of Kosovo
	Interim Report		5 copies in Japanese 15 copies in English	Including 10 copies in English to the Government of Kosovo
	Draft Final Report			
		Main report	15 copies in English	Including 10 copies in English to the Government of Kosovo
		Summary	15 copies in English	Including 10 copies in English to the Government of Kosovo
		Summary in Japanese	5 copies in Japanese	
	Final Report			
		Main report	15 copies in English	Including 10 copies in English to the Government of Kosovo
		Summary	15 copies in English	Including 10 copies in English to the Government of Kosovo
		Summary in Japanese	10 copies in Japanese	
		Manuals	15 copies in English	Including 10 copies in English to the Government of Kosovo
		Quality control report		
Material for public relations	Outline of the Project		200 copies in English Electronic data	Including 150 copies to the Government of Kosovo

1.8.3. Technology Transfer

The figure below shows a general workflow for the creation of geo-spatial data. In the Project, latest materials and equipment were used for the series of operations except for aerial photography to transfer state-of-the-art technology.

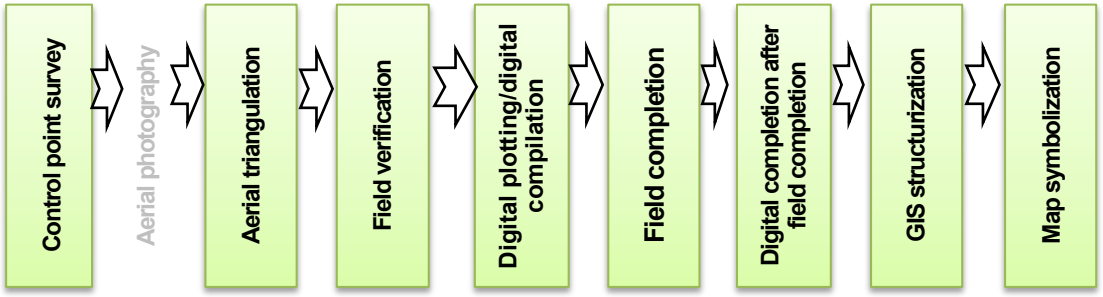


Figure 1-5 General Workflow for Creation of Geo-spatial Data

Because geo-spatial data are being created from the outputs of the aerial photography and aerial triangulation available at KCA, new aerial photography or control point survey has not been performed (although the technology transfer on the control point survey was implemented) in the Project.

Table 1-5 List of Implemented Technology Transfer Subjects

	Content	Goal
Fieldwork	Control point survey	Understanding of basic concept
		GNSS survey planning and management
		Leveling planning and management
		Confirmation, understanding and evaluation of measurement and calculation results
		Finalization of survey results
		Understanding of quality control and creation of quality control sheet
		Creation of manuals
	Field verification	Understanding of the work in the pre-interpretation and the methods for the analysis of existing reference materials and photo-interpretation
		Understanding of the practical method of field verification
		Understanding of how to organize the verification result
		Understanding of the quality and accuracy control
		Operation of handheld GPS devices
		Creation of manuals
	Field completion	Method of identifying unclear/mismatching locations at the site
		Compilation of the verified data
		Understanding of quality control and creation of quality control sheet
		Creation of manuals

	Content	Goal
Office work	Aerial triangulation	Basic operation of digital photogrammetry system (project file creation, data import)
		Basic processing of aerial photography images
		Basic operation of software (tie point observation, GCP observation, adjustment calculation)
		Confirmation, understanding and evaluation of adjustment calculation results
		Advanced operation of software
		Understanding of parameters and adjustment calculation results
		Understanding of quality control and creation of quality control sheet
		Creation of manuals
	Digital plotting	Basic operation of digital photogrammetry system (understanding the plotting operations)
		Basic operation of software
		Advanced operation of software (detailed settings, etc.)
		Understanding of map symbols
		Understanding of capturing method in accordance with the contraction scale
		Understanding of plane feature plotting/understanding of contour line plotting
		Understanding of quality control and creation of quality control sheet
		Creation of manuals
	Digital compilation	Basic operation of software (MicroStation and Bentley Map)
		Entry of the data of annotations and administrative boundaries
		Adjustment of locations of features
		Data cleaning
		Creation of polygon data
		Edge matching with existing topographic map data
		Understanding of quality control and creation of quality control sheet
		Creation of field completion forms
		Creation of manuals
	Digital compilation after field completion	Verification of the confirmation results of field completion
		Understanding of the modification work based on map symbols and practical training
		Understanding of the inspection method of modified data and practical training
		Understanding of quality control and creation of quality control sheet
		Conversion to the data file to be provided for the subsequent process
		Creation of manuals
	Data structurization Creation of Fundamental GIS data	Understanding of the GIS (understanding of standard data structures)
		Basic operation of GIS software
		Advanced operation of GIS software
		Proposals on the utilization of GIS data
		Understanding of quality control and creation of quality control sheet
		Creation of manuals
	Application of symbols to topographic map data and map adjustment	Understanding of map adjustment
		Understanding of symbolization method in accordance with contraction scale
		Basic operation of symbolization software
		Advanced operation of symbolization software (detailed settings, etc.)
		Understanding of quality control and creation of quality control sheet
		Creation of manuals

1.8.4. Promotion of Data Utilization

The programs mentioned in the table below were held for the promotion of data utilization.

Table 1-6 List of Programs Held for Promotion of Data Utilization

Method	Target	Purposes
Questionnaire surveys	Participants in the first seminar and relevant agencies	Understanding of the current state of data utilization Identification of potential users
Holding of seminars	Relevant agencies, users of the topographic map data and the fundamental GIS data, foreign donor organizations and members of the press	Presentation of the project contents and output Presentation of recommendations for, and cases of, the data utilization
Training for users by the working group	Engineers and experts of the relevant agencies	Provision of training and support on the methods and technologies for the data utilization
Web-based delivery	Users in Kosovo and around the world	Contribution to the promotion of E-Government by disclosing the data prepared in this Project, as well as orthophotos and the data of existing maps which had already been publicly available (both in the raster data format)

1.9. Effects of the Project Implementation (What It Has Brought to the Counterparts)

1.9.1. Accomplishment of the Development of Nationwide Geo-spatial Data

The 1/25,000 topographic maps created in the 1970's in the era of the former Yugoslavia had been used as the national base maps, the basic data for national development, in Kosovo. Therefore, updating of geo-spatial data and development of digital data had been expected in order to meet various data needs including data use in GIS. The implementation of this Project has led to the establishment of the foundation of the national development with the creation of the latest geo-spatial data of approx. 90 % of the total land area of Kosovo.

1.9.2. Technical Capacity to Create and Update Geo-spatial Data without External Assistance

Staff members of KCA have learned a series of basic technologies and methods required for the creation

of geo-spatial data in the technology transfer. As a consequence, KCA is considered to be ready to create geo-spatial data of the approx. 10 % of the total land area of Kosovo outside the project area which KCA will have to create unassisted and thereafter update the data for change in the future. The Project Team confirmed that KCA had submitted a request for the budget for the data creation and updating mentioned above for the next fiscal year to its competent authority, MESP, in the discussion on the Draft Final Report.

1.9.3. Web-based Delivery

KCA has already established a system to provide cadastral data, small-scale topographic maps and orthophotos through the Internet by launching its Geo-Portal. However, it has many limitations including those on types of available data, methods of data utilization and range of the free data provision. The geo-spatial data created in this Project are digital data and hence versatile. If these data are made freely available on the existing Geo-Portal, utilization of geo-spatial data which has been until now mostly limited to staff members in technical positions in governmental organizations will be dramatically extended. The delivery of topographic map data in the raster format is planned for the time being after the completion of the Project.

1.9.4. Trigger to Expand Data Utilization Extensively in Development and Conservation of the National Land

The Geo-spatial Data Utilization Working Group was launched for the effective utilization of the output data and promotion of data utilization after the commencement of the Project. Implementation of training for geo-spatial data users was one of the activities undertaken by the group. It is hoped that the implementation of this training increases the demand for the data and serves as a trigger to promote information exchange among the relevant agencies and data utilization in a wide range of areas.

1.9.5. Training in Japan

During the approx. two-week Training in Japan, the three participants visited relevant agencies, including the Geospatial Information Authority of Japan, an agency administering surveying and mapping in Japan and consultancy firms. They also visited the Japan Aerospace Exploration Agency (JAXA), with the possibility of using satellite imagery for developing geo-spatial data taken into consideration. They learned the difference in the roles of their respective duties in the administration of map- and mapping-related affairs in Kosovo and Japan, new technologies and the legal system for creation and utilization of geo-spatial data in Japan. They expressed a strong will to utilize what they had learned in the Training in Japan for the development of standards for surveying and mapping, a system for operating geo-spatial databases and laws related to geo-spatial data in their country after their return.

1.9.6. Potential Cases for Data Utilization

It is considered that the 1/25,000 geo-spatial data created in this Project can be effectively utilized in the formulation of master plans covering the entire territory of the country and ecosystem-based guidelines for natural environmental conservation. Potential use of the National Spatial Data Infrastructure (NSDI), which can be developed in future, is expected in the following examples.

(1) Spatial Plan of Kosovo

A. Basic Concept for Urban Development

Master plans for urban development and landscape conservation/improvement at the regional level are required for the formulation of guidelines for appropriate demarcation of urban areas (of residential, commercial and industrial areas, areas for public facilities, etc.), selection of areas available for development, disaster risk reduction and environmental conservation on the basis of the projections of the population, commercial sales and industrial production. The 1/25,000 geo-spatial data can be effectively utilized for the formulation of these master plans.

B. Basic Concept for Agricultural Development

Assessment of land resources at the national level is indispensable for conservation and new development of agricultural land. The 1/25,000 geo-spatial data created in this Project are suitable for general classification of topography required for the assessment. Information at the level appropriate (neither too detailed nor too general) for the analysis from the viewpoint of river-system management can be derived from the data. Therefore, the output of this Project can be utilized as basic information justifying the basic concept included in the Spatial Plan.

C. Concept for the Trunk Road Network

For the areas where functional skeletal roads have not been sufficiently developed, it is recommended to formulate master plans for layout of a trunk road network in which the existing roads are classified into trunk and semi-trunk road networks and the projected road traffic volume is appropriately allocated to these networks. The 1/25,000 geo-spatial data can be utilized as a source of information for the study on the current road conditions and roadside land usage and the projection of traffic volume required for the formulation of the master plans.

D. Basic Concept for Natural Environmental Conservation and Disaster Risk Management

(1) Formulation of the Basic Policy on Disaster Risk Management

It is possible to forecast and evaluate the occurrence of landslides and expansion of soil erosion and use the result of the forecast and evaluation for the conservation and the maintenance and improvement of

productivity of land by assessing the possibility of occurrence of disasters by overlaying various data including those on meteorological conditions, topography, land use, vegetation cover and river systems on the geo-spatial data. It is also possible to formulate a basic plan for disaster risk management with the formulation of regional master plans for flood control measures and the simulation of the expansion and scale of areas affected by river flooding based on the data on land use and habitable areas in river basins and accurate data on public facilities.

(2) Formulation of Guidelines for the Conservation of the Natural Environment and Cultural Assets

The 1/25,000 topographic map data can be utilized as useful information for the formulation of a master plan for environmental conservation, etc. which includes conservation of forests and bio-diversity for the conservation of ecosystem and designation and review of environmental conservation areas at the national level and assessment of hot spots for protection and utilization of cultural assets.

2. Details of Project Implementation

2 . 1. Project Workflow

The overall workflow of this Project is shown in the figure below.

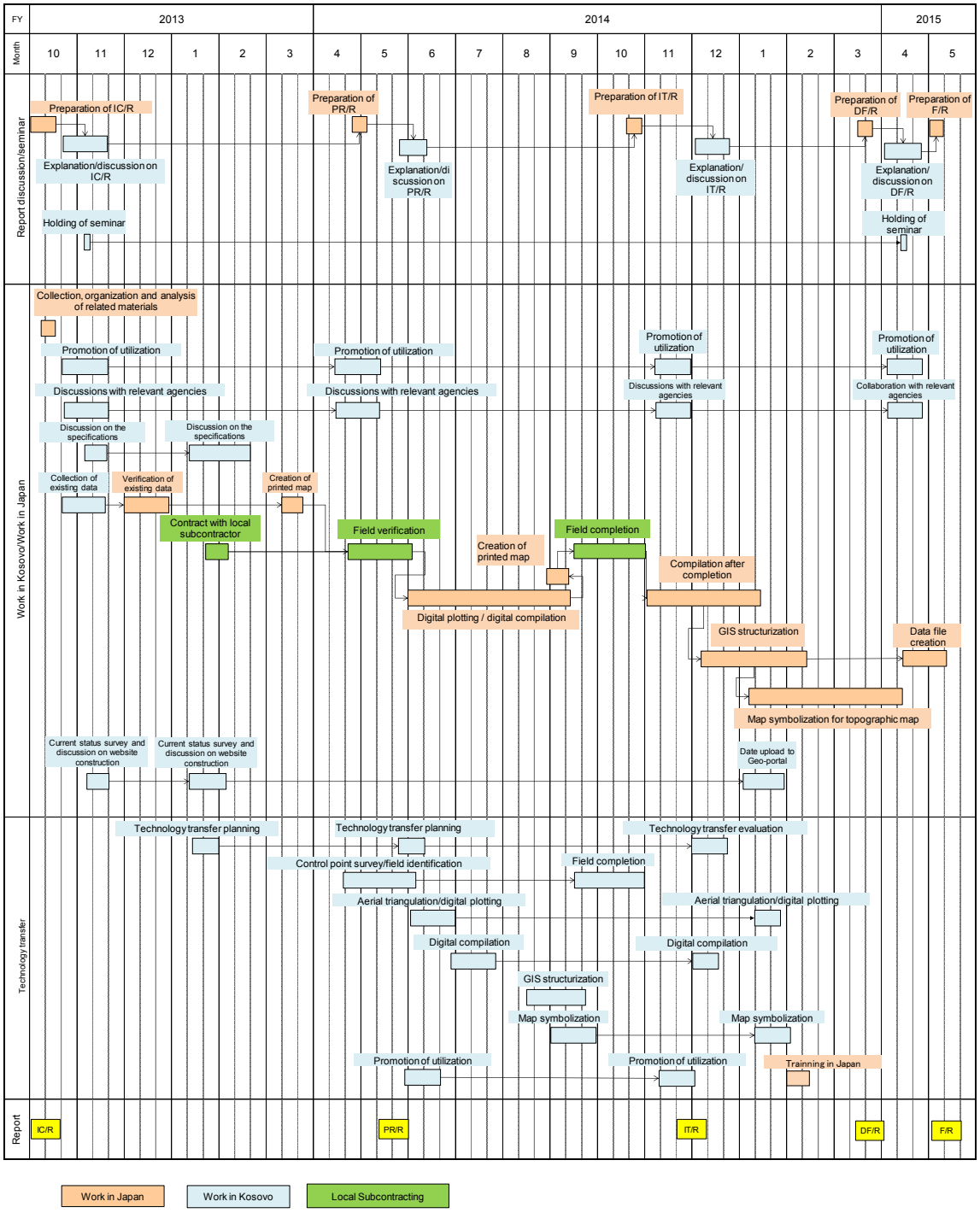


Figure 2-1 Project Workflow

2 . 2. Details of Project Implementation

The details of the work implemented in this Project are described by work component in the following.

[1] Collection, Organization and Analysis of Relevant Materials/Information (Work in Japan)

Reference materials and information relevant to the Project available in Japan were obtained and analyzed. The result of the analysis was used for the development of clearly-defined basic policies for the Project implementation and in a study on survey plan and methods, methods of technology transfer, subjects and details of the survey, subjects and details of the technology transfer and implementation structure and schedule.

[2] Preparation of Inception Report (Work in Japan)

The result of [1] mentioned above was used in the preparation of the Inception Report. The report describes the following:

- Objectives of the Project
- Project purposes
- Basic policies for Project implementation
- Details and methods of Project implementation
- Technology transfer
- Materials and equipment necessary for the technology transfer
- Outputs
- Project implementation structure
- Personnel plan of the Project Team

Representatives of JICA (Infrastructure and Peacebuilding Department and Middle East and Europe Department), JICA Balkan Office, the Ministry of Land, Infrastructure, Transport and Tourism of Japan, the Geospatial Information Authority of Japan and the Project Team had a teleconference on the Report on October 10, 2013, and approved the basic policies for the project implementation.

[3] Explanation and Discussion on the Inception Report (Work in Kosovo)

The Inception Report was explained to KCA to discuss the policies, details and cooperation structure with respect to the implementation of the Project. The contents of discussion in the meeting were compiled in the minutes of the meeting, which were approved by both parties.

Six staff members of KCA and five Project Team members listed in Table 2-1 participated in

the explanation and discussion meeting held on November 1, 2013, in the conference room of KCA.

Table 2-1 Participants of Explanation and Discussion Meeting on the Inception Report

	Name	Position
KCA		
1	Dr. Murat Meha	Chief Executive Officer
2	Mr. Muzafer Çaka	Head of Project Coordination Office
3	Mr. Avni Rrustemi	GIS and Mapping Expert
4	Mr. Mentor Kosumi	Measurement Expert
5	Mr. Amir Reçica	GIS Expert
6	Mr. Esat Xani	GIS Expert
Project Team		
7	Mr. Akihiro Sugita	Project Manager / Technology Transfer (Human Resources Development) Planning
8	Mr. Hisashi Mori	Collaboration with Relevant Agencies / Promotion of Utilization
9	Mr. Akira Nishimura	Discussion on Specification
10	Mr. Kensuke Kimura	Project Coordination / Assistance to Field Verification and Completion
11	Ms. Lorika HISARI	Interpreter

Figure 2-2 Explanation and Discussion on the Inception Report

[4] Discussion on Specifications (Work in Kosovo)

A decision on the survey criteria to be applied to 1/25,000 digital topographic maps to be created, map sheet size and division of the digital topographic maps and map symbol regulations of 1/25,000 digital topographic maps was made in the discussion with KCA.

(1) Discussion on Survey Criteria

Discussion was held with KCA on the survey criteria, which were the most fundamental specifications for the 1/25,000 digital topographic maps to be created, at the start of the survey in October 2013. The four staff members of KCA listed below participated in the discussions:

- Mr. Avni Rrustemi
- Mr. Mentor Kosumi
- Mr. Amir Reçica
- Mr. Esat Xani

Since various survey results owned by KCA had been created with certain survey criteria, it was agreed in the discussion to use the same criteria. The precise values adopted in the survey criteria were reexamined in the discussions and decided as follows:

- Geodetic datum: EUREF (ETRS89)
- Reference ellipsoid: GRS-80
  Semi-major axis a = 6378137.00 m
  Flattening f = 1/298.257222101
- Projection method: Transverse Mercator (TM)
- Plane coordinate system: Central meridian 21°E
  Latitude of Origin 0°N (Equator)
  Zone width 3° (in the longitudinal direction)
  Scale factor at Origin 0.9999
  False easting at Origin Y = 7,500,000.00 m
  False northing at Origin X = 0.00 m
- Height standard: Height standard based on the mean sea level of the Adriatic Sea

Representatives of KCA and the Project Team put their signatures on an agreement on the values adopted in the survey criteria as proof of the final confirmation of the criteria.

(2) Discussion on the Map Sheet Size and Division of Digital Topographic Maps

A discussion was held as follows on the map sheet size and division of the 1/25,000 digital topographic maps to be created.

1) Subjects of the Discussion

KCA owns 1/25,000 topographic maps created in the Yugoslavia era (created in 1970, updated in 1979). They were created with sheet size and division defined by certain rules.

The subjects of the discussion were map sheet size, division and names to be used in the creation of 1/25,000 digital topographic maps.

2) Discussion on Map Sheet Size and Division

Discussion on the two subjects was held in November 2013 and January 2014. The four KCA staff members who had participated in the discussions on the survey criteria participated in this discussion.

In the beginning of the discussion, preference was given to the adoption of the map sheet size (7‟ 30” x 7‟ 30”) and division and the numbering system (system for giving map sheet numbers) adopted in the Yugoslavia era, because a neighboring country had used the same old rules for the creation of digital topographic maps at the same scale in the recent past.

However, as the adoption of the global standards is the recent trend, it was decided to adopt the international map sheet size of topographic maps at the scale concerned and the rules of map sheet division based on the map sheet size.

3) Adopted Map Sheet Size and Division

The map sheet size and division mentioned below, which complied with the international rules, were determined for 1/25,000 digital topographic maps to be created.

- Map sheet size: 7‟ 30” (longitude) x 5‟ 00” (latitude) (approx. 10 km x 9.2 km)
- Map sheet division: Division compliant with the international rules based on the above-mentioned map sheet size
- Map sheet numbers: Allocation of map sheet numbers in compliance with the international rules
- Map sheet names: An identification name of each map sheet shall be a name of a principal location in an area on the map sheet concern selected by KCA

4) Change in the Topographic Mapping Area with the Adoption of the New Map Sheet

Size and Division

As the new map sheet size and division had been adopted, a review was conducted and a discussion was held on a new topographic mapping area. The change in the mapping area was carried out in such a way that the predetermined size of the mapping area was maintained and all the topography and features to be created on all the map sheets to be created could be expressed on them.

The two parties approved the topographic mapping area after the final change with their representatives putting their signatures on an agreement on the final mapping area.

(3) Discussion on Map Symbol Regulations of 1/25,000 Digital Topographic Maps

Photogrammetry is to be used for the creation of 1/25,000 digital topographic maps in the Project. Map symbol regulations applicable to maps at the scale level concerned are required for the creation of these maps. Although KCA has possessed analog topographic maps at the same scale, it has not had map symbol regulations of the map at the scale concerned. Therefore, a discussion was held on new map symbol regulations of 1/25,000 digital topographic maps and the new rules were created in the discussion.

1) Purpose and Creation of the Map Symbol Regulations of Topographic Maps

a. Purpose

To create map symbol regulations to be applied to the 1/25,000 digital topographic maps to be created

b. Preparation

Kosovo used to be a part of Yugoslavia. In the Yugoslavia era, 1/25,000 topographic maps were widely used in Kosovo. KCA has maintained close cooperative relationships with surveying institutions in neighboring countries (Macedonia and Montenegro). Because of these facts, draft map symbol regulations of 1/25,000 digital topographic maps of Kosovo with structures and elements required for map symbol regulations were prepared with the regulations of 1/25,000 topographic maps of the Yugoslavia era and those of the 1/25,000 digital topographic maps prepared recently in the neighboring countries used as reference materials.

2) Composition of the Map Symbol Regulations of Topographic Maps

The prepared draft map symbol regulations were composed of the contents mentioned below so that the data created in accordance with the map symbol rules could be used effectively in various areas.

a. Structure of the Map Symbol Regulations

Topography and features to be expressed on topographic maps (topography and feature data to be constructed in a geo-spatial database) are classified by Feature Class and Data Class in accordance with their geo-spatial characteristics. In this structure, each topography/feature is located under an appropriate data class.

b. Elements of the Map Symbol Regulations

Elements of the map symbol regulations are composed of topography and features to be expressed on topographic maps and the following information that all of them should have.

- Names of future classes
- Names of data classes
- Names of topography/features
- Code numbers
- Data formats
- Definitions of topography/features
- Capturing standards for topography/features
- Method of capturing topography/feature information
- Map symbols of topography/features

3) Subjects of the Discussion on Creation of Map Symbol Regulations of Topographic Maps

Selection of topography and features to be expressed on topographic maps in accordance with the prepared map symbol regulations and structure and items and details of the elements of the map symbol regulations were selected as the subjects of the discussion on creation of the map symbol regulations.

4) Discussion on Creation of Map Symbol Regulations of Topographic Maps

The discussion on the creation of map symbol regulations was held in January and February 2014.

a. Participants in the Discussion

The four KCA staff members who had participated in the discussion on the survey criteria participated in this discussion.

b. Course of the Discussion

The following steps were followed in the discussion:

Step 1: The concept of elements which topography and features to be expressed on

topographic maps should have as required by the map symbol regulations was explained.

Step 2: Relevance of expressing each topography or feature on a 1/25,000 digital topographic map was examined starting from the first topography/feature in Feature Class 1 - Data Class 1 in the prepared draft regulations. The result of the examination was used for the selection of topography and features to be expressed on maps. Names and definitions of selected topography and features were discussed and determined. In principle, names and definitions of all topography and features to be expressed on topographic maps had been determined in this step.

Step 3: Standards for expression of topography and features to be expressed on maps (standards for spatial sizes of topography and features to be expressed and importance of their expression on maps) and methods of capturing topography and feature information (a method to capture information proving existence of topography and features concerned and a method to capture them as digital data) were discussed and determined.

Step 4: Symbols to express topography and features to be expressed on topographic maps and their data types were discussed and determined. In the discussion on the symbols, their shapes, sizes and color tones were determined and data types were determined with characteristics of symbols taken into consideration.

There were cases where discussion had gone backward to a previous step for some topography and features.

5) Created Map Symbol Regulations of Digital Topographic Maps

The first draft of the map symbol regulations of 1/25,000 digital topographic maps was created in April 2014 through the steps mentioned above. The outline of the created map symbol regulations is as follows:

Feature class:	9
Data class:	34
Total number of topography/features:	155 (including 25 annotations)

Since then, several discussions have been held with KCA on the regulations until the final version mentioned below was adopted in January 2015.

Feature class:	9
Data class:	34
Total number of topography/features:	158 (including 28 annotations)

6) Discussion on Marginal Information on Digital Topographic Maps

In the discussion on the marginal information on printout digital topographic maps, the following matters were discussed and determined:

- Items to be printed in the marginal information
- Locations of printing and designs of items to be printed

The four KCA staff members who had participated in the discussion on the survey criteria participated in this discussion.

a. Items to be printed in the marginal information

Items to be printed in the marginal information were discussed and determined with the existing 1/25,000 analog topographic maps of Kosovo and printout topographic maps at the same scale of the neighboring countries used as reference materials.

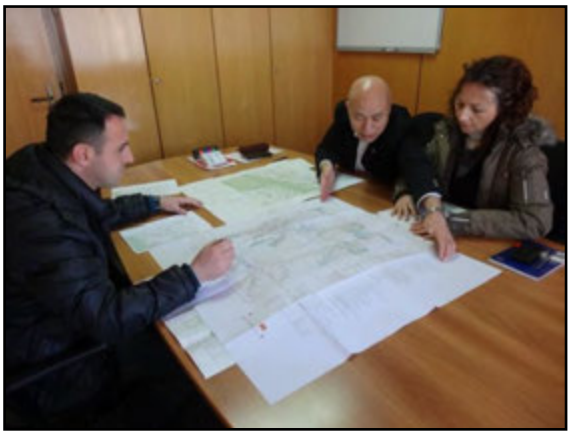



Figure 2-3 Scenes from Discussion on Specifications

The main items determined to be printed in the marginal information are as follows:

* Map sheet name and number and names of adjacent map sheets
* Coordinate values at the corners, grid and grid coordinate values
* Scale bar
* Survey criteria, legend of map symbols, history of map sheet revision

b. Locations of printing and designs of items to be printed

Locations of printing and design of items to be printed were discussed and determined

with the designs of printout topographic maps of the neighboring countries used as main reference materials.

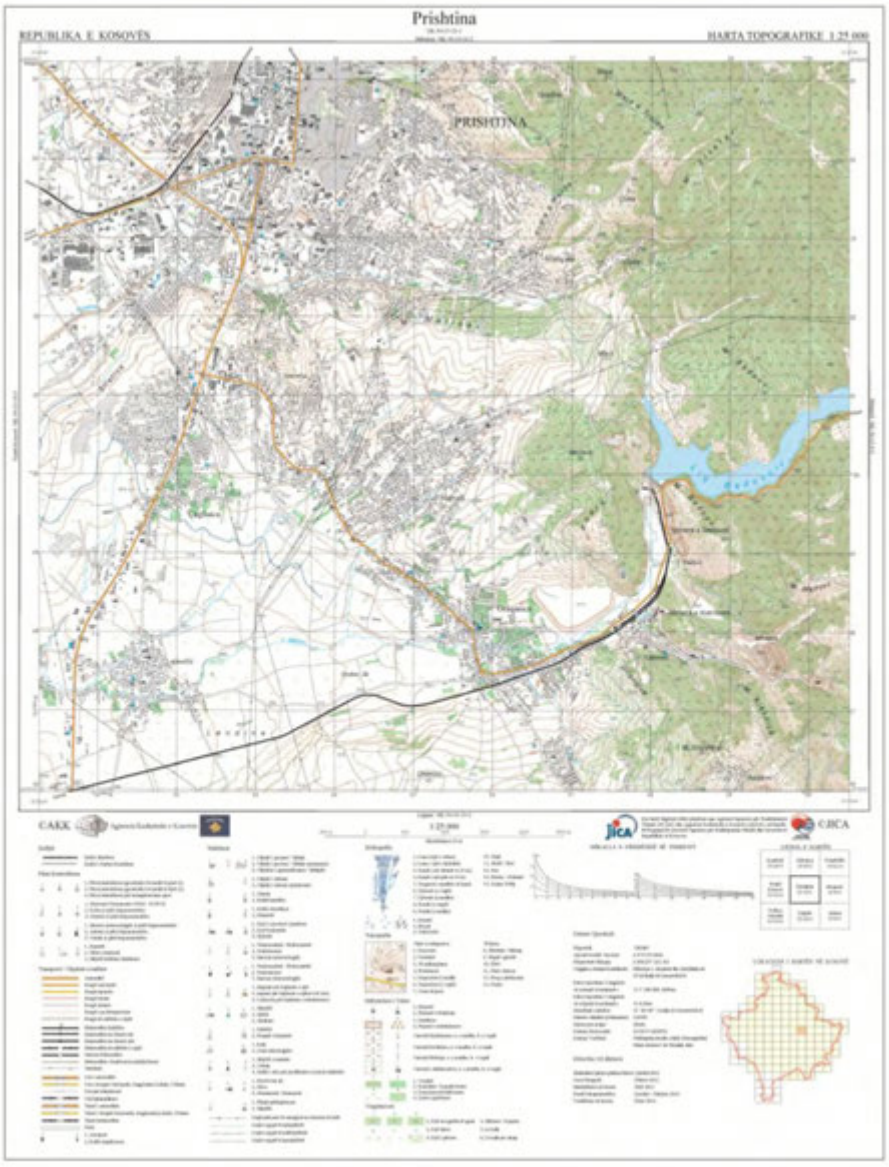


Figure 2-4 Marginal Information (Final version)

[5] Collection and Organization of Existing Materials (Work in Kosovo)

Various data in possession of KCA were obtained. The main data sets among the obtained are mentioned below. The total size of the obtained data was approx. 9 TB (terabytes).

- Data of the aerial photographs taken in 2004 and orthophoto data and results of aerial triangulation
- Data of the aerial photographs taken in 2009 and orthophoto data and results of aerial triangulation

- Data of the aerial photographs taken in 2012 and 2013 and orthophoto data and results of aerial triangulation
- Scan data of various types of existing maps (at the scales of 1/25,000, 1/50,000, 1/100,000, etc.)
- Others

[6] Survey on Current Environment for Website Construction (Work in Japan/Kosovo)

A website to transmit geo-spatial data, "Geo-Portal," has already been constructed within the website of KCA. A survey and activities were conducted for the addition of topographic map data to be created in this Project to the website.

(1) Outline of Geo-Portal

Geo-Portal was constructed in May 2013 with assistance from the Norwegian national survey institution, the Norwegian Mapping Authority (Statens Karverk). A private Croatian company developed software for this website.

Its main functions include browsing, printing, measurement, input, search, downloading and uploading of geo-spatial data and user management (including user"s authorization). In other words, software for most of the functions required for a portal has been developed. As the GML format is used for downloading and uploading of vector geo-spatial data and the GeoTiFF format is used for downloading and uploading of shape files and raster data of geo-spatial data, both vector and raster data can be added to the website. Therefore, there is no need for customization of the website for registration of topographic maps. However, since symbology of map symbols, line types, etc. has not been fully developed, creation of symbology is required for efficient browsing of vector data. Styled Layer Descriptor (SLD) of Open GIS® is followed for the types of symbology of polygons, lines and points. The main contents and functions of SLD are as follows:

Point:	Selection among □, ○, Δ, ☆, ×, etc. Setting of colors, outlines, degrees of transparency, sizes, angles, etc. Label setting, filtering (attributes, scale)
Line:	Colors, line types (solid/broken/dotted lines), line widths, degrees of transparency Label setting, filtering (attributes, scale)
Polygon:	Setting of colors, outlines (solid/broken/dotted lines), degrees of transparency, etc. Label setting, filtering (attributes, scale)

Since SLD does not support annotations, they are to be expressed as labels of point data.

The data created in the "Project on Support to the Civil Registration Agency and Unified Address System" implemented in KCA with assistance from the EU have been stored on the website and data such as those created in the "Cadastral Map" project of Finland are to be stored on the website.

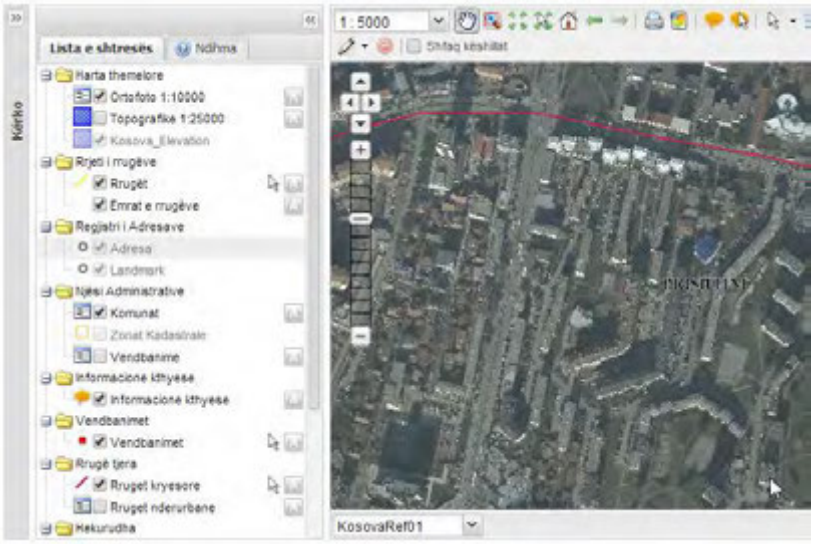


Figure 2-5 Geo-Portal of KCA

(2) Operational Status of Geo-Portal

No significant problem seems to have occurred with regard to the operation of the website in its first year of operation, with exception of minor operational problems. The major geo-spatial information contents registered at the website include:

1) Orthophotos,
2) Raster data of topographic maps (created in the Yugoslavia era),
3) Elevation maps,
4) Cadastral zones,
5) Administrative boundaries and names of local governments and villages,
6) Addresses
7) Road network, and
8) Others

(3) Operating Condition of the Hardware

Geo-Portal is being operated on the equipment which had been owned by KCA before the construction of the portal. This single-case rack-mount server is being used not only for the operation of Geo-Portal but also in other projects and as a print server and a data server (of

orthophotos and original aerial photo data created in the past). Its major component elements as of January 2014 were eight blades, which had a total storage capacity of approx. 36 TB.

Blade (CPU, memory, etc.)

Hard disks

Vacant space

Figure 2-6 Condition of Hardware

(4) Relationship with NSII

The NSII Law has not been enacted. It is still at the stage of a bill. It appears that, if this bill is enacted, Geo-Portal of KCA will be the platform of NSII. Article 9 of the bill stipulates that KCA shall take responsibility of construction, development and maintenance of the NSII Geo-Portal. It will be possible to browse all data once the construction of NSII has been completed. However, it is assumed that fees will be charged for downloading some data and downloading of such data as cadastral maps will be restricted.

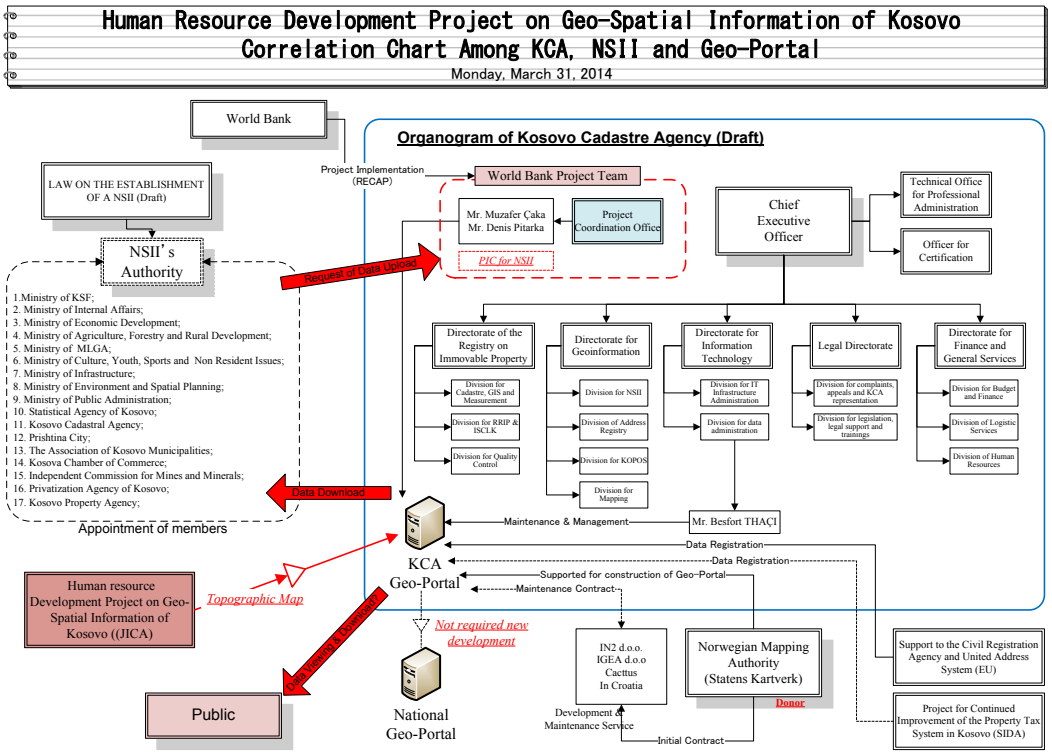


Figure 2-7 Diagram of Interactions between KCA and NSII

(5) Transmission of Topographic Map Data

As of September 2014, KCA had installed or was planning to install the additional equipment of its Geo-Portal. Therefore, there is no longer the need for procurement of equipment for the installation of additional hard disks by JICA which was discussed in March 2014. Under such circumstances, KCA and the Project Team agreed on the policies mentioned below for the provision of the topographic map data.

- Digital topographic map data shall be transmitted from the Geo-Portal of KCA.
- KCA shall prepare disk space for digital topographic map data in its Geo-Portal.
- Digital topographic map data shall be transmitted as raster data. However, KCA shall enter vector data if the need for the entry of such data arises.
- After the completion of the Project, KCA shall enter (upload) the digital topographic map data to the KCA Geo-Portal.

Figure 2-8 Interview with KCA Staff Members

[7] Verification and Preparation of Images, etc. (Work in Kosovo/Work in Japan)

The aerial photographic data and results of the aerial triangulation obtained from KCA were used for the verification of their accuracy for their use in the creation of geo-spatial data in this Project.

The aerial photographic data derived from the photographs taken in 2004, 2009, 2012 and 2013 were obtained. However, the verification was not conducted on the photographs taken in 2004,

because they were not to be used for the data creation of the target area. The accuracy verification revealed that there was no problem in using the data concerned in this Project.

Figure 2-9 shows the locations of the image data obtained from KCA by year of photography. Images taken in 2013, 2012 and 2009 are indicated in red, green and blue, respectively.

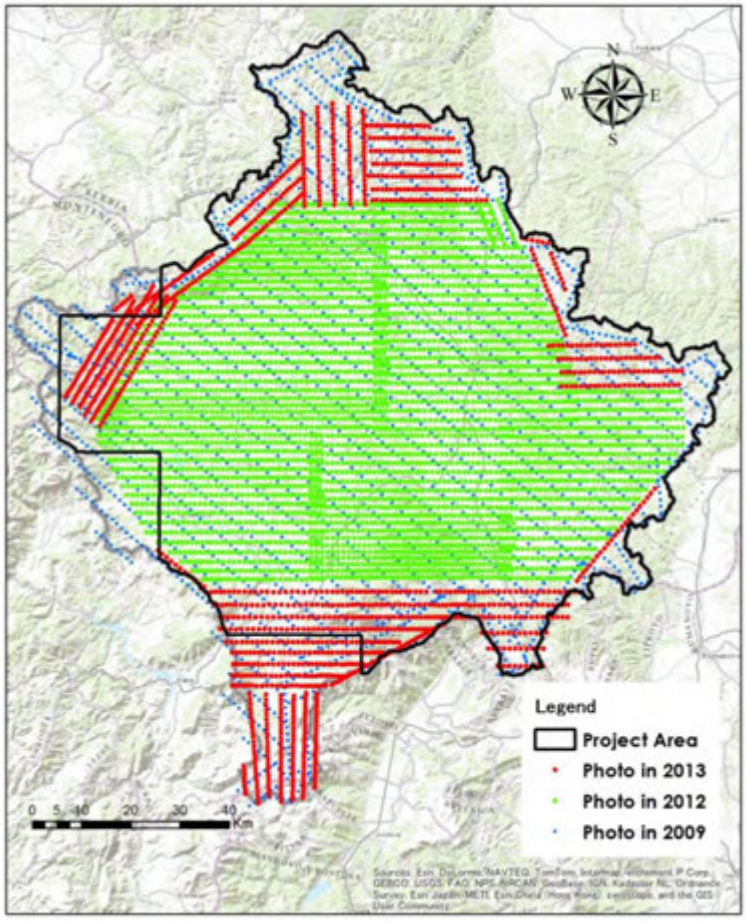


Figure 2-9 Locations of the Images by Year of Photography

[8] Subcontracting of Field Verification and Field Completion (Work in Kosovo)

The field verification and field completion were implemented by a local subcontractor as described in the original plan. Before the tender for the selection of the local subcontractor, a discussion was held with KCA on the work to be subcontracted and the three private companies mentioned below which were considered capable of completing the work concerned in the stipulated study area within the stipulated work period were shortlisted for the tender.

Invitation to Tender delivered to: Consulting EA
GM Architecture
CADCOM sh.p.k.

A general competitive bid with the three designated companies mentioned above was implemented for the selection of the local subcontractor (of the field verification and field completion). CADCOM sh.p.k. was selected as the subcontractor in the bid in which the number of full-time engineers, quantity of equipment owned, business experience and price were used as the selection criteria and was awarded the contract.

[9] Participation in ODA Seminar (Work in Kosovo)

JICA Balkan Office hosted ODA Seminar at Swiss Diamond Hotel in Pristina on February 5, 2014. The Chief Executive Officer, Dr. Meha, and Mr. Avni of KCA participated in the seminar as presenters. They explained the current state of KCA and the details of the implementation of this Project to other participants from relevant agencies as an effort to inform them of the Project.

Figure 2-10 Chief Executive Officer, Dr. Meha, (right) and Mr. Avni (left) Making Presentations

[10] Preparation of Progress Report (Work in Japan)

With respect to the work details and technology transfer carried out after the preparation of the Inception Report, a Progress Report describing the progress, the future plan and others was created.

JICA (Infrastructure and Peacebuilding Department and Middle East and Europe Department), JICA Balkan Office and the Project Team had a teleconference on May 20, 2014 and confirmed the progress, schedule in future of the Project and others using this Report.

[11] Field Verification (Work in Kosovo)

In the field verification, information required for capturing topography and features defined as those to be expressed on digital topographic maps in the map symbol regulations (first draft) in the digital plotting was captured. Orthophotos printed by map sheet area were used in the work.

(1) Purpose

The purpose of the work was to acquire information required for capturing topography and features defined as those to be expressed on digital topographic maps in the map symbol regulations in the digital plotting from the field verification and obtained reference materials.

(2) Implementation Period

The field verification was conducted in a 43-day period between Tuesday, April 22, 2014 and Tuesday, June 3, 2014. The detailed schedule of the major components of the work was as follows:

- Field verification by the subcontractor: April 23 – June 2, 2014
- Field survey for the inspection of the field verification by the project members: April 30 – May 23, 2014
- Field verification for the preparation of the Photo-interpretation Handbook: April 30 – May 23, 2014
- Collection of reference materials: April 25 – June 2, 2014

(3) Implementation Structure

The engineers of the Kosovo side (those of the subcontractor and KCA) and the project members mentioned below participated in the field verification.

- Project members

Mr. Satoru Nishio
Mr. Takeo Sugimoto

- KCA engineers

Mr. Avni Rrustemi
Mr. Mentor Kosumi
Mr. Amir Reçica
Mr. Esat Xani

- Engineers of the subcontractor (CADCOM sh.p.k.)

Table 2-2 List of Engineers of the Subcontractor

No.	Name and Surname	Assigned Position
1	Mr. Xhelal Canziba	Manager
2	Mr. Ramiz Berisha	Expert of Geodesy
3	Mr. Selajdin Haxhimurati	Expert of Geodesy
4	Mr. Muharrem Metbala	Technician of Geodesy
5	Mr. Betim Canziba	Technician of Geodesy
6	Mr. Armend Metbala	Technician of Geodesy
7	Mr. Fatos Gashi	BSc. of Geodesy
8	Mr. Labinot Ademi	Technician of Geodesy
9	Mr. Astrit Gashi	Technician of Geodesy
10	Mr. Genc Doda	Technician of Geodesy
11	Mr. Agon Blakaj	Technician of Geodesy
12	Mr. Durim Canziba	Expert for data processing
13	Mr. Elvis Canziba	Expert for data processing

(4) Details of the Implementation

The field verification was implemented following the flowchart shown below. The technology transfer on the field verification to the engineers of KCA was implemented in the form of OJT while the field verification was being implemented.

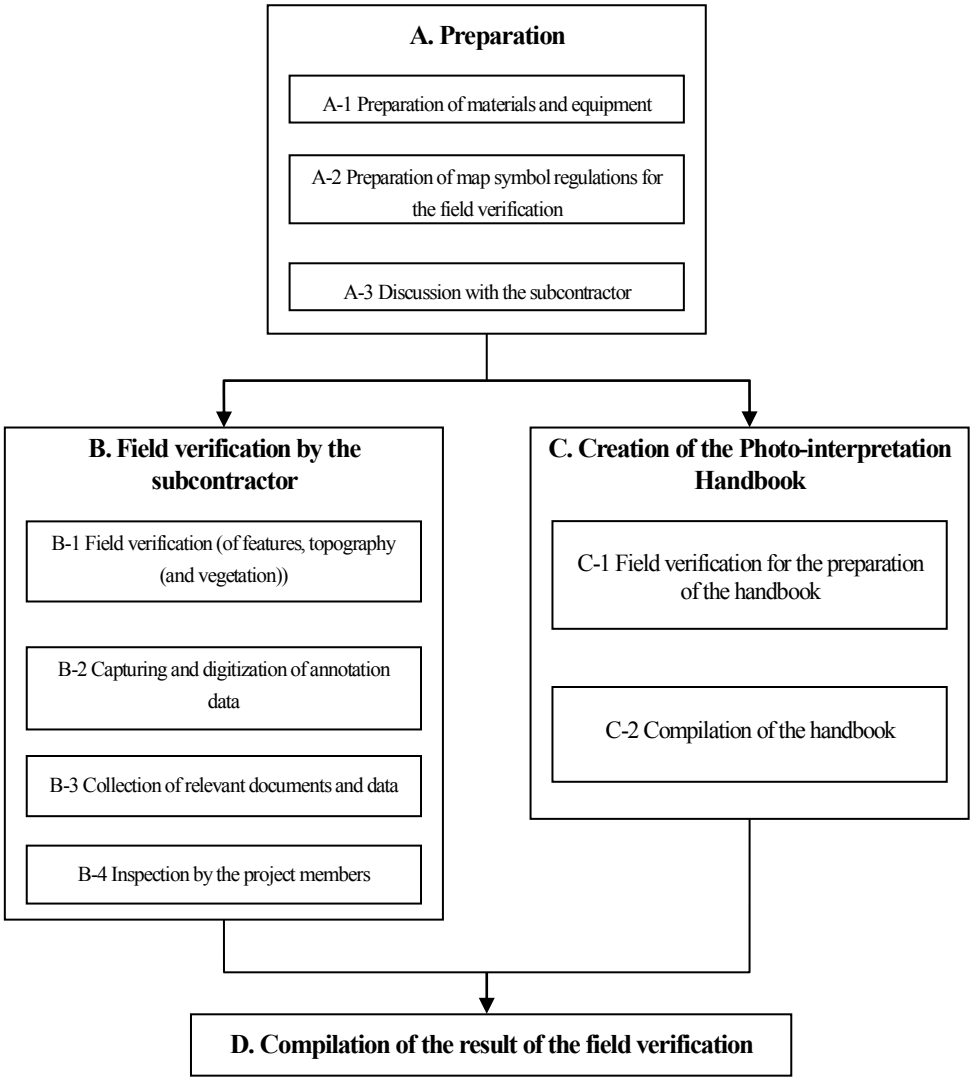


Figure 2-11 Flowchart of Field Verification

A Preparation

Preparation was made before the field verification for its smooth implementation as follows.

A-1 Preparation of materials and equipment

The Project Team clipped the field verification forms prepared with the orthophotos provided by KCA and the existing 1/25,000 topographic maps also provided by KCA by map sheet area in Japan. The clipped forms and maps were printed out with water-resistant pigmented ink to reduce the damage caused by rainwater. The field verification forms were printed on pieces of water-resistant paper.

The materials mentioned below were prepared for the field verification and leased to the subcontractor by the Project Team.

- 1/25,000-scale field identification forms (prepared by clipping the orthophotos by map sheet

area): a set of 130 sheets

- Existing 1/25,000 topographic maps (prepared by clipping the maps by map sheet area): a set of 130 sheets

The major materials and equipment prepared by the subcontractor were:

- Water-resistant ball-point pens (in four colors, red, blue, green and black) and mechanical pencils
- Triangular scales and rulers
- Drawing boards
- Digital cameras with GPS
- Handheld GPS devices
- Safety vests

A-2 Preparation of map symbol regulations for the field verification

The project members in charge of the field verification identified unclear points in the map symbol regulations (first draft) created jointly by KCA and the Project Team before the field verification and prepared the map symbol regulations (first draft) for the field verification.

Meanwhile, the Albanian version of the map symbol regulations (first draft) created by KCA engineers was provided to the subcontractor before the field verification to improve the level of the understanding of the map symbols of its engineers.

A-3 Discussion with the subcontractor

The Project Team requested submission of a work implementation plan via e-mail to the subcontractor, CADCOM sh.p.k., before the field verification. The team instructed the subcontractor to include the information on the quantities of the equipment to be used and available vehicles in the plan for the supervision of the detailed schedule of the work, in addition to the work schedule, personnel assignment plan and safety measures.

The project members in charge of the field verification arrived in Kosovo on April 22, 2014. On the following day, they had a meeting with the subcontractor and KCA. The participants in the meeting confirmed and discussed each component of the work using the submitted work implementation plan. The project members examined the work management plan of the subcontractor and pointed out the problems in the plan to the subcontractor before the field verification for the establishment of a work structure as sound as possible for safe and smooth execution.

On April 24, a trial of the field verification was carried out in a suburb of Pristina and the project members and the engineers of KCA and the subcontractor confirmed exactly what types of data should be captured in the actual field verification. On both days, all the 13 engineers of the subcontractor in the list mentioned above participated in the entire work.

The details of the discussion on April 23 were as follows:

Details of the work

It was decided that the field verification by the subcontractor was to be conducted with six groups of two engineers (and seven groups with two additional engineers in the latter half). Each group was to use one vehicle. Annotation data were to be digitized in the night of the day on which they returned from the field verification in order to prevent erroneous entry of the verified data.

Schedule control

In order to control the progress of the work precisely, the project members requested the subcontractor to submit a progress report every Monday after the work had begun. The information in the progress reports was shared with KCA for the technology transfer on the schedule control.

Quality control

The project members shared the same standards for the field verification with the engineers of the subcontractor and KCA by providing them with detailed explanation of the field verification methods. A trial field verification was also conducted to reduce individual differences in the verification result. In addition, the project members informed the engineers of the subcontractor that they should inspect the field verification work without prior notice, as an effort to improve the quality of the work of the subcontractor. The details of the inspection are described below in "B-4 Inspection by the Project Members."

The project members instructed the engineers of the subcontractor to confirm the settings of the equipment to be used (such as handheld GPS devices) to prevent inadvertent mistakes deriving from, for example, using the wrong coordinate systems when using them in the work.

Safety control

As it had been confirmed that the subcontractor did not have sufficient awareness to safety control, the project members instructed them to establish systems of safety control and communication at the time of emergency. As the work schedule submitted by the subcontractor had no off-days, the project members asked them to prepare a reasonable and sound work schedule and made sure that they should not work on Sundays.

All the engineers working in the field verification were urged to wear the safety vests as they often worked on a road and also were requested to carry the ID cards for identification.

In order to ensure the security of the workers in the residential area of the Serbians in the north, in particular, the project members asked the subcontractor and KCA to make an arrangement with the

local KCA offices for cooperation in the work. As the residents in this area spoke Serbian, the cooperation of the staff members of those offices (*i.e.* their presence at verification sites) was expected to lead to the improvement in the quality of the work.

Figure 2-12 Discussion with the Subcontractor and Demonstration of Field Verification

B Field verification by the subcontractor

All the subjects to be verified were classified into those to be verified 1) in the "field verification," 2) with "collection of reference materials" and 3) with the "photo-interpretation by operators" in accordance with the map symbol regulations (first draft) created in the preceding steps. The project members and the staff of KCA created the classification (first draft) jointly.

The members informed the subcontractor of the contents of the draft classification and finalized it after having examined it for any problems before the field verification.

B-1 Field verification (of features, topography (and vegetation))

The implementation of the verification 1) in "the field verification" and 2) with "collection of reference materials," among the three types of the verification mentioned above, was subcontracted. In principle, the implementation of the field verification was entrusted to the subcontractor. See Table 2-3 in "B-3 Collection of relevant documents and data" for the collection of reference materials.

All the features and topography to be verified at their locations have been verified at the locations in the subcontracted work. All the topography and features, except for those which "can be clearly interpreted by an operator at the steps of photo-interpretation and plotting" as specified in the classification in the map symbol regulations, (or, all the topography and features classified as the subjects of field verification in the capturing standards in the map symbol regulations (first draft)) were to be the subjects of the field verification. In the case of public facilities, their exact positional data and data to be used as annotations such as their names, if such annotation data were required, were verified.

The engineers of the subcontractors were to use the digital camera with GPS functions and the

handheld GPS devices effectively in the verification and, if they were not sure what to verify for a certain verification subject, they were to ask the project members or the engineers of KCA the details of the verification of the subject concerned.

All the findings in the field verification were recorded on the field verification forms. The annotation data collected in the field were entered in Microsoft Excel files.

B-2 Capturing and digitization of annotations data

Locations of all topography and features whose annotation data had been captured in the field verification and from reference materials were clearly marked on field verification forms and the details of the data were entered in the entry forms.

Names of rivers, mountains and other topographic features and names of large buildings which could serve as landmarks were captured as annotation data.

Digitization of the annotation data was conducted using PCs in the office. In principle, the engineer who had carried out the field verification was to enter the data captured in the verification in a computer file.

Figure 2-13 Office of CADCOM sh.p.k. and Verification of Digitization of Annotation Data

B-3 Collection of relevant documents and data

The original plan was that the subcontractor was to take the lead in the collection of reference materials. However, it was realized later that many of the data to be displayed on topographic maps (*e.g.* those of administrative boundaries) are considered almost as national secrets and that, thus, it was impossible to acquire the data in the subcontractor-led operation. Therefore, most of the data were collected by the staff members of KCA and the project members. Table 2-3 shows the collected documents and data. KCA provided the subcontractor with the documents and data which were considered useful as reference materials in the field verification among the collected ones in the initial stage of the field verification.

Table 2-3 List of Collected Documents and Data

Collected documents/data	Source	Date of collection	Document or digital data	Notes
State boundary	KCA	October 2014	Digital data	Received the data updated in October
National park	KCA	April 2014	Digital data	
1st and 2nd order geodetic control point, GNSS – KOPOS	KCA	April 2014	Digital data	
Road category	Transportation Road Department	April 2014	Digital data	
High tension power line	Kosovo Energy Corporation	April 2014	Document	A diagram of the network of high tension power lines at the voltage of 110kV or above
Name of municipalities	Kosovo Statistic Agency	April 2014	Digital data	
Trigonometric point (church, mosque, meteorological station, antenna, chimney)	KCA	July 2014	Digital data	
State boundary pillar	KCA	August 2014	Digital data	

The project members processed the data on the state boundary, national parks, geodetic control points, roads, high tension power lines and the names of municipalities with close examination of the digital data and selection of annotation data during their stay in Kosovo since they had managed to obtain the data on these subjects by June 2. Although the data on the trigonometric points and state boundary pillars were not available to the project members during their stay in Kosovo, all the data mentioned in the list above became available by the end of the field completion on October 31.

B-4 Inspection by the project members

In order to control the quality of the subcontracted work, the subcontractor's work was inspected while it was being implemented. In accordance with the Survey International Specifications of JICA, 2 % of the work completed was to be selected for the inspection and the error ratio of 5 % of the number of the verification subjects was to be used as the pass mark of the inspection. Although 2 % of the total number of map sheets of 130 was 2.6, which should be rounded up to 3, the field verification in four map sheet areas were inspected with the time of the work and characteristics of individual map sheet areas taken into consideration.

In the inspection, the project members conducted independent field verification of the selected map sheet areas where the subcontractor had already conducted it and the results of the two verifications were compared.

Figure 2-14 Inspection Map (notes in pink indicate omissions)

Table 2-4 shows the map sheet areas inspected and the result of the inspection. The mapping area was divided into seven zones and, if the error ratio (the ratio of the number of omissions and missing positional data and codes to the number of the verification subjects) of an inspected map sheet area had exceeded the pass mark, the field verification was to be conducted again in all the map sheet areas in the zone which included the area where the high error ratio had been detected.

As the first inspection revealed that the error ratios in all the inspected areas exceeded the pass mark, the project members instructed the subcontractor to conduct the field verification for the second time in all the zones.

Table 2-4 Result of Inspection by Project Members

Map sheet number	Date of inspection	Total number of the topography and features to be verified: A (number of locations)	Number of errors in the form of omission: B (number of locations)	Error ratio: B/A	Pass mark of the error ratio	Conclusion
No. 109	May 5 – 8, 2014	84	36	43 %	5 % or less	New field verification required
No. 90	May 14 – 15, 2014	129	78	60 %	5 % or less	New field verification required
No. 49	May 20 – 22, 2014	121	26	21 %	5 % or less	New field verification required
No. 67	May 22 – 23, 2014	60	4	7 %	5 % or less	New field verification required

The subcontractor had recognized the seriousness of the problem and asked for advice on how to reduce the errors. The project members recommended the subcontractor to conduct new field verification and identify the reasons for the omissions at the site at first and, then, to make the verification of a map sheet area conducted by a team different from the one which had conducted the first verification.

The detailed analysis of the errors conducted later revealed the decrease in the error ratio from the beginning of the field verification to its completion. This observation indicates that lack of experience of the engineers of the subcontractor in the field verification with orthophotos was a major cause of the errors. After the inspection, the project members accompanied each team to the sites of verification for a week and provided the team members with additional technical guidance to reduce the error ratio. This new guidance improved the quality of their work and the error ratios in the all zones were below the pass mark in the inspection of the result of the second field verification. Because of this observation, the project members concluded that the outputs of this field verification could be used in the subsequent steps.

Figure 2-15 Inspection of Field Verification (left) and Second Field Verification (right)

C Creation of the Photo-interpretation Handbook

The project members and the engineers of KCA created the "Photo-interpretation Handbook" jointly by studying reference materials and conducting a field survey to verify how the topography and features included in the map symbol regulations (first draft) whose data were to be captured with "photo-interpretation" in accordance with the capturing standards appeared on orthophotos. This handbook is to be used mainly in the photo-interpretation in the plotting.

C-1 Field verification for the preparation of the handbook

Field verification of an interpretation key is a process of comparing a feature concerned at its actual

location with its image on an orthophoto to verify how the feature concerned appears on the orthophoto.

Characteristics of the feature concerned were recorded as findings in a reconnaissance and its photographs were taken at its location. These data captured in the reconnaissance were included in the handbook on interpretation keys.

Photo-interpretation of "vegetation," which was considered to be difficult, was conducted carefully. It appeared that grassland and broad-leafed forests occupied a large area in the areas near cities, while coniferous forests and mixed forests occupied a large area in the forest areas far from cities.

Figure 2-16 Grassland and Broad-leaved Forest (left) and Village and Mixed Forest behind Village (right)

C-2 Compilation of the handbook

The purpose of creating the Handbook by compiling the interpretation keys of major features was to enable people conducting photo-interpretation and operators in the subsequent step of digital plotting to interpret land use and features accurately and objectively.

The following are some of the major features which were photo-interpreted.

"Transportation facilities (including roads and railways): Expressways, national highways, provincial roads, local roads, city streets, miscellaneous roads, bridges on expressways and ordinary roads, small bridges, (single-track and double-track) railways, bridges and tunnels on railways, railway station buildings, airports and local airports

"Buildings": Ordinary buildings (large and small), densely populated areas, abandoned buildings (large and small), mosques, churches, churches of the orthodox Christianity, monasteries, central government buildings, local government buildings, police stations, fire stations, post offices, power plants, substations, sewage treatment plants, schools, hospitals, sports facilities, factories, filling stations, ruins of castles, antenna towers, chimneys, water tanks, silos, bronze statues, monuments, caves and high tension power lines

"Water bodies": Lakes, rivers (large and small), wetland, and shrubby wetland

"Land use": Mines, quarries, solid waste disposal sites, Muslim cemeteries, Christian cemeteries, cemeteries of the victims of the civil war, vineyards, orchards, other types of farmland and afforested areas

"Vegetation": Broad-leaved forests, coniferous forests, mixed forests, bushes, grassland and grassland with trees

No "road under construction," "tunnel on road," "electrified railway," "beacon," "cable car," "law court," "meteorological station," "water purification plant," "solid waste disposal facility," "historical site," "wind power plant," "water transmission pipeline," "petroleum pipeline," "gas pipeline," "reservoir," "peat land," "railway under construction," "abandoned railway," "abandoned mine" or "Jewish cemetery" was found in the field reconnaissance for photo-interpretation. If there was a particular instruction in the result of the field verification, such an instruction was followed in the plotting.

Figure 2-17 Part of the Photo-interpretation Handbook

D Compilation of the result of the field verification

The subcontractor has submitted the tangible outputs mentioned below.

- Completed field verification forms (1/25,000-scale orthophotos): One set of 130 sheets
- Lists of annotations by map sheet area (Microsoft Excel files in which annotation data were entered in English, Albanian and Serbian) : One set for the 130 sheets

The subcontractor has also created the outputs mentioned below:

- Collected relevant documents and data: One set (for details, see the list shown above)

- Existing 1/25,000-scale topographic maps (leased): One set
- Photo-interpretation Handbooks: One set

[12] Explanation and Discussion on Progress Report (Work in Kosovo)

The Progress Report prepared was explained to KCA to discuss the content. The content of the discussion was summarized as a record of discussion on which an agreement was obtained from both parties.

The explanation and discussion meeting was held on June 10, 2014 in the conference room in KCA. Four staff members of KCA and three Project Team members participated in the meeting.

Table 2-5 Participants of Explanation and Discussion Meeting on the Progress Report

	Name	Post
KCA		
1	Dr. Murat Meha	Chief Executive Officer
2	Mr. Muzafer Çaka	Head of Project Coordination Office
3	Mr. Avni Rrustemi	GIS and Mapping Expert
4	Mr. Mentor Kosumi	Measurement Expert
Project Team		
7	Mr. Akihiro Sugita	Project Manager / Technology Transfer (Human Resources Development) Planning
8	Mr. Akira Ota	Aerial Triangulation / Digital Plotting
9	Ms. Lorika HISARI	Interpreter

[13] Digital Plotting (Work in Japan)

With the aerial photograph images and the aerial triangulation results that have been collected, a stereo model is displayed on a digital plotter.

In accordance with the content determined by the discussions on the map symbol rules and by referring to the field verification results, the shapes and the positions of features were captured as graphic information to create a digital

Figure 2-18 Plotting by Digital Plotter

plotting data file of level 25,000 (about 9,869km^2). With respect to the feature type and category, classification was carried out in accordance with the items captured by plotting and the capturing standard.

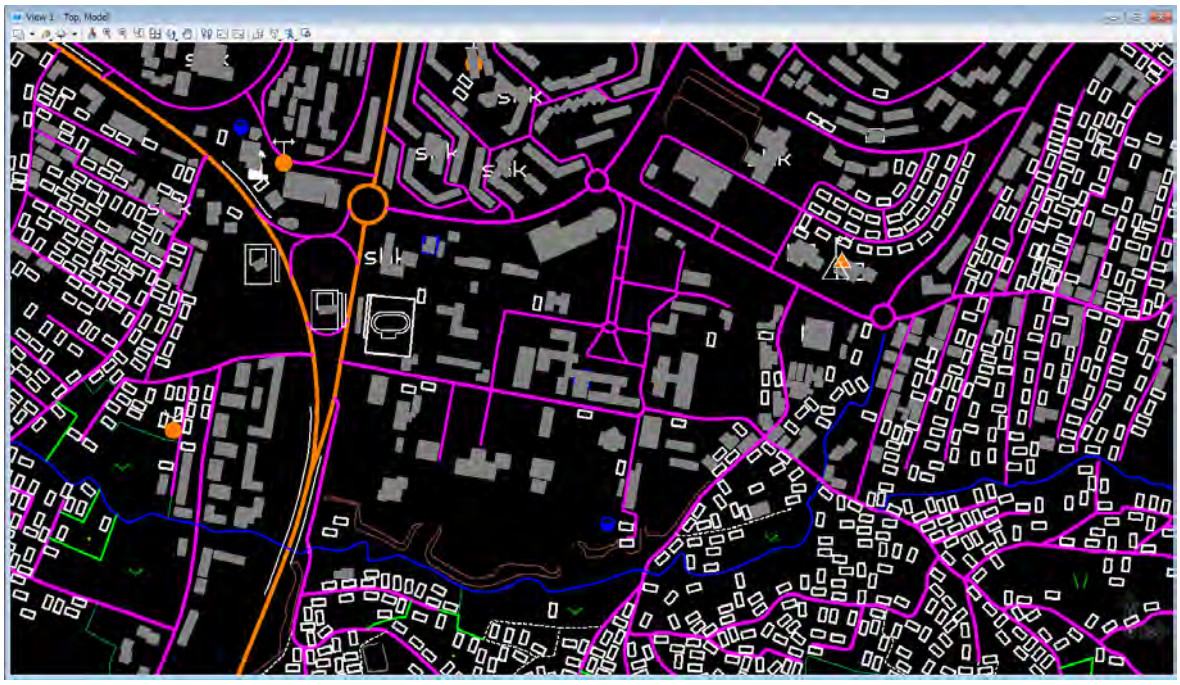


Figure 2-19 Digital Plotting Image (in Pristina City)

[14] Digital Compilation (Work in Japan)

Figure 2-20 Digital Compilation Work

Topographic map data were created by performing data cleaning, such as combining line data, converting data to polygons and deletion of unnecessary data, on the digital plotting data file and adding administrative boundary data, annotation data, etc. In creating the topographic map data, features in adjacent map sheets were checked.

With respect to unclear locations (missing data, errors) newly found in the process of digital plotting and digital compilation, an "unclear location" layer was created within the digital plotting data and description of the problem with each location was entered as text data so that such information

could be used as a reference in the succeeding work (field completion).

[15] Field Completion (Work in Kosovo)

Field completion was implemented by outsourcing to a local subcontractor, as was the case for field verification.

(1) Purpose

The purpose of the field completion was to capture required data by eliminating the obscurity and correcting mismatches generated in the digital plotting and digital compilation of the topography, features and annotations captured in the field verification with re-verification at their sites.

(2) Implementation period

The field completion was implemented in the 50-day period between Tuesday, September 16, 2014 and Tuesday, November 4, 2014.

The detailed schedules of the major components of the field completion including supervision and inspection of the work conducted by the subcontractor and field verification of power lines were as follows:

- Explanation meeting and trial of the field completion: September 18
- Field completion conducted by the subcontractor: September 19 – October 31
- Inspection: September 18, October 3 and October 17
- Pre-interpretation of the power lines: September 17 – October 15
- Field verification of the power lines: September 29 – October 21

(3) Quantities of the work

The quantities of the work were as follows:

- Field completion by the subcontractor: 1,386 locations in the 130 map sheet areas
- Inspection by the project members: 3 map sheet areas
- Field verification of the power lines: All the power lines with a voltage of 110kV and above were verified.

(4) Implementation structure

The field completion was implemented by CADCOM sh.p.k. as the field verification in accordance with the original plan.

The engineers of the Kosovo side (the subcontractor and KCA) and the project members mentioned below participated in the field completion.

- Project members

  Mr. Satoru Nishio

  Mr. Takeo Sugimoto

- KCA engineers

  Mr. Avni Rrustemi

  Mr. Mentor Kosumi

  Mr. Amir Reçica

  Mr. Esat Xani

  Mr. Qazim Sinani

- Engineers of the subcontractor, CADCOM sh.p.k.

Table 2-6 List of Engineers of the Subcontractor

No.	Name and Surname	Assigned Position
1	Xhelal Canziba	Manager
2	Betim Canziba	Technician of Geodesy
3	Hetem Gashi	Technician of Geodesy
4	Taulant Vuqeterna	Technician of Geodesy
5	Selami Rexha	Technician of Geodesy
6	Abaz Tara	Technician of Geodesy
7	Durim Canziba	Expert for data processing
8	Elvis Canziba	Expert for data processing
9	Ashim Shehu	Expert for data processing
10	Ehad Pista	Expert for data processing

(5) Details of the implementation

The field completion was implemented following the flowchart shown below. The technology transfer on the field completion to the engineers of KCA was implemented in the form of OJT while the field completion was being implemented.

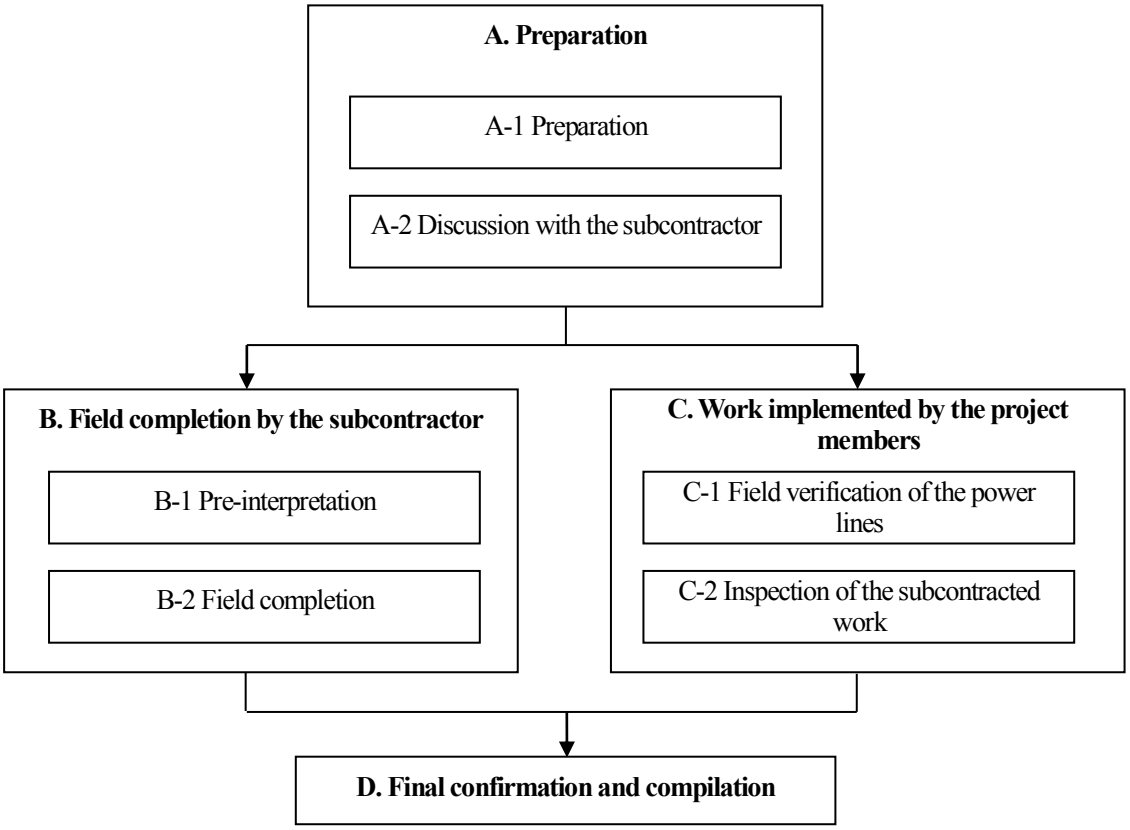


Figure 2-21 Flowchart of Field Completion

A Preparation

Preparation was made before the field completion for its smooth implementation as follows.

A-1 Preparation

The Project Team carried out the digital plotting and the digital compilation in Japan using the result of the field verification and created digital compilation draft maps. Then, the team prepared the field completion forms by describing questionable and unclear points found by the operators in the digital plotting and the digital compilation on the draft maps.

The materials mentioned below were prepared for the field completion and leased to the subcontractor by the Project Team.

- 1/25,000 level field completion forms: One set of 130 sheets
- 1/25,000 level field verification forms (which were used in the field verification and on which its result had been described): One set of 130 sheets
- The existing 1/25,000 topographic maps (clipped by map sheet area, used in the field verification):

One set of 130 sheets

The major materials and equipment prepared by the subcontractor were:

- Water-resistant ball-point pens (in four colors, red, blue, green and black) and mechanical pencils
- Triangular scales and rulers
- Drawing boards
- Digital cameras with GPS
- Handheld GPS devices
- Safety vests

A-2 Discussion with the subcontractor

The project members had a meeting with the subcontractor, CADCOM sh.p.k. in the presence of the staff members of KCA in the morning of September 18 partly for the explanation on the outline of the work in the field completion. All the engineers of the subcontractor mentioned in the list shown above participated in the discussion in the meeting.

In the afternoon, a trial of field completion was conducted in a suburb of Pristina to confirm in details how to carry out the field completion at the site.

In the meeting, the project members requested submission of a work implementation plan to the subcontractor, with the instruction that the contents of the plan should be similar to those in the plan for the field verification and that the plan should include the description of the quantities of equipment to be used and available vehicles for the supervision of the progress of the work in details, as well as a work schedule, personnel assignment plan and safety measures. The subcontractor submitted the work implementation plan in the following week, on September 29th. The details of the plan were as follows:

Implementation structure

It was decided that the field completion by the subcontractor was to be conducted with five groups of two engineers. Each group was to use one vehicle.

Schedule control

In order to control the progress of the work precisely, the project members requested the subcontractor to submit a progress report every Monday after the work had begun. The information in the progress reports was shared with KCA for the technology transfer on the schedule control.

Quality control

The project members shared the same standards for the field completion with the engineers of the

subcontractor and KCA by providing them with detailed explanation of the field completion methods. A trial field completion was also conducted to reduce individual differences in the verification result. In addition, the project members informed the engineers of the subcontractor that they should inspect the field completion work without prior notice, as an effort to improve the quality of the work of the subcontractor. The details of the inspection are described below in "C-2 Inspection of the subcontracted work."

Safety control

The safety control methods used in the field verification were followed. All the engineers working in the field completion were urged to wear the safety vests as they often worked on a road and also were requested to carry the ID cards for identification.

In order to ensure the security of the workers in the residential area of the Serbians in the north, in particular, the project members asked the subcontractor and KCA to make an arrangement with the local KCA offices for cooperation in the work.

Figure 2-22 Discussion with Subcontractor on Field Completion and Trial of Field Completion

B Field completion by the subcontractor

The field completion consists of two major components: "Pre-interpretation" conducted in the office and "field completion" conducted in the field.

B-1 Pre-interpretation

Before the field completion, the digital compilation maps (completion forms) and the field verification forms were compared to see if the result of the field verification conducted in the previous phase had been incorporated correctly in the digital compilation maps. The project members issued an instruction to relocate annotations which were difficult to be read because of the overlap with features.

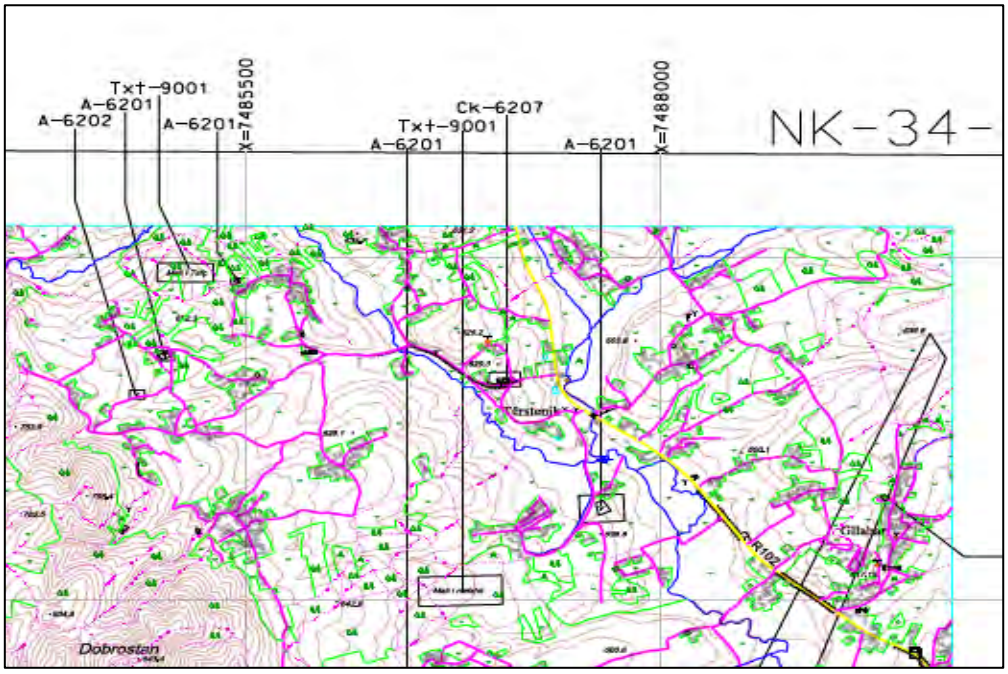


Figure 2-23 Field Completion Form

Figure 2-24 Field Verification Form (reprint)

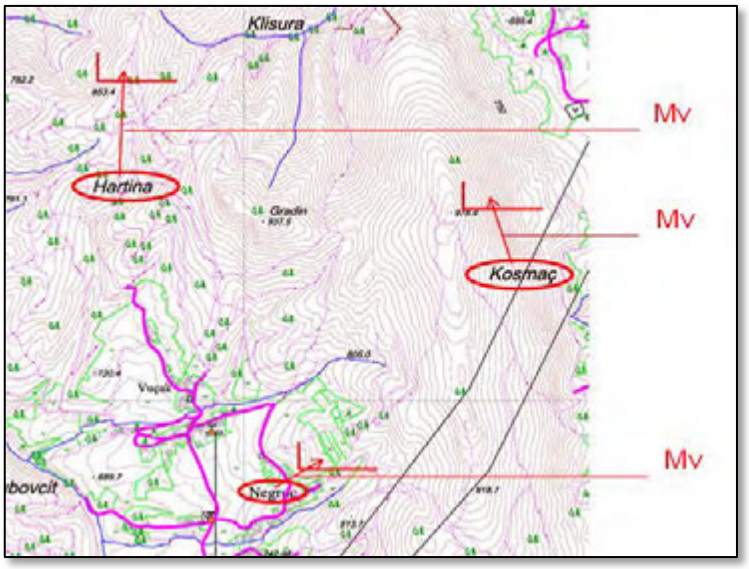


Figure 2-25 Conceptual Image of Relocation of Annotations

B-2 Field completion

The subcontractor conducted the field completion at the 1,386 locations where doubt in the accuracy of the data had been detected in the plotting. There were seven types of requests for the field completion as shown in Table 2-7. The engineers of the subcontractors surveyed all topography and features requiring re-verification at the sites, including those whose shapes had not been clearly defined, those which had not been able to be located, those whose codes might have been recorded wrongly, those whose annotations might have been misspelled and those with edge mismatching, using the digital cameras with GPS and handheld GPS devices effectively.

In principle, findings of the survey (instructions for data addition and correction) were recorded on the field completion forms. Annotations whose spelling had been corrected were entered in Microsoft Excel files.

Table 2-7 Types of Requests for Field Completion from Operators

Symbol	Description	Example	Meaning of the example
Ck	Please re-survey the location because there is uncertainty in the result of the field verification.	Ck-6201	A boundary of a cemetery has not been defined clearly.
A	Please survey the location because a feature is supposed to be there.	A-4301	Verify whether or not there is an antenna at the location.
Cg	Please survey the location because a wrong feature seems to have been recorded at the location.	Cg-3103/3104	Is the feature at the location a local road, instead of a regional road?
Mv	Please identify the correct location of the feature because the recorded location seems to be wrong.	Mv-4217	Verify the location of the school because its recorded location seems to be wrong.
No	Please survey the location for the existence of the recorded feature because it has not been found on images.	No-3203	The bridge does not exist or it cannot be found on images.
Em	A feature located in two adjacent map sheet areas is recorded differently in the two areas. Please re-verify the feature to decide which record is correct.	Em-7101/7103	Verify whether the description in 7101 or 7103 is right.
Txt	While a certain number has been given to a field survey photograph, there is no annotation with this number in the lists of annotation.	Txt-(1)	There is no annotation for (1) in the list.

C Work implemented by the project members

The project members inspected the work of the engineers of the subcontractor as a supervisory activity to the subcontractor. The members also verified the routes of the power lines as their own work.

C-1 Field verification of the power lines

Since the verification of high tension power lines is a one-dimensional survey of following the lines unlike a two-dimensional survey of the field completion, it is very difficult to conduct these two types of work simultaneously. Therefore, it was decided not to include the verification of the power line network in the work to be subcontracted and to make it a survey subject of the project members.

The project members created small-scale printout maps on which routes of the power line can be easily drawn for the verification in Japan. Meanwhile, they prepared large-scale printout maps for the verification of the routes in areas near substations where it was difficult to draw them on small-scale maps because many lines were connected in a very complicated way in those areas.

All the power lines which could be interpreted on photographs were plotted in the digital plotting and digital compilation regardless of whether or not they were for the transmission of electric power with a voltage of 110kV and above.

The project members conducted pre-interpretation with aerial photographs and located substations before the field verification. The information on the locations of substations was used as reference in the field verification because it was easy to start verification of routes of power lines from a substation or a power plant.

The main subjects verified in the field in the field verification of the high tension power line network were as follows:

- Whether or not routes of the power lines were correctly plotted, especially in the areas near substations and power plants.
- Decision on whether a certain power line is for the transmission of electric power with a voltage of 110kV and above which is to be mapped or that with a voltage of less than 110kV which is not to be mapped.
- History of changes in routes of power lines.

Exact routes of the entire high tension power lines with a voltage of 110kV and above in Kosovo were identified in this field verification.

Figure 2-26 Field Verification of Power Lines (Left: Substation, Right: Intercrossing power lines)

C-2 Inspection of the subcontracted work

In order to control the quality of the subcontracted work, the subcontractor's work was inspected while it was being implemented. In accordance with the Survey International Specifications of JICA, 2 % of the work completed was to be selected for the inspection and the error ratio of 5 % of the number of the verification subjects was to be used as the pass mark of the inspection. Although 2 % of the total number of map sheets of 130 was 2.6, which should be rounded up to 3, the field completion in four map sheet areas were actually inspected with the characteristics of the mapping area taken into consideration.

In the inspection, the project members conducted independent field completion of the selected map

sheet areas where the subcontractor had already conducted it and the results of the two completion works were compared.

Table 2-8 shows the map sheet areas inspected and the result of the inspection. If the error ratio in an inspected map sheet area had exceeded the pass mark, the field completion was to be conducted again. However, the field completion conducted by the subcontractor passed the inspection in all areas as shown in the table below.

Table 2-8 Inspection Result of Field Completion Outcome by Project Members

Map sheet number	Date of inspection	Total number of the topography and features to be verified: A (number of locations)	Number of errors in the form of omission: B (number of locations)	Error ratio: B/A	Pass mark of the error ratio	Conclusion
No. 77	September 18, 2014	19	0	0 %	5 % or less	Passed
No. 94	October 3, 2014	8	0	0 %	5 % or less	Passed
No. 32	October 9, 2014	13	0	0 %	5 % or less	Passed
No. 37	October 17, 2014	4	0	0 %	5 % or less	Passed

D Final confirmation and compilation

The subcontractor conducted the final verification on whether or not there were omissions in the field completion. If the subcontractor had found any omission, they were to conduct an additional field completion. The project members in charge of the field completion collected the completed field completion forms from the subcontractor at the end after having confirmed non-existence of edge mismatches between map sheets.

The tangible outputs submitted by the subcontractors are as follows:

- Completed field completion forms (1/25,000 level digital compilation maps): One set of 130 sheets
- Lists of modified annotations created by map sheet area: One set for the 130 sheets

[16] Preparation of Interim Report (Work in Japan)

With respect to the work details and technology transfer carried out after the preparation of the Progress Report, an Interim Report describing the progress, the future plan and others was prepared.

JICA (Infrastructure and Peacebuilding Department and Middle East and Europe Department), JICA Balkan Office, Geospatial Information Authority of Japan and the Project Team had a teleconference on November 28, 2014 and confirmed the progress, schedule in future of the Project and others using the report.

[17] Explanation and Discussion on the Interim Report (Work in Kosovo)

The Interim Report prepared was explained to KCA to discuss the content. The content of the discussion was summarized as a record of discussion on which an agreement was obtained from both parties.

The explanation and discussion meeting was held on December 15, 2014 in the conference room in KCA. Five staff members of KCA and three Project Team members participated in the meeting.

Table 2-9 Participants in the Explanation and Discussion Meeting on the Progress Report

	Name	Post
KCA		
1	Dr. Murat Meha	Chief Executive Officer
2	Mr. Muzafer Çaka	Head of Project Coordination Office
3	Mr. Avni Rrustemi	GIS and Mapping Expert
4	Mr. Amir Reçica	GIS Expert
5	Mr. Mentor Kosumi	Measurement Expert
Project Team		
7	Mr. Akihiro Sugita	Project Manager / Technology Transfer (Human Resources Development) Planning
8	Mr. Kohei Isobe	Digital Compilation
9	Ms. Lorika HISARI	Interpreter

Figure 2-27 Explanation and Discussion on the Interim Report

[18] Digital Compilation after Field Completion (Work in Japan)

Data correction and modification were carried out on the items confirmed in the field completion. Also, administrative boundary data collected at the site and annotation data were entered.

[19] Data Structurization (Work in Japan)

The topographic map data completed by digital compilation after field completion were structuralized in accordance with the map symbol rules to make the data usable on the GIS. The GIS data created in the structurization are in the ArcGIS Geodatabase format for their use in the subsequent map symbolization. The GIS data were created for each map sheet area.

[20] Map Symbolization for Topographic Map (Work in Japan)

Based on the map symbols determined in the discussions on the specifications, map symbolization was carried out on the data after the completion of data structurization for the creation of topographic map.

Conventionally, different software were often used for structurization and symbolization and for this reason, the work of creating a new topographic map after modification was complicated. Since the symbolization function of GIS software (ESRI ArcGIS) has improved lately, GIS

software was used for symbolization.

[21] Preparation of Draft Final Report (Work in Japan)

A Draft Final Report was prepared by summarizing the results of creating the geo-spatial data, technology transfer and promotion of utilization as well as recommendations to KCA.

JICA (Infrastructure and Peacebuilding Department and Middle East and Europe Department), Geospatial Information Authority of Japan and the Project Team conducted a meeting on March 23, 2015 and confirmed the outputs of the Project and others using this Report.

[22] Explanation and Discussion on Draft Final Report (Work in Kosovo)

The Draft Final Report prepared in the step above was explained to KCA to discuss the content. The content of the discussion was summarized as a record of discussion on which an agreement was obtained from both parties.

The explanation and discussion meeting was held on April 16, 2015, in the conference room in KCA. Four staff members of KCA and five Project Team members participated in the meeting.

Table 2-10 Participants in the Explanation and Discussion Meeting on the Draft Final Report

	Name	Post
KCA		
1	Dr. Murat Meha	Chief Executive Officer
2	Mr. Avni Rrustemi	GIS and Mapping Expert
3	Mr. Esat Xani	GIS Expert
4	Mr. Avni Ahmeti	Head of GIS Department
Project Team		
5	Mr. Akihiro Sugita	Project Manager / Technology Transfer (Human Resources Development) Planning
6	Mr. Hisashi Mori	Collaboration with Relevant Agencies / Promotion of Utilization
7	Mr. Zenichi Chiba	GIS Structurization / Website Construction
8	Mr. Kensuke Kimura	Project Coordination / Assistance to Field Verification and Completion
9	Ms. Lorika HISARI	Interpreter

Figure 2-28 Explanation and Discussion on the Draft Final Report

[23] Preparation of Final Report (Work in Japan)

In consideration of the comments by KCA, the Draft Final Report was revised to make the Final Report.

In addition, manuals created through the technology transfer were finalized and a report on quality control was also created. The manuals and quality report were compiled separately in consideration of the usability.

[24] Creation of Data Files (Work in Japan)

In accordance with the specifications agreed with KCA after discussions, the geo-spatial data created were stored on an external hard disk drive.

3. Technology Transfer

3 . 1. Technology Transfer Item

[1] Technology Transfer Planning (Work in Kosovo)

KCA has selected the five staff members mentioned in the table below as the participants of the technology transfer in this Project. KCA and the Project Team have agreed that all the participants should participate in all the stages of the technology transfer unless they have compelling and justifiable reasons not to do so.

Table 3-1 Participants of Technology Transfer Selected by KCA

Name	Post	Age	Experience in surveying and mapping
Mr. Avni Rrustemi	GIS & Mapping Expert	34 years old	Approx. 3 years
Mr. Mentor Kosumi	Measurement Expert	31 years old	Approx. 12 years
Mr. Amir Reçica	GIS Expert	31 years old	Approx. 7 years
Mr. Esat Xani	GIS Expert	31 years old	Approx. 9 years
Mr. Qazim Sinani	GIS Expert	35 years old	Approx. 6 years

(As of September 2014)

The geo-spatial data created covers about 90 % of the national land of Kosovo and the remaining data, which covers about 10 %, will be created by KCA on its own after the completion of the Project. For this reason, technology transfer was implemented in relation to the series of operations to enable KCA to develop geo-spatial data independently.

The following manuals shall be created in order to maintain sustainability of the project and establish a sustainable structure for smooth development of geo-spatial data and continuous use of the transferred technologies by KCA after the completion of this Project.

Table 3-2 Types and Purposes of Manuals

Type	Purpose	Description
Work manual	To enable the KCA personnel to execute the work by using this manual	Specific technical details of the work executed in each process step for the creation of geo-spatial data, including software operation manuals, etc.
Training manual	To enable KCA to carry out technology transfer within its organization	Objectives, positioning and technology required of each process step and method for evaluating the result of technology transfer for the whole process for the creation of geo-spatial data

The manuals were created not only in English but also in Albanian and Serbian, official languages of Kosovo.

The technology transfer implemented is described for each technology transfer item in the following.

[Transfer of the Technologies Used in the Field Work]

[2] Control Point Survey

Technology transfer was implemented on control point survey (the work of setting control points necessary for the succeeding work of aerial triangulation and capturing the positional information of the points by measurement) in relation to the creation of digital topographic map based on aerial photogrammetry.

a. Target of technology transfer

KCA and the Project Team had a meeting in order to accommodate requests from KCA in the technology transfer and discussed the targets of the technology transfer. The two parties agreed on the details of the technology transfer on the control point survey mentioned in the table below in the meeting. Since all the participants of the technology transfer were able to operate GNSS equipment without any problem at all, operation of the GNSS equipment was removed from the contents of the technology transfer.

Table 3-3 Contents of Technology Transfer on Control Point Survey

Content	Goal
Control point survey	Understanding of basic concept
	GNSS survey planning and management
	Leveling planning and management
	Confirmation, understanding and evaluation of measurement and calculation results
	Finalization of survey results
	Understanding of quality control and creation of quality control sheet
	Creation of manuals

Figure 3-1 Equipment of KCA (GNSS receiver and controller)

b. Participants of technology transfer

- Mr. Avni Rrustemi
- Mr. Mentor Kosumi
- Mr. Amir Reçica
- Mr. Esat Xani

c. Schedule

Implementation period		Description
Week 1	May 29, 2014	Lectures on the control point survey

d. Method of technology transfer

The technology transfer was carried out mainly in the form of lectures. In consideration of not only transfer of the technologies to the participants but also dissemination of the technologies to KCA staff who did not participate in the technology transfer, a work manual which could be used also as a training manual was created for and used in the technology transfer.

e. Evaluation of the result of technology transfer

A comprehensive evaluation method in which qualitative evaluation was added to quantitative evaluation was used for the evaluation of the result of the technology transfer. It has been concluded that the participants have acquired the transferred technologies with their knowledge and technical capacity in the surveying that they had before this technology transfer, the perfect attendance record and their positive learning attitude, as mentioned in the following:

- The perfect attendance record and earnest attitude towards the lectures of all the participants deserves praise.
- As the control point survey by the subcontractor was already in progress, the participants of the technology transfer were able to learn its basic components in a short period of time.
- As they have basic knowledge of photogrammetry, their capacity in the control point survey is considered to have reached the level at which they can implement it independently after the completion of this Project.

Table 3-4 Result of Technology Transfer on Control Point Survey

Name of the participant	Attendance percentage	Attitude during the technology transfer	
		Activeness	Attentiveness
A	100 %	Δ*	○
B	100 %	Δ*	○
C	100 %	Δ*	○
D	100 %	Δ*	○

Evaluation criteria

Activeness: ○ Sufficient preparation and asking questions Δ No particular questions

× Coming late to the class/leaving the class early

Attentiveness: ○ Always taking notes Δ Whispering

× Leaving the room temporarily during the class, etc.

* Because the participants had the basic knowledge, they did not ask many questions.

[3] Field Verification

Technology transfer was implemented on field verification (identification of the features that cannot be identified by photography interpretation at the site) using aerial photographs or orthophotos.

a. Target of technology transfer

KCA and the Project Team had a meeting in order to accommodate requests from KCA in the technology transfer. The two parties agreed on the targets of the technology transfer on the field verification mentioned in the table below in the meeting.

Table 3-5 Contents of Technology Transfer on Field Verification

Content	Goal
Field verification	Understanding of the work in the pre-interpretation and the methods for the analysis of existing reference materials and photo-interpretation
	Understanding of the practical method of field verification
	Understanding of how to organize the verification result
	Understanding of the quality and accuracy control
	Operation of handheld GPS devices
	Creation of manuals

b. Participants of technology transfer

- Mr. Avni Rrustemi
- Mr. Mentor Kosumi
- Mr. Amir Reçica

- Mr. Esat Xani

c. Schedule

Implementation period		Description
Week 1	May 26 to 27, 2014	Lecture on, pre-interpretation for and OJT of the field verification

d. Method of technology transfer

After the lecture on field verification work as a preliminary training, the technologies concerned were transferred at the site of the field verification in the form of OJT (on-the-job training). The technology transfer was conducted with dissemination of the technologies to the engineers of KCA who did not participate in the technology transfer taken into consideration, with the inclusion of the work process management including collaboration with the subcontractor and inspection of the field verification by the subcontractor in the technology transfer.

Figure 3-2 Scenes from Technology Transfer on Field Verification

e. Evaluation of the result of technology transfer

The level of mastery of the field verification of the participants was evaluated with the attendance record and the attitude towards the lecture during the technology transfer as well as with a quantitative indicator. They managed to complete all the work assigned to them within the allocated time in the OJT. The inspection by the project members in charge of field verification has found no problems in the result of their OJT. These facts indicate that the participants have acquired the technologies used in the field verification.

- The project members were able to confirm that the participants had acquired the skills essential for the field verification including the skills to make plans required for travelling in and surveying a target area in a systematic way, to identify locations on the ground with aerial photographs and to verify features of interest in accordance with the capturing standards in the OJT.
- The participants were able to recognize kinds of problems which were likely to occur in the field verification through the OJT on the inspection and were able to prepare measures to rectify the

problems.

Table 3-6 Result of Technology Transfer on Field Verification

Name of the participant	Attendance percentage	Attitude during the technology transfer	
		Activeness	Attentiveness
A	100 %	○	○
B	100 %	○	○
C	100 %	○	○
D	100 %	○	○

Evaluation criteria

Activeness: ○ Sufficient preparation and asking questions △ No particular questions

× Coming late to the class/leaving the class early

Attentiveness: ○ Always taking notes △ Whispering

× Leaving the room temporarily during the class, etc.

[Evaluation of the participants in the OJT]

Duration of the OJT	Area verified km^2	Area verified km^2/day	Target quota
2 days	71	35.5 km^2/day	30 km^2/day

Verification subject	Number of the subjects
Feature	71
Annotation	13
Total	84

[4] Field Completion

Technology transfer was implemented on field completion (re-identification of unclear locations (missing data, errors) found in digital plotting and compilation) using map sheets after digital compilation.

a. Target of technology transfer

KCA and the Project Team had a meeting in order to accommodate requests from KCA in the technology transfer. The two parties agreed on the targets of the technology transfer on the control point survey mentioned in the table below in the meeting.

Table 3-7 Contents of Technology Transfer on Field Completion

Content	Goal
Field completion	Method of identifying unclear/mismatching locations at the site
	Compilation of the verified data
	Understanding of quality control and creation of quality control sheet
	Creation of manuals

b. Participants of technology transfer

- Mr. Avni Rrustemi
- Mr. Mentor Kosumi
- Mr. Amir Reçica
- Mr. Esat Xani
- Mr. Qazim Sinani

c. Schedule

Implementation period		Description
Week 1	October 8 to 9, 2014	Lectures and OJT on the field completion

d. Method of technology transfer

On Day 1, the technology transfer was conducted mostly in the form of lectures. In consideration of not only transfer of the technologies to the participants but also dissemination of the technologies to engineers of KCA who did not participate in the technology transfer, a work manual which could be used also as a training manual was created for and used in the technology transfer.

On Day 2, the technology transfer was conducted in the form of OJT at the site. Collaboration with the subcontractor in the field verification and the work process management including inspection of the field verification conducted by the subcontractor were also included in the technology transfer. In the beginning, participants had to spend a long time to reach the site of the work. However, this problem was solved when they later became familiar with reading maps.

Figure 3-3 Technology Transfer on Field Completion

e. Evaluation of the result of technology transfer

The level of the mastery of the field completion of the participants was evaluated with the attendance

records and attitude towards the lectures on Day 1 and a quantitative indicator. They managed to complete all the work assigned to them within the allocated time in the OJT. The inspection by the project members in charge of field completion has found no problems in the result of their OJT. These facts indicate that the participants have acquired the technologies used in the field completion.

- Since the field completion is the work similar to the field verification, the project members in charge of field completion were able to reconfirm the level of mastery of the actual work in the field verification of the participants in the OJT of the field completion.
- The project members confirmed that the participants understood what unclear data and errors were and had skills to correct them at the site.

Table 3-8 Result of Technology Transfer on Field Completion

Name of the participant	Attendance percentage	Attitude during the technology transfer	
		Activeness	Attentiveness
A	100 %	○	○
B	100 %	○	○
C	100 %	○	○
D	100 %	○	○

Evaluation criteria

Activeness: ○ Sufficient preparation and asking questions Δ No particular questions
× Coming late to the class/leaving the class early

Attentiveness: ○ Always taking notes Δ Whispering
× Leaving the room temporarily during the class, etc.

[Evaluation of the participants in the OJT]

Duration of the OJT	Area verified km^2/day	Target quota
1 day	94.5km^2 (1 map sheet)/day	1 map sheet/day

Map No.	Map sheet No.	Verification subjects	Number of subjects	Number of errors
32	NK-34-14-15-2	Topography, features and annotations	13	0

[Technology transfer on the Office Work]

[5] Aerial Triangulation

Technology transfer was implemented on aerial triangulation (adjustment calculation necessary for constructing stereo models in the succeeding 3D digital plotting work) using existing aerial

photography data and control point data.

a. Target of technology transfer

The subjects mentioned in the table below were the targets of the technology transfer. Such flexible measures as changing the contents and focuses of the transfer of certain technologies were taken during the technology transfer to accommodate requests from KCA.

Table 3-9 Contents of Technology Transfer on Aerial Triangulation

Content	Goal
Aerial triangulation	Basic operation of digital photogrammetry system (project file creation, data import)
	Basic processing of aerial photography images
	Basic operation of software (tie point observation, GCP observation, adjustment calculation)
	Confirmation, understanding and evaluation of adjustment calculation results
	Advanced operation of software
	Understanding of parameters and adjustment calculation results
	Understanding of quality control and creation of quality control sheet
	Creation of manuals

b. Participants of technology transfer

The five people mentioned in the table below participated in the technology transfer on the aerial triangulation. A questionnaire survey revealed that three of them understood the theory of aerial triangulation. The survey also revealed that two of them had experience in operating software for photogrammetry and that they did not have a practical level of knowledge or technical capacity in aerial triangulation.

Table 3-10 Participants of Technology Transfer on Aerial Triangulation

Name	Post	Experience, skills, etc. in aerial triangulation		Remarks
		Theory	Software operation	
Mr. Avni Rrustemi	GIS and Cartography Expert	Yes	No	
Mr. Avni Ahmeti	Head of GIS Department	Yes	No	
Mr. Amir Reçica	GIS Expert	No	No	
Mr. Esat Xani	GIS Expert	Yes	No	A little experience in using ERDAS software
Mr. Mentor Kosumi	Measurement Expert	No	No	

c. Schedule

The training began with how to install the software for the purpose of enabling KCA to strengthen its work implementation structure independently after the completion of this Project. As the questionnaire survey of the participants revealed the existence of participants who did not know the basic theory of aerial triangulation, the lectures on the basic theory followed the software installation in the training.

Table 3-11 Schedule of Technology Transfer on Aerial Triangulation

Implementation period			Description
First phase	Week 1	June 4 to 5, 2014	Installation of the hardware and software
	Week 2	June 8	Installation of the hardware and software
		June 9 to 12	Lecture on the theory of aerial triangulation
			Training on aerial triangulation (one model, single course) Training on aerial triangulation (two courses) Goals: Basic operation of the digital photogrammetry system, basic processing of aerial photography images and basic operation of the software (tie point observation, GCP observation and adjustment calculation)
			Training on aerial triangulation (1 block) Goal: Confirmation, understanding and evaluation of the result of the adjustment calculation Advanced operation of the software
	Week 3	June 15	Review of the training on aerial triangulation Goal: Understanding of the parameters and result of the adjustment calculation
Second phase	Week 1	January 16 to 19, 2015	Reproduction of existing aerial triangulation result Summary and evaluation of the training

d. Method of technology transfer

The "Aerial Triangulation Training Manual" and the presentation which summarized aerial triangulation were used in the lecture on the theory of aerial triangulation.

In the practical training on the aerial triangulation, the project member in charge of aerial triangulation performed demonstration of how to use equipment and materials procured in this Project and, then, the participants practiced what the project members had done. The training was carried out in steps. As the scale of the work increased from "one model" through "one course" and "two courses" to "one block," the participant achieved the goals of "basic setting," "basic operation of the software," "confirmation, understanding and evaluation of the calculation result," "advanced operation of the software" and "understanding of the parameter settings" successively.

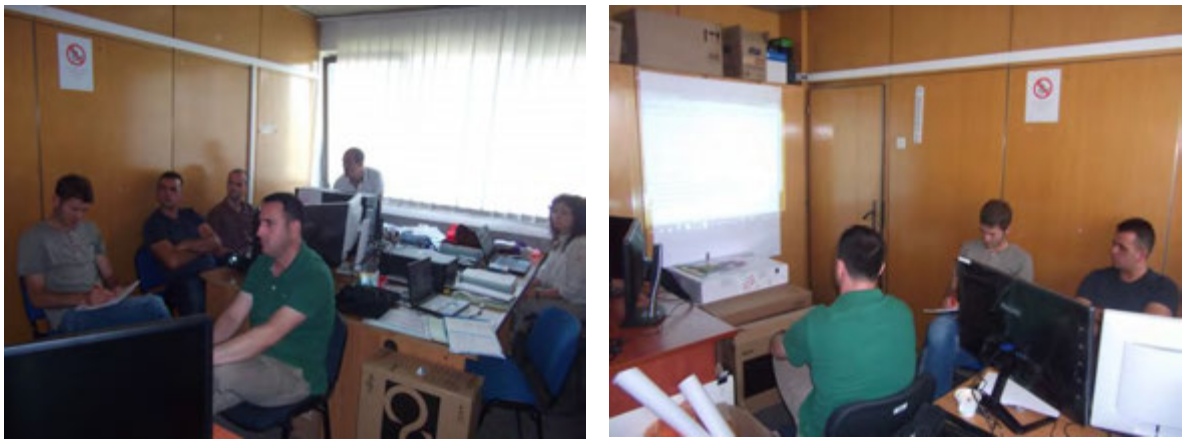


Figure 3-4 Lecture on Theory of Aerial Triangulation

(1) Basic operation of the digital photogrammetry system (creation of a project file and import of various types of data)

The technologies for the basic operation (basic setting) of ERDAS Image Photogrammetry, the software to be used in the aerial triangulation, were transferred. The contents of the training were as follows:

- Roles of, parameter setting for and files related to a project file
- Outline and the method for the setting of the coordinate system
- Outline and the method for the setting of a camera file
- Import of images
- Import of a control point file
- Outline of exterior orientation elements
- Import and linking with images of exterior orientation elements

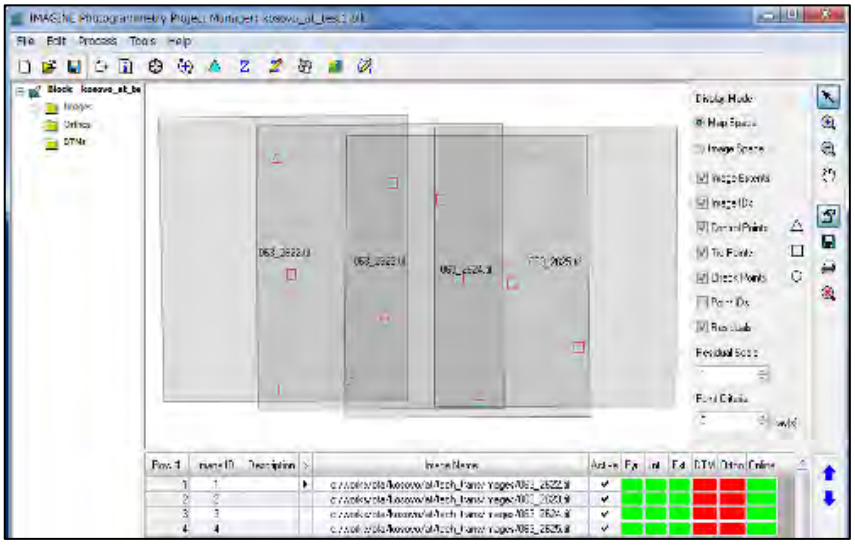


Figure 3-5 Screen for Basic Setting of Aerial Triangulation Software

(2) Basic processing of aerial photograph images

Setting of the orientation of aerial photography is extremely important in aerial triangulation and it is closely associated with the setting of a camera file. Therefore, an entire lecture dedicated to the subject was provided to the participants. In addition, the participants practiced the setting of tone and hue of images to those suitable for the observation of control points and tie points on the images.

(3) Basic operation of the software (tie point observation, GCP observation and adjustment calculation)

After a lecture on the quantities and positioning of tie points and GCPs required for aerial triangulation was provided to the participants with the Japanese standards as reference, they practiced the tie point and GCP observation with interactive processing (manual processing) with the software. In the practice of the observation, the project member explained the methods to identify identical points on adjacent overlapping images efficiently and to select points with which errors were unlikely to occur to the participants.

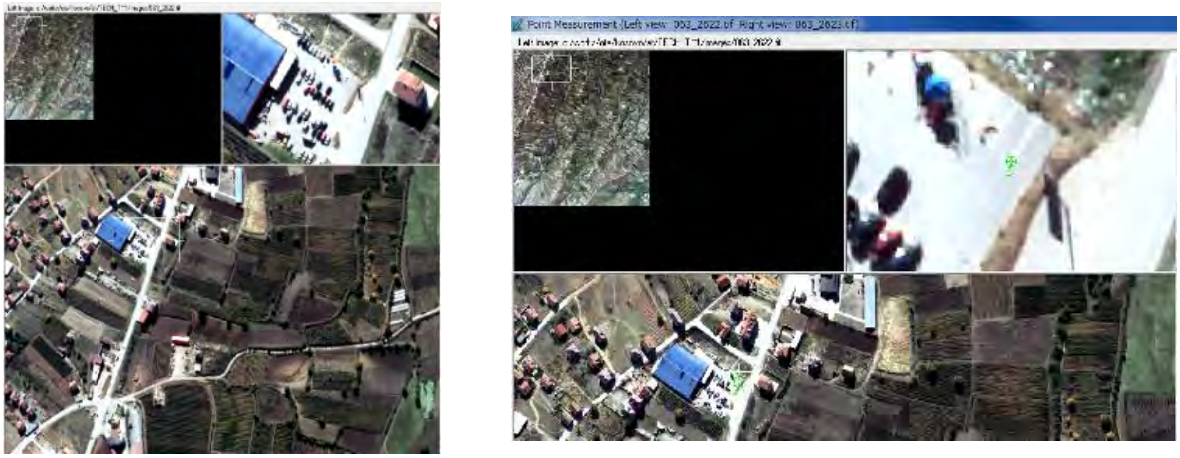


Figure 3-6 Control Point Observation Screen

(4) Confirmation, understanding and evaluation of the result of the adjustment calculation

After the practice of the tie point and GCP observation, the result of the practice was used for the adjustment calculation. After the lecture explaining allowable accuracy ranges at different scales, lectures and practice on the processes and points to be inspected when an error had been detected were provided to the participants.

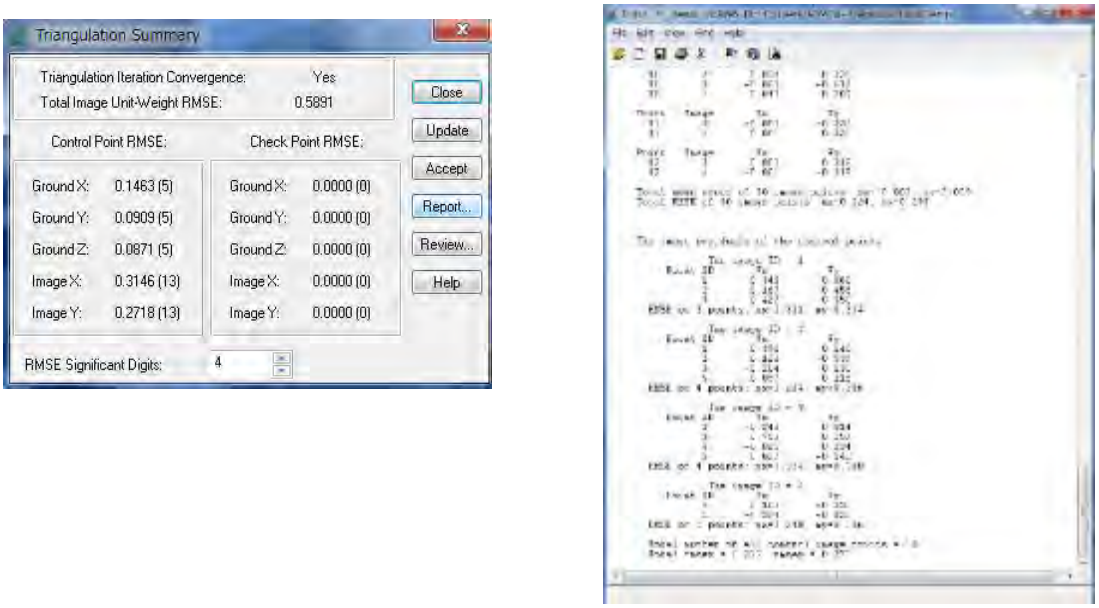


Figure 3-7 Result of Adjustment Calculation

(5) Advanced operation of the software

Since automatic processing was an effective way to conduct the tie point observation when the number of images to be processed was large, lectures and practice on the parameter setting for automatic tie point observation were provided to the participants. After the practice, the participants confirmed the difference in the numbers and locations of tie points observed in the automatic observations with different parameter settings and had a lecture on the points to be noted in the automatic tie point observation and disadvantages of its use.

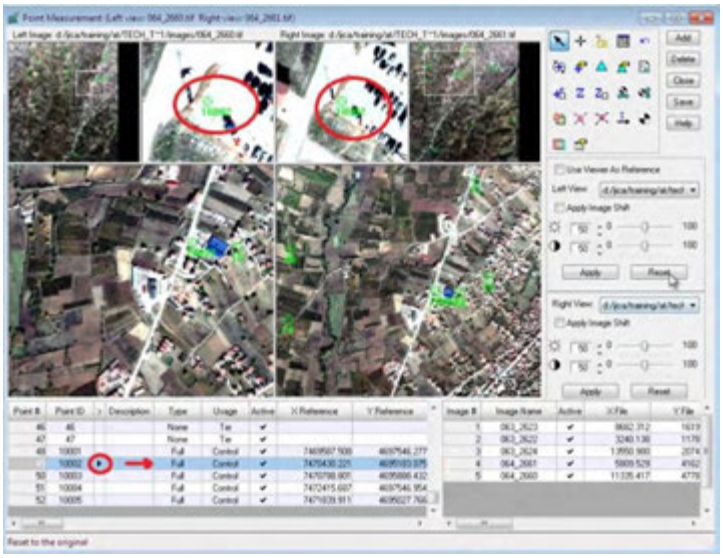


Figure 3-8 Result of Automatic Tie Point Observation

(6) Understanding of the relationship between the parameter setting and the result of the adjustment calculation

After taking the lecture and the practice on the parameter setting for the adjustment calculation including the types and setting methods of the number of iteration and allowable accuracy range, the participants confirmed the difference in the calculation result derived from the difference in the parameters.

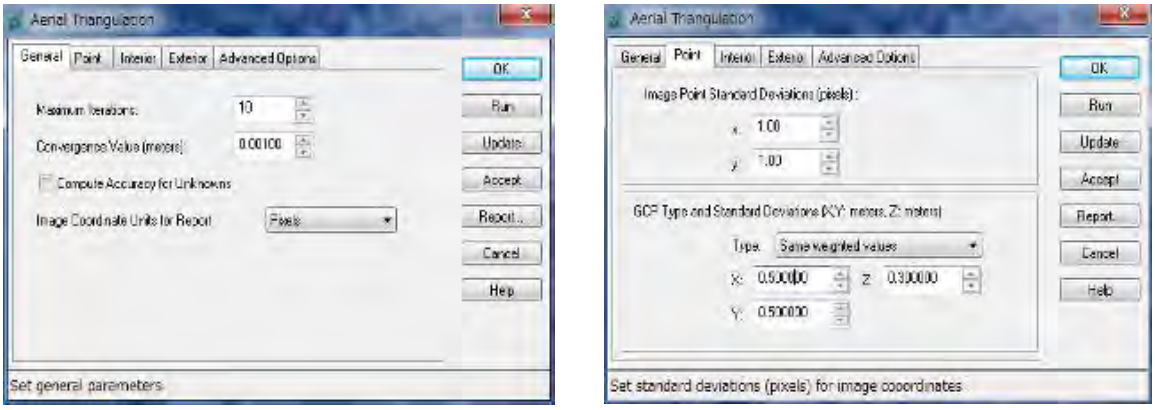


Figure 3-9 Parameter Setting Screens

(7) Understanding of the quality control and creation of the quality control sheet

The output of the aerial triangulation was evaluated by comparing the results of the calculation conducted in the aerial triangulation with the pass marks for the tie points and GCPs. The participants of the technology transfer entered the results of the evaluation in the quality control sheet. The project member in charge of the aerial triangulation inspected the completed sheet and found no problem in the entries. Therefore, it was concluded that the participants had understood the concept of the quality control in the aerial triangulation and the use of the quality control sheet and that they were capable of creating the quality control sheet without a problem.

Quality Control Table of Block Adjustment (DMCII230-018)

Project Name				Work Volume		Adjustment		Ground Sample	Work Period		Organization	Super	Akira OTA (JICA)
Kosovo				Course	3	Bandle Adjustment		0.40m	From 19 January 2015		Kosovo Kadastral Agency	Inspector	Avni RRUSTEMI
				Images	12				To 19 January 2015				

Course No.	Flight Altitude (m)	Image ID		Number of GCP XY	Number of GCP Z	Number of Excluded XY	Number of Excluded Z	Check Points Residuals Point Name	Check Points Residuals XY (m)	Check Points Residuals Z (m)	Final Residual of Block Adjustment Points (Weight is noted in【】) Point Name	Final Residual of Block Adjustment Points (Weight is noted in【】) XY (m)	Final Residual of Block Adjustment Points (Weight is noted in【】) Z (m)	Residual intersection of tiepoints X RMS (μm)	Residual intersection of tiepoints X MAX (μm)	Residual intersection of tiepoints Y RMS (μm)	Residual intersection of tiepoints Y MAX (μm)	Residual intersection of tiepoints XY RMS (μm)	Residual intersection of tiepoints XY MAX (μm)
C62	3640	2583	2586	5	5	0	0							0.26	-1.51	0.16	0.94	0.31	1.78
C63	3640	2622	2625									【0.5,0.5】	【0.3】	【2.0】		【2.0】			
C64	3640	2600	2603									0.20	0.10	Tolerance				15	30
												0.42	0.27						
												0.29	0.28						
												0.20	0.10						
												0.09	0.05						

Residual of Check Points RMSE (m)			Residual of Block Adjustment RMSE (m)		
				0.26	0.19
Tolerance			Tolerance	1.00	0.50

Residual of Check Points MAX (m)			Residual of Block Adjustment MAX (m)		
	0	0		0.42	0.28
Tolerance	0.9	0.9	Tolerance	2.00	1.00

Equipment	Digital Photogrammetric WorkStation	Operator	Avni RRUSTEMI	Check Period	1	mandays

Figure 3-10 Quality Control Sheet Used in the Aerial Triangulation

(8) Reproduction of existing aerial triangulation results

KCA will have to be able to create stereo models from aerial photographs using existing aerial photographs and outputs of aerial triangulation, as it is to create digital topographic maps independently after the completion of this Project. For this reason and also for the review and application of knowledge the participants had gained in the technology transfer on aerial triangulation, this practical training was conducted. The participants successfully reproduced the existing output of aerial triangulation without a problem in the training.

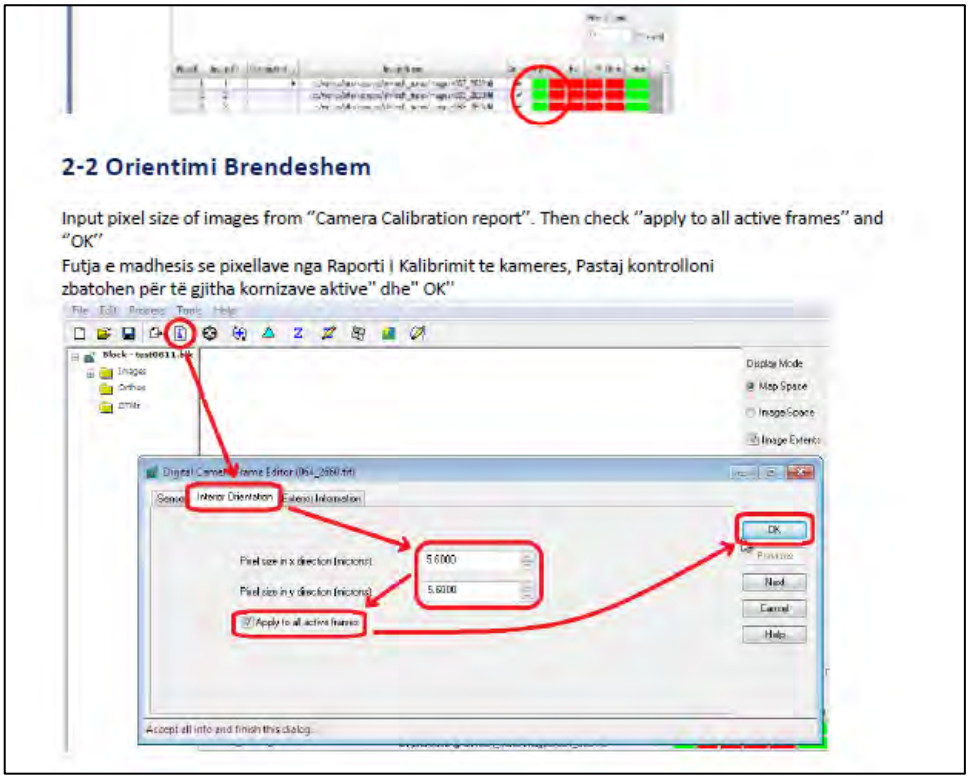


Figure 3-11 Part of Manual for Aerial Triangulation

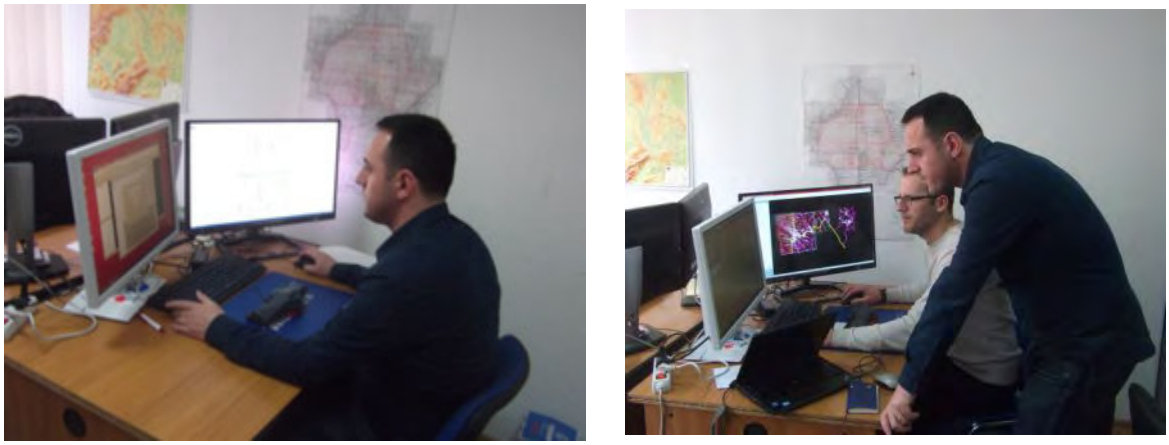


Figure 3-12 Technology Transfer on Aerial Triangulation (Left: Reproduction of the existing output, Right: Revision of the manual)

e. Evaluation of the result of technology transfer

The participants of the technology transfer conducted aerial triangulation of a block (with multiple images taken from multiple flight paths) of a target area using advanced technologies including the automatic tie point observation and obtained good results. They also managed to evaluate the results independently and completed the quality control sheet.

In addition, they created a manual unassisted, used the manual in the review of the training on aerial triangulation and completed the review without relying on the Project Team member.

Table 3-12 Result of Technology Transfer on Aerial Triangulation

Content	Goal	Evaluation indicator	Evaluation result
Aerial triangulation	Basic operation of the digital photogrammetry system (creation of a project file and import of various types of data)	The participants are able to perform the basic operation unassisted on a condition different from that used in the training.	The participants have acquired technical capacity to reproduce existing aerial triangulation outputs.
	Basic processing of aerial photography images	The participants are able to set a condition which makes the observation easy unassisted.	The participants were able to set such parameters as color tones at will.
	Basic operation of the software (tie point observation, GCP observation and adjustment calculation)	The participants are able to perform manual observation smoothly.	The participants have become able to smoothly identify locations of target points in photo-interpretation and observe these points.
	Confirmation, understanding and evaluation of the result of the adjustment calculation	The participants are able to identify locations of errors and correct them.	The participants have become able to identify locations of errors from the calculation report and correct them. They will have to be able to do the above-mentioned with a large quantities of tie points and GCPs.
	Advanced operation of the software	The participants are able to process data of a designated range with the automatic processing. The participants are able to reproduce the existing aerial triangulation result.	The participants were able to observe tie points with the automatic processing. They have acquired the technical capacity to reproduce existing aerial triangulation outputs.
	Understanding of the relationship between the parameter setting and the result of the adjustment calculation	The participants are able to set parameters for the automatic observation appropriately for different conditions.	The participants were able to understand the parameter setting for the automatic processing.
	Understanding of the quality control and creation of the quality control sheet	The participants are able to create the quality control sheet unassisted.	The participants were able to create the quality control sheet unassisted.
	Creation of manuals	The participants are able to create manuals.	The participants were able to create manuals.

[6] Digital Plotting

Technology transfer was implemented on 3D digital plotting (capturing features as graphic information by measuring the stereo models constructed by using the aerial triangulation results) using aerial photography images and aerial triangulation results.

a. Target of technology transfer

The subjects mentioned in the table below were the basic subjects of the technology transfer. Such flexible measures as changing the contents and focuses of the transfer of certain technologies were taken during the technology transfer to accommodate requests from KCA.

Table 3-13 Contents of Technology Transfer on Digital Plotting

Content	Goal
Digital plotting	Basic operation of digital photogrammetry system (understanding the plotting operations)
	Basic operation of software
	Advanced operation of software (detailed settings, etc.)
	Understanding of map symbols
	Understanding of capturing method in accordance with the contraction scale
	Understanding of plane feature plotting/understanding of contour line plotting
	Understanding of quality control and creation of quality control sheet
	Creation of manuals

b. Participants of technology transfer

The five people mentioned in the table below participated in the technology transfer on the digital plotting. A questionnaire survey of the participants revealed that none of them had knowledge of the theory of stereo plotting and that four of them had experience in using CAD software, but not in stereo plotting. They showed interest in all the work associated with the stereo plotting, with the exception of operation of CAD software, and requested the training put emphasis on the capturing of three-dimensional data.

Table 3-14 Participants of Technology Transfer on Digital Plotting

Name	Post	Experience, skills, etc. in digital plotting		Remarks
		Theory	Software operation	
Mr. Avni Rrustemi	GIS and Cartography Expert	No	Yes	AutoCAD, ArcGIS
Mr. Avni Ahmeti	Head of GIS Department	No	Yes	AutoCAD, Quantum GIS
Mr. Amir Reçica	GIS Expert	No	Yes	AutoCAD, Geomedia
Mr. Esat Xani	GIS Expert	No	Yes	AutoCAD, Geomedia
Mr. Mentor Kosumi	Measurement Expert	No	No	Geomedia

c. Schedule

The training began with the basic operation of the digital photogrammetry system. The focus of the training was on “understanding of map symbols,” “data capturing in accordance with map scales” and “capturing of three-dimensional data.”

Table 3-15 Schedule of Technology Transfer on Digital Plotting

Implementation period			Description
First phase	Week 1	June 16 to 18, 2014	Creation of symbols (points, lines and polygons) Goals: Understanding of the basic operation of CAD software and map symbols and understanding of mapping scale
			Setting of PRO600 (Environment setting between the digital photogrammetry system, stereo viewing software and CAD software) Goal: Basic operation of the digital photogrammetry system (Understanding of the plotting operation)
		June 19	Practice on digital plotting (planimetric features: roads and rivers) Goals: Understanding of the scale-specific method for data capturing and understanding of plotting planimetric features
	Week 2	June 22	Practice on digital plotting (planimetric features: buildings, infrastructure and land use) Goals: Understanding of the scale-specific method for data capturing and understanding of plotting planimetric features
		June 23 to 24	Practice on digital plotting (planimetric features: vegetation) Goals: Understanding of the scale-specific method for data capturing and understanding of plotting contours
		June 25 to 26	Practice on digital plotting (contours, etc.: spot elevations, topography and contours)
	Week 3	June 29 to 30	Practice on digital plotting (contours, etc.: spot elevations, topography and contours)
			Review of the training on digital plotting
Second phase	Week 1	January 20 to 23, 2015	Training of the digital plotting of the area to be mapped independently by KCA
	Week 2	January 26 to 27	Training of the digital compilation and map symbolization of the area to be mapped independently by KCA Summary and evaluation of the training

d. Method of technology transfer

The training on digital plotting was implemented in the style in which the project member in charge of digital plotting demonstrated a certain technology using the equipment and materials procured in this Project and, then, the participants practiced what the member had done. The data of the area used in the technology transfer on the aerial triangulation mentioned above were used in the technology transfer on the digital plotting.

The training was provided in three parts, "setting of the digital photogrammetry system," "creation of map symbols" and "practice of the digital plotting." The technology transfer began with a lecture on the basic theory of "digital plotting" with a presentation which summarized the "Digital Plotting Training Manual" and the outline of the digital plotting, followed by the technology transfer for the goals mentioned in the table in "**a.**" above in their order in the table.

In the second phase of the technology transfer, an area appropriate for the training on digital plotting was selected within the area to be mapped independently by KCA after the completion of the Project. Training was then conducted for both the review and repetition of the practice of the technologies for digital plotting transferred in the previous phase and preparation for the work to be conducted by KCA in future.

(1) Basic operation of the digital photogrammetry system (Understanding of the plotting operation)

The technologies required for the basic operation of the modules used in the digital plotting, ERDAS Imagine Photogrammetry, PRO600 and MicroStation, were transferred. The details of the training were as follows:

- Understanding of the function of each module (*e.g.* ERDAS Imagine Photogrammetry = stereo viewing software, PRO600 = software linking the stereo viewer and CAD and MicroStation = CAD software)
- Management and reproduction of stereo models with ERDAS Imagine Photogrammetry
- Data setting for each captured feature (setting of the code, color, line type, line width, map symbol, etc.) with MicroStation
- Catalog creation and setting with PRO600
- Understanding of the basic operation of TopoMouse

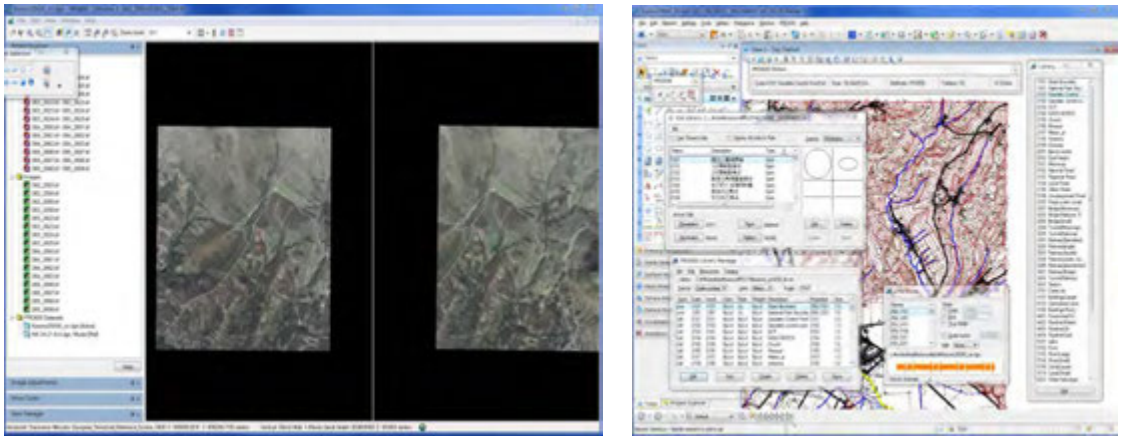


Figure 3-13 Digital Photogrammetry System

(2) Basic operation of the software

The participants practiced creation of symbols to be used in the digital plotting as a practice to master the basic operation of MicroStation, which is used in the drawing process in the digital plotting.

They created several symbols of "point," "line" and "polygon" data using the basic drawing functions, editing functions and modification functions of MicroStation in combination.

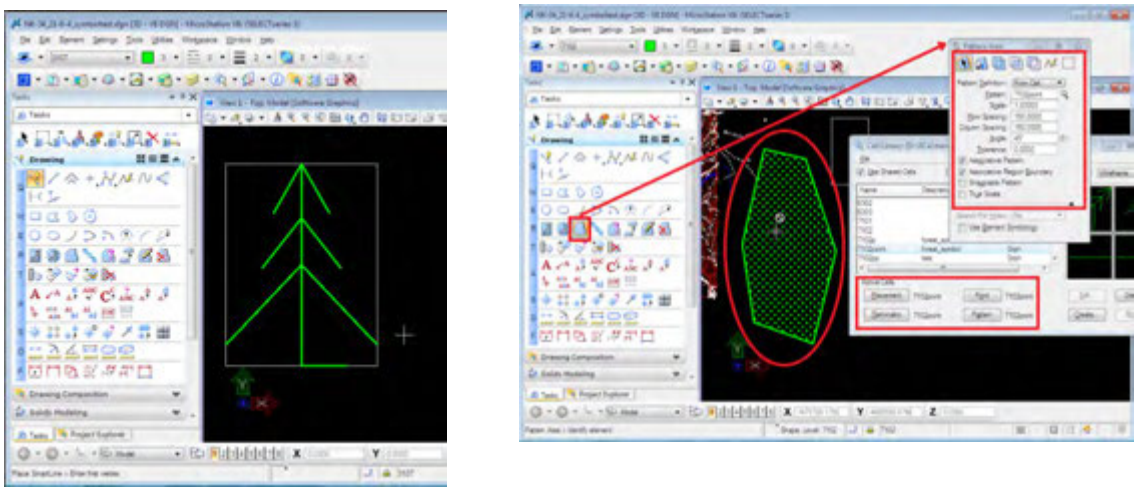


Figure 3-14 Symbols Created in the Training

(3) Advanced operation of the software (detailed setting, etc.)

There are many features to be captured which have characteristic shapes and which have to be captured with specific methods. In many cases, the efficiency of capturing these features can be improved by using capturing methods adapted to their characteristics (*e.g.* rectilinearization of building data, arrangement of symbols which can be rotated and streaming of contour data).

The participants practiced the advanced operation mentioned above in the training with PRO600.

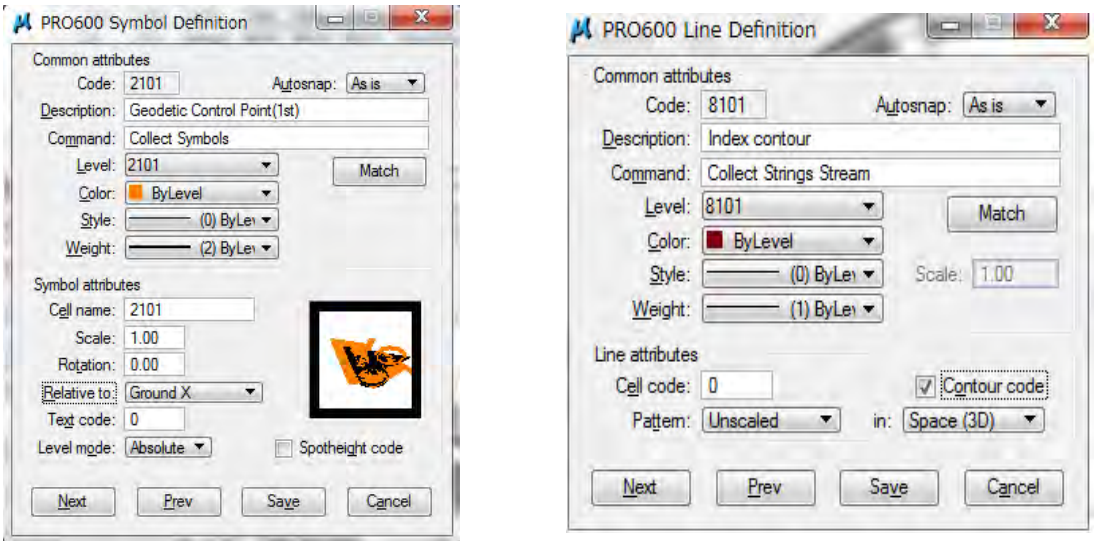


Figure 3-15 Screen of PRO600 for Setting a Data Capturing Method

(4) Understanding of map symbols

A lecture was provided on the map symbols required for the creation of 1/25,000 topographic maps, features to be captured and the capturing standards for each of those features.

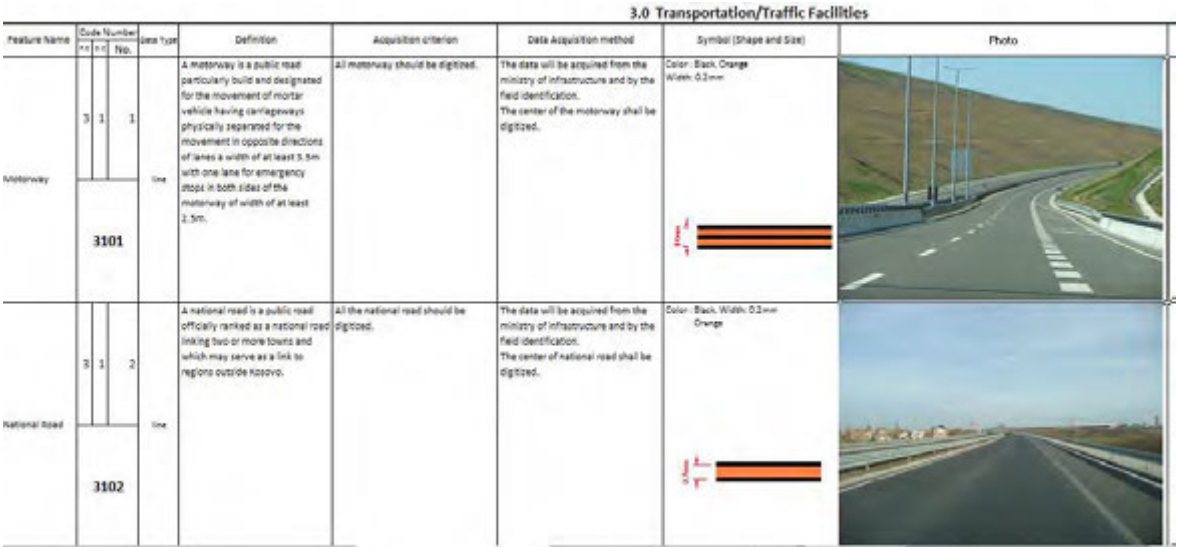


Figure 3-16 Map Symbols for 1/25,000 Topographic Maps (including plotting instruction)

(5) Understanding of the scale-specific data capturing method

A lecture to facilitate the understanding of the scale-specific data capturing method required for the digital plotting at the scale of 1/25,000 was provided using the data created in digital plotting conducted in Japan and the existing 1/25,000 topographic maps.

Figure 3-17 Comparison between Plotting Data and a 1/25,000 Printout Map

(6) Understanding of the plotting of planimetric features and contours

In the training on the plotting of planimetric features, the participants had a lecture to explain the result of the field verification, following the lectures to explain map symbols and map-scale-specific data capturing method mentioned above, to review the contents of the previous lectures. After the lectures, the participants practiced the plotting of planimetric features.

The focus of the training was on the method to capture types of roads and shape of roads as line data appropriate for the representation on 1/25,000 topographic maps.

The training on the plotting of contours began with capturing data of spot elevations, followed by drawing contours compatible with the captured data of spot elevations. The focus of the training was on creation of shapes to represent rivers.

(7) Training of the digital plotting of the area to be mapped independently by KCA

A zone in the area to be mapped independently by KCA (10 % of the total land area outside the project area) after the completion of the Project (map sheet number NK-34-21-10-3) was selected as a training area as it met the criteria being adjacent to the project area and having many elements, such as stages of urbanization and topographic characteristics. The training was conducted on this area for the review and repetition of the practice of the technologies for digital plotting transferred and preparation for future work.

The participants in the training were able to capture all the photo-interpretable features to be captured in the area approximately a quarter of the map sheet area during the training period.

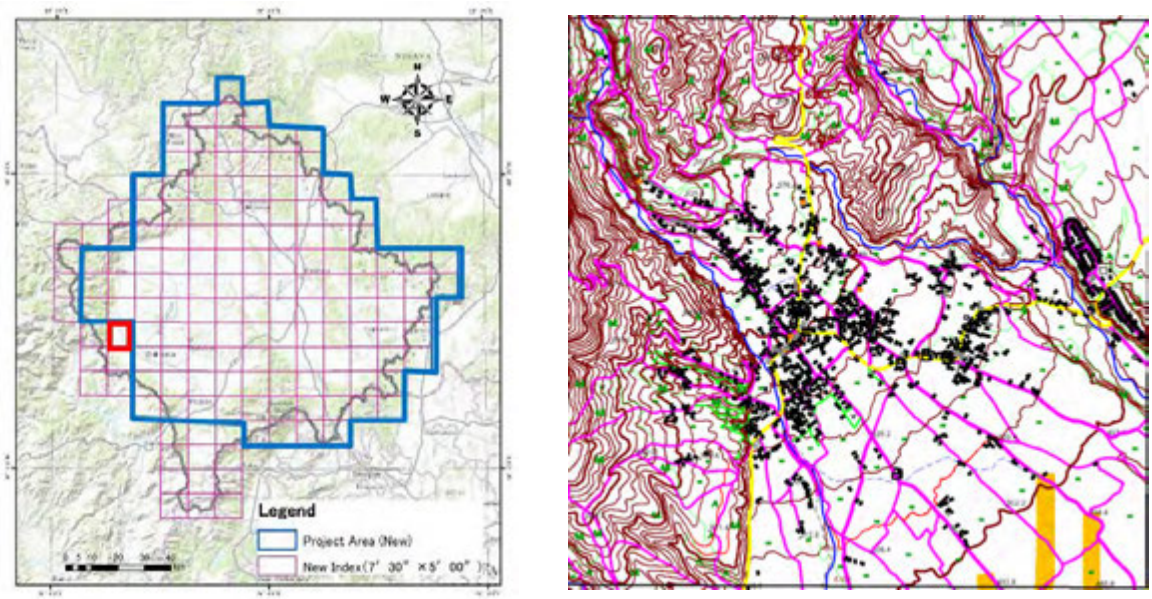


Figure 3-18 Map of Training Area for Digital Plotting in the Area to be Mapped Independently by KCA and Output of Digital Plotting

(8) Training of the digital compilation and map symbolization of the area to be mapped independently by KCA

The participants of the technology transfer independently practiced creation of map symbolization data from the digitally plotted data created in (7) partly for the review of the technology transfer on "digital compilation" and "map symbolization."

They managed to complete the work using the manual created during the technology transfer with support from the project member.

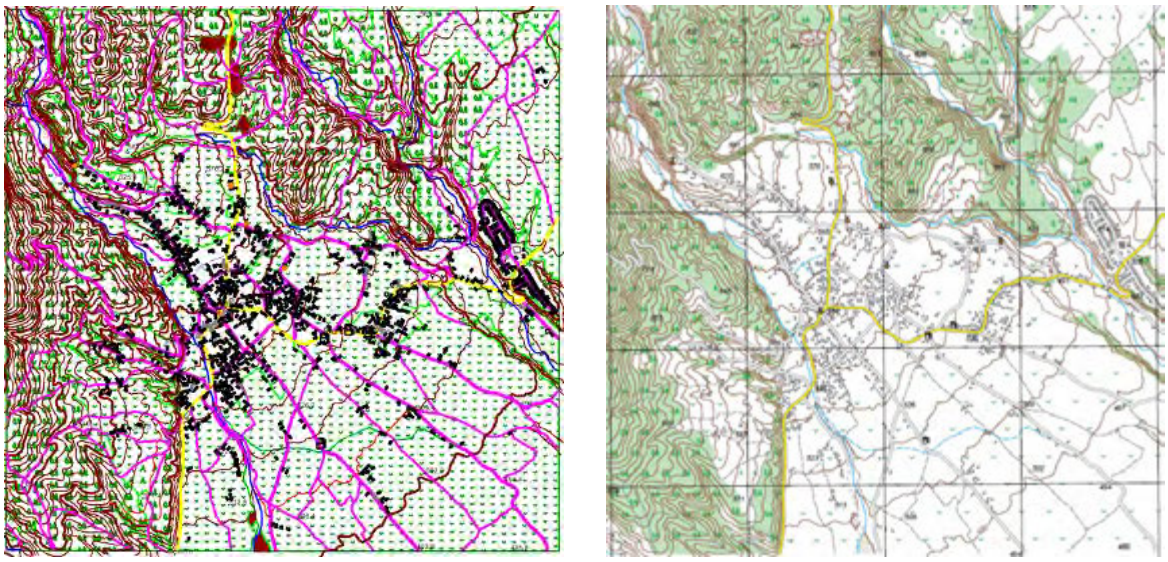


Figure 3-19 Outputs of "Digital Compilation" and "Map Symbolization" of Area to be Mapped Independently by KCA

(9) Understanding of quality control and creation of quality control sheet

The participants inspected the digital plotting data captured in (7) against the background of orthophotos for „excesses" and „omissions" in feature capturing in the quality control and entered the result of the quality control in the quality control sheet. The project member inspected the sheet and found no problem in the entries. Therefore, it was concluded that the participants of the technology transfer had understood the concept of the quality control in, and quality control sheet for, the digital plotting and that they were able to create the quality control sheet without a problem.

Digital Plotting **Quality control sheets**

Project Name	Sheet Name/No.	Mapping Scale	Volume	Period	Executive Organization	Chief Engineer	Checked by
Human Resource Development Project on Geo-Spatial Information of Kosovo	NK34_21_10_3	1/25,000	95Km2	Beginning: 2015/ 1/ 27 End: 2015/ 1/ 27	JICA Study Team	Akihiro Sugita	Akira OTA

Item		Missing	Error	Item		Missing	Error	Item		Missing	Error	Item		Missing	Error
Boundaries	Classification	0	0	Building Symbols	Classification	1	0	Vegetation	Form of boundary	4	0	#	Sheet Name/No.		
(1***)	Form	0	0	(42**)	Position	0	0	(7***)	Classification of symbols	0	0	Marginal Information	Grid Line		
Control Points	Position/Classification	5	0	Small Objects	Classification	0	0	Contours	Form	0	25		Coordinates Value		
(2***)	Value	0	3	(43**)	Position	0	0	(81**)	Value	0	2		Sheet index		
Road	Classification	14	0	Public Facility	Classification	0	0	Common Geography	Classification	0	0		North arrows		
(31**)	Form	0	0	(44**)	Form	0	0	(82**)	Form	0	0		Map description		
Road facilities	Classification	0	0	Water Area	Classification	2	0	Annotations	Administrative name	0	0		Others		
(32**)	Form	0	0	(51**,52**)	Form	0	1	(9***)	Other administrative name	0	0	Connection between adjacent sheets		0	0
Railway	Classification	0	0	Artificial object in the water area	Classification	0	0		Control point name	0	0	**Remarks**			
(33**)	Form	0	0	(53**)	Position	0	0		Transportation/Traffic facility	0	0				
Railway facilities	Classification	0	0	Land facility	Form of boundary	0	0		Water area name	0	0				
(34**)	Form	0	0	(61**)	Classification of symbols	0	0		Land use name	0	0				
Aviation / Other Transportation/Traffics	Classification	0	0	Religious Area	Form of boundary	0	0		Geography name	0	0				
(35**,36**,37**)	Position	0	0	(62**)	Classification of symbols	0	0		Place name	0	0				
Buildings	Classification	1	0	Plantation	Form of boundary	2	0		Road destination	0	0				
(41**)	Form	0	0	(63**)	Classification of symbols	0	0	Other	Instructions point	0	0				

Note
1: Create by each sheet. Kill by hatching the box for the item is not applicable.
2. Aggregated and describes the number of falling off and clerical error etc. in each item based on the result of inspection.
3. # item can not be described, in the case of Field completion.
4 (****) shows the classification code.

Figure 3-20 Quality Control Sheet for Digital Plotting Created in the Practical Training

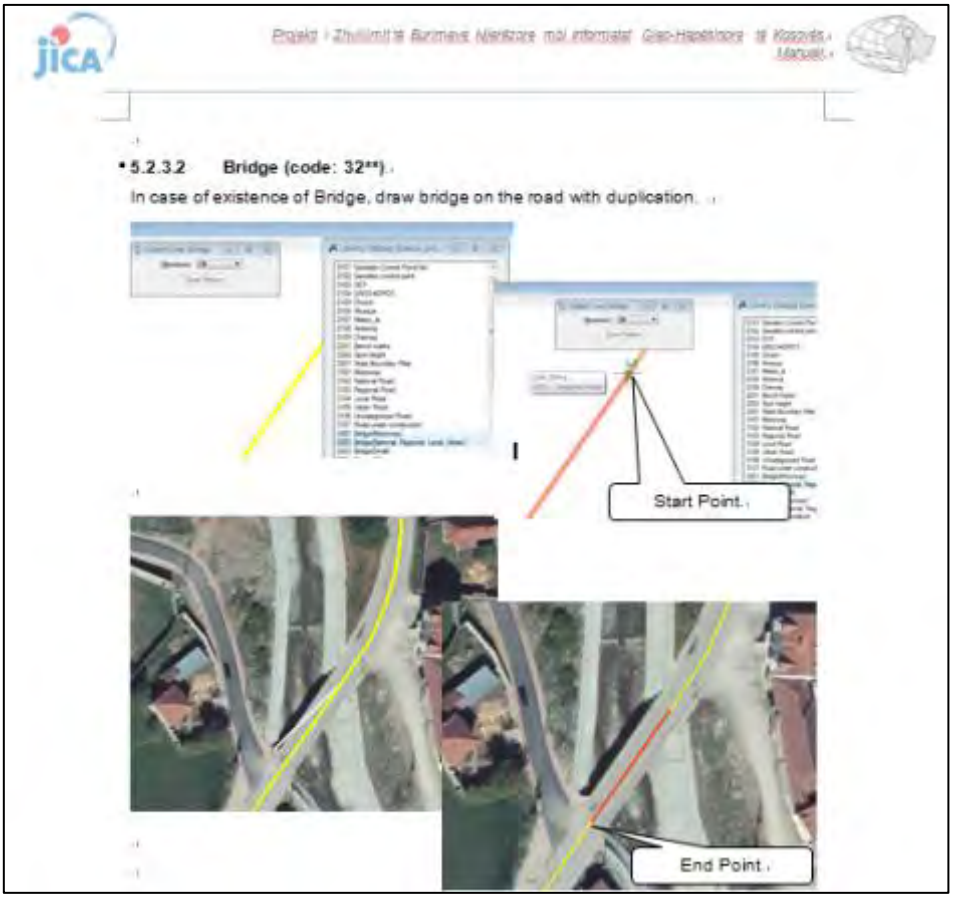


Figure 3-21 Part of Manual for Digital Plotting

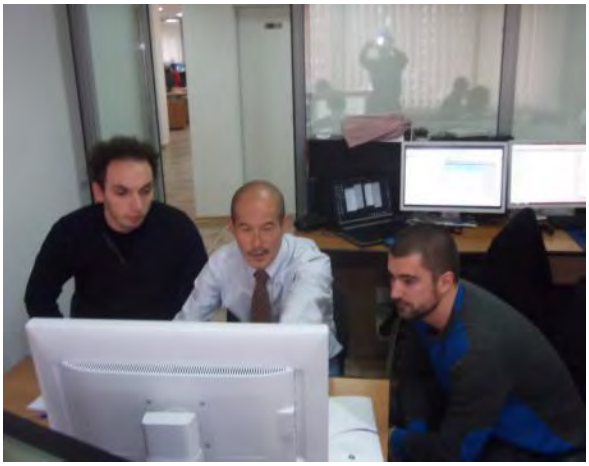



Figure 3-22 Technology Transfer on Digital Plotting (Left: Practical training on digital plotting, Right: Technology transfer on management of materials and equipment)

e. Evaluation of the technology transfer

The participants of the technology transfer were able to perform digital plotting, including various settings, of the area used in the technology transfer. The integrity of the output data of their plotting was high. (Integrities of 98.5 % and 95.6 % were observed for planimetric features and contours/spot elevations, respectively, in the result of the quality control.)

As they have difficulty in capturing contours, they shall have to master an appropriate way to express contours in valleys and flat areas on 1/25,000 topographic maps with repetition of the practice.

It is recommendable that the speed of the work shall be improved with repetition of the practice.

Table 3-16 Result of Technology Transfer on Digital Plotting

Content	Goal	Evaluation indicator	Evaluation result
Digital plotting	Basic operation of the digital photogrammetry system (understanding of the plotting operation)	The participants are able to perform the initial setting of PRO600 unassisted on a condition different from that used in the training.	The participants were able to perform the setting of PRO600 in accordance with the capturing standards, which were revised during the project period, unassisted.
	Basic operation of the software	The participants are able to create designated symbols smoothly with MicroStation.	The participants were able to create symbols, which were changed during the project period, independently.
	Advanced operation of the software (detailed setting, etc.)	The participants are able to create designated symbols smoothly with PRO600.	The participants were able to create symbols, which were modified during the project period, on PRO600 unassisted.
	Understanding of map symbols	The participants are able to select a correct code for each feature smoothly.	The participants are able to select appropriate codes without a problem.

	Understanding of the scale-specific data capturing method	The data captured in the mapping area satisfy the capturing standards for map symbols.	The participants are able to capture data other than contours appropriately.
	Understanding of the plotting of planimetric features	The data integrity in the designated area is at least at 90 %.	The output created by the participants satisfied the criterion of the integrity of more than 90 %. (98.5 %)
	Understanding of the plotting of contours	The data integrity in the designated area is at least at 90 %.	The output created by the participants satisfied the criterion of the integrity of more than 90 %. (95.6 %)
	Understanding of quality control and creation of quality control sheet	The participants are able to create the quality control sheet unassisted.	The participants were able to create the quality control sheet.
	Creation of manuals	The participants are able to create manuals.	The participants were able to create manuals.

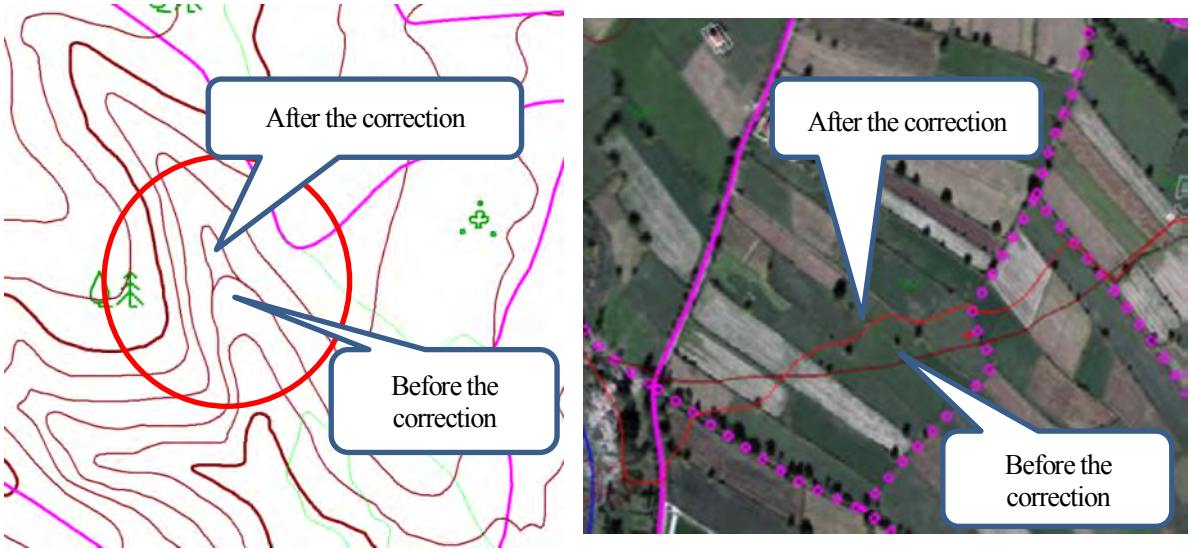


Figure 3-23 Output of Contour Drawing by Participants of Technology Transfer at KCA
(Left: Drawing in a valley, Right: Drawing on a flat area)

[7] Digital Compilation

Technology transfer was implemented on digital compilation (creating topographic map data by aligning digital plotting data and data cleaning based on the field compilation results and capturing standard) to create topographic map data from the digital plotting data.

a. Target of technology transfer

The subjects mentioned in the table below were the basic subjects of the technology transfer. Such flexible measures as changing the contents and focuses of the transfer of certain technologies were taken

during the technology transfer to accommodate requests from KCA.

Table 3-17 Contents of Technology Transfer on Digital Compilation

Content	Technology transfer item
Digital compilation	Basic operation of software (MicroStation and Bentley Map)
	Entry of the data of annotations and administrative boundaries
	Adjustment of locations of features
	Data cleaning
	Creation of polygon data
	Edge matching with existing topographic map data
	Understanding of quality control and creation of quality control sheet
	Creation of field completion forms
	Creation of manuals

b. Participants of technology transfer

- Mr. Avni Rrustemi
- Mr. Mentor Kosumi
- Mr. Amir Reçica
- Mr. Esat Xani
- Mr. Qazim Sinani

Figure 3-24 Training on Digital Compilation

c. Schedule

The technology transfer was conducted in accordance with the schedule shown below.

Table 3-18 Schedule of Technology Transfer on Digital Compilation

Implementation period		Description
Week 1	June 30, 2014	Digital plotting
	July 1 to 4	Basic operation of the software (preparation for the work, MicroStation and Bentley Map)
Week 2	July 7 to 8	Entry of annotations (positioning method for annotation and cartographic annotation rules)
	July 9	Entry of boundaries (boundary areas data preparation method)
	July 10 to 11	Adjusting position arrangement (position arrangement adjustment method and position arrangement rules)
Week 3	July 14 to 15	Data cleaning (removal of duplicate and fragmented data and cleaning of the data of linear features)
	July 16 to 18	Creation of polygon data (independent polygons, topological structure of polygons, concept of data cleaning and rules on creation of polygons)
Week 4	July 21	Data coupling (data coupling method)
	July 22	Field completion forms (preparation of field completion forms)
	July 23	Discussion on the next phase of the technology transfer

d. Method (contents) of technology transfer

The contents of the technology transfer are described in the order of the subjects of the technology transfer described in the table in „**a.**" above.

(1) Basic operation of the software (MicroStation and Bentley Map)

The technology transfer on the basic operation of "MicroStation" and "Bentley Map," the software used in the digital compilation, were conducted. The technologies required for using the functions required for digital compilation were transferred to the participants. The details of the training were as follows:

- Preparation of the working environment of MicroStation
- Outline of MicroStation and Bentley Map
- Screen operation (expansion, contraction, relocation, etc.)
- Layer operation
- Snapping method
- Method of data entry (map symbols, lines, polygons, circles and annotations)
- Data correction method (correction of shapes, modification of measurements and attributes)
- Inspection of geometry of figures
- Correction of geometry of figures

After the explanation on the above-mentioned operations, data for the practice were created. The participants entered digitized feature data on the background of simple existing maps in the training and

learned the basic operation of the software while creating data.

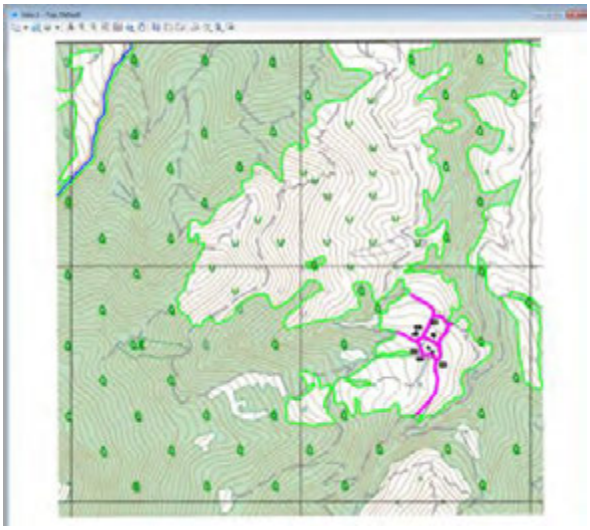


Figure 3-25 Data Created by Participants of Technology Transfer

(2) Entry of annotations and administrative boundaries

The participants practiced the method to add annotations and administrative boundaries to digital plotting data. As this training was conducted before digital plotting data were created in the technology transfer, the participants practiced the digital compilation with the digital plotting data created by the project member.

The annotations recorded on the field verification photos were used for the entry of annotations with a function of MicroStation. The participants learned how to represent the annotations with characters with the size provided in the map symbol regulations and how to place annotations of linear features such as roads and rivers with angles, when the need arises, in the training. The participants of the technology transfer successfully placed all the annotations in the map sheet area used in the technology transfer.

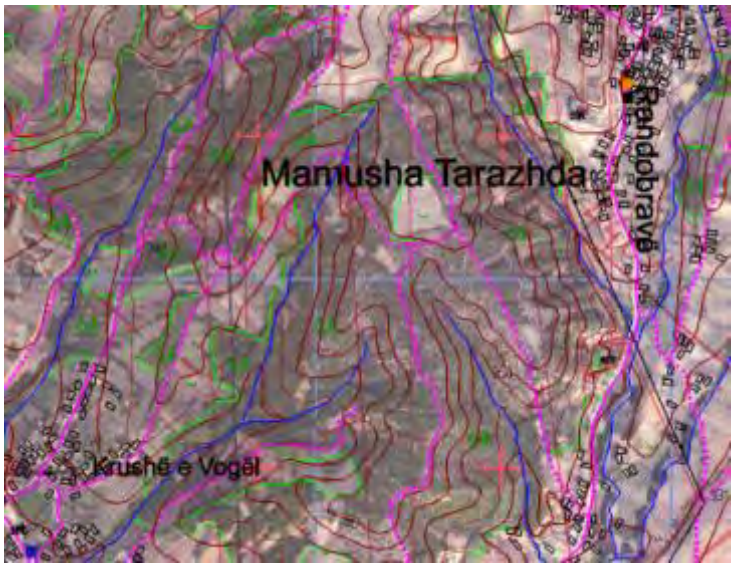


Figure 3-26 Part of Annotations Entered by Participants of Technology Transfer

(3) Adjustment of locations of features

The participants had training on how to adjust the locations of two overlapping features on a map. Since the positional data of features interpreted on aerial photographs are captured accurately, there is a possibility that symbols of two features created in the digital plotting from the captured data may be displayed overlapped on a map. In such a case, the locations of the features shall have to be adjusted in the digital compilation to eliminate the overlap.

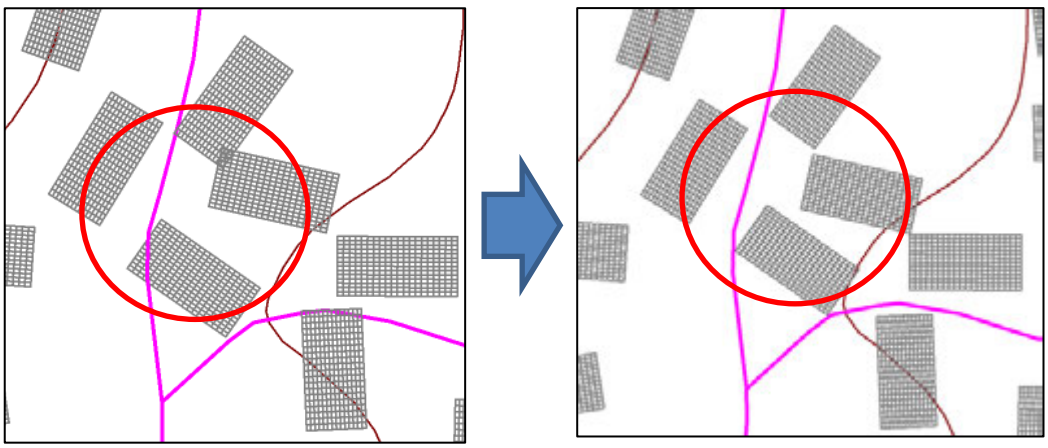


Figure 3-27 Adjustment of Locations of Features

The participants of the technology transfer practiced adjustment of locations of features in the area used in the technology transfer. The project member had identified the locations where overlap of features were

observed in advance and inspected the result of the practice of the digital plotting at these sites. If the project member had found incompleteness in the result, the participants were instructed to correct it. After the practice, the participants became able to adjust locations of features appropriately.

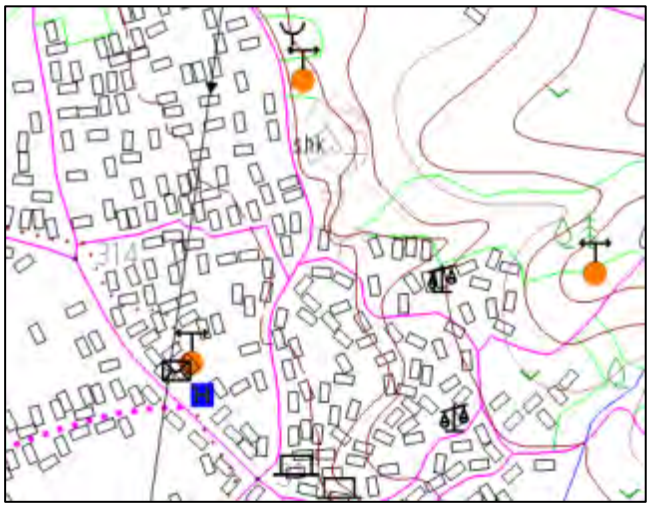


Figure 3-28 Part of Data whose Locations were Adjusted by Participants of Technology Transfer

(4) Data cleaning

Data cleaning is the work of correcting data which do not have data structures (polygon, line and point data) compliant with the map specifications at the stage of digital plotting to data with correct structures and identifying and correcting errors such as duplication and fragmentation occurred in the plotting. The participants had training on identification and correction of these errors in the map sheet area used in the technology transfer. The subjects of the data cleaning in the training were as follows:

- Identification of duplicate data: Identify sets of data captured for the same feature and eliminate duplication.
- Identification of fragmented data: Inspect minute line and other data generated in the plotting and delete these artifacts.
- Inspection of line data for interruptions: Inspect line data for features which form networks, such as roads, rivers and railways for interruptions.
- Inspection of polygon data: Inspect whether or not polygon data are closed. Inspect whether or not there is a gap on the outline of polygon data.

In the training, the participants identified errors using the logical inspection program and corrected them with functions of the software. Inspection was conducted not once but repeatedly until all the errors had been eliminated. In this way, the participants corrected all the errors successfully.

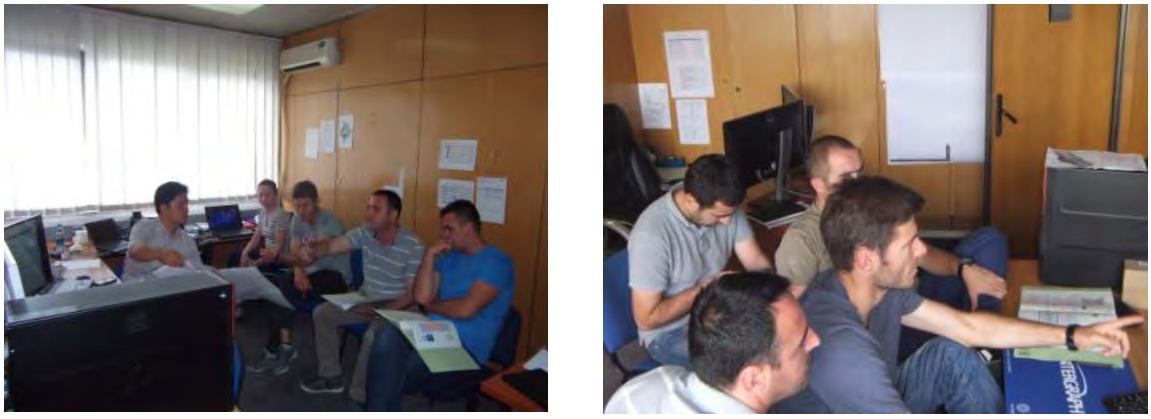


Figure 3-29 Technology Transfer on Digital Compilation

(5) Creation of polygon data

The project member explained the method for the creation of polygon data from cleaned data. In the practical training, the practical method to be used when creating topological polygon data was demonstrated using a vegetation feature as an example.

Since topological polygon data could be created efficiently with GIS software, the participants used the method of creating source data for polygon creation in the digital compilation and creating polygon data from the source data in the GIS structurization in the practice.

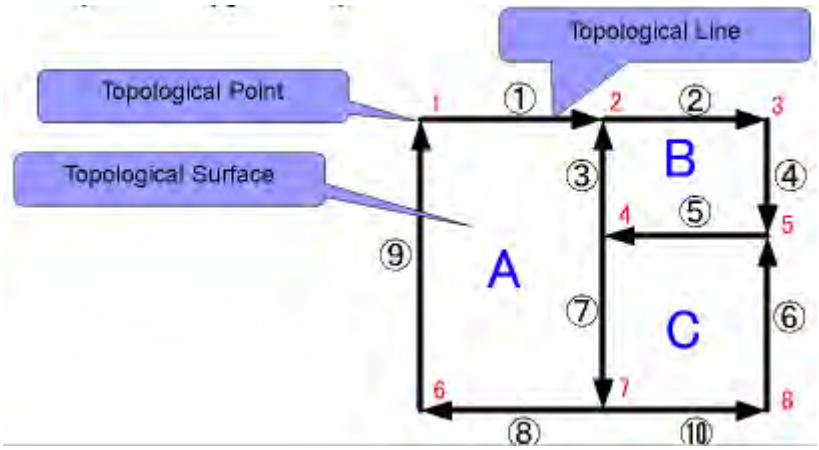


Figure 3-30 Topological Polygon Data

The participants of the technology transfer created vegetation polygons in the area used in the technology transfer in the practice and had mastered the method of creating them by the end of the practice.

(6) Edge matching with the existing topographic maps

The participants practiced the method of edge matching between the map of the map sheet area used in

the technology transfer and those of the adjacent areas using the data of the adjacent areas prepared by the project member. Edge matching is the work of connecting data in adjacent areas as shown in Figure 3-31.

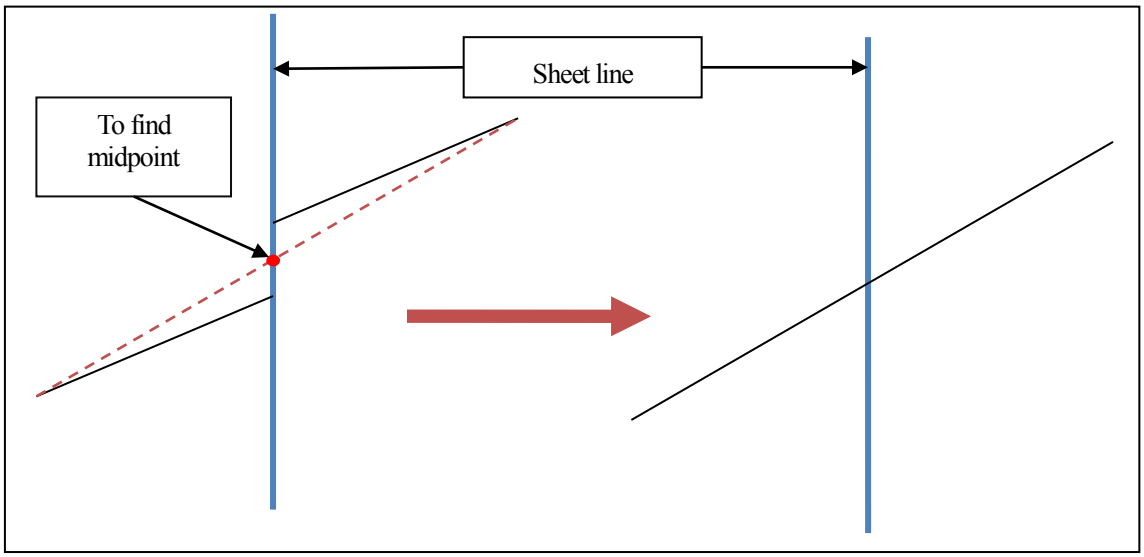


Figure 3-31 Conceptual Drawing of Edge Matching

The project member explained the accuracy required for and the order of procedures in edge matching and the participants practiced edge matching between adjacent map sheet areas. They successfully performed the edge matching with the training data prepared by the project member.

(7) Understanding of quality control and creation of quality control sheet

As the contents of the training for the understanding of the quality control and on the creation of an quality control sheet in this technology transfer overlapped with those of the training on the same subject in the technology transfer on the digital compilation after field completion, it was decided in the discussion between the participants and the project member that the training concerned should be combined and implemented in the technology transfer on the digital compilation after field completion.

(8) Creation of field completion forms

The participants practiced the method to create "field completion forms" to be used for the clarification of the uncertainties detected in the digital plotting and the digital compilation in the field. They successfully created the maps to be used in the field completion including the one shown in Figure 3-32.

Figure 3-32 Map to be Used in Field Completion Created by Participants of Technology Transfer

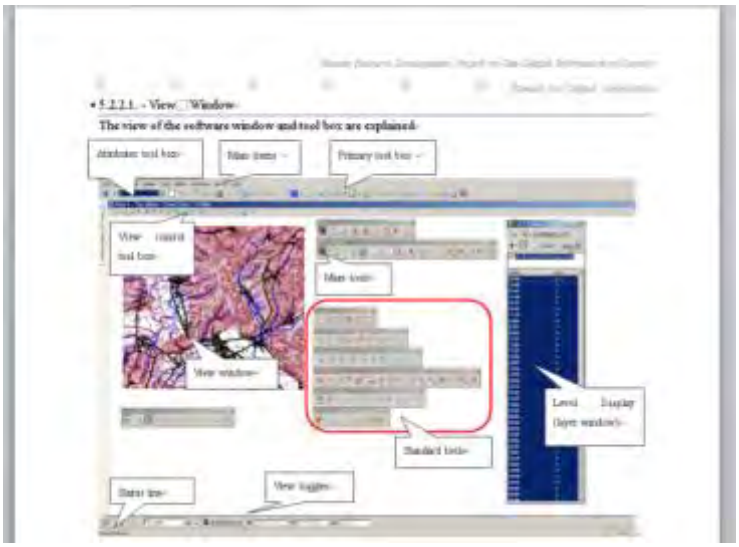


Figure 3-33 Part of Manual for Digital Compilation

e. Evaluation of the technology transfer

The participants of the technology transfer successfully completed the digital compilation of the digital plotting data of the area used in the technology transfer prepared by the project member within the duration of the technology transfer. Figure 3-34 shows the digital compilation data created by them, which verifies that they have understood the procedures for the digital compilation.

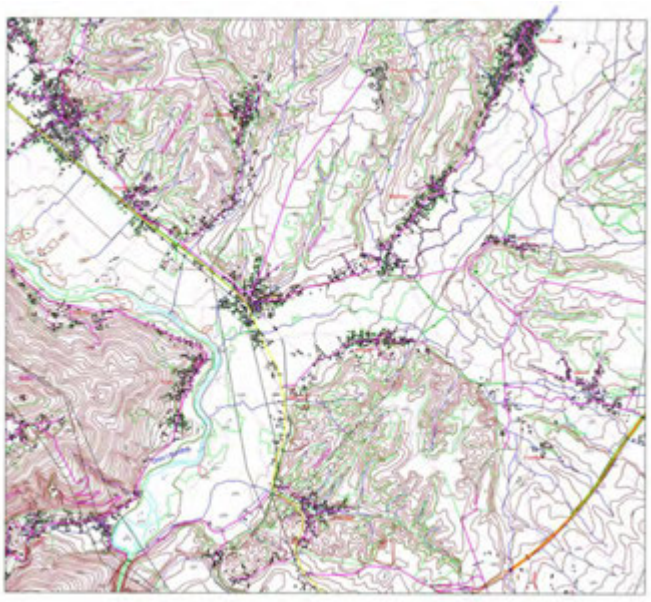


Figure 3-34 Completed Digital Compilation Data

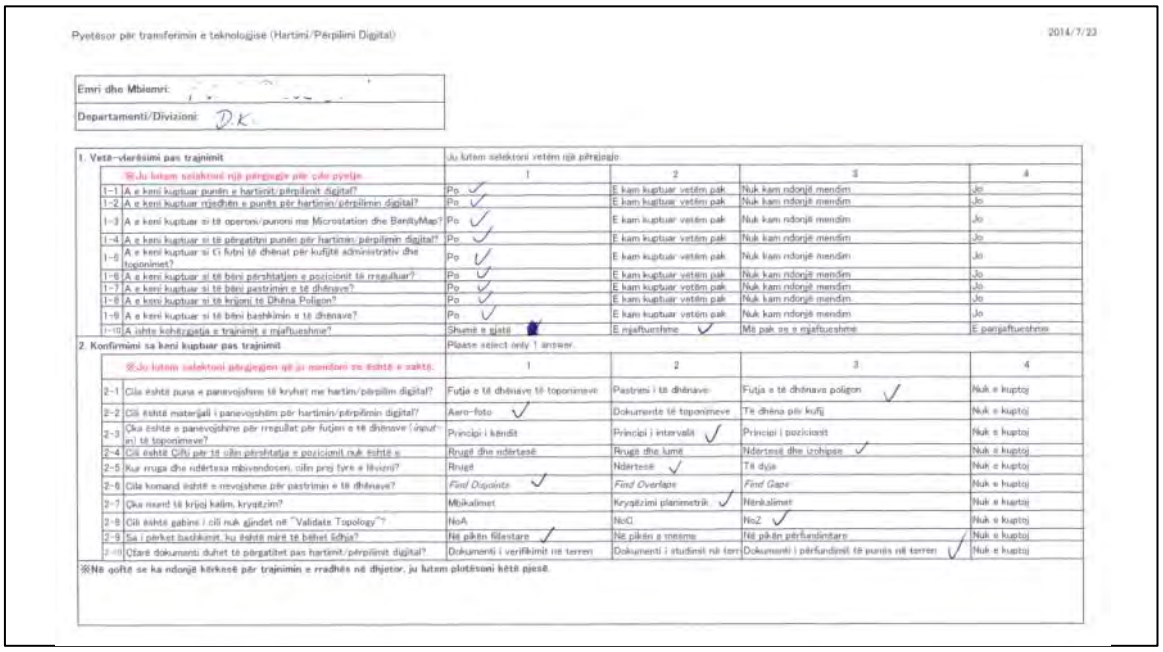
The project member asked the participants to fill in a questionnaire and take an examination for the evaluation of their level of understanding of the transferred technologies. The questionnaire contains the questions mentioned below for the self-evaluation of their understanding.

- Have you understood the details of the digital compilation procedures?
- Have you understood the workflow of the digital compilation?
- Have you understood how to use MicroStation and Bentley Map?
- Have you understood how to make preparation for the work?
- Have you understood how to represent annotations and administrative boundaries?
- Have you understood how to adjust locations of features?
- Have you understood the methods for data cleaning?
- Have you understood how to create polygons?
- Have you understood the method for edge matching?
- Do you think that the duration of the training was sufficient?

The participants of the technology transfer mostly selected “I have understood” as their answers to the questions on the technologies from the options, “I have understood,” “I have understood a little” “I cannot say whether I have understood or not” and “I have not understood.” Most of them selected “Sufficient” as the answer to the question on the duration of the training. The result of this questionnaire survey has confirmed that the participants consider that they have understood the contents of the technology transfer.

The percentage of correct answers of the participants in the examination for the evaluation of the level

of understanding (which had ten questions) was 72 % on average. This observation indicates that they have understood the contents of the technology transfer, in general. There was one question to which all of them had answered incorrectly. As misconception about the intention of the question seemed to have been the cause for the incorrect answer, the project member provided additional explanation on the question during the technology transfer on the digital compilation after field completion.



Pyetësor për transferimin e teknologjisë (Hartimi/Përpilimi Digital) 2014/7/23

Emri dhe Mbiemri:

Departamenti/Divizioni: D.K.

1. Vetë-vlerësimi pas trajnimit	Ju lutem selektoni vetëm një përgjigje.			
※Ju lutem selektoni një përgjigje për cilo pyetje.	1	2	3	4
1-1 A e keni kuptuar punën e hartimit/përpilimit digital?	Po ✓	E kam kuptuar vetëm pak	Nuk kam ndonjë mendim	Jo
1-2 A e keni kuptuar mjedhën e punës për hartimin/përpilimin digital?	Po ✓	E kam kuptuar vetëm pak	Nuk kam ndonjë mendim	Jo
1-3 A e keni kuptuar si të operoni/punoni me Microstation dhe BentleyMap?	Po ✓	E kam kuptuar vetëm pak	Nuk kam ndonjë mendim	Jo
1-4 A e keni kuptuar si të përgatitni punën për hartimin/përpilimin digital?	Po ✓	E kam kuptuar vetëm pak	Nuk kam ndonjë mendim	Jo
1-5 A e keni kuptuar si Ci fvlni të dhënat për kufijtë administrativ dhe toponimet?	Po ✓	E kam kuptuar vetëm pak	Nuk kam ndonjë mendim	Jo
1-6 A e keni kuptuar si të bëni përshtatjen e pozicionit të rrjedhur?	Po ✓	E kam kuptuar vetëm pak	Nuk kam ndonjë mendim	Jo
1-7 A e keni kuptuar si të bëni pastrimin e të dhënave?	Po ✓	E kam kuptuar vetëm pak	Nuk kam ndonjë mendim	Jo
1-8 A e keni kuptuar si të krijoni të Dhëna Poligon?	Po ✓	E kam kuptuar vetëm pak	Nuk kam ndonjë mendim	Jo
1-9 A e keni kuptuar si të bëni bashkimin e të dhënave?	Po ✓	E kam kuptuar vetëm pak	Nuk kam ndonjë mendim	Jo
1-10 A ishte kohëzgjatja e trajnimit e mjaftueshme?	Shumë e gjatë	E mjaftueshme ✓	Më pak se e mjaftueshme	E panjaftueshme

2. Konfirmimi sa keni kuptuar pas trajnimit	Please select only 1 answer.			
※Ju lutem selektoni përgjigjen që ju mendoni se është e saktë.	1	2	3	4
2-1 Cila është pura e panevojshme të kryhet me hartim/përpilim digital?	Futja e të dhënave të toponimeve	Pastrimi i të dhënave	Futja e të dhënava poligon ✓	Nuk e kuptoj
2-2 Cili është materjali i panevojshëm për hartimin/përpilimin digital?	Aero-foto ✓	Dokumente të toponimeve	Të dhëna për kufij	Nuk e kuptoj
2-3 Cka është e panevojshme për rregullat për futjen e të dhënave (input) të toponimeve?	Principi i kërdit	Principi i intervalit ✓	Principi i pozicionit	Nuk e kuptoj
2-4 Cili është Qëllu për të cilën përshtatja e pozicionit nuk është e	Rrugë dhe ndërtesë	Rrugë dhe lumë	Ndërtesë dhe ujëhipës ✓	Nuk e kuptoj
2-5 Kur rruga dhe ndërtesa mbivendosen, cilin proj tyre e lëvizni?	Rrugë	Ndërtesë ✓	Të dyja	Nuk e kuptoj
2-6 Cila komand është e nevojshme për pastrimin e të dhënave?	*Find Disjoints* ✓	*Find Overlaps*	*Find Gaps*	Nuk e kuptoj
2-7 Cka nxirr të krijoj kalim, kryqëzim?	Mbikalimet	Kryqëzimi planimetrik ✓	Nënkalimet	Nuk e kuptoj
2-8 Cili është gabimi i cili nuk gjindet në "Validate Topology"?	NoA	NoC	No2 ✓	Nuk e kuptoj
2-9 Sa i përket backkimit, ku është më të bëhet ëdhja?	Në pikën fillestare ✓	Në pikën e mesme	Në pikën përfundimtare	Nuk e kuptoj
2-10 Cfarë dokumenti duhet të përgatitet pas hartimit/përpilimit digital?	Dokumenti i verifikimit në terren	Dokumenti i studimit në terr	Dokumenti i përfundimit të punës në terren ✓	Nuk e kuptoj

※Në qoftë se ka ndonjë kërkesë për trajnimin e rradhës në dhjetor, ju lutem plotësoni këtë pjesë.

Figure 3-35 Completed Questionnaire/Examination Form

The outputs of the practice and the responses in the questionnaire and the examination indicate that the participants of the technology transfer have understood the contents of the work in the digital compilation sufficiently.

[8] Digital Compilation after Field Completion

Technology transfer was implemented on digital compilation after field completion (correction and modification of digital compilation data based on the result of field verification of unclear locations (missing data, errors) found in digital compilation) to correct and modify digital compilation data.

a. Target of technology transfer

The subjects mentioned in the table below were the basic subjects of the technology transfer. Such flexible measures as changing the contents and focuses of the transfer of certain technologies were taken during the technology transfer to accommodate requests from KCA.

Table 3-19 Contents of Technology Transfer on Digital Compilation after Field Completion

Content	Goal
Digital compilation after field completion	Verification of the confirmation results of field completion
	Understanding of the modification work based on map symbols and practical training
	Understanding of the inspection method of modified data and practical training
	Understanding of quality control and creation of quality control sheet
	Conversion to the data file to be provided for the subsequent process
	Creation of manuals

b. Participants of technology transfer

The people mentioned below participated in the technology transfer on the digital compilation after field completion.

- Mr. Avni Rrustemi
- Mr. Mentor Kosumi
- Mr. Amir Reçica
- Mr. Qazim Sinani

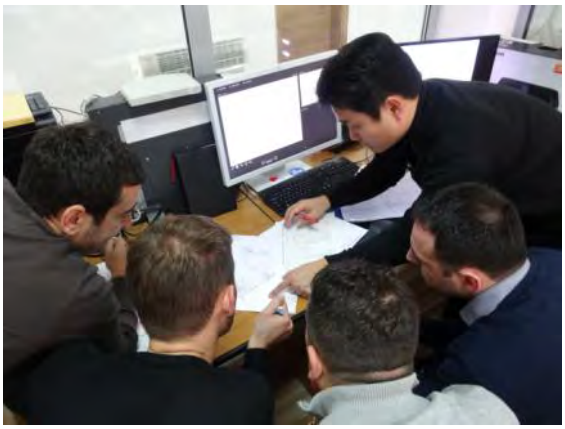


Figure 3-36 Scenes from Technology Transfer on Digital Compilation after Field Completion

c. Schedule

The technology transfer was conducted in accordance with the schedule shown below.

Table 3-20 Schedule of Technology Transfer on Digital Compilation after Field Completion

Implementation period		Description
Week 1	December 5, 2014	Explanation of the contents and confirmation of the schedule of the technology transfer
Week 2	December 8	Verification and interpretation of the survey result of the field completion
	December 9 to 10	Lectures and practical training on the modification work based on map symbols

	December 11 to 12	Lectures and practical training on the inspection method of modified data
Week 3	December 15	Lectures and practical training on the inspection method of modified data, participation in the discussion on the Interim Report
	December 16 to 17	Lecture on quality control and creation of quality control sheet
	December 18 to 19	Lecture and practical training on data conversion, summary and evaluation of the training

d. Method (contents) of technology transfer

The contents of the technology transfer are described in the order of the subjects of the technology transfer described in the table in „**a.**" above.

(1) Verification and interpretation of the survey results obtained in the field completion

The project member in charge of digital compilation after field completion explained result of the field completion created in the preceding process using a field completion form of the area used in the technology transfer as an example. The member explained the meanings of the symbols for instructions for the field completion set in the field completion process and confirmed the instructions indicated by the symbols on the form. Table 3-21 shows the meanings of the instruction symbols explained in the technology transfer.

Table 3-21 Symbols for Instructions for Field Completion

Symbol	Meaning	Description	Example	Meaning of the example
Ck	Check	Please re-survey the location because there is uncertainty in the result of the field verification.	Ck-6201	A boundary of a cemetery has not been defined clearly.
A	Add	Please survey the location because a feature is supposed to be there.	A-4301	Verify whether or not there is an antenna at the location.
Cg	Change	Please survey the location because a wrong feature seems to have been recorded at the location.	Cg-3103/3104	Is the feature at the location a local road, instead of a regional road?
Mv	Move	Please identify the correct location of the feature because the recorded location seems to be wrong.	Mv-4217	Verify the location of the school because its recorded location seems to be wrong.
No	Nothing	Please survey the location for the existence of the recorded feature because it has not been found on images.	No-3203	The bridge does not exist or it cannot be found on images.
Em	Edge Matching	A feature located in two adjacent map sheet areas is recorded differently in the two areas. Please re-verify the feature to decide which record is correct.	Em-7101/7103	Verify whether the description in 7101 or 7103 is right.
Txt	Annotation	While a certain number has been given to a field survey photograph, there is no annotation with this number in the lists of annotation.	Txt-(1)	There is no annotation for (1) in the list.

A field completion form on which the result of the field completion was entered is shown below.

Figure 3-37 Part of Completion Form Used in Explanation

An example of the use is described and explained for each completion symbol in the manual so that engineers who did not participate in the technology transfer can understand its meaning. The participants of the technology transfer were able to understand the completion results by consulting the field completion forms and the manual.

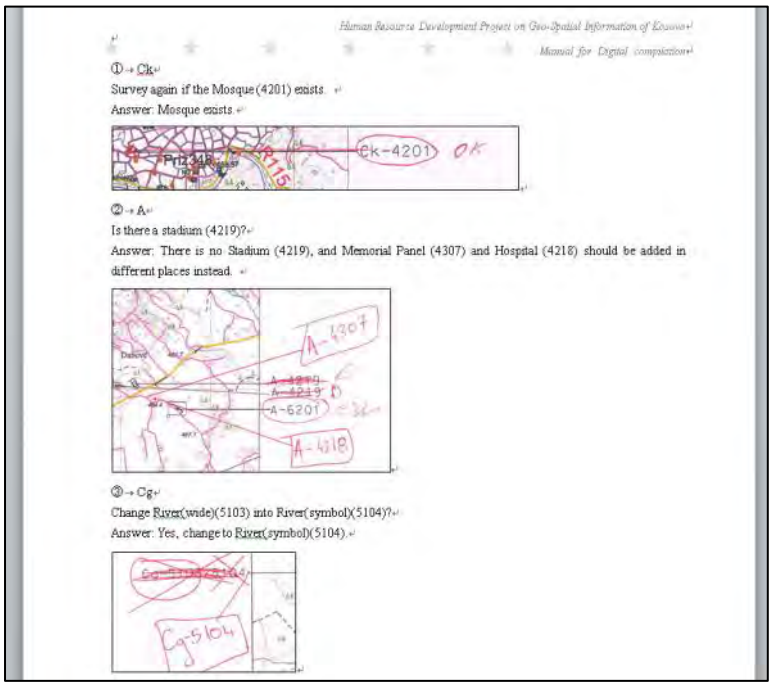


Figure 3-38 Practical Examples of Use of Completion Symbols Described in Manual

(2) Lecture and practical training on the modification work based on the map symbols

The training on the modification of the digitally compiled data on the basis of the survey results of the field completion verified in the previous section was conducted. As the participants had already mastered the software operation method in the digital compilation process, the modification method was mainly explained in this technology transfer.

The participants incorporated the survey result of the field completion in the data created in the digital compilation in the practical training. They were able to use all the survey results to modify the digitally compiled data in the practical training.

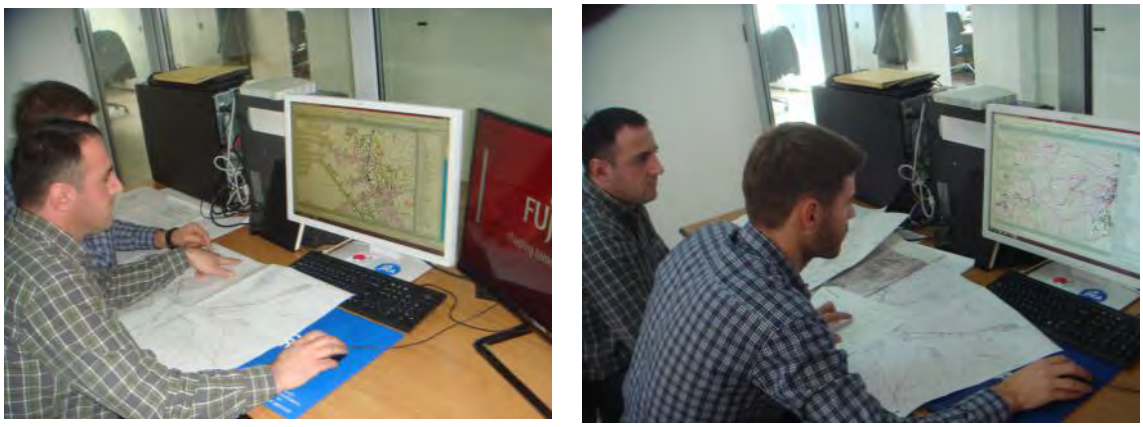


Figure 3-39 Practical Training on Digital Compilation after Field Completion

(3) Lectures and practical training on the inspection method of modified data

The training on visual inspection of the data created in the digital compilation after field completion in the preceding section was conducted. In the visual inspection, the data were inspected for omissions, excesses and erroneous entries with the survey results which had been used so far, and the information provided by KCA used as source information. The data were inspected for the following five points:

[1] Omission of entries

[2] Excess of entries

[3] Erroneous entries

[4] Errors in location

[5] Re-verification of questionable entries

Each verification item identified in the inspection was marked with an inspection symbol specifically defined for each type of the inspection points to ensure integrity of the inspection conducted by different inspectors. The inspection symbols are defined as follows:

[1] Data re-verification → CK (Check)

To be used when detailed re-verification of the data is required to decide whether they are correct or not

[2] Data addition → A (Add)

To be used when data are missing

[3] Data deletion → D (Delete)

To be used when unnecessary data are to be deleted

[4] Data change → CG (Change)

To be used when data have to be replaced with correct ones

[5] Data relocation → MV (Move)

To be used when data are to be relocated

The project member explained the inspection method using the form used in the inspection. The inspection method for each of the five inspection points was explained and these methods were demonstrated for the inspection of an uninspected form in the technology transfer to facilitate understanding of the methods of the participants.

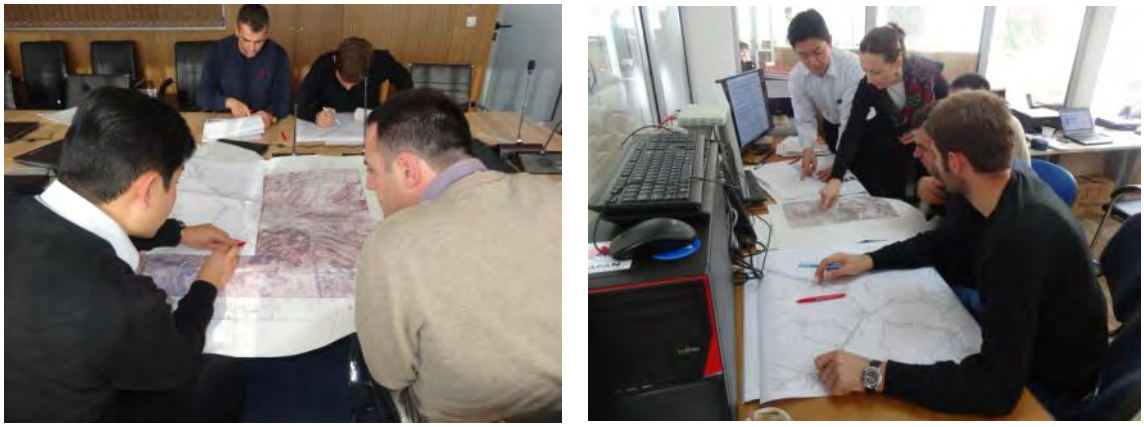


Figure 3-40 Training on Visual Inspection in Digital Compilation after Field Completion

After the explanation of the inspection methods, the participants practiced the visual inspection. The project member facilitated improvement of their inspection capacity by re-inspecting the results of the inspection conducted by them and, when an omission in the data inspection had been found, notifying them of the omission.

Figure 3-41 Practical Training on Visual Inspection in Digital Compilation after Field Completion

The participants inspected all the map sheet areas used in the technology transfer. The results of the inspection were filed with the source information for the inspection so that they can be used as an example of the visual inspection when KCA is to create digital topographic maps of the remaining 10 % of the land area. They were also made aware of the need to inspect data more than once when required.

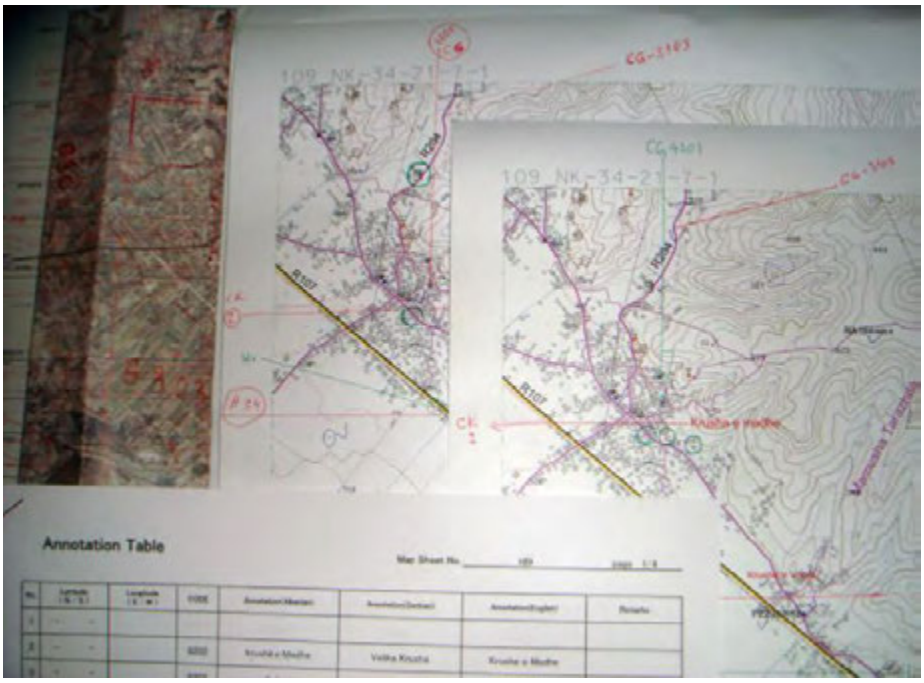


Figure 3-42 Result of Visual Inspection and Source Information

(4) Understanding of quality control and creation of quality control sheet

The project member explained the importance of quality control using the case of the visual inspection mentioned above and the need for quality control not only in digital compilation after field

completion but also in other processes including digital compilation.

The method to create the quality control sheet was explained using the result of the visual inspection and the participants created it in the practical training. The entries in the sheet were inspected to confirm whether or not there was an error in the entries. As there was no defect in the entries, it was concluded that the quality control sheet had been appropriately completed.

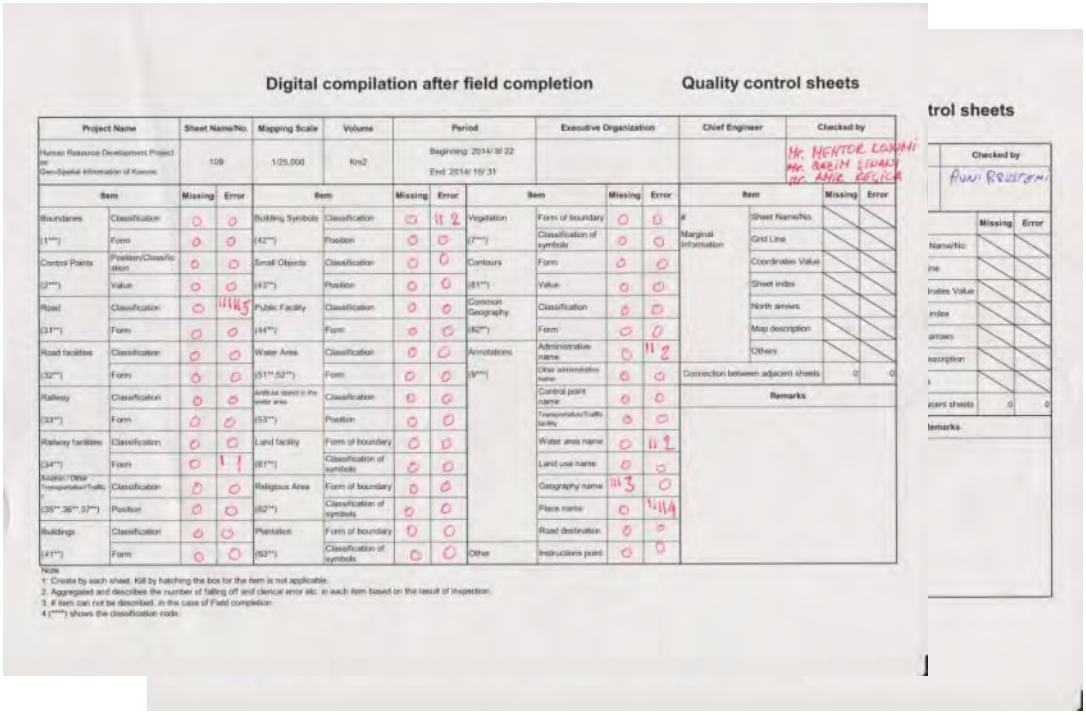


Figure 3-43 Quality Control Sheet Created in Practical Training

(5) Conversion to the data file to be provided for the subsequent process

The output data of the digital compilation after field completion have to be processed in the subsequent process of structurization of digital data (GIS structurization). The project member explained the need for preparing an efficient intermediate file format, as different types of software packages are used in the digital compilation after field completion and the GIS structurization.

The software packages used in the digital compilation after field completion, MicroStation and Bentley Map, have a function to create data output in the Shape file format of the software used in the GIS structurization (ArcGIS). The project member explained this data file conversion.

It was easy to perform the conversion in the environment prepared in advance by the project member. However, as the need to change environmental setting might arise because of changes in the map symbols and databases, the project member taught the participants how to change the setting.

The project member preset an environment in such a way that data were not correctly converted in it for the practical training. The participants modified the setting of this environment until the data had

been correctly converted in the training. In this way, their learning of the data conversion method was facilitated.

The participants managed to construct an environment which enabled correct data conversion in the end.

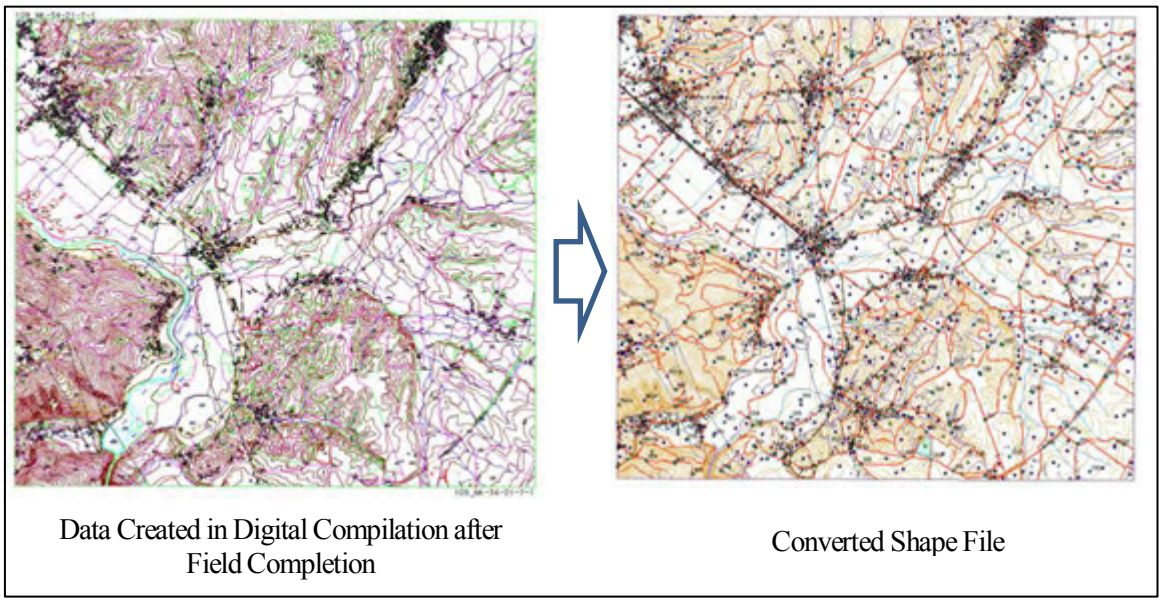


Figure 3-44 Data Converted by Participants of Technology Transfer

e. Evaluation of the technology transfer

The participants of the technology transfer were able to create data of the area used in the technology transfer to be used in the subsequent processes by performing the digital compilation after field completion, quality control and data conversion independently. Inspection of their output revealed that they had understood the methods used in those processes.

The project member asked the participants to fill in a questionnaire and take a written examination in order to evaluate the level of their understanding of the transferred technologies. The participants were asked to evaluate their own levels of understanding by answering the questions in the questionnaire given below.

- Have you understood the details of the work in the digital compilation after field completion?
- Have you understood the workflow of the digital compilation after field completion?
- Have you understood the symbols used on the output of the field completion?
- Have you understood how to modify data?
- Have you understood the quality control method?
- Have you understood the methods of the visual inspection?
- Have you understood the symbols used in the visual inspection?
- Have you understood how to create the quality control sheet?

- Have you understood how to convert data?
- Was the training period sufficient?

The participants were asked to respond to these questions with "Yes.", "Yes, to a certain extent.", "I cannot say yes or no." or "No."

Two of the four respondents responded "Yes." to all the questions concerning their understanding and "Yes." to the question on the training period.

One of the remaining two responded "Yes, to a certain extent." to three questions and the other did the same to one. (Both of them responded "Yes." to the other questions.) One of the two responded "No, it was a little insufficient." to the question on the training period.

The training period for the digital compilation after field completion was shorter than that for the digital compilation. This fact is considered to have been a cause of those slightly unsatisfactory responses.

The average mark of the participants for the ten questions in the written examination was approx. 50 %. The project member concluded that their understanding of the transferred technologies was insufficient on the basis of this examination result. Thus, the member returned the marked examination papers to them and asked them to study the manuals and other relevant materials for the questions to which they had given incorrect answers. Some of the participants could not attend part of the training because they had other training to attend. The low mark may be attributed to this fact.

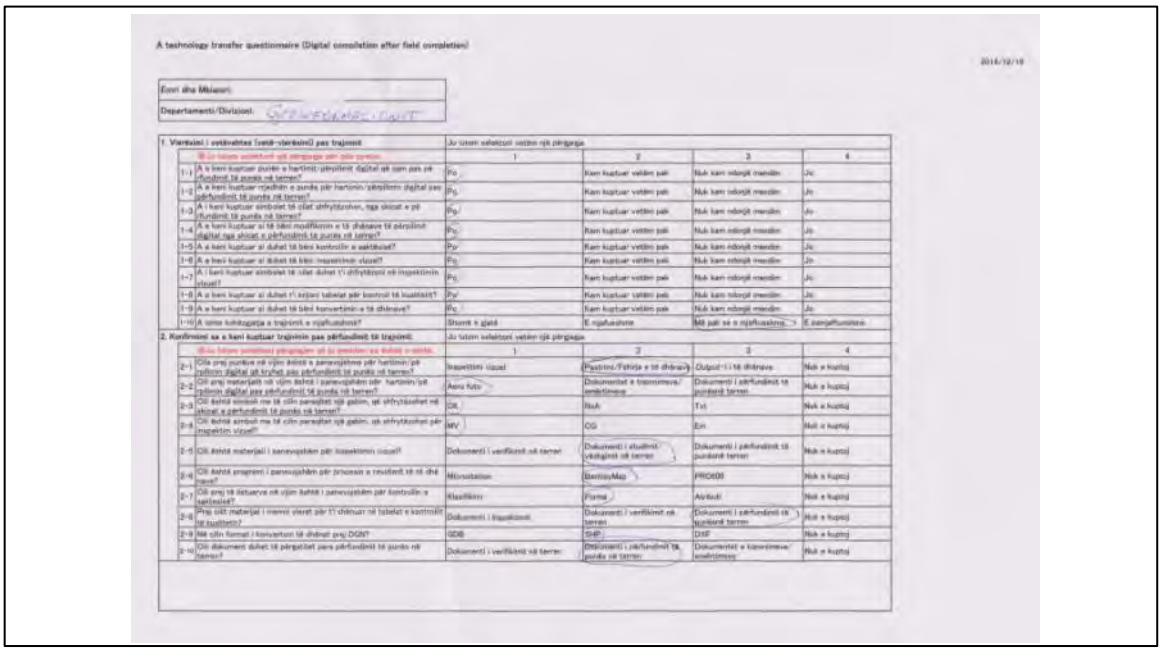


Figure 3-45 Questionnaire/Examination Completed by Participant

On the basis of the results of the questionnaire inquiry and the examination, the project member requests the participants to repeat the voluntary practice of the learned technologies to improve their understanding of

the technologies.

On the other hand, although the number of the participants was small, they helped and complemented one another in the practical training to manage to achieve the goal of creating the topographic map of the area used in the technology transfer. This fact led the project member to conclude that they would be able to create the geo-spatial data of the remaining 10 % of the total land area of the country in cooperation.

[9] GIS Structurization

Technology transfer was implemented on map symbolization and the structurization of digital compilation data for the use of the data in the GIS (structurization of the topographic map data created in digital compilation to create data that is usable in the GIS).

a. Target of technology transfer

The goals mentioned in the table below were set for the technology transfer and the technologies required for achieving these goals were transferred to the participants.

Table 3-22 Contents of Technology Transfer on GIS Structurization

Content	Goal	Description of the implemented technology transfer
Data structurization Creation of fundamental GIS data	Understanding of the GIS (understanding of standard data structures)	1) Outline of GIS (including that of ArcGIS)
	Basic operation of GIS software	2) Basic operation of ArcGIS (including Maplex) 3) Export and import of data (including CAD data)
	Advanced operation of GIS software	4) File format for ArcGIS 5) Database structurization using ArcGIS (including creation and compilation of attributes) 6) Points to be noted in the data import (text, cell and polygon data, etc.) 7) Logical check of data (including topology)
	Proposals on the utilization of GIS data	8) Function specific to GIS (including data processing) 9) Concept on data updating
	Understanding of quality control and creation of quality control sheet	10) Error detection with the software 11) Outline of the quality control sheet 12) Schedule management and quality control
	Creation of manuals	13) Creation of a work manual by the participants of the technology transfer

b. Participants of technology transfer

The four people mentioned below participated in the technology transfer on the GIS data structurization. They had a little experience in using GIS.

- Mr. Avni Rrustemi

- Mr. Mentor Kosumi
- Mr. Amir Reçica
- Mr. Qazim Sinani

c. Schedule

The technology transfer with the contents mentioned above and the final exercise was implemented with the schedule described below. The total number of days on the schedule was 17. However, because the participants had to attend to other duties, the actual number of days of the technology transfer was 14.5.

Table 3-23 Schedule of Technology Transfer on GIS Structurization

Implementation period		Description
Week 1	September 8 to 12 (5 days)	1) Outline of GIS (including that of ArcGIS) 2) Basic operation of ArcGIS (including Maplex) 3) Export and import of data (including CAD data) 4) File format for ArcGIS
Week 2	September 15 to 19 (4 days)	5) Database structurization using ArcGIS (including creation and compilation of attributes) 6) Points to be noted in the data import (text, cell and polygon data, etc.) 7) Logical check of data (including topology)
Week 3	September 22 to 26 (3.5 days)	8) Function specific to GIS (including data processing) 9) Concept on data updating 10) Error detection with the software 11) Outline of the quality control sheet 12) Schedule management, quality control and final exercise
Week 4	September 29 to 30 (2 days)	Final exercise

d. Method of technology transfer

The project member created a manual covering the contents of the technology transfer mentioned above and used it in the technology transfer. The manual is composed of the outline of the theory of each technology to be transferred and several practices based on the theory. The project member gave a lecture on the outline of the theories in English. In addition, an interpreter interpreted the lecture consecutively in Albanian to improve the level of the understanding of the theories of the participants. The project member prepared several exercises using simple data models and used them for not only the improvement of the understanding but also the acquisition of software operation techniques. Meanwhile, the rules and basic policy on taking training for the technology transfer were established before the commencement of the technology transfer.

The following is a summary of the training and its result.

1) Implementation period: 14.5 days

2)	Implementation hours:	9:00 – 11:30 and 13:30 – 15:30, a total of 4.5 hours/day
3)	Precondition:	Basic knowledge, experience and understanding of survey and topographic maps and capacity to operate personal computers and Windows
4)	Target level:	To be able to convert CAD data into GIS database with GIS software
5)	Target of skill acquisition:	Understanding of the outline of GIS, basic operation of ArcGIS, understanding of the basics of GIS database, conversion of topographic map data (CAD) into GIS database, etc.
6)	Implementation method:	Lecture on the outline of theories and practices associated with the theories
7)	Final exercise:	Conversion of digital compilation CAD data (of one map sheet area) into GIS database
8)	Languages used:	English and Albanian
9)	Learning materials:	Training & Work Manual, output CAD data of the digital compilation
10)	Equipment used:	Workstation (2 units), a projector (of KCA)
11)	Software used:	ArcGIS ver. 10.2.1. (two licenses, advanced and standard)

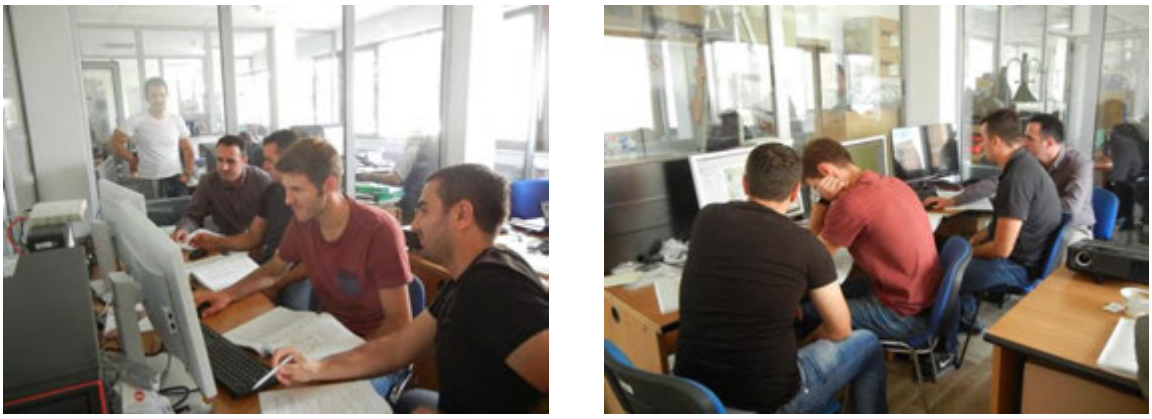


Figure 3-46 Scenes from Technology Transfer on GIS Structurization

After the completion of the technology transfer, the final exercise was given to the participants. In the final exercise, the participants practiced conversion of sample data created in the digital compilation (of one map sheet area, a design file of MicroStation) into a GIS database in accordance with the provided GIS database structure. They also created polygons and compiled attribute data using the same data in the final exercise. The figure below shows the CAD data used and GIS data created in the practice.

Output data of the digital compilation (CAD)	GIS-structured data

Figure 3-47 Input and Output of Final Exercise of GIS Structurization

The participants created a list of the contents of the practice and the procedures used in it while they were working on the final exercise. They confirmed and examined the contents of the list. This activity is the first step toward the creation of their own work manual. The Project Team hopes that they use the Training & Work Manual to be prepared by the team as a reference material for the creation of their own manual and that they continue to update their manual.

e. Evaluation of the technology transfer

The level of mastery of the transferred technologies for the GIS structurization of the participants was evaluated comprehensively with the evaluation indicators mentioned in the table below, in principle.

Table 3-24 Result of Technology Transfer on GIS Structurization

Item	Indicator	Evaluation method	Mark
Motivation	Percentage of attendance	Quantitative	○
Attitude	Learning attitude during the technology transfer	Qualitative	○
Acquisition of technical knowledge	Result of the final exercise	Quantitative	△
Mastery of actual work	Figures in the quality control sheets	Qualitative	△
	Time required for the entire work	Qualitative	△

1) Motivation

- Percentage of attendance

There were two units of technology transfer per day for 14.5 days. Therefore, the total number of units was 29. Attendance of the participants was evaluated with this number. When the attendance was poor, the project member asked the chief executive officer to urge the participants to

attend the training.

Table 3-25 Percentage of Attendance at Technology Transfer on GIS Structurization

Name	Week 1 September 8 to 12 (5 days)	Week 2 September 15 to 19 (4 days)	Week 3 September 22 to 26 (3.5 days)	Week 4 September 29 to 30 (2 days)	Total
A	9/10	8/8	7/7	4/4	96.55 % (28/29)
B	8/10	7.5/8	7/7	4/4	91.38 % (26.5/29)
C	10/10	7.5/8	7/7	1/4	87.93 % (25.5/29)
D	6/10	8/8	3/7	2/4	65.52 % (19/29)
Total	82.50 % (33 days/40 days)	96.88 % (31 days/32 days)	85.71 % (24 days/28 days)	75.00 % (12 days/16 days)	**85.34 % (99/116)**

The participants of the technology transfer participated in the training while having other duties and projects to attend to. The percentage of their attendance of more than 85 % under such a circumstance deserves a mention.

2) Attitude

The participants seemed to have more interest in software operation in the practice sessions than lectures during the technology transfer.

The participants were sometimes found lacking motivation to make their own effort to acquire new technologies during the technology transfer. Such attitude shall have to be improved in order for KCA to become independent and develop itself. It is also worth mentioning to the participants in the training that accurate self-evaluation is essential for the improvement of their motivation to participate in technology transfer and training and their technical capacities.

3) Acquisition of technical knowledge and mastery of actual work

Acquisition of technical knowledge and mastery of actual work were evaluated with the result of the actual work in the final exercise, "conversion of digital compilation data into GIS structured data." "Figures in the quality control sheets" and "the time required for the entire process" were also evaluated with the result of the final exercise.

- Result of the final exercise

As two PCs were used by four participants in the technology transfer, participants were divided in two teams and took the final exercise as teams. The participants completed the exercise with guidance provided by the project member when the participants had to perform work they had not understood completely. Therefore, the same scores were given to both teams. The table below shows the allotment of marks to the subjects in the exercise and the marks given to the teams of the participants.

Table 3-26 Result of Exercise of GIS Structurization

Point allotment / Team	Data conversion	Polygon creation/ Attribute addition	Topology check	Attribute compilation	Adjustment/ Listing	Total
	30 points	25 points	15 points	20 points	10 points	
A	21	16	5	13	8	63
B	21	16	5	13	8	63

Because their understanding of the software operation has not reached a technically sufficient level, they are still unable to react flexibly to unexpected problems in software operation. To solve this problem they will have to improve their ability to the level at which they can react to any problems by reading the manual to be prepared carefully and repeatedly.

It can be said as the overall evaluation of the technical knowledge and mastery of actual work of the participants of the technology transfer that they have to make further effort to improve their knowledge and technical capacity using the technologies acquired in this technology transfer, because their experience in the creation of geo-spatial data is limited. In addition, they have to improve their English to understand error messages, other messages and terms displayed on the screen because the software packages they are using are English versions.

[10] Map Symbolization

The technologies used for the symbolization of the topographic map data for the printing and distribution of topographic maps were transferred to the participants. Map symbolization is the process of creating data which can be printed with a plotter through map adjustment, which is the work of creating maps with respectable appearance with pre-determined expressions by applying the map symbols determined in the Discussion on Specifications to the data structured from the digital compilation data in accordance with the provisions of the map symbol regulations.

ArcGIS (Advanced) and ArcGIS (Standard) procured in this Project have a "Representation" function which enables map adjustment without changing the positional accuracy of data. In other words, this function eliminates the need for the creation of new data for DTP software and makes the response to data update easy because the same data can be used in the entire process. Because of these benefits, ArcGIS (Advanced) and ArcGIS (Standard) were selected for the use in this Project.

a. Target of technology transfer

The technology transfer on map symbolization was implemented in two phases, the first phase in October 2014 and the second phase in January 2015.

The project member in charge of map symbolization conducted a questionnaire survey of the five

expected participants of the technology transfer at the beginning of the first phase. The survey revealed 1) that, although they did not have experience in map adjustment with ArcGIS, they had experience in the creation of thematic maps with symbology and 2) that they were interested in the operating methods for the creation, registration and use of original symbols.

Manuals and sample data prepared in advance were used as the materials for the technology transfer. The operation/practice-oriented technology transfer was implemented with these materials while incorporating requests from the participants as much as possible.

[First phase of the technology transfer]

Table 3-27 Contents of Technology Transfer on Map Symbolization (First phase)

Content	Goal	Description of the implemented technology transfer
Application of symbols to topographic map data and map adjustment	Understanding of map adjustment	• Relocation of overlapping symbols, priority order of relocation and a method to represent relocated symbols
	Understanding of symbolization method in accordance with contraction scale	• Use of different representations on large and small-scale maps because of the difference in density of map elements (omissions and exaggeration)
	Basic operation of symbolization software	• Difference between symbology and representation in ArcGIS • Creation of map symbols in accordance with the map specifications • Conversion to Representation and application of the map symbol rules • Layer structures with the priority order of symbols taken into consideration
	Advanced operation of symbolization software (detailed settings, etc.)	• Relocation and transformation of map symbols and retention of the true data location • Automatic detection of symbol overlaps and correction measures • Use of masking on overlapping symbols • Creation and addition of a legend and marginal information • Representation of the names and numbers of adjacent map sheets
	Understanding of quality control and creation of quality control sheet	• Visual inspection with printed maps and record of correction • Presentation of the cases in the past and creation of quality control sheet
	Creation of manuals	• Support to the creation of an original manual by the participants of the technology transfer based on the manual prepared by the project members and the technology transfer

[Second phase of the technology transfer]

The project member conducted interviews with the counterparts at the beginning of the second phase. On the basis of the findings in the interviews, it was decided to include the review of the contents of the first phase and practical training on a series of work from the digital compilation to data structurization and map symbolization of the new data (of an area outside the project area) created by the participants of the technology transfer on digital plotting in the second phase.

Table 3-28 Contents of Technology Transfer on Map Symbolization (Second phase)

Content	Goal	Description of the implemented technology transfer
Review of the creation of the data required for map symbolization/ creation of map-symbolized data	Creation of data topologies (preliminary preparation for the structurization)	• Compilation of the plotted data with Bentley Map • Creation of polygon topologies (correction of errors) • Processing of line data (combining line data on each layer) • Data export to the DWG/DXF format
	Structurization (Import of the above-mentioned data to a Geodatabase)	Structurization with ArcGIS • Addition of required attributes to each feature • Creation and inspection of topologies
	Symbolization	• Relocation and transformation of symbols • Automatic detection and correction of overlapping symbols • Use of masking on overlapping symbols • Creation and addition of a legend and marginal information • Representation of the titles and numbers of the adjacent map sheets
	Inspection/correction	• Identification of data requiring correction on the screen • Correction of the identified data
	Creation of manuals	• Support to the creation of manuals

b. Participants of technology transfer

- Mr. Avni Rrustemi

Due to other engagements, only one person mentioned above out of the five people who had responded to the questionnaire before the commencement of the technology transfer participated in the technology transfer regularly throughout its duration. However, the technology transfer was conducted almost as personal tutoring and the participant was able to use ample time for the practice under such a circumstance. He was so motivated as to prepare an original video manual to transfer the technologies he had acquired to other staff members by taking notes of the operating methods and video of the entire process.

c. Schedule

Practices and lectures were provided as mentioned in the table below with the findings in the questionnaire and interview surveys taken into consideration.

Table 3-29 Schedule of Technology Transfer on Map Symbolization

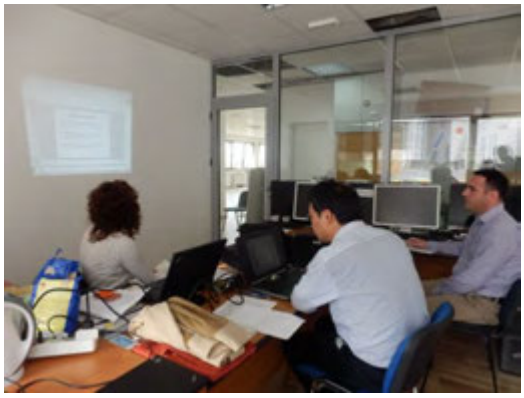
	Implementation period		Description
First phase	Week 1	October 8 to 10, 2014	Preparation for the technology transfer (on symbolization)
	Week 2	October 13 to 17	• Understanding of "Representation" in ArcGIS • Difference between symbology and Representation • Method for the conversion of symbology to Representation • Method for the creation of map symbols • Method for the application of created symbols to Representation • Method for fine adjustment of map symbols
	Week 3	October 20 to 24	• Practice of Representation • Questions and Answers • Creation of neatlines and grid lines
	Week 4	October 27 to 31	• Practice of Representation • Review and Questions and Answers • Explanation on the quality control method • Summarization
Second phase	Week 5	January 8 to 9, 2015	• Review of the work in the digital compilation including the classification of CAD data and combining of line data with MicroStation
	Week 6	January 12 to 16	• Review of the work in the digital compilation including the classification of CAD data and combining of line data with MicroStation • Creation of polygon topologies with MicroStation • Data import from a CAD database to a Geodatabase • Data creation by the spatial attribute joining of polygon and point data • Addition of annotation data • Conversion of point data to 3D data • Data dissolution • Extraction of line data required for the creation of polygon data (used only Representation) • Methods to create and correct a topology for each feature class • Symbolization (conversion to Representation)
	Week 7	January 19 to 23	• Creation of relation masking • Comments on the map created by the KCA engineers and explanation on correction measures • Creation of inspection fields • Question-and-answer session on inspection items • Advice on correction measures • An examination to evaluate the technology transfer on

			symbolization
	Week 8	January 26 to 27	• Training of the digital compilation/map symbolization of the area to be mapped independently by KCA • Overall evaluation

d. Method of technology transfer

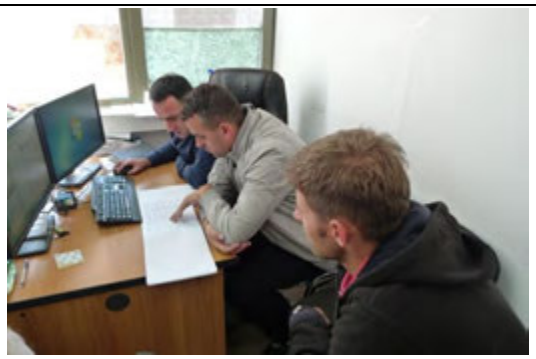
The training on the map symbolization and map adjustment was conducted using structured data and the Representation function of ArcGIS.

The project member told the participants that map data for plotter output and offset printing were created from data of point symbols, line symbols, polygon symbols or texts in the digital compilation/structured data handed over from the preceding steps through this symbolization process. As digital compilation/structured data are used for map symbolization and adjustment, use of data which have not been inspected and corrected sufficiently at each step up to the digital compilation and GIS structurization in map symbolization and adjustment could adversely affect accuracy of the output of the map symbolization/adjustment. Based on this fact the project member informed the participants of the importance of the inspection and correction at each step.

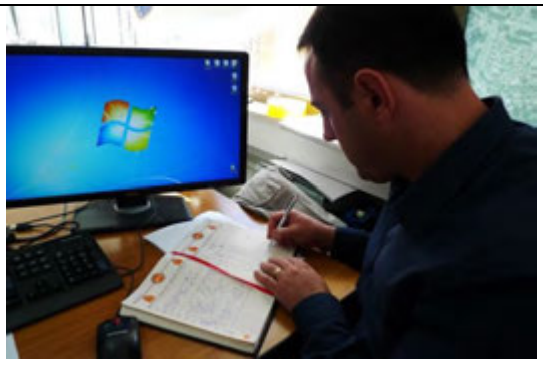


Technology transfer (lecture)

Technology transfer (practice)



Participants working together on a practice



Participant taking notes

Figure 3-48 Scenes from Technology Transfer on Map Symbolization

- Details of the contents of the technology transfer

  The project member explained the map symbolization using the manual prepared in advance and, when necessary, oral presentation, visual presentation and demonstration.

1) Explanation on the outline of map symbolization and adjustment with ArcGIS in a lecture
   - Comparison with the conventional methods (ArcGIS allows retention of data accuracy)
   - Difference from the symbology in ArcGIS (ArcGIS allows data representation in accordance with judgment based on the principle of map adjustment)
   - Problems (problems related to user-friendliness, the number of relevant manuals currently available, adaptation to the coordinate system used in Kosovo)

2) Instruction on the methods for the creation and registration of map symbols
   - Point symbols (mosques, churches, chimneys, etc.): Composites of point symbols of different shapes
   - Line symbols (roads, railways, etc.): Representation using the layer structure
   - Polygon symbols (vegetation, graveyards, etc.): Creation of patterns using point symbols and placement of the patterns
   - Registration of new symbols mentioned above and import, modification, addition and deletion of the existing symbols

3) Conversion to "Representation"
   - Allocation of map symbols created in accordance with the map specifications to all layers
   - Conversion from point data to annotation of texts (with a function of ArcGIS)

4) How to carry out map adjustment
   - The project member instructed the participants to carry out the map adjustment by 1km TM grid, the created Kosovo Coordinate System.
   - The participants relocated, generalized and redrew individual symbols for appropriate representation on topographic maps without overlapping, excessive and sparse representations on the basis of a judgment based on the principle of the map adjustment.
   - The project member told the participants to correct overlapping symbols which were inappropriate to be represented on maps because of a large area of overlap among all the overlapping symbols detected automatically by the software, instead of correcting all of them. The project member instructed the participants that some of those overlapping symbols might not even have to be corrected if a judgment based on the principle of map adjustment supported it.

- The project member instructed the participants to ensure visibility of symbols and annotations with masking. The project member informed the participants that, although ArcGIS can be used for automatic masking, automatically created masking should be visually inspected to decide whether such masking was necessary or not and that such use of ArcGIS required attention because it required huge data space.
- The project member instructed the participants to use relocation and omission (no representation and masking) as a main measure against inappropriate representation within a 1km grid.
- The project member instructed the participants that line shapes had to be changed without changing the relative positions of the original features.
- The project member explained the priority order for relocation among natural features, ground control points, roads, railways and buildings to the participants. The member taught them that a feature should be relocated within the limit of the cumulative relocation of 1.2mm (as this figure is a Japanese standard and as symbols used in foreign countries are larger than those used in Japan, 1.5mm – 1.8mm is appropriate in those countries), in principle.
- The project member provided the participants with an instruction on how to represent a legend and marginal information (how to customize a legend and how to represent the names and numbers of the adjacent maps).
- The project member provided the participants with an explanation on creating shortcut keys and displaying them in a toolbar as a means to improve the workability.

As different sets of criteria have to be used for the judgment based on the principle of map adjustment mentioned above, depending on the scales and purposes of use of the maps to be created, establishment of a standard is required before the implementation of adjustment work. As it is particularly important to know the difference between expression and shapes of symbols on the existing maps and actual conditions in the field, the project member taught the participants the importance of considering this difference during the planning of the preparation of the specifications, preparation of the specifications and dissemination of their contents.

5) Participants asked for an explanation on the method of setting neatlines on arbitrary lines of longitude and latitude during the training. In response, the project member provided them with an instruction on how to define the customized coordinate system (KOSOVOREF01) for the creation of neatlines/TM grids with MicroStation.

6) Quality control

The quality control in the map symbolization is performed by visual inspection. A person in charge of inspection inspects the entire map on a screen of a PC by displaying an enlarged view of a map on the screen

and inspecting the map on the screen while scrolling. The inspector makes comments where s/he finds erroneous, excessive, too sparse and missing representations and corrects them. Instruction on the correction to a person who is to perform the correction can be made clear by recording the comments and transferring the recorded comments to the person concerned. However, this type of inspection is likely to fall into the state of "You cannot see the forest for the trees" as it is difficult to grasp the image of the entire map with this inspection. Therefore, the project member told the participants the importance of the inspection of a map printed as a proof-reading sheet.

A proof-reading sheet is usually printed after the scroll inspection/correction on a PC screen has been completed and, then, visual inspection of the printed sheet is conducted.

The project member instructed the participants to record the number of errors found in the proof-reading on the quality control sheet by type of feature with description of the errors, if necessary, and keep the sheet as a reference for the improvement of the quality of the maps. The project member gave a presentation on a series of procedures, "from a private surveying company to the Japan Association of Surveyors and finally to the inspection at the Geospatial Information Authority of Japan," using the cases in the past in Japan.

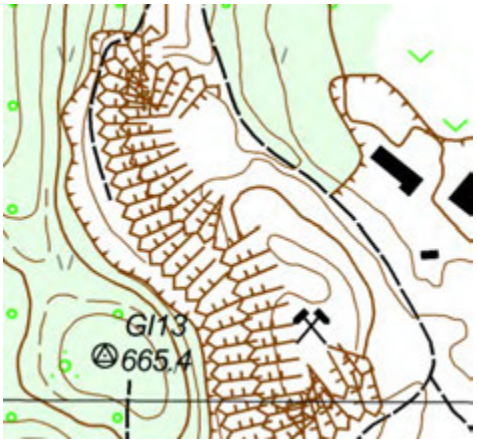
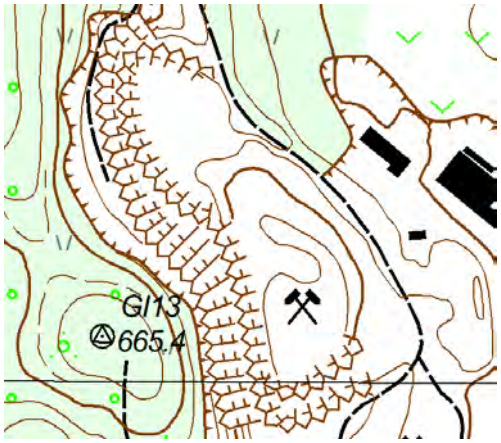
(Overlaps between roads and buildings) There is no need to correct all the overlaps.	(Overlaps between roads and rivers) In this case, relocation was made at two locations in the northern part.
	
Overlapping symbols	**Recompilation after map adjustment**
	
Overlapping symbols in the same color without masking	**Overlapping symbols in the same color with masking**
	

Figure 3-49 Cases of Map Adjustment

e. Evaluation of the technology transfer

A "generally good" result was obtained in the technology transfer that was conducted with the goal of

completing the creation of map data of the area used in the technology transfer. However, it was unfortunate that only one person could participate in the training because the others had other engagements.

An examination was given to the participant and another staff member of KCA for the overall evaluation of the technology transfer. The result of the examination indicates that they have acquired a high level of understanding of the symbolization work and have understood 80 % of the technology transfer. This fact is considered to indicate that the participant has acquired the technical capacity to perform map symbolization unassisted.

■ Questions for the evaluation

1) One of the three questions given to the participants was on the plotting, compilation and structurization, because the project member considered that comprehensive understanding of the details of the work was required for map adjustment.
   - Both of them only described the outline of the work in their answers, which earned them a mark of approx. 60 %.
2) The remaining two questions were on translocation of simple symbols and overlapping symbols in the map symbolization.
   - Although they were given some tricky questions, they gave "generally good" answers to the questions.

■ Issues to be addressed in future

Map symbolization (map adjustment) is work requiring high levels of understanding and technical capacity. Therefore, the participant shall have to continue self-training until he becomes able to provide topographic maps with excellent representation. It is also considered necessary to create an environment where advice of experts is made readily available.

3.2. Materials and Equipment Procured for the Technology Transfer

Table 3-30 and Figure 3-50 show the materials and equipment procured for the technology transfer and their configuration diagram, respectively.

Table 3-30 Materials and Equipment for Technology Transfer

Usage	Name of material or equipment	Quantity
Photogrammetry system		
Desktop PC	Fujitsu Celsius R930	2
Software for digital photogrammetry	IMAGINE Photogrammetry	2
Aerial triangulation software	ORIMA	1
Software for digital plotting	PRO600	2
CAD software for digital plotting	Bentley MicroStation	2
CAD software for digital compilation	Bentley Map	2
Software for DEM data creation/compilation	IMAGINE AutoDTM IMAGINE Terrain Editor	2
Stereo image observation device (3D monitor)	Philips 278G4DHSD	2
Mouse for photogrammetry	TopoMouse	2
Image processing software	Adobe Photoshop	1
Uninterruptible power supply (UPS)	APC SC1500I 230V RM	2
For GIS structurization and map symbolization		
Desktop PC	Fujitsu Celsius R930	2
Software for GIS	ESRI ArcGIS for Desktop Advanced	1
Software for map symbolization	ESRI ArcGIS for Desktop Standard	1
Uninterruptible power supply (UPS)	APC SC1500I 230V RM	2
Miscellaneous		
Handheld GPS	Garmin GPSMAP62SC	2
A set of consumables for plotter Ink cartridge, print head, rolled paper	Genuine parts of HP	1

Photogrammetry system

Hardware configuration
- PC
(Fujitsu Celsius R930)
- 3D monitor (including glasses)
(Philips 278G4DHSD)
- Mouse for photogrammetry
(Leica TopoMouse)
- UPS
(APC SC1500I 230V RM)

Software configuration
For photogrammetry
- Digital photogrammetry software
(IMAGINE Photogrammetry)
- Software for aerial triangulation
(ORIMA)
- Software for DEM data creation/compilation
(IMAGINE AutoDTM, IMAGINE Terrain Editor)
- Software for digital plotting
(PRO600)
- CAD software for digital plotting and compilation
(MicroStation, Bentley Map)
- Software for creating documents
(Microsoft Office)
- Software for assisting document creation
(Adobe Acrobat)
- Anti-virus software
(F-Secure)

Hardware configuration
- PC
(Fujitsu Celsius R930)
- 3D monitor (including glasses)
(Philips 278G4DHSD)
- Mouse for photogrammetry
(Leica TopoMouse)
- UPS
(APC SC1500I 230V RM)

Software configuration
For photogrammetry
- Digital photogrammetry software
(IMAGINE Photogrammetry)
- Software for DEM data creation/compilation
(IMAGINE AutoDTM, IMAGINE Terrain Editor)
- Software for digital plotting
(PRO600)
- CAD software for digital plotting and compilation
(MicroStation, Bentley Map)
- Software for creating documents
(Microsoft Office)
- Software for assisting document creation
(Adobe Acrobat)
- Anti-virus software
(F-Secure)
- Image processing software
(Adobe Photoshop)

GIS/ symbolization

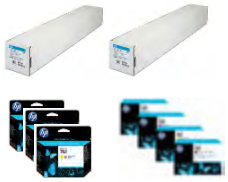
Hardware configuration
- PC
(Fujitsu Celsius R930)
- UPS
(APC SC1500I 230V RM)

Software configuration
- Software for GIS
(ESRI ArcGIS for Desktop Advanced)
- Software for creating documents
(Microsoft Office)
- Software for assisting document creation
(Adobe Acrobat)
- Anti-virus software
(F-Secure)

Hardware configuration
- PC
(Fujitsu Celsius R930)
- UPS
(APC SC1500I 230V RM)

Software configuration
- Software for symbolization
(ESRI ArcGIS for Desktop Standard)
- Software for assisting document creation
(Adobe Acrobat)
- Anti-virus software
(F-Secure)

- Handheld GPS
(Garmin GPSMAP62SC)



- Plotter paper
- Plotter ink cartridge
- Plotter print head

Figure 3-50 Materials and Equipment Configuration Diagram

3 . 3. Training in Japan of the Counterparts

KCA submitted a request to JICA for training in Japan of its staff members. The proposed purpose of the training was to observe and learn how geo-spatial data were created, utilized and managed in Japan. JICA studied the request and decided to implement this training. As a consequence, the training in Japan aiming at "strengthening the organization and the administration of map and mapping-related affairs" was conducted in February 2015.

The output of this training is expected to be shared with staff members of KCA who did not participate in the training and utilized for the strengthening of the organizational capacity (human resources), the capacity to administer map and mapping-related affairs, the technical and management capacity and the promotion of the development, dissemination and utilization of geo-spatial data.

(1). Outline of the training course

(a) Course title

The Study for Utilization of Geo-Spatial Data and Institutional Strengthening

(b) Training subjects

- The National Spatial Data Infrastructure and national ground control points
- Promotion of dissemination and systems for the sales of maps and map data
- Calibration of surveying instruments, inspection of survey output and training on surveying technologies
- GIS-related activities in Japan and cases of topographic maps of foreign countries created by Japanese
- Utilization of satellites for the creation of topographic maps with satellite imagery

(c) Training period: February 2 to 12, 2015

(d) Number of participants: 3

Table 3-31 Participants of Training in Japan

Name	Position
Dr. Murat Meha	Chief Executive Officer
Mr. Esat Xani	GIS Expert
Mr. Avni Rrustemi	GIS and Cartography Expert

(2). Conceptual diagram of the training

The figure below shows the concept for the implementation of the training.

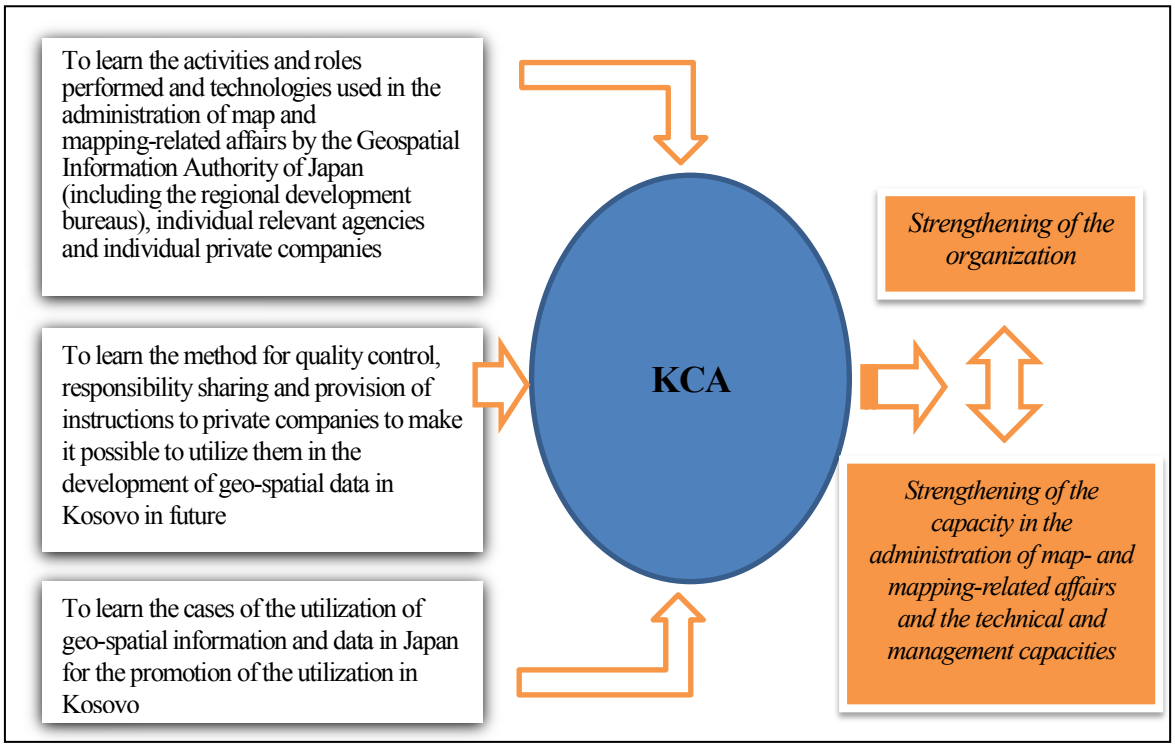


Figure 3-51 Conceptual Diagram of Training in Japan

(3). Remarks on the training course

The Chief Executive Officer, the general manager of various types of maps and geo-spatial data, of KCA participated in the training course. Two engineers who were engaged in the actual work of creation, modification, updating and management of these data at KCA also participated in the course. These two engineers were also participants of the technology transfer in Kosovo.

In the training course, they visited the Geospatial Information Authority of Japan (GSI) (Head Office and Kinki Regional Survey Department), the Japan Association of Surveyors and Japan Map Center, organizations managing and selling various maps and geo-spatial data and calibrating surveying instruments. At each organization, the participants were given explanation on the creation and utilization of geo-spatial data in Japan at present, roles of the organization and services provided by the organization.

In the visit to the Japan Aerospace Exploration Agency (JAXA), the participants had opportunities that they could not have in Kosovo of listening to the presentation on the utilization of satellite imagery in creation of geo-spatial data and seeing actual rockets and satellites up close in the exhibition space.

As the lectures provided at each of these organizations had many useful contents relevant to the

services of KCA including organizational structures and systems for data management and sales in Japan, the participants explained the current state of geo-spatial data creation and utilization in Kosovo to staff members of those organizations, asked many questions and exchanged opinions actively with them. They were very attentive during the lectures and, from this attitude, their earnestness to this training was keenly felt.

	
Courtesy call to GSI	GNSS-based Control Station (at GSI)
	
Visit to JAXA	Calibration of a surveying instrument

Figure 3-52 Scenes from Training in Japan

(4). Utilization of the outputs of the training

(a) Training outputs

- The participants learned the current state of the creation and quality control of geo-spatial data, systems for information disclosure, the registration systems for surveyors and assistant surveyors, etc. in Japan and identified the difference in the situation between Kosovo and Japan, information useful for them and matters to be improved in Kosovo.
- They understood the details of the methods of creating various topographic and thematic maps from satellite imagery.

(b) Ways to utilize the outputs

- Establishment and improvement of a legal system for the administration of map- and mapping-related affairs (*e.g.* quality control and a data sales system) in Kosovo
- Information transmission for expansion of the geo-spatial data utilization to organizations using the data and the private sector
- Reform and strengthening of the organizational structure of KCA
- A study on standards on calibration of surveying instruments which Kosovo does not have
- A study on the establishment of a qualification system for those involved in map creation and surveying (similar to the system for qualifying surveyors and assistant surveyors of Japan)
- Creation of various topographic and thematic maps using satellite imagery
- Creation of 3D geographic information
- Others

3 . 4. Conclusion

The project members felt that the participants of the technology transfer participated in the training with the will to continue to develop geo-spatial data of the 10 % of the total land area outside of the project area independently. Although it is understandable that they had to attend other duties while participating in the technology transfer, it is unfortunate that the attendance rate to the technology transfer was lower than expected.

The duration of the technology transfer was by no means long enough. However, the level of achievement of the technology transfer was evaluated at „4" in the comprehensive analysis of the result of the evaluation of the technology transfer of each process mentioned below with the criteria mentioned in the following table. This evaluation result seems to indicate that the KCA staff members who participated in the technology transfer have acquired the capacity to create geo-spatial data of the remaining 10 % of the total land area unassisted, even though it may take a long time for them to do so.

Table 3-32 Evaluation Criteria for Technology Transfer as a Whole

Level of achievement	Evaluation criterion	Relative capacity level compared with that of the project members set at 100
5	Equivalent or superior to the level of the project members	100 % – 91 %
4	Able to complete the work, even though it will take a long time	90 % – 76 %
3	Able to complete the work with assistance from experts	75 % – 51 %
2	Unable to implement the work without guidance and instruction of experts	50 % – 26 %
1	Unable to implement the work at all	25 % – 1 %

Meanwhile, it is possible to assume KCA as an organization administrating map- and mapping-related affairs responsible for operating and managing the geo-spatial data. In this case, KCA may outsource the

data creation. As its staff members have learned what work has to be carried out and how the quality of data should be controlled at each process in the data creation in the technology transfer, they are considered to be sufficiently capable of controlling outsourced work.

The increase in the number of requests for sophisticated data services to KCA will be a natural consequence of the development of the new geo-spatial data in Kosovo. In order to meet these requests, KCA shall have to perform the following:

- ✧ The geo-spatial data of the remaining 10 % of the territory shall be developed without fail either by itself or through outsourcing.
- ✧ As not all the functions of the materials and equipment used in the technology transfer were explained or used in the technology transfer, efficiency of the work shall be improved with the use of those unused functions.
- ✧ Human resources for the geo-spatial data creation shall be developed within KCA by accumulating knowledge and experience on the geo-spatial data creation in accordance with the manuals created in the technology transfer.
- ✧ The capacity to acquire highly reliable geographic information shall be enhanced by improving the capacity in interpretation of aerial photographs.
- ✧ Use of satellite imagery shall be discussed when creating or updating geo-spatial data when necessary.

4. Data Utilization

4.1. Current State and Issues of the Utilization of Map Data

4.1.1. Current State of and Demand Projection for the Utilization of Topographic Maps

[1] Understanding of the Current State with a Questionnaire Survey

A questionnaire survey of the participants in the First Seminar was conducted to elucidate the current trends in the geo-spatial data utilization.

1) Details of the Questions and Respondents

The participants were requested to give their responses to the questions set up individually for the four themes mentioned below. Only six non-KCA staff member participants responded to the questionnaire while the project members were in Kosovo. The number of the respondents was small presumably because of the insufficient understanding by the participants of the aim of this Project on the data utilization, in addition to the short period of time given to them to respond to the questionnaire.

- Use of map data in daily work
  - Types of map data used
  - Purposes of the use
  - Method to obtain map data
- Requirement for future usage
- Environment of the office in terms of Hardware and Software
  - Availability of PCs
  - Network environment at work places
- For wider utilization of geo-spatial data
  - Details of the expectation of new geo-spatial information data
  - Expected future data use with assumed use in GIS, etc.

The total number of the collected responses is 11. The table below shows the numbers of respondents by institution.

Table 4-1 List of Questionnaire Responses

	Agency	Number of collected responses
1.	Ministry of Environment Protection (MEP)	1
2.	Ministry of Public Administration (MPA)	2
3.	Ministry of Environment and Spatial Planning (MESP)	1
4.	Agency of Statistic	1
5.	Local governments	1
6.	KCA	5
Total		11

[2] Profiles of the Respondents and Data Utilization in Their Organizations

The respondent engineers and experts from the five institutions utilizing geo-spatial information work for planning departments of their respective institutions and have approx. ten years of working experience. At this time, there have been only several cases of the data utilization at those institutions. It seems that map data have not been utilized frequently in MPA, with printout maps used only as reference materials. Meanwhile, it seems that medium scale maps such as 1/25,000 maps have been used frequently in MEP and MESP and those ministries have a high expectation of the creation of new geo-spatial information by KCA. As all the institutions have adequate network environments including LAN, they seemed to intend to use the data frequently for creation of thematic maps if KCA manages to deliver the data.

4.1.2. Current State and Issues of the Utilization of Geo-spatial Data

[1] Current State and Expectation of the Utilization of Geo-spatial Data

The answers from user institutions, such as the ministries contributing to planning and designing the land, revealed the fact that they have been likely to utilize paper-wise topographic maps instead of digital topographic data. Although they have not used digital map data, it looks that they need to utilize geo-spatial data inevitably in common cases.

Most of cases seem to making use of those information for creation of thematic maps and presentation of geographic features in analytical consideration. The answers showed the strong will that they are going to utilize the geo-spatial data more positively if the data shall be disseminated in digital format, and will try to learn the technology such as GIS.

[2] Problems in the Promotion of the Data Utilization

Staff members of governmental organizations, who are heavy users of maps, have used medium-scale topographic maps in one way or another. However, they have mostly used printed maps and, if they have

ever used electronic data, the data used have been mostly raster data. These users are discontent with the limitation on the data usage such as fees charged on the usage. They expect the increase in the types of data available from Geo-Portal and the development of an environment allowing free data downloading as the motivations to increase the use of digital data. KCA is certainly required to develop an environment and review systems to meet these requests and demands.

4 . 2. Utilization Seminar

4 . 2 . 1. Holding of the First Seminar

The first seminar was held at Hotel Sirius in Pristina on November 8, 2013 with the objectives of explaining the significance of this Project, the outputs, the cases of promoting the use of the data and the cases of data utilization and promoting the utilization of the data.

A total of 48 people from relevant agencies, including Mr. Shpëtim Rudi, the Deputy Minister of the Ministry of Environment and Spatial Planning (MESP) to which KCA belonged, participated in the seminar. The participants were from the following agencies:

- Ministry of Environment and Spatial Planning
- Ministry of Public Administration
- Ministry of European Integration
- Ministry of Environment and Spatial Planning – Kosovo Environmental Protection Agency
- Ministry of Culture, Youth and Sport – Department of Cultural Heritage
- Ministry of Economic Development – Kosovo Geological Service
- Independent Commission for Mines and Minerals
- Municipal Cadastral Office, Pristina
- Municipal Cadastral Office, Mitrovica
- Municipal Cadastral Office, Prizren
- Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH
- Radio Television of Kosovo – Radio

Presentations on the details of this Project mentioned below were made at the seminar by members of the Project Team and staff of KCA.

- Explanation of the study methods, work composition and work schedule (by the Project Team)
- Expected areas of data utilization and application and case studies (by the Project Team)
- History and current status of topographic maps in Kosovo (by KCA)

Copies of the document shown in the figure below which briefly described the outline of the

Project, as well as the seminar program, presentation materials and user questionnaire form, were distributed to all the participants.

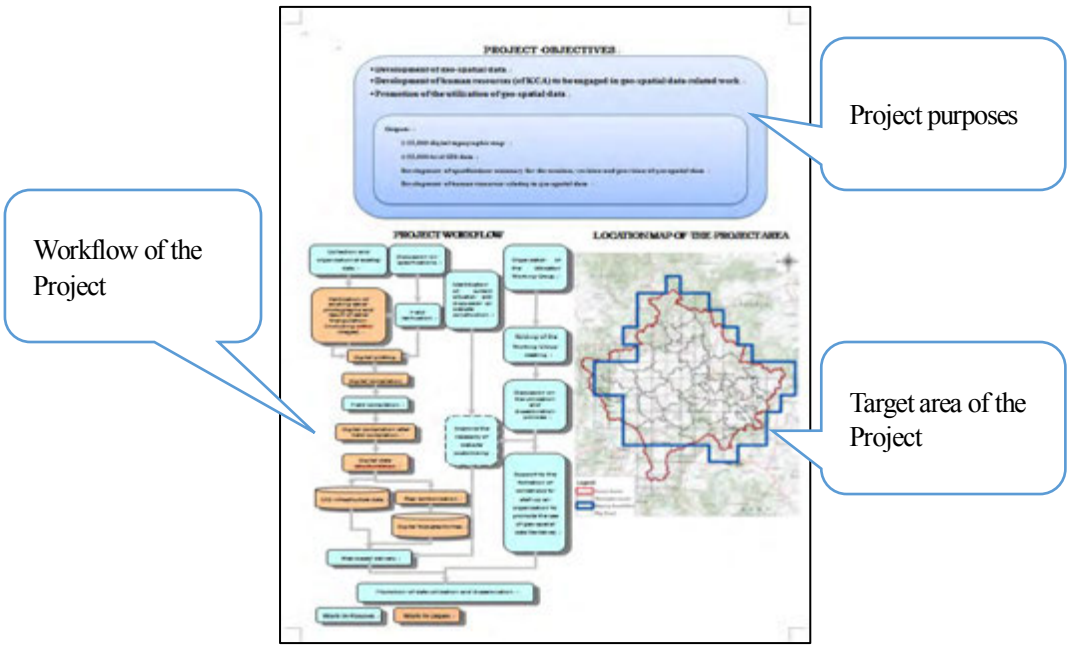


Figure 4-1 Document Outlining the Project Distributed in the Seminar

4 . 2 . 2. Holding of the Second Seminar and its Outputs

The Second Seminar was held at the Swiss Diamond Hotel in Pristina on April 15, 2015. One hundred and one people participated in the seminar.

Detailed presentations on 1) the processes and outputs of the geo-spatial data creation, 2) the policies for, problems in and actual cases of promotion of data utilization and 3) the measures and basic policies to be adopted by KCA for the promotion of data utilization were made in the seminar which was composed of three parts as mentioned below. (See Appendix-7 for the seminar program.)

In **Part 1**, the Project members gave a presentation focused on the outputs of the geo-spatial data and other data created in this project and their significance. The presentation also included an explanation of the survey methods.

In **Part 2**, two representatives of the Geo-spatial Data Utilization Working Group, one government official and one researcher in the urban administration, as data users, presented cases of the utilization of geo-spatial data in practical work in their presentations on the methods and findings of studies on cases of geo-spatial data utilization by utilization organizations.

In **Part 3**, the Project Team and the Chief Executive Officer of KCA gave a presentation entitled "Potential of and Proposal for the Promotion of Geo-spatial Data Utilization." They mentioned the roles expected of geo-spatial data and the methods and prospect of their utilization during the implementation of the strategic plans for the development of Kosovo (including the Spatial Plan of Kosovo and E-Government) in their presentation. The Chief Executive Officer of KCA also stated the importance of the creation of geo-spatial data of the remaining 10 % of the territory and announced KCA's intention to create such data.

The organizations mentioned below participated in the seminar.

- Ministry of Environment and Spatial Planning – Institute of Spatial Planning
- Ministry of Public Administration
- Ministry of Agriculture, Forestry and Rural Development
- Ministry of Culture, Youth and Sport
- Ministry of Culture, Youth and Sport – Kosovo Institute for Protection of Monuments
- Ministry of Infrastructure
- Ministry for the Kosovo Security Forces
- Kosovo Agency of Statistics
- Independent Commission for Mines and Minerals
- Kosovo Security Force
- Hydro-Economic Enterprise
- Hydrometeorology Institute of Kosovo
- KOSTT – Kosovo Electricity Transmission, System and Market Operator J.S.C.
- Municipal Cadastral Office, Drenas
- Municipal Cadastral Office, Ferizaj
- Municipal Cadastral Office, Fushë
- Municipal Cadastral Office, Gjakova
- Municipal Cadastral Office, Gjilan
- Municipal Cadastral Office, Istog
- Municipal Cadastral Office, Lipjan
- Municipal Cadastral Office, Podujevo
- Municipal Cadastral Office, Prishtina
- Municipal Cadastral Office, Prizren
- Municipal Cadastral Office, Rahovec
- Municipal Cadastral Office, Skenderaj
- UNDP

- University of Pristina – Faculty of Geography
- University of Pristina – Faculty of Philology
- Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH
- KCA
- JICA
- RTK (Public TV broadcast)

Figure 4-2 Scenes from the Second Seminar

4 . 3. Assistance to Users in Relevant Agencies for the Promotion of the Data Utilization

4 . 3 . 1. Capacity Building of Users in Relevant Agencies

[1] Planning and Calling for Participation in the Data Utilization Promotion Training

A meeting for the promotion of geo-spatial data utilization, "The Geo-spatial Data Utilization Working Group," was planned. Working-level data users in charge of planning and survey from government-affiliated organizations including relevant ministries and agencies (hereinafter referred to as "relevant agencies"), where the utilization of geo-spatial data was recommended, were the intended participants in the meeting, as the purpose of the meeting was to promote the geo-spatial data utilization in those agencies by urging their users to utilize the data as much as possible in the performance of their duties. As a preparatory activity for the training, the project members prepared the prospectus shown below calling for the participation by relevant agencies in the Working Group in order to encourage as many relevant agencies as possible to participate in this training.

PROSPECTUS

JICA Study Team

This is to call for the participation in the "Working Group" which shall be organized in order to encourage you to utilize geo-spatial data more actively in your areas where you are addressing in your duties.

In order to involve as many relevant agencies as possible in the efforts for promoting the use of the output data from the JICA project, the "Utilization Working Group", which consists of technical staff belonging to the relevant agencies, shall be initiated herewith.

The Group will be scheduled to meet at least 3 times in the Project period. The issues and activities are envisaged as follows for the time being.

- Kickoff meeting
- Discussion on the priority issues in terms of use of geo-spatial data
- What is ongoing task with necessity of topographic map data
- Ability and possibility of application use of geo-spatial data

To enable the personnel of relevant agencies to learn the technology for effective utilization of geo-spatial data in tackling issues of high priority by hands-on experience, a pilot study for analyzing the issues with an application of the GIS should be proposed to examine and verify the effective usage of the geo-spatial data.

Copies of this document were officially delivered from KCA to heads of relevant agencies after the holding of the first seminar. Staff members of those agencies who had expressed intention to participate in the Working Group Training were invited to an explanatory meeting, in which the aim of the Working Group, work schedule for its activities and requests from the Working Group were explained. However, as the period between the delivery of the prospectus and the holding of this meeting was short, staff members of only a limited number of institutions managed to participate in the Working Group Training.

Therefore, the Project Team asked the Chief Executive Officer of KCA to continue the invitation to the Working Group Training after the Project Team had gone back to Japan. As a consequence, a total of 14 staff members from 11 relevant agencies had agreed to participate in the Working Group Training as shown in Table 4-2.

In the explanatory meeting, the explanation on the purpose of the establishment of this Working Group for the purpose of promoting data utilization, roles and functions of KCA staff members and roles of the Project Team was provided as shown in Figure 4-3.

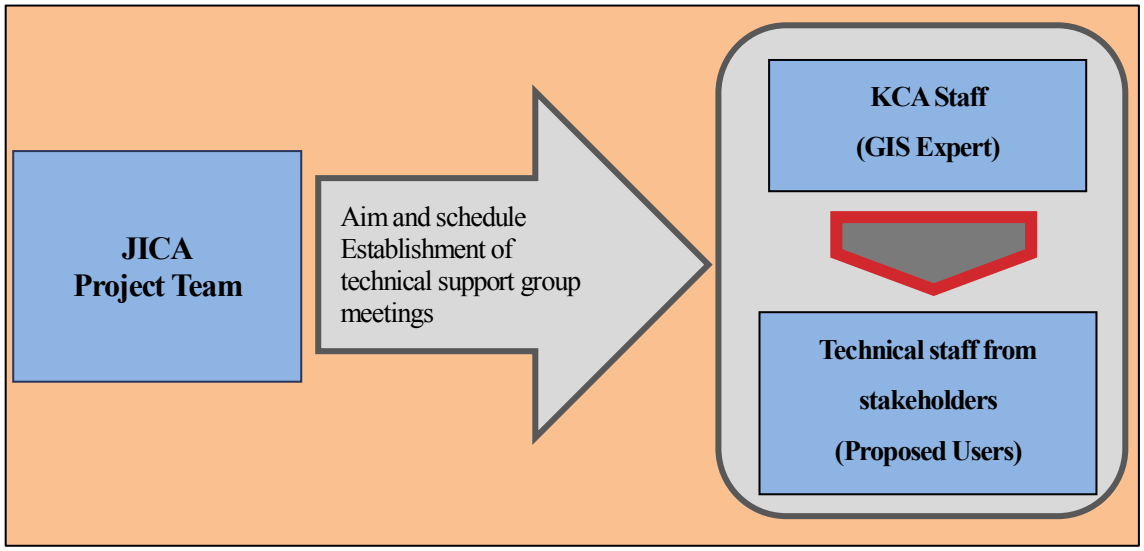


Figure 4-3 Composition of Working Group and Functional Relationship between its Components

Table 4-2 Institutions/Organizations which Have Expressed Intention to Participate in Working Group Training and Names of Participants from Them

Institutions	Participants
Kosovo Environmental Protection Agency	Bajram Kafexholli
Planning Institute	Riza Murseli
Kosovo Agency of Statistics	Idriz Shala
Department of Road Infrastructure, Ministry of Infrastructure	Naim Kelmendi
Department of Heritage, Ministry of Culture, Youth and Sport	Drenushë Behluli-Mehmeti Milot Berisha
Department of Tourism, Ministry of Trade and Industry	Halil Bajrami
Ministry of Environment and Spatial Planning	Riza Murseli Hasim Kryeziu
Cadastral Office, Prizren	Dukagjin Berisha
Cadastral Office, Mitrovica	Fatime Beqiri Cyma Mehmetaj-Morina
Cadastral Office, Pristina	Vjosa Statovci
Independent Commission for Mines and Minerals (Agency)	Sami Duraku

Unlike the technology transfer implemented within KCA, the Working Group Training was intended to promote utilization of the geo-spatial data in actual work in relevant agencies after the release of the geo-spatial data created through the Project. While two seminars to be held during the Project period are

publicity activities intended for providing donor organizations and ordinary people working in a wide variety of fields with opportunities to understand the importance and use of the geo-spatial data, this Working Group Training was mainly for staff members of relevant agencies whose need for the knowledge and technologies for the data utilization is directly connected to their duties.

Figure 4-4 Scene from Explanatory Meeting

[2] Capacity Building Program for the Geo-spatial Data Utilization in the Training

Quantum GIS, open-source GIS software, was used in the training as a tool for the utilization of geo-spatial data. The Project Team members took the lead in the implementation of the hands-on-training on the contents, basic operation and introductory application techniques of the software.

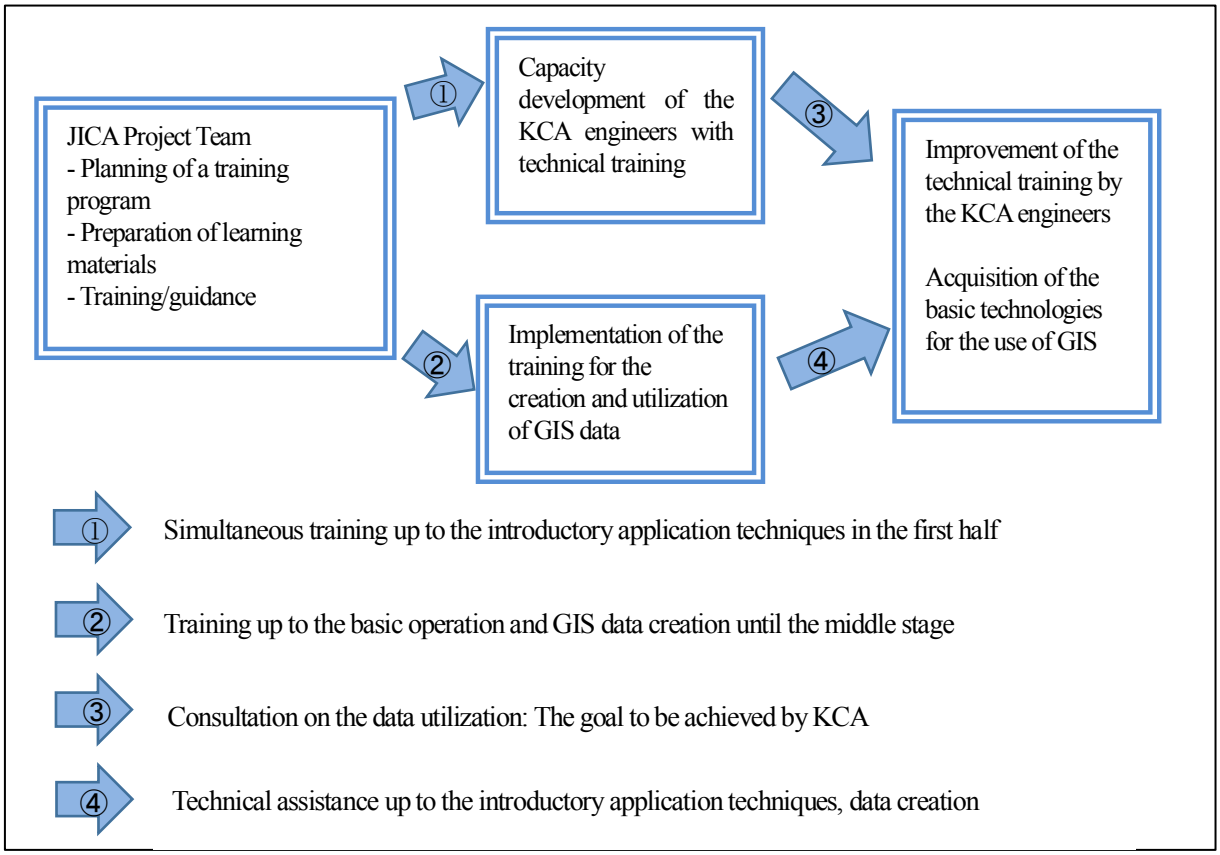


Figure 4-5 Concept of Capacity Building Program for Enhancing Data Utilization Supporting Ability of KCA GIS Staff

The program designed in accordance with the concept shown in the figure above aims at not only the improvement of the awareness of the staff members of KCA as a whole to the geo-spatial data utilization as a capacity building program, but also the technology transfer on the data utilization to KCA staff members. To achieve these aims, a staff member of KCA was appointed as the person in charge of the training program and the program was implemented as a plan aiming at "the creation of a technical support system for data users in the geo-spatial data utilization."

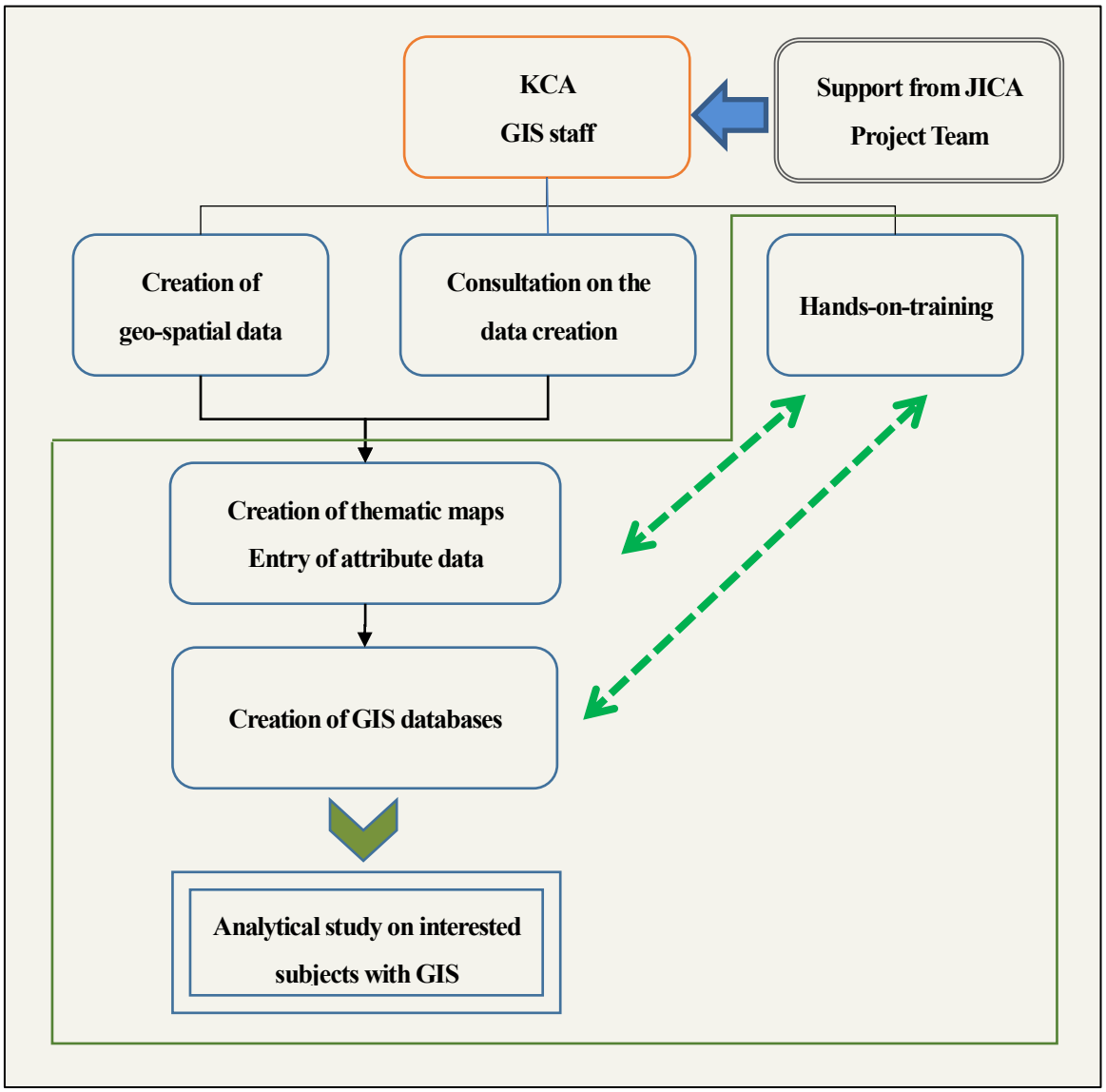


Figure 4-6 Structural Flow of Data Utilization Support System for Geo-spatial Data Users with the Emphasis on the Role of KCA Staff

[3] Implementation of the Working Group Training and its Outputs

This working group training program was implemented in five sessions. The participants were provided with instructions and advice in accordance with their capacities and aims. They used the basic data of their own in the training.

1) First Session (held on April 25, 2014)

The participants from various ministries, agencies and organizations were interviewed individually to evaluate their knowledge and technical capacities in the geo-spatial data utilization in the first session. Then, the subject of the session mentioned below was adopted, the participants were classified into

three groups by level of the technical capacity and the goal to be achieved in the training was established for each group.

Subject: Close examination of the themes to dealt by each participant in the training and evaluation of their technical knowledge and level of skills

Participants: Total number of the participants: 8
1 from KCA and 7 from six relevant agencies

Table 4-3 List of Participants in Working Group Training

Relevant Agency	Post	Name of the Participant
Ministry of Environment and Spatial Planning	Responsible for GIS	Mr. Riza Murseli
Kosovo Agency of Statistics	Responsible for GIS	Mr. Idriz Shala
Ministry of Culture, Youth and Sports	Archeologist	Mr. Milot Berisha
	Officer for Architectural Heritage	Ms. Drenushë Behluli-Mehmeti
Municipal Cadastral Office – Pristina	Senior Officer for Geodesy	Ms. Vjosa Statovci
Independent Commission for Mines & Minerals	Head of GIS Department	Mr. Sami Duraku
Ministry of Trade and Industry	Officer for Tourism Policies	Mr. Bedri Milaku
Ministry of Trade and Industry	Officer for Regional Tourism Policies for Tourism Policies	Mr. Xhmmajl Pllana

Table 4-4 Established Goal Levels

Established Goal Levels		
A	To create a thematic map with digital data: To display geo-spatial data on a PC screen as desired and process data as required	Low ↓
B	To learn the knowledge and actual operation method of the GIS software for geo-spatial data utilization through practice sessions	
C	To acquire the techniques to use GIS application to create a database required in the actual work and use it for data analysis on one"s own theme	High

2) Second Session (held on April 29, 2014)

In order to provide practical training on the skills to use the GIS software and data creation for the participants to achieve their target goals, the goals mentioned below were established for the participants with their requests taken into consideration.

Table 4-5 Level of Digital Data Operational Skills of and Goals Established for Training Participants

Level	Affiliation	Goals Established
B	Department of Heritage, Ministry of Culture	The participant shall map, display and change data of historical sites, create a database of such data and update and manage the database.
B	As above	Since the participant is actually conducting an archeological assessment in the Ulpiana area, he shall create a database of data of excavated items and manage a wide variety of such data collectively on maps.
C	Kosovo Statistic Agency	The participant shall conduct spatial analysis of an area of approx. 250 km^2 south of Rahovec City.
A	Ministry of Trade and Industry	The participants shall centrally control tourism information by downloading data of tourist facilities, roads and structures on topographic maps and linking them with topographic information so that the information can be utilized for the planning of measures to promote tourism.
B	Municipal Cadastral Office – Pristina	In order to enable systematic management of the zone data, the participant shall create orientation maps and database of each zone and display the maps and data in the database over geo-spatial data.
C	Independent Commission for Mines & Minerals	The participant shall analyze the conditions of the locations of mineral resource prospects, characteristics of each of them and causes of their formation while making association between them. He shall construct an analysis system in which various types of data are analyzed in an integrated fashion.

Figure 4-7 Consultation with Participants on Data Utilization for Themes Selected by Them

3) Third and Fourth Sessions (held on May 13 and 16, 2014, respectively)

The participants had practical training on the basic technologies such as operation of the GIS software and creation of GIS data with the software for the achievement of their themes established above. The project member created manuals on the subjects mentioned below for this training and provided the participants with personalized training in accordance with their needs.

- ✧ Basic setting of the software
- ✧ Data import
  - ● Image data
  - ● Text data
  - ● GPS data
- ✧ Creation of GIS data (in the Shape file format)
- ✧ Processing of attribute tables
- ✧ Creation of thematic maps
- ✧ Data analysis (basic)
- ✧ Data analysis (advanced)

4) Fifth Session (held on October 15 and 23, 2014)

In this training, the project member reviewed the contents of the training that the participants had taken and provided them with advice on the solution of problems that they had and for the achievement of their target technical levels.

- ✧ Subjects reviewed:
  - ➢ Basic operation
  - ➢ Georeferencing of image data
  - ➢ Creation of GIS data (in the Shape file format)
  - ➢ Creation of thematic maps
  - ➢ Others

5) Training Outputs

The project member in charge of promotion of data utilization prepared manuals for the provision of instructions on operation methods of the GIS software and the basic technologies such as creation of GIS data to the participants while they were actually operating the software for their individual themes.

The participants were able to learn methods for data utilization and those used in GIS and get closer to their individual goals by following this manual.

Two of the participants gave presentations on the outputs of this training at the Second Seminar.

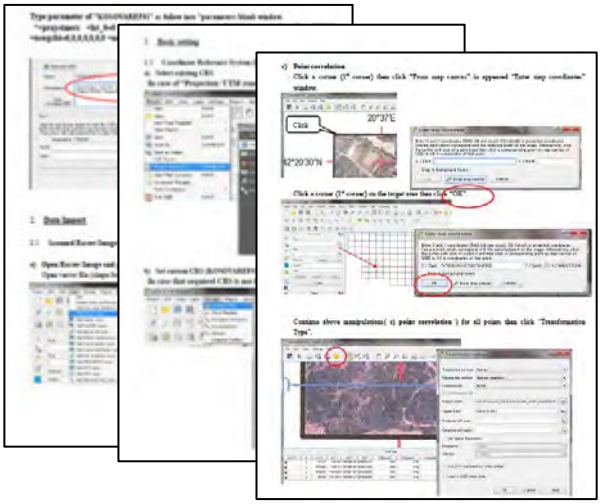


Figure 4-8 Part of Manual

4 . 4. Measures to Promote Data Utilization

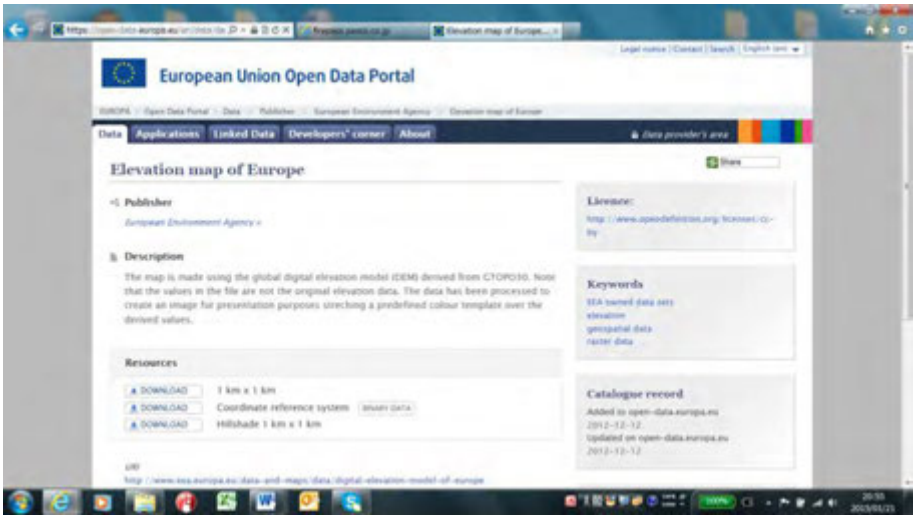
4 . 4 . 1. Promotion of Data Utilization with Conversion of Geographic Information to Open Data

[1] Trends in the Open Data Policies of Major Developed Countries

As a strategy to promote E-Government, the governments of developed countries are accelerating the conversion of their data to open data, with the importance of ensuring transparency and accountability, promotion of the data utilization in the private sector and expansion of economic activities taken into consideration. The major trends in this area are described in the following.

- ✧ At the end of 2011, the EU formulated the "Open Data Strategy for Europe." The EU decided to launch "Data Portal[*1]," maintain fair conditions in the EU area and support research and development of data processing technologies in accordance with the strategy.
- ✧ In May 2012, the Obama Administration of the U.S.A. announced acceleration of the open data movement in "Building a 21st Century Digital Government."
- ✧ In Japan, with the submission of the Open Government Data Strategy by the IT Strategic Headquarters in June 2012, the open data movement has gained momentum. It was decided that the infrastructure development for and the promotion of the geo-spatial utilization, which were already in progress, should keep pace with this government-wide acceleration of the promotion of the Open Government Data Strategy. The government announced the principles mentioned below to be applied to the information that it possesses.

1. The Government shall actively release public data.
2. Public data shall be released in machine-readable formats which make secondary use of the data easy.
3. The use of public information shall be encouraged whether for both commercial and non-commercial purposes.



***[1]: European Union Open Data Portal**

The EU Open Data Portal is your single point of access to a growing range of data produced by the institutions and other bodies of the European Union. Data are free to use, reuse, link and redistribute for commercial or non-commercial purposes.

The importance of the services of KCA is increasing in Kosovo as the government seeks to establish E-Government. KCA and MPA, the organization promoting E-Government, shall define their respective duties and shall be actively involved in the task of disclosing geo-spatial data.

[2] Composition of the Promotion of the Open Data Movement for the Geo-spatial Data

European countries have realized the high potential of various types of information owned by the public sector organizations, mainly those handling geo-spatial data, for commercial use and adopted a strategy of promoting unconditional or reasonably conditional secondary use of the data in a wide range of areas. The Government of Japan intends to announce its concept on the use of copyrighted materials which allows secondary use of data copyrighted and disclosed by the government in a wide range of areas.

The promotion of geo-spatial data utilization is expected to contribute to the development of the national economy in Kosovo. The data utilization shall have to be promoted in a wide range of areas both in the public and private sectors and the public data shall have to be utilized in businesses and for new services. Therefore, it is advisable to review the functions of the existing Geo-Portal which is providing geo-spatial data, conduct a study for the conversion of the data to open data and develop a system which allows secondary use (reuse and reproduction) of the data in a wide range of areas. (See Figure 4-9)

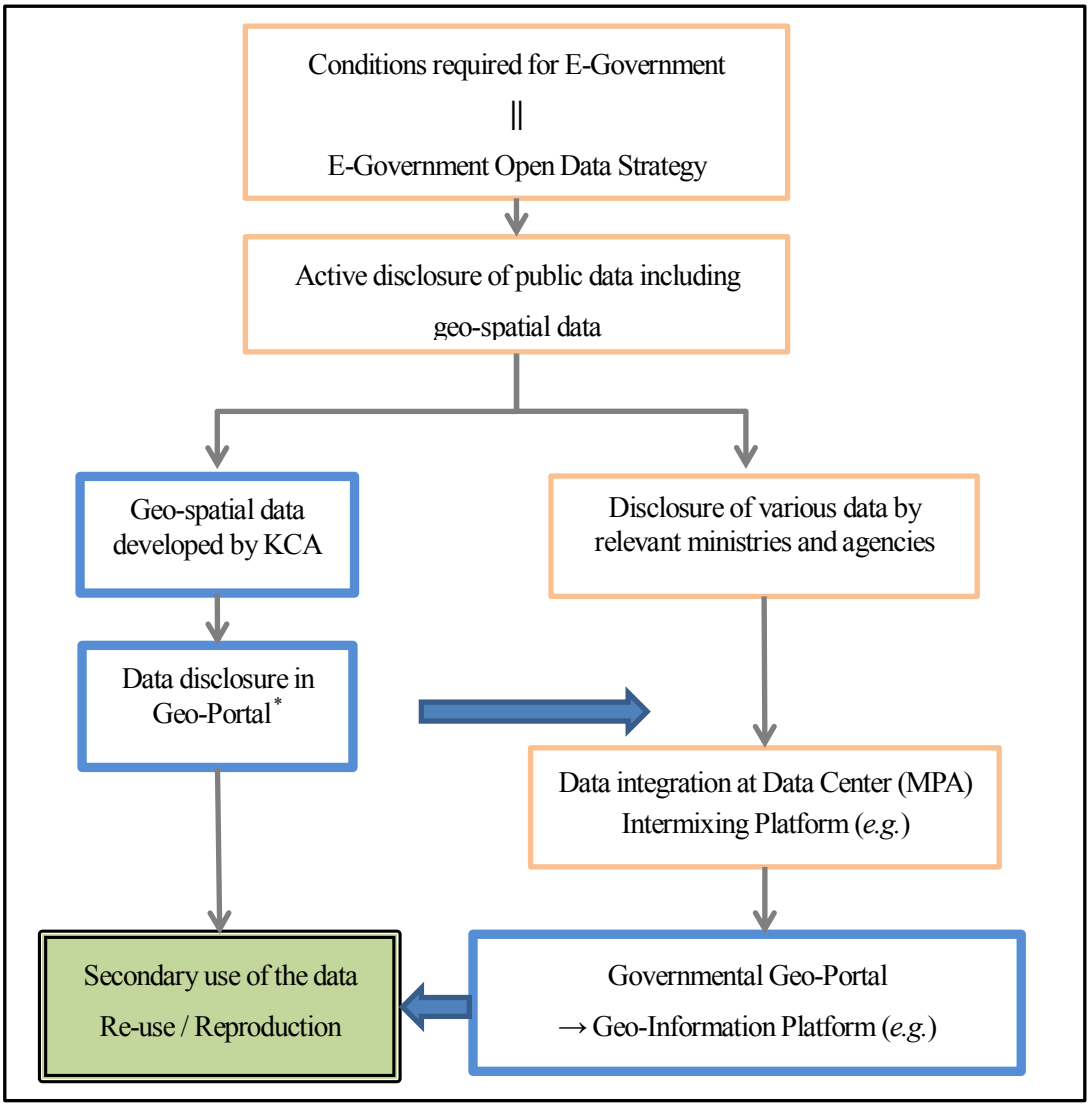


Figure 4-9 Contribution of Disclosure of Geo-spatial Data to Secondary Data Use and Construction of E-Government

* *Establishment of a system and internal regulations for the data disclosure*

It is advisable to disclose geo-spatial data as "open data." Disclosure of geo-spatial data as open data requires rules on data use which promote the secondary use.

KCA has already established Geo-Portal as a system which enables provision of cadastral data, small-scale maps and orthophotos through the Internet. Guidance on the contents of Geo-Portal, the types of data available in Geo-Portal, methods used in Geo-Portal, fees and range of free services is published in the form of a brochure for a wide variety of users to promote utilization of Geo-Portal.

However, Geo-Portal is not designed to allow all users to download any type of data without limitation. Unfairness is found in the design of Geo-Portal: There is a difference in the user authorization between ordinary users and users of governmental organizations. A portion of raster data can be browsed and

downloaded free of charge. The rest cannot be downloaded free of charge or processed. Only users with professional qualifications are given the authorization to do so. In principle, even users of governmental ministries, agencies and organizations have to pay fees for the use of Geo-Portal in accordance with the established rule on user fees.

It is advisable to integrate the geo-spatial data of KCA with data from other relevant agencies at the data center of MPA where they are collected. This integration gives added value to the geo-spatial data. Then it is advisable to provide the value-added geo-spatial data as open data with higher degree of freedom to a wide variety of users through Geo-Portal. The figure below shows the conceptual diagram of the flow of the geo-spatial and other data.

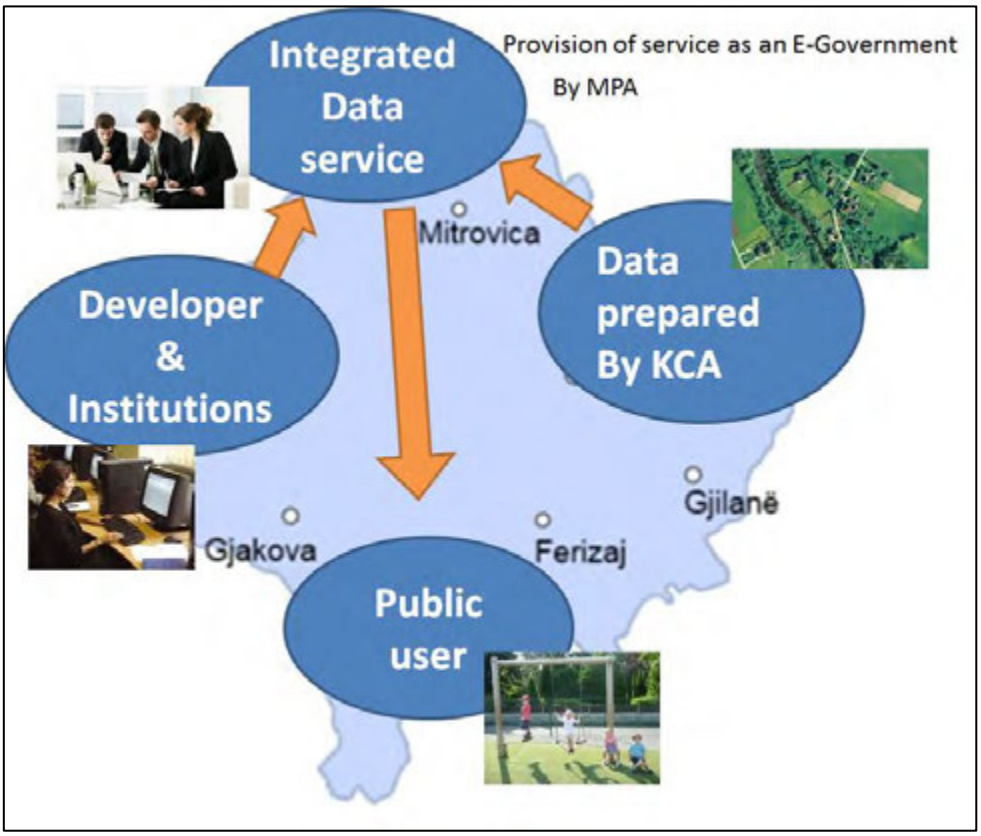


Figure 4-10 Vision for Utilization of Geo-spatial Data as Open Data

4 . 4 . 2. Measures to Promote Secondary Use of Geo-spatial Data

[1] Development of Guidelines for Data Disclosure for the Promotion of Secondary Use

Guidelines for the secondary use of geo-spatial data have to be developed to clearly define the concept of the secondary use of geographic information at data utilization organizations and to provide guidelines for provision and distribution of geo-spatial data with issues concerning copyrights appropriately addressed. It is advisable to include matters mentioned below in the guidelines.

≪Basic provisions in the terms of use for the promotion of the secondary use≫

- KCA, as a data source, shall have to define in advance the range to which authorization for the secondary use of its geo-spatial data, including handling of the copyright, applies in the cases where users use the provided geo-spatial data to create information with added value greater than that of the original data and distribute it.
- It shall be provided whether the permission for the data use shall be provided under a license agreement or other means. The conditions for the permission of reproduction of, partial modification of and creation of derivative data (derivative works) from the provided data shall be clearly defined.
- The conditions for the distribution of outputs of secondary use shall also be clearly defined. The license agreements in Japan and Germany (BKG) allow free secondary use of provided geo-spatial data with the clear indication of the source of the original data.
- The permission shall not prohibit integration and superposition of geo-spatial data of KCA and data created by other organizations.

[2] Method for the Provision of Geo-spatial Data

It is advisable to disclose geo-spatial data as open data for the promotion of their secondary use. To disclose them as open data requires a study on the regulations on handling of map data currently in use and interpretation of intellectual property rights* and the creation of a new system and terms of use for geo-spatial data provision on the basis of the result of the study.

*: The Law No. 04/L-065 on Copyright and Related Right provides the details and range of application of copyrights and related rights in Kosovo. The legal office of KCA explained that it was difficult to copyright the products of KCA on the basis of its interpretation of the law.

"MESP Administrative Instruction No. 25/2013" which provides regulations and fees for the use of products of KCA has the following provisions on obligations of data users:

- Users shall not give products of KCA to third parties without permission of KCA.
- Users shall not reproduce products of KCA without permission of KCA except where the reproduction is deemed necessary on the basis of a security concern.
- Users shall prevent unauthorized access to products of KCA of third parties.
- Users shall not allow their co-workers and employers to use the provided data for personal use.

- When KCA has given permission to reproduce its product to a data utilization organization, the organization shall have to specify that the duplicate is a product of KCA with the logo mark of KCA on it.

[Reference] Table 4-6 shows the systems for the disclosure and provision of geo-spatial data in major countries.

Table 4-6 Provision and Use of Geo-spatial Data in Major Countries in Europe / North America and Japan

	Data acquisition through the Internet	Regulation on data use	Intellectual property right
USGS (USA)*	Downloadable	Copyright-free (Data can be used freely)	Data created by the government can be used as copyright-free data
Ordinance Survey (UK)*	Downloadable	License agreement	The Copyright Law
IGN (France)*	Downloadable	License agreement	Intellectual Property Code
BKG (Germany)*	Downloadable	• License agreement • Guidelines	The Copyright Act
Japan	Downloadable (base map data)	Free use with user registration	Data copyrighted by the government can be used as copyright-free data, in principle
	Purchasable in CD-ROM	To be used in accordance with the terms of use	

* Source: "Survey on Guidelines for the Provision of Geo-spatial information in major countries, 2007," GSI (in Japanese, partially revised)

Both a system using the Internet via new functionally improved Geo-Portal and a system of direct provision in electronic media can be used for the provision of geo-spatial data of KCA to their users. Whichever system is selected, it is important to conclude license agreement with KCA and data users and provide general articles for the data use mentioned below including clear definition of the obligations and rights of both parties to the agreement.

✧ Articles to be included in the license agreement

- Definition of the licenser and the licensee (beneficiary) (who provides the license to what kind of party)
- Subject: to clearly define the purpose(s) of the licensing
- To clearly define the rights of both the data provider (KCA) and data users
- To define obligations of licensed users generated under the agreement

Data distribution through a license agreement system is beneficial to KCA because it ensures the licenser (KCA) user fee revenue from the data provision under the license and enables KCA to recover the data development cost.

Under the system currently in use, all the geo-spatial data (cadastral maps) and orthophoto data created by KCA are properties of the nation and the fees for data and service provision are set in accordance with "Administrative Instruction MESP No. 25/2013 on Fees for Products and Services of Kosovo Cadastral Agency." It is assumed necessary to conduct a new study based on the current fee system on the quality control and frequency of updating of data, purpose of data use and the rights to redistribute and reproduce them to set the license fee.

Table 4-7 shows the total amounts of the sales of the data created by KCA in each of the last three years (2012 – 2014) on a revenue basis. Most of the data were sold to governmental organizations in this period. The sales revenue has been paid to the Ministry of Finance.

Table 4-7 Record of Paid Distribution of Products of KCA (in Euros)

Year	Cadastral maps	Orthophotos
2012	53,411.44	–
2013	24,654.00	–
2014	146,129.50	125,000

Source: Interview at the Marketing Dept., KCA

[Reference] The articles providing licensing conditions for the use of geographic information of BKG of Germany are shown below.

Licensing Conditions

- Maps of Germany, Regional Maps and Historical Maps
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4.4.3. Implementation of Comprehensive Measures to Expand Data Utilization in Inter-organizational Cooperation among Relevant Ministries and Agencies

Strengthening of the cooperation between KCA and relevant governmental organizations is indispensable for the promotion of the utilization of geo-spatial data in a wide range of areas. There are those who appeal

for the need for the implementation of comprehensive measures in cooperation between KCA and these organizations for the expansion of the data utilization in new areas in these organizations. Under such circumstances, a study on and implementation of practical measures are urgently required. Some of such measures are described in the following.

[1] Establishment of a Platform for Geo-spatial Data Utilization

A platform which is designed to allow all user organizations and general users interactive access to it through the data center established in MPA and allow them to update, add and share data and to use applications with ease shall be established. The aim of establishing this platform is to maximize the utilization of the geo-spatial data provided by KCA. It is expected to become impossible to meet various data needs only with the existing Geo-Portal of KCA* in future. Therefore, this platform shall be established as a site for comprehensive utilization of geo-spatial data which allows utilization of multiple pieces of information in an organized fashion (provisionally called Geo Information Platform).

* The only digital data available on Geo-Portal at the moment are cadastral data. The base map data can only be downloaded from Geo-Portal as raster data. The current Geo-Portal users are classified into general users and professional users working in the public sector and different restrictions on the use of Geo-Portal functions apply to the two groups. These facts are considered as potential hindrances to the utilization of geo-spatial data.

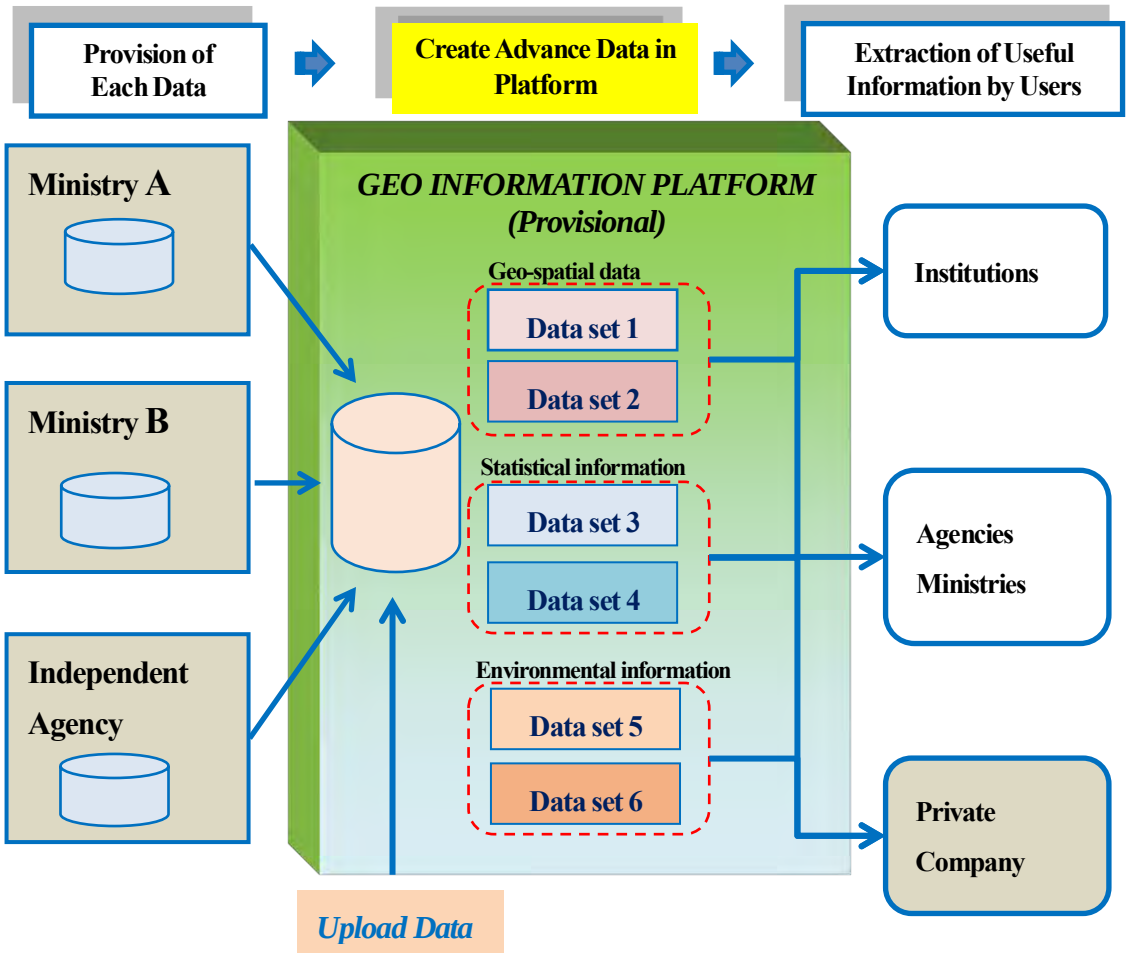

Figure 4-11 Provision of Information Appropriate for Intended Purpose from Platform Integrated in Data Center

[2] Reinforcement of Cooperation between KCA and MPA for the Realization of E-Government Function – Through the Geo-Information Platform –

In MPA, DeGAP was restructured into the Agency for Information Society (AIS) in January 2014 as stipulated in a new law.

AIS considers that the "Geo-Information Platform" proposed by the JICA (Project Team) is an important component for the realization of E-Government because it can play an important role in the actual operation of E-Government. A new data center, "State Data Electric Center," was established in MPA with assistance from the World Bank. MPA has a plan to construct a system in which all the data owned and created by all the national institutions are stored in this data center and users can share and utilize all the digitized data stored in the center for their needs.

However, as the server with which KCA provides data is not located in MPA at present, MPA considers it necessary to relocate the data server of KCA to the new data center established in MPA. MPA is also

considering a plan to develop a platform for the utilization of geo-spatial information by a wide variety of users by developing a map module.

It is recommendable to establish an organic mutual relationship between MPA and KCA shown in Figure 4-12 in order to accommodate those plans of MPA.

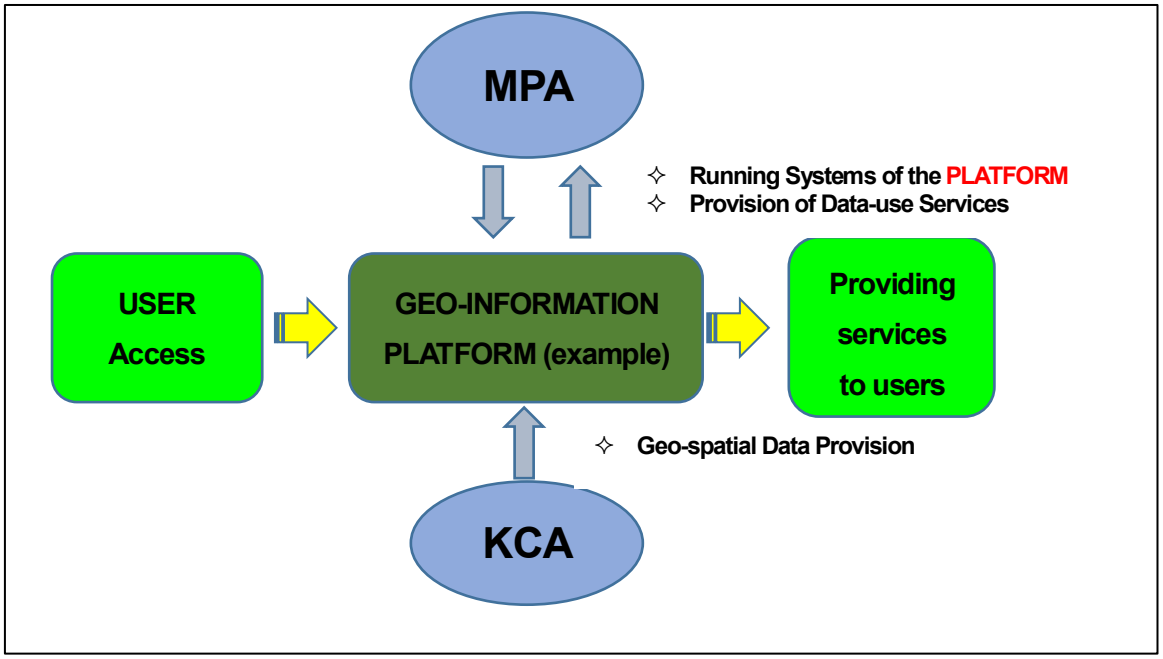

Figure 4-12 Schematic Diagram of Conversion of Geo-spatial Data of KCA to Open Data for Promotion of E-Government

[3] Implementation of Organized Promotion Activities by the Ministries and Institutions involved in NSII

1) Establishment of the Open Data Utilization Council

The Inter-ministerial Coordination Council (tentative name) shall be established (with the members of the "Working Group" established within the NSII Council as its core members). The members of the council shall have regular discussion and consultation on studies on released data, selection of functions, rules for and methods of data utilization, legal matters including copyright issues and needs surveys on the above-mentioned platform.

2) Establishment of an Organization to Promote the Use of Geo-spatial Data

In order to promote expansion of the data utilization in various scenes after the completion of this Project, geographic data users (including government ministries and agencies responsible for planning and administration, independent agencies, universities and research institutions, mining companies and foreign corporations associated with them, private surveyors and NGOs) shall, with the establishment "the Organization to Promote the Use of Geo-spatial Data (provisional)" in mind, have regular discussions with

data providing organizations on details of the activities of the organizations, improvement of their services and creation of a system for the data utilization and take lead in creation of consensus among the personnel and organizations concerned.

3) Implementation of the Training for Data Users

Seminars and training courses to improve and promote the use of and create awareness to the technologies for the data utilization shall be held on a regular basis to expand the user base and promote international exchange. It is ideal that the GIS-related departments in KCA which planned and provided the training program in the Geo-spatial Data Utilization Working Group shall take lead in the implementation of this training/workshop.

4 . 5. Conclusion

The measures to be formulated, systems to be developed and activities to be taken to promote the utilization of and improve the awareness to the new geo-spatial data mentioned above are summarized as follows.

[Expansion of the User Base]

At present, the utilization of geo-spatial data is limited mostly in the planning and administrative departments of relevant governmental organizations including ministries and agencies. Therefore, efforts shall be made to expand the user base of the geo-spatial data administered by KCA. In practice, systems shall be developed, regulations shall be eased and the types of data available for downloading shall be increased in order to encourage private companies, foreign aid organizations, general users and researchers to use the geo-spatial data of KCA.

[Promotion of the Open Data Movement]

Domestic guidelines for the promotion of the conversion of geo-spatial data into open data, which has been carried out in many countries including Japan, shall be developed.

[Review of the Internal Regulations on Data Utilization and Preparation of New Regulations]

At present, certain types of KCA's products cannot be downloaded. There are restrictions which prevent secondary use of data, such as prohibition of unauthorized reproduction of data. Therefore, KCA is required to modernize the user policies with review of the internal regulations and easing of restrictions in line with the international standards.

[Gathering of the Stakeholders]

Enactment of the NSII Law is expected in very near future. After the enactment, technical exchange among the stakeholders interested in geo-spatial information including KCA and discussion on proposals submitted by them are expected to be held in the regular meetings of "the Inter-organizational Working Group on Data Utilization" provided in the NSII Law and in meetings of the sub-working groups. It is advisable to have gatherings of the stakeholders for the technical exchange and the discussion as frequently as possible.

[Establishment of a Support System on the Use of Data Utilization Technologies]

It is also considered necessary for KCA to take lead in supporting active data utilization by users in the general public by implementing technical training courses on a regular basis on such subjects as methods for the utilization of geo-spatial data and advanced utilization of the data in GIS. As the output data of the Project are to be made publicly available on Geo-Portal, KCA should consider offering workshops and other training opportunities on effective use of the data, particularly for NGOs and private researchers.

Memorandum

28th – October – 2013

Japan International Cooperation Agency Study Team for "Human Resource Development on Geo-Spatial Information of Kosovo in Republic of Kosovo" (hereinafter referred to as "the JICA Study Team"), and Kosovo Cadastral Agency (hereinafter referred to as "KCA") held a series of meetings concerning technical matters at KCA office.

The following matters have been agreed upon between KCA and the JICA Study Team.

1. The survey standards

The Geodetic datum	: EUREF89 (ETRS89)
The reference ellipsoid	: GRS-80 a= 6378137.00 f=1/298.257222101
The projection system	: Transverse Mercator
The coordinate system	: Central Meridian of Origin is 21° 00' East of Greenwich Zone width: 3° 0` 00`` Latitude of Origin is Equator Scale Factor at origin is 0.9999 False Y= 7500000.00m False X= 0.00m Unit of measurement is Meter.
The standard height	: The standard of height is based on the mean sea level of the Adriatic Sea.

Avni Rrustemi
Project Manager
Kosovo Cadastral Agency
(KCA)
Republic of Kosovo

杉田 明弘

Akihiro Sugita
Team Leader
JICA Study Team
Japan International Cooperation Agency
(JICA)

MINUTES OF MEETING
ON
THE INCEPTION REPORT OF THE POJECT
FOR
HUMAN RESOURCES DEVELOPMENT PROJECT
ON GEO-SPATIAL INFORMATION OF KOSOVO

AGREED UPON BETWEEN

KOSOVO CADASTRAL AGENCY (KCA)
AND
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

Pristina

15th November, 2013

Dr. MURAT MEHA
Chief Exective Officer

KOSOVO CADASTRAL AGENCY

Mr. Akihiro SUGITA
Project Manager/Technology Transfer
(Human Resources Development) Planning

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

The JICA Project Team (hereinafter referred to as "the Team") headed by Mr. Akihiro SUGITA visited Kosovo from 23 October, 2013 in order to carry out Project for Human Resources Development Project on Geo-Spatial Information of Kosovo (hereinafter referred to as" the Project"). The Team had an occasion for the meetings to explain the project details based on the Inception Report of the Project to the staff of KCA. As a result of discussions held after the explanation, the Inception Report was accepted by KCA. The points we discussed and agreed on are as follows;
The attendant list is attached in Appendix-1.

1. Acceptance of the Inception Report

KCA received ten (10) sets of Inception Report in advance for the discussion of Inception Report from the Team. The Team explained the crucial issues shown hereunder that should be taken into account for successful implementation of the Project. KCA understood the points that are stressed in the presentation of the Inception Report and agreed to the all.

1. Highlighting of overall objectives;
2. The importance of skills for creating a medium scale topographic map (1/25000);
3. Encouraging wide utilization by data dissemination;
4. The methodology to be used during project implementation;
5. Importance of Technology Transfer;
6. The need of organizing a Working Group;
7. Involving local ministries, agencies, universities, institutions etc. in the seminar
8. Rigorous selection of the counterpart participants.

2. Undertaking matter

The Team confirmed the followings as undertaking matter of KCA.

(1) To provide counterpart personnel from KCA to be involved in the Technology Transfer.
(2) To provide necessary existing topographic maps, digital aerial photographic data, results of aerial triangulation and observation data of ground control points for the Project area.
(3) To provide all necessary existing data for mapping such as boundary data and whatsoever to be needed after a series of discussion on map symbols.

3. Set up of the Working Group

Both sides agreed to launch a Working Group comprising of the members of the institutions over the ministries, and agencies for the purpose of facilitating data dissemination and developing wide spread utilization of the data. KCA promised to select appropriate personnel as the members from the above organizations.

4. Holding the first seminar

KCA and The Team decided that the first seminar will be held on 8th November, 2013. KCA accepted to make an announcement to call for attendance from all parts of Kosovo.

The seminar was held on 8th November at the conference room of Sirius Hotel. There were 48 participants including mass media. Seminar program is attached in Appendix-2 and attendants list is attached in Appendix-3. All agenda programmed in advance were smoothly raised and presented to the participants by key speakers, and then active discussions the topic were made through the questions from the flour, that are shown in Apendix-4.

5. Principle of contracting out

As for the contractor who is eligible to be invited to tender for the contract, the Team explained the basic policy and principle of tender invitation citing that only private sector has a right to become a contractor.

KCA admitted its rule for putting the field surveys to contracting.

6. Tender invitation

The Team explained that the tender invitation should be made to all eligible registered consultancies by KCA under the name of the Team by the time of next session starting January, 2014. KCA understood that qualified company as a contractor would be chosen from among bidders to the tender taking the contents of their proposals into consideration. The Team will call for the tender invitation to the followings companies which are selected by KCA.

- CADCOM sh.p.k
- GM Architecture
- Consulting EA

7. Map sheet size and its numbering

KCA wants to harmonize concerning map sheets size and numbering in the international standard or neighboring countries from existing one.

KCA promised that concerning numbering and name of each map sheet will be decided and provide them to the Team.

8. Installation of equipment and software for technology transfer

The Team explained concerning the equipment and software which will be installed in the Project.

KCA strongly requested the followings regarding the equipment and software.

- Concerning software for the Photogrammetric systems, Leica make in preferable.
- Concerning GIS software ESRI make (Arc GIS) is preferable.

9. Request from KCA

9.1 KCA showed the desire of training in Japan so that they can learn administration systems, ordering systems, a scheme of capacity development system and so on at the related organizations in Japan.

The Team promised to convey their request to JICA.

9.2 KCA requested the team to attend the donor meeting from the Team which will be held on March and October, 2014 in Pristina.

The Team answered that it will be conveyed this to JICA.

Appendix 1

Attendant list of discussion of Inception Report

KCA

Dr. Murat MEHA	Chief Executive Officer
Mr. Muzafer CAKA	Head of Project Coordination Office
Mr. Avni RRUSTEMI	GIS and Mapping Expert
Mr. Menor KOSUMI	Measurement Expert
Mr. Amir Recica	GIS Expert
Mr. Esat XANI	GIS Expert

JICA Project Team

Mr. Akihiro SUGITA	Project Manager/Technology Transfer (Human Resources Development) Planning
Mr. Hisashi MORI	Collaboration with Relevant Agencies/ Promotion of Utilization
Mr. Akira NISHIMURA	Discussion on Specification
Mr. Kensuke KIMURA	Project Coordination/ Assistance to Field Verification and Completion
Ms.Lorika HISARI	Interpreter

Appendix - 2

PASCO
World's Leading Geospatial Group

KOKUSAI KOGYO CO., LTD.

Japan/Kosovo/Seminar on Human Resource Development Project on Geo-Spatial Information of Kosovo

It is with pleasure to invite you to the seminar of JICA (Japan International Cooperation Agency)-KCA (Kosovo Cadastral Agency) Project

Japoni/Kosovë/Seminar për Projektin e Zhvillimit të Burimeve Njerëzore mbi Informatat Gjeo-Hapësinore të Kosovës

Kemi kënaqesine t'ju ftojmë në seminarin për projektin e JAICA-s (Agjencioni Japonez per Zhvillim Ndërkombëtar) dhe AKK-së (Agjencioni Kadastral i Kosovës)

PROGRAMME

Date: 8 November 2013
Venue: Hotel SIRIUS, Pristina, Kosovo

9:30 Registration of Participants

10:00 Opening and Welcome address
- Deputy Minister of Ministry of Environment and Spatial Planning
- Dr. Murat MEHA
  Chief Executive Office of KCA
- Ms. Kanako TERUI
  ODA Advisor to Ministry of European Integration, JICA

10:30 Coffee Break

PROGRAMI

Data: 8 nëntor 2013
Vendi: Hotel SIRIUS, Prishtinë, Kosovë

9:30 Regjistrimi i pjesëmarrësve

10:00 Hapja e seminarit dhe fjalët hyrëse
- Zëvendësministri i Mjedisit dhe Planifikimit Hapësinor
- Dr. Murat MEHA
  Zyra e Kryeshefit Ekzekutiv të AKK-së
- Znj. Kanako TERUI
  Eksperte e JICA-s dhe Këshilltare e ODA-s në Ministrinë e Integrimeve Europiane

10:30 Pauza e kafës

10:50 Presentation of the Project

- Outline of the Project:
  Mr. Akihiro SUGITA (JICA Project Team)
- Vision of Data utilization and dissemination:
  Mr. Hisashi MORI (JICA Project Team)
- History and current situation of Topographic Map in Kosovo:
  Mr. Avni Rstustemi (KCA)

12:00 Closing Remarks

12:20 Lunch

10:50 Prezentimi i projektit

- Përmbajtja e projektit:
  Mr. Akihiro SUGITA (Ekipi i JAICA-s për projektin)
- Vizioni për shfrytëzimin dhe shpërndarjen e të dhënave:
  Mr. Hisashi MORI (Ekipi i JAICA-s për projektin)
- Historia dhe situata ekzistuese e Hartës Topografike në Kosovë:
  Z. Avni Rrustemi (AKK)

12:00 Fjalët përmbyllëse

12:20 Dreka

Republika e Kosovës

Republika Kosova-Republic of Kosovo

Qeveria e Kosovës –Vlada Kosova-Government of Kosovo

Ministria e Mjedisit dhe Planifikimit Hapësinor /Ministarstvo Sredine i Prostornog Planiranja/Ministry of Environment and Spatial Planning

Agjencia Kadastrale e Kosovës/Katastarska Agencija Kosova/Kosovo Cadastral Agency

Seminar on Human Resources Development Project on Geo-Spatial Information of KOSOVO

8.11.2013

Appendix - 3

Nr. No.	Emri mbiemri Name Surname	Posti Title	Institucioni Institution	Adresa elektronike e-mail address	Nënshkrimi Signature
1	Ardes Gashi	Z.L për zhvillim institucional	MIE		
2	XHEVDET KASTRATI	Autori i Hartës KPMM	KPMM		
3	RAMIZ KRASNIQI	AKITAR BORDI	KPMM		
4	Vjosa Stafaveci	Zyrtare për gjeodezi	K.K. Prishtinë		
5	KRËSHNIK RIZA	TC	JICA		
6	Bajram Kajtazolli	Udhëheqës i SIM	MMPH/AMMK		
7	Rizah Mumeli	GIS spec.	MMPH/AMMK	.net	
8	ZANA LLONÇARI	ARKITEKTE PËR REST	MKRS/DTK	.net	
9	ZANA RAMA	Arkitekte	MKRS/DTK	.net	
10	HAMDI RESTELICA	Gjeodet	KADASTRALI PRISHTINËS		
11	MENTOR KOSUMI	Gjeodet	AKK		
12	ASLAN GASHI	GJEODET	AKK		

Nr. No.	Emri mbiemri Name Surname	Posti Title	Institucioni Institution	Adresa elektronike e-mail address	Nënshkrimi Signature
13	AMIR REGICA	EKSPERT i GIS.	AKK		[signature]
14	MENTOR XHEMAJLI	udhëheqës. tekn.? [illegible]	AKK		[signature]
15	ABDULLAH TEJECI	[illegible] Kadastr	DGJK - Prizren		[signature]
16	DUKAGJIN BERISHA	GJEODET	D.GJ.K. PRIZREN		[signature]
17	Gafurr Vuthi	HRDE	AKK		[signature]
18	Besnik Veselaj	GIS Expert	AKK		[signature]
19	Esat Ymeri	GIS EXPERT	AKK		[signature]
20	Fadil Shehu	GIS Expert	NH. Ilir Lepaja?		[signature]
21	Lulzim Seferaj	ZYRTAR PËR MARKETING	AKK		[signature]
22	Fidaim Sahiti	Kryeshef ekzekutiv	Agjencioni Gjeologjik së Kosovës? [illegible]		[signature]
23	Bardha Shkurtaj	Gazetare	RTK - Radio		[signature]
24	MUZAFER ÇAKA	KOORDINATOR - ZKP	AKK		[signature]

Nr. No.	Emri mbiemri Name Surname	Posti Title	Institucioni Institution	Adresa elektronike e-mail address	Nënshkrimi Signature
25	RESHAT MUHAXHI	GIS	AKK		
26	AVNI PRUTEKI	GIS	AKK		
27	QAZIM KRASNIQI	AKK	AKK		
28	HATEM ÇERKINI	Director	[illegible]		
29	AVNI AHMETI	DREJTOR	AKK		
30	Esat Krasniqi	Z.K.K.F Gjakovë	Zyrtar		
31	Emrush Pajaziti	GJEOMETER	K.K.F. Ferizaj		
32	Ajet Muriqi	Jurist	KKF Ferizaj		
33	PATRIOT HASANI	GIS	AKK		
34	ARMEND ZHEGROVA	Project Coordinator	GIZ		

Nr. No.	Emri mbiemri Name Surname	Posti Title	Institucioni Institution	Adresa elektronike e-mail address	Nënshkrimi Signature
35	Adile Buja	DBA			
36	Nenon Benisha	UDH INJËSIS PËR INTEG. SIS. SOF			
37	Denis Pitarua	ARK - PR OFFICE			
38	Fatos Aumetaj	AKK - Exc. KK			
39	Bashkim Shaqiri	AKK - Shefi sektorit			
40	Sefedin Rushi	M.M.PH: zv. Ministri			
41	Murat Meha	CEO of KCA			
42	Hysen Pireva	Arc			
43	SUGITA AKIHIRO	Project Manager			
44	MORI Hisashi	Supervisor of data-use			

Nr. No.	Emri mbiemri Name Surname	Posti Title	Institucioni Institution	Adresa elektronike e-mail address	Nënshkrimi Signature
45	Kensuke KIMURA	Project Coordinator	JICA PROJECT TEAM		
46	[illegible]	Dipl. Ing. Arch. (NICE PUCKA)	JICA PROJECT TEAM		
47					
48					
49					
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Appendix -4

"Human Resource Development Project on Geo-Spatial Information of Kosovo"

JICA – KCA

Seminar, 8 Nov 2013

Q&A session

Q1: Kosovo Geological Institute, Ministry of Economic Development

Is there a legal framework that regulates the responsibilities (responsible institutions) for creation of the geo-spatial information, except KCA who has now taken the responsibility for drafting, establishment or organization of the NSDI?

A1: Kosovo Cadastral Agency (KCA), Ministry of Environment and Spatial Planning (MESP)

Mr. Murat Meha,

The Law on the National Geo-Spatial Data is under the drafting process, sponsored by KCA and MESP. This Law will determine the model of cooperation between Kosovo institutions and all producers/creators of the geo-spatial data. These data will not only be produced but there will be an obligation to upload them to the main geo-portal, which will then be used by all, and there will be a possibility to update them as well. That's why KCA has started with so called a pre-campaign by contacting other institutions as well for the utilization and launching of the geo-spatial data that they have at their disposal.

So, this will be functional by a Law; the proposal for this Law is done and its drafting was supported by the international and national experts. We expect it to be approved soon but we don't know the exact date of the approval by the Kosovo Parliament.

Q2: Institute of Spatial Planning, Ministry of Environment and Spatial Planning (MESP)

From the presentations I have seen that this project will also include cooperation with other institutions except with the KCA, GIS and mapping experts that work in other institutions, and that trainings will be organized during this project. I would like to know how it is foreseen that other institutions are involved, is it only on information exchange, will they also be part of the work in drafting/producing the map or will they also benefit from the trainings that will be organized during this project?

A2: JICA Study Team

Mr. Hisashi Mori

Thank you for your question! Regarding the opportunity of being trained in order to get to learn about the comprehensive use of the geo-spatial data, we will organize a meeting in order to set up a

Working Group and will encourage you to participate in the meeting to discuss and raise the issues that you address. We expect to have a solution after the discussion, with a help of KCA experts in charge of GIS and the support of the JICA Study Team. For this purpose we asked you to fill out a Questionnaire to get some ideas for how to best organize and regarding the programme of this Working Group in order for you to have an opportunity to train yourself under our scheme.

Q3: Independent Commission for Mines and Minerals (ICMM)

Mines Engineer

I want to thank you first; it was a very interesting and important presentation. In the first presentation it was stated that a few types of maps will be produced. But, I had no opportunity to listen if a map on Minerals Industry will be produced! I believe that the GIS section that exists in the ICMM can well contribute to this project.

A3: JICA Study Team

Mr. Akihiro Sugita

Mining Map is actually out of our project because our project aim is to develop a Topographic Map and for the development of the Mining Map we need another process. However, we can advise later in the project period, on how to create a Mining Map.

Comment: KCA, MESP

Mr. Murat Meha,

Considering that this is a first seminar, and raising of different questions from different colleagues and various fields shows that we are now aware of the information system of national spatial data and it has started to take place all over within our institutions including the experts.

So, the fact that we are all here today and together is a sign of a good start, where a coordination and cooperation of all these institutions is foreseen, but all this would not have been successful without a mutual communication. This communication is happening; this communication has started among us considering that we also have the support of the Japanese experts.

We know what the topographic map presents and it will be a very good base for other maps, such as geological maps, mining maps, and other various thematic maps. The topographic base is of a high importance, for example today for the geological or the mining map is used the old topographic base map, not up to date, and in the areas where the terrain has changed due to road works, ground digging or filling, we still present them in the geological and mine maps as an untouched terrain. The geo- information is gradually getting completed and through the geo-portal every citizen will have an access to. This will be a very good base for Kosovo and its economic development.

So, I am thankful for your engagement through the questions, there will be more work to do in the future. The work will not be finished only with this topographic map, after the topographic map as a base of 1:25,000 other thematic maps will be produced including the 3D presentations, for the overall use of citizens either inside or outside of the country.

MINUTES OF TECHNICAL MEETING

ON

THE POJECT

FOR

HUMAN RESOURCES DEVELOPMENT PROJECT

ON GEO-SPATIAL INFORMATION OF KOSOVO

AGREED UPON BETWEEN

KOSOVO CADASTRAL AGENCY (KCA)

AND

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

Pristina

4th February, 2014

Dr. MURAT MEHA
Chief Exective Officer

KOSOVO CADASTRAL AGENCY

Mr. Akihiro SUGITA
Project Manager/Technology Transfer
(Human Resources Development) Planning

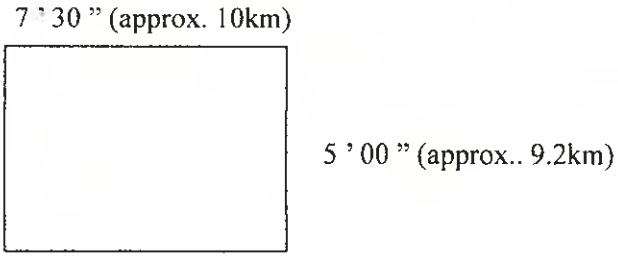
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

The JICA Project Team (hereinafter referred to as "the Team") headed by Mr. Akihiro SUGITA visited Kosovo from 21 January, 2014 in order to carry out Project for Human Resources Development Project on Geo-Spatial Information of Kosovo (hereinafter referred to as" the Project"). The Team and Kosovo Cadastral Agency (hereinafter referred to as "KCA") held a series of meetings concerning technical matters at KCA office.

The following matters have been agreed upon between KCA and the Team.

1. 1:25,000 topographic map sheet size

Map sheet size is changed as followings in accordance with a strong request by KCA;



Appendix 1 shows map sheet index in old system which is complied with Yugoslavia era and in new system which is complied with International rule.

2. The map sheet numbering system

The numbering system to be applied for the topographic map scale 1:25,000 is referred in the attached document. (See Appendix 2)

3. The map sheet name

The map sheet name to be applied for the topographic map scale 1:25,000 is referred in the attached document. (See Appendix 3)

4. The Project area

The Team and KCA had several discussions about new project area because the map sheet size was changed. The Team and KCA agreed on the new project area that is shown in Appendix 4. Area is approximately 9862.69 sq km. A previous project area is shown in Appendix 5. Appendix 6 shows area of each map sheet.

Besides, KCA strongly requested to the Team that area to be created data extend to 500m out from border because of consideration of data matching among neighboring countries. The area of outside border is approximately 243.31 sq km. The data of neighboring countries shall be prepared by KCA, and it shall be given to the Team by the end of July 2014.

The Team and KCA agreed that area to be created data is totally approximately ten thousands one hundred and six (10,106) sq km. (See Appendix 7)

5. Contracting Field Survey Work

The Team conducted bidding for subcontracting to private company in order to carry out the Field Survey. CADCOM sh.p.k was awarded the contractor to perform the task of Field Survey eventually.

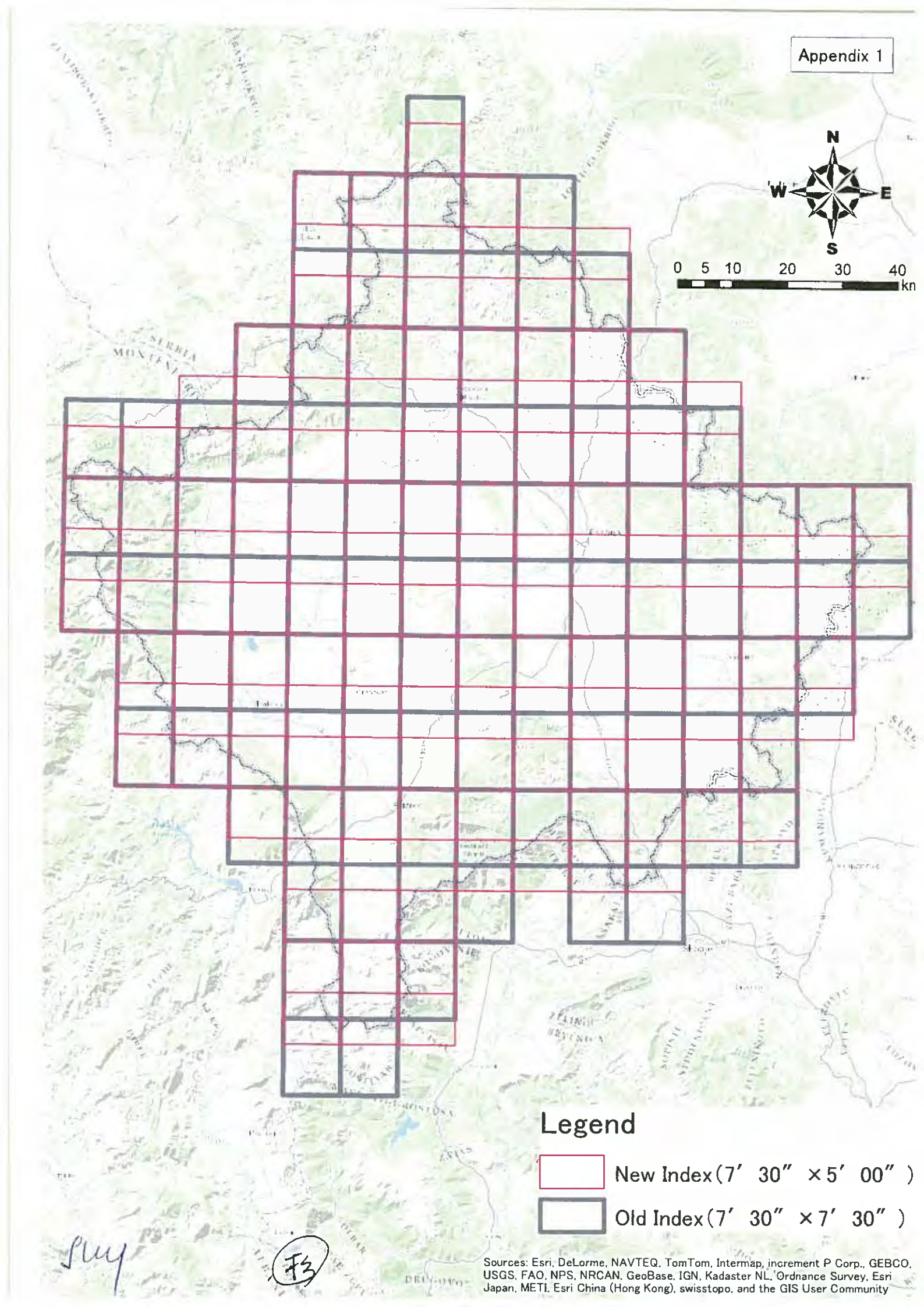
In the course of the bidding, the Team asked KCA to be a witness for this procedure and duly decided the above company in justice. The Team notified the result of the bidding to KCA for official acknowledgement by the counterpart.

6. Training in Japan

KCA strongly requested to the Team for visitation and training in Japan in 2014 to learn administration system of geo-spatial data, situation of Continuously Operating Reference Station (CORS) by Geospatial Information Authority of Japan, dissemination activities of topographic maps and relevant geo-spatial data in Japan and other which KCA can rarely experience through the Project in Kosovo.

The Team promised to convey the message to JICA headquarters.

Appendix 1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Old Index (7′ 30″ × 7′ 30″)
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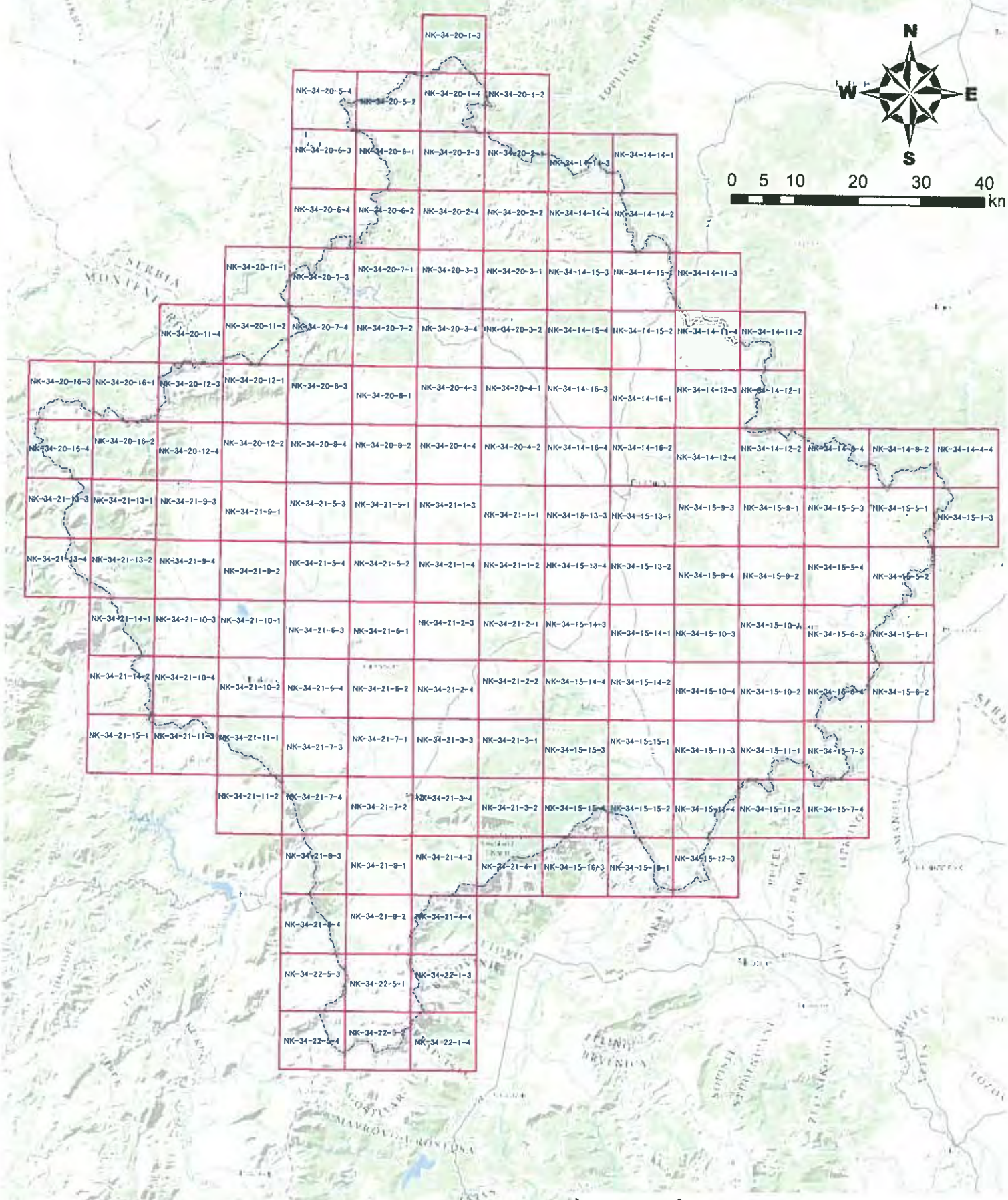
Appendix 2



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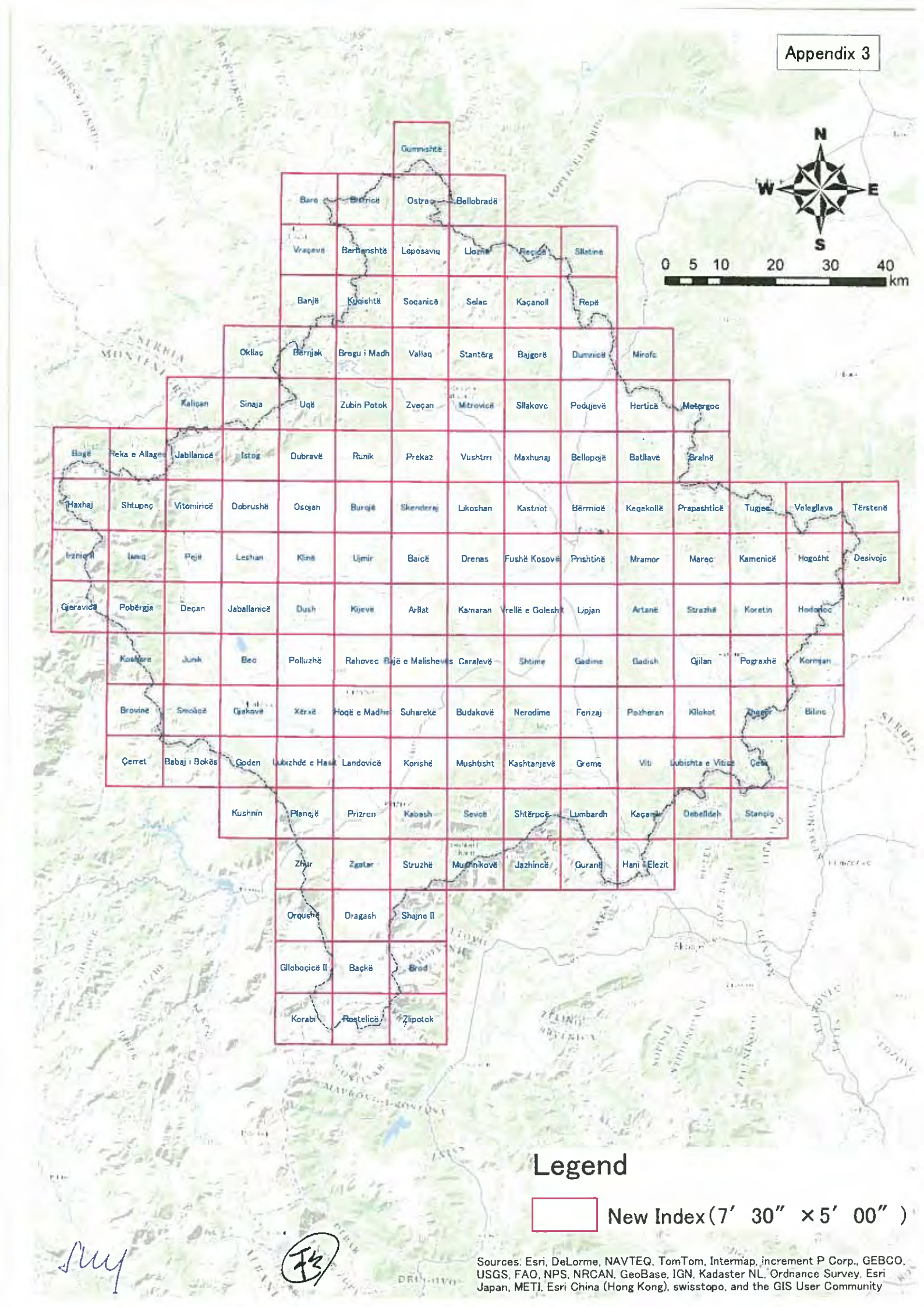
New Index (7′ 30″ × 5′ 00″)

Sources: Esri, DeLorme, NAVTEQ, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, and the GIS User Community

Appendix 3

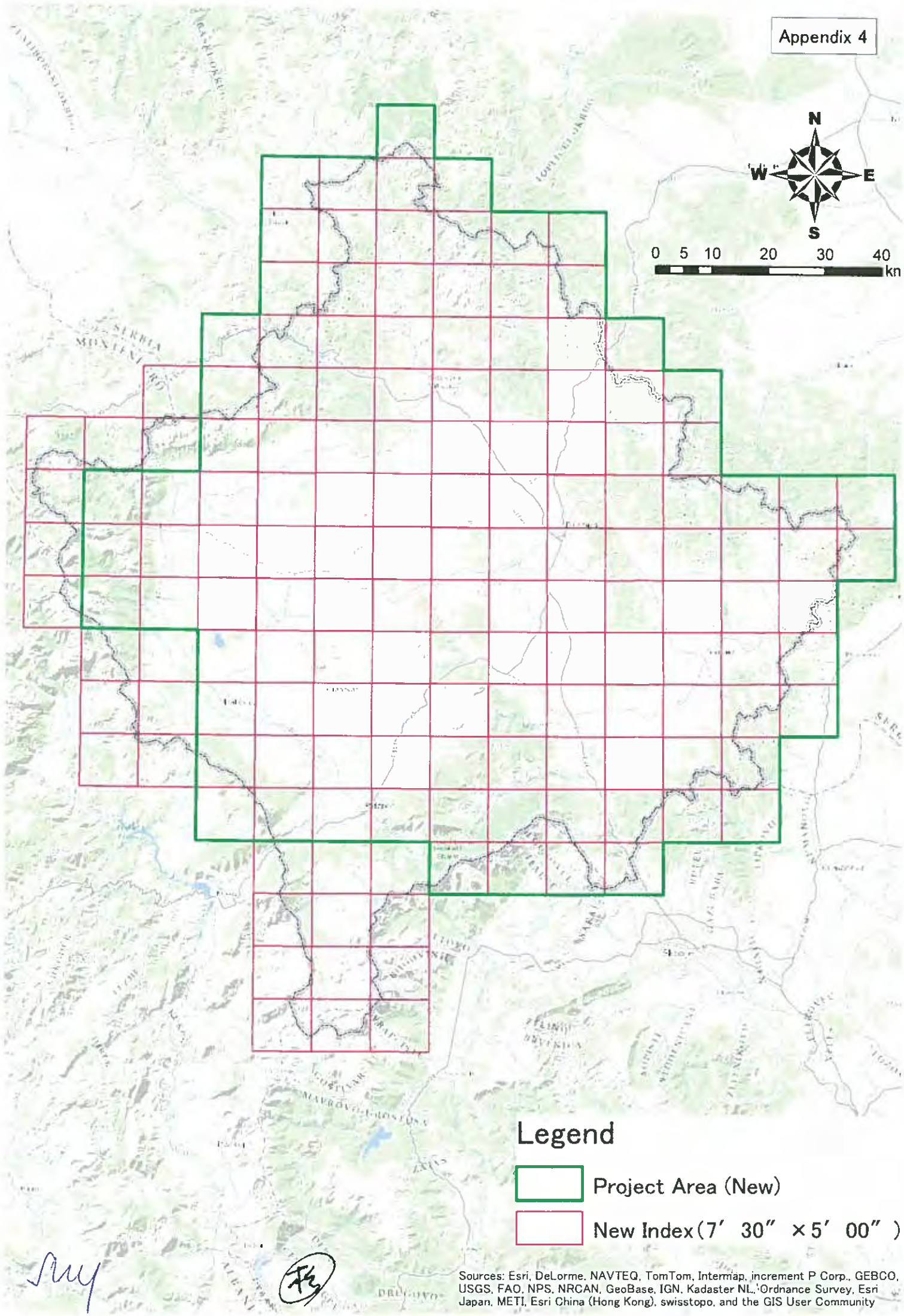


Legend

New Index (7′ 30″ × 5′ 00″)

Sources: Esri, DeLorme, NAVTEQ, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, and the GIS User Community

Appendix 4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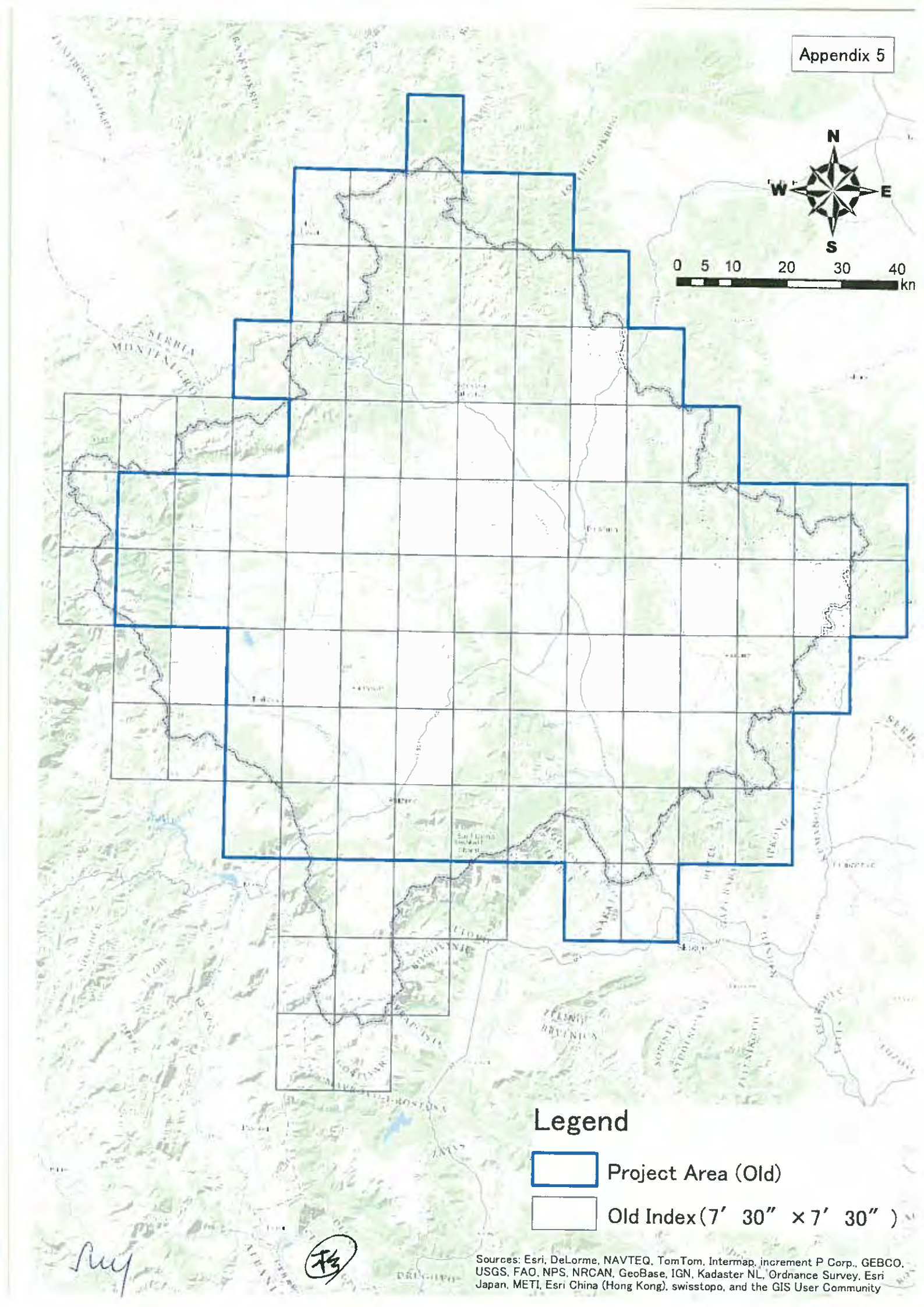
Project Area (New)
New Index (7′ 30″ × 5′ 00″)
Sources: Esri, DeLorme, NAVTEQ, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, and the GIS User Community

Appendix 5

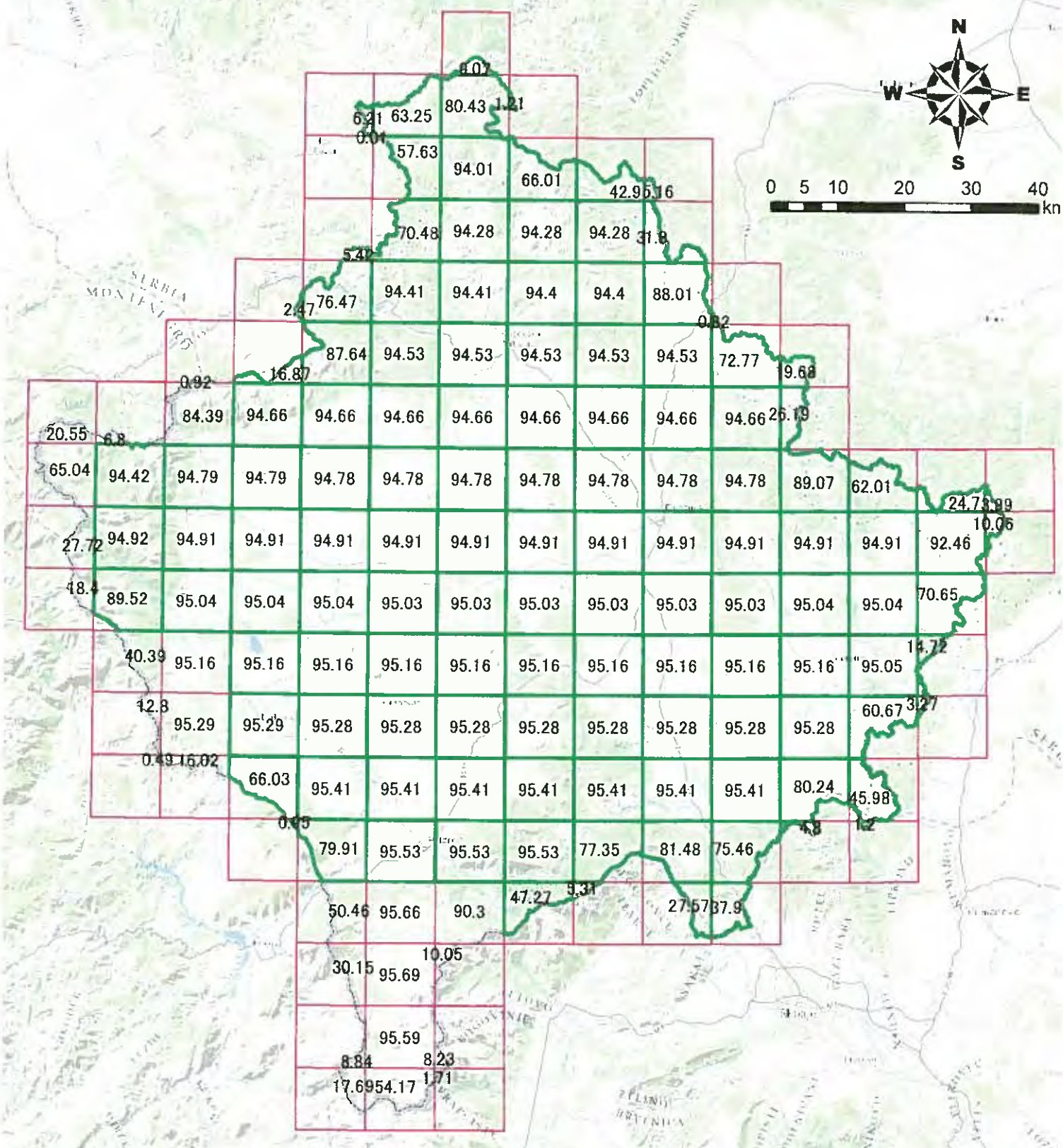


Legend

Project Area (Old)

Old Index (7′ 30″ × 7′ 30″)

Appendix 6



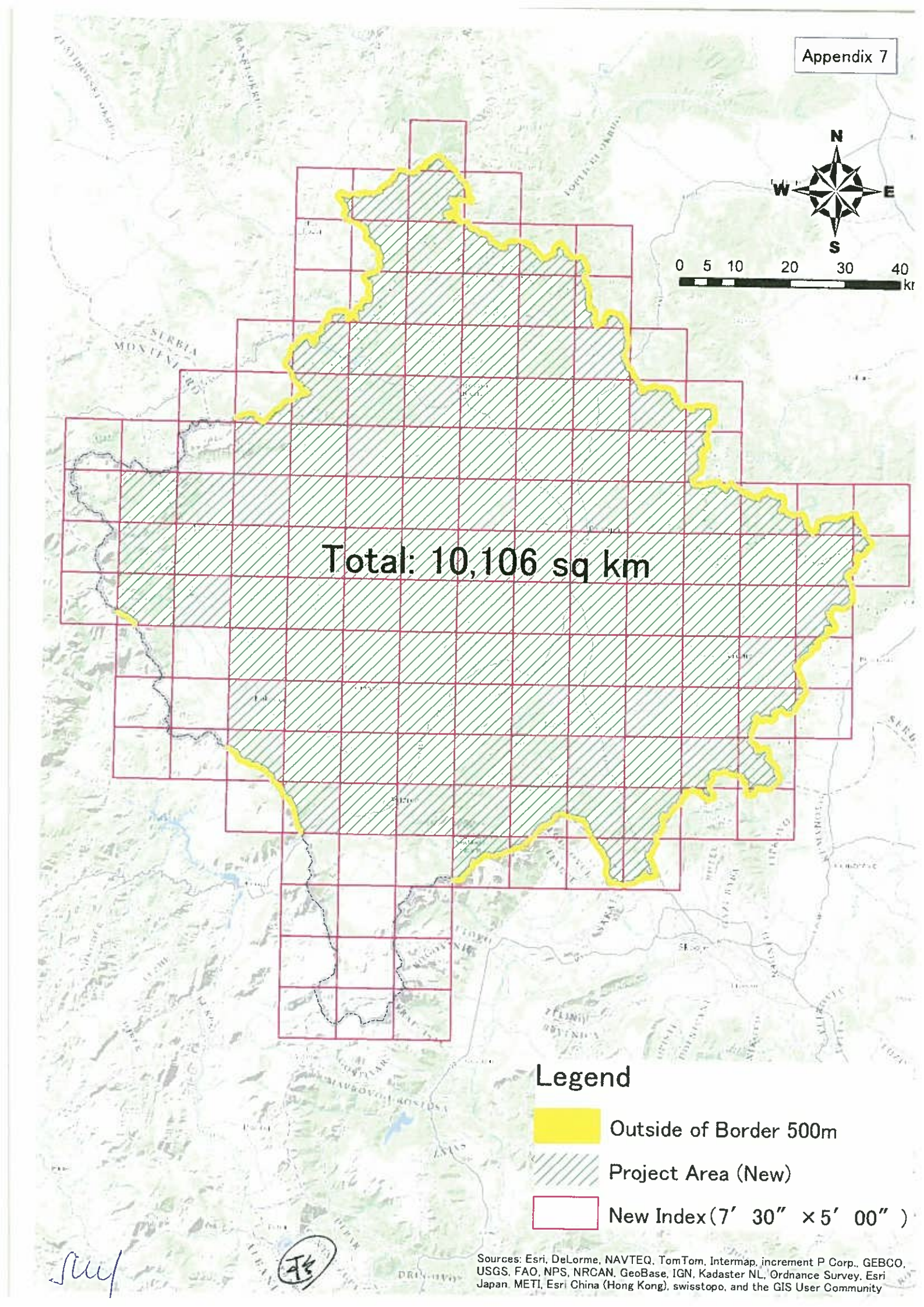
The reason why there is variation of the area in full one map sheet is because of figure of the earth. All map sheets is divided by equal interval (7′ 30″ ×5′ 00″) in geographic coordinate system (Latitude and Longitude). However, the quadrangle of map sheet has distortion in the high latitude because the figure of earth is ellipsoid, and as a consequence the area of each quadrangle will vary.
This area is calculated in KOSVOREF map projection.

Legend

Project Area (New)

New Index (7′ 30″ ×5′ 00″)

Appendix 7


N
W
E
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0 5 10 20 30 40
Total: 10,106 sq km
Legend
Outside of Border 500m
Project Area (New)
New Index (7′ 30″ ×5′ 00″)
Sources: Esri, DeLorme, NAVTEQ, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, and the GIS User Community

MINUTES OF MEETING
ON
THE PROGRESS REPORT OF THE POJECT
FOR
HUMAN RESOURCES DEVELOPMENT PROJECT
ON GEO-SPATIAL INFORMATION OF KOSOVO

AGREED UPON BETWEEN

KOSOVO CADASTRAL AGENCY (KCA)
AND
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

Pristina

12th June, 2014

Dr. MURAT MEHA
Chief Exective Officer
KOSOVO CADASTRAL AGENCY

Mr. Akihiro SUGITA
Project Manager/Technology Transfer
(Human Resources Development) Planning

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

The JICA Project Team (hereinafter referred to as "the Team") headed by Mr. Akihiro SUGITA visited Kosovo from 29 May, 2014 in order to carry out Project for Human Resources Development Project on Geo-Spatial Information of Kosovo (hereinafter referred to as" the Project"). The Team had an occasion for the meetings to explain the project details based on the Progress Report of the Project to the staff of KCA. As a result of discussions held after the explanation, the Progress Report was accepted by KCA. The points we discussed and agreed on are as follows;
The attendant list is attached in Appendix-1.

1. Acceptance of the Progress Report

KCA received ten (10) sets of Progress Report in advance for the discussion of Progress Report from the Team. The Team explained the crucial issues shown hereunder that should be taken into account for successful implementation of the Project. KCA understood the points that are stressed in the presentation of the Progress Report and agreed to the all.

1. Progress and schedule of the Project
2. Schedule and contents of Technology Transfer
3. The methodology to be used during project implementation
4. Activities of Working Group

2. Undertaking matter

The Team confirmed the followings as undertaking matter of KCA.

(1) To provide counterpart personnel from KCA to be involved in the Technology Transfer.
(2) To exempt equipment for Technology Transfer which JICA and the Team procure from VAT (Value-Added Tax).
(3) To provide office space for the Team even under renovation of KCA's building.

3. Participants of Technology Transfer

Both sides reconfirmed that the participants of the technology transfer assigned by KCA shall participate in all items of the technology transfer unless they have compelling and justifiable reasons not to.

4. Data format of topographic data

Both sides agreed to be able to determine the data format of Geo-spatial data by reference to neighboring countries such as Macedonia and Montenegro that JICA mapping project was conducted.

Appendix 1

Attendant list of discussion of Progress Report

KCA

Dr. Murat MEHA	Chief Executive Officer
Mr. Muzafer CAKA	Head of Project Coordination Office
Mr. Avni RRUSTEMI	GIS and Mapping Expert
Mr. Mentor KOSUMI	Measurement Expert

JICA Project Team

Mr. Akihiro SUGITA	Project Manager/Technology Transfer (Human Resources Development) Planning
Mr. Akiro OTA	Aerial Triangulation / Digital Plotting
Ms.Lorika HISARI	Project Officer/Interpreter

Memorandum

Subject: **Publication of the digital topographic map**
Date: **September 19, 2014**

Japan International Cooperation Agency Project Team for "Human Resource Development on Geo-Spatial Information of Kosovo" (hereinafter referred to as "JICA Project Team"), and Kosovo Cadastral Agency (hereinafter referred to as "KCA") held a series of meetings concerning the following technical matters at the KCA office.

The following matters were agreed upon between the JICA Project Team and KCA:

1. The digital topographic map to be made by the project will be published using the KCA Geo-portal system after the project.

2. KCA will provide disk space in the KCA Geo-portal for the publication of the digital topographic map.

3. The style of publication of the digital topographic map was decided to adopt a style of raster data which will be provided from the JICA Project Team.

4. KCA will upload the digital topographic map to the KCA Geo-portal system through the project with the assistant of the JICA Project Team.
   - Sample upload data will be provided from the JICA Project Team in December of 2014.
   - Final data will be delivered from JICA at the end of the project that may be May or June of 2015.

Murat Meha
Chief Executive Officer
Kosovo Cadastral Agency
Republic of Kosovo

for 千葉 善一

Akihiro Sugita
Team Leader
JICA Study Team

MINUTES OF MEETING
ON
THE INTERIM REPORT OF THE POJECT
FOR
HUMAN RESOURCES DEVELOPMENT PROJECT
ON GEO-SPATIAL INFORMATION OF KOSOVO

AGREED UPON BETWEEN

KOSOVO CADASTRAL AGENCY (KCA)
AND
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

Pristina

18th December, 2014

Dr. Murat MEHA
Chief Exective Officer

KOSOVO CADASTRAL AGENCY

Mr. Akihiro SUGITA
Project Manager/Technology Transfer
(Human Resources Development) Planning

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

The JICA Project Team (hereinafter referred to as "the Team") headed by Mr. Akihiro SUGITA visited Kosovo from 8th December, 2014 in order to carry out the Project for Human Resources Development Project on Geo-Spatial Information of Kosovo (hereinafter referred to as "the Project").

The Team had an occasion for the meetings to explain the project details based on the Interim Report of the Project to the staff of Kosovo Cadastral Agency (hereinafter referred to as "KCA"). As a result of discussions held after the explanation, the Interim Report was accepted by KCA. The points we discussed and agreed on are as follows;

The attendant list is attached in Appendix-1.

1. Acceptance of the Interim Report

KCA received ten (10) sets of Interim Report in advance for the discussion of Interim Report from the Team. The Team explained the crucial issues shown hereunder that should be taken into account for successful implementation of the Project. KCA understood the points that are stressed in the presentation of the Interim Report and agreed to all.

- Progress and schedule of the Project
- Technology Transfer
- Promotion of Data utilization

2. Undertaking matter

The Team confirmed the followings as undertaking matter of KCA.

- To assign counterpart personnel from KCA to be involved in the Technology Transfer.
- To consider regarding participants for the final seminar that shall be held on March 2015.

3. Certificate of Technology Transfer

KCA requested from the Team to issue a certificate for those who participated in the Technology Transfer. The Team answered that certification shall be issued from the Team on March, 2015.

4. Annotation Data for topographic map

The Team requested from KCA to conduct the inspection and correction of the annotation data that will be placed on the topographic map data. KCA answered that they will be finished by the middle of January.

The Team can do nothing but reflect the annotation data from KCA into the topographic map data because the Team should not edit the annotation data. Therefore, if any mistakes of the annotation are found after the project, KCA shall correct them by itself.

5. Sample data of topographic map

KCA requested from the Team to present a sample data of a topographic map . The Team answered that it shall be presented on January.

6. Training in Japan

The Team explained the aim, contents and the schedule of the training in Japan. KCA understands them.

Appendix 1

Attendant list of discussion of Interim Report

KCA

Dr. Murat Meha	Chief Executive Officer
Mr. Muzafer Qaka	Head of Project Coordination Office
Mr. Avni Rrustemi	GIS and Mapping Expert
Mr. Amir Reçica	GIS Expert
Mr. Mentor Kosumi	Measurement Expert

JICA Project Team

Mr. Akihiro Sugita	Project Manager/Technology Transfer (Human Resources Development) Planning
Mr. Kohei Isobe	Digital Compilation
Ms. Lorika Hisari	Project Officer/Interpreter

MINUTES OF MEETING
ON
THE DRAFT FINAL REPORT OF THE POJECT
FOR
HUMAN RESOURCES DEVELOPMENT PROJECT
ON GEO-SPATIAL INFORMATION OF KOSOVO

AGREED UPON BETWEEN

KOSOVO CADASTRAL AGENCY (KCA)
AND
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

Pristina

17th April, 2015

Dr. Murat MEHA	Mr. Akihiro SUGITA
Chief Exective Officer	Project Manager/Technology Transfer
	(Human Resources Development) Planning
KOSOVO CADASTRAL AGENCY	JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

The JICA Project Team (hereinafter referred to as "the Team") headed by Mr. Akihiro SUGITA visited Kosovo from 8th April to 20th April , 2015 in order to carry out the Project for Human Resources Development Project on Geo-Spatial Information of Kosovo (hereinafter referred to as" the Project").

During the assignment in Kosovo, the Team and KCA held the discussion on the Draft Final Report and the second seminar.

The isuues between KCA and the Team are as follows:

1. Explanation of Draft Final Report

The Team submitted to KCA a Draft Final Report elaborating on the whole process of technical works as well as the preferable direction to activate and encourage the data utilization in wider range of users. According to the contents of the report submitted, the Team had an occasion to give counter personnel an explanation on it and answered the questions raised by the KCA as followings;

1) Acceptance of Draft Final Report

KCA accepted for the contents of Draft Final Report which was submitted by the Team.

2) Confirmation matters from the Team to KCA

The Team confirmed the prospect of execution about the remaining area which is out of the Project area.

KCA replied that a budget request for it for next fiscal year already has been submitted to the Ministry of Environment and Spatial Planning (MESP) which is a superior organization of KCA.

The Team confirmed about execrating main user of Geo-Spatial data which created in the Project.

KCA replied that we expected as follows;

Ministry of Environment and Spatial Planning (MESP),
Ministry of Agriculture,
Independent Commission for Mines and Minerals (ICMM),
Ministry of Infrastructure,
Ministry of Education,
Agency of Statistics, and so on.

2. Holding the Second Seminar

KCA and the Team held the second seminar on 15th April, 2015. There were 101 participants

including mass media. Program of the seminar is attached in Appendix-1 and attendants list is attached in Appendix-2. All agenda programmed in advance were smoothly raised and presented to the participants by key speakers, and then active discussions on the topic were made through the questions from the floor, that are shown in Apendix-3.

3. Equipment

KCA created request letter for the donation of the equipment which is prepared by JICA Balkan office and the Team for the Project. KCA handed its original to Mr.Sugita, and he will bring and hand it to JICA Balkan office on 22nd April.

Attendant list

KCA

Dr. MURAT MEHA	CEO of KCA
Mr.Avni RRUSTEMI	GIS & Mapping Expert
Mr.Esat XANI	GIS Expert
Mr.Avni AHMETI	GIS Expert

JICA Project Team

Mr. Akihiro SUGITA	Project Manager / Technical Transfer (Human Resource Development)
Mr. Hisashi MORI	Collaboration with Relevant Agencies / Promotion of Utilization
Mr. Zenichi CHIBA	GIS Structurization / Website Construction
Mr. Kensuke KIMURA	Project Coordination / Assistant to Field Verification and Completion
Ms.Lorika HISARI	Project Officer / Interpreter

Appendix - 1

PASCO
World's Leading Geospatial Group

KOKUSAI KOGYO CO., LTD.

Japan/Kosovo/Seminar on Human Resource Development Project on Geo-Spatial Information of Kosovo	Japoni/Kosovë/Seminar për Projektin e Zhvillimit të Burimeve Njerëzore mbi Informatat Gjeo-Hapësinore të Kosovës
It is our pleasure to invite you to the seminar of JICA (Japan International Cooperation Agency)-KCA (Kosovo Cadastral Agency) Project	Kemi kënaqësinë t'ju ftojmë në seminarin për projektin e JAICA-s (Agjencioni Japonez për Zhvillim Ndërkombëtar) dhe AKK-së (Agjencioni Kadastral i Kosovës)
PROGRAMME	PROGRAMI
Date: 15 April 2015 Venue: Swiss Diamond Hotel, Pristina, Kosovo	Data: 15 prill 2015 Vendi: Hotel Swiss Diamond, Prishtinë, Kosovë
9:30 Registration of Participants	9:30 Regjistrimi i pjesëmarrësve
10:00 Opening and Welcome address • Deputy Minister of Ministry of Environment and Spatial Planning • Chief Executive Office of KCA Dr. Murat Meha • JICA Representative Ms. Kanako Terui	10:00 Hapja dhe fjala hyrëse • Zëvendës Ministri i Ministrisë së Mjedisit dhe Planifikimit Hapësinor • Zyra e Kryeshefit të Ekzekutivit, AKK Dr. Murat Meha • Përfaqësuesja e JAICA-s Znj. Kanako Terui
10:45 Coffee Break	10:45 Pauza e kafës
11:00 **Session 1: Presentation of the Project Results** • Outcomes of the Project Mr. Akihiro Sugita (JICA Project Team)	11:00 **Sesioni 1:Prezantimi i Rezultateve të Projektit** • Rezultatet e Projektit Z. Akihiro Sugita (Ekipi Studimor JICA)

• What KCA got in the Project Dr. Murat Meha & Mr. Avni Rrustemi (KCA)	• Çka përfitoi AKK nga Projekti Dr. Murat Meha dhe Z. Avni Rrustemi (AKK)
12:00 Lunch	12:00 Dreka
13:00 **Session 2: "Utilization Working Group" members on the method and outcome of the utilization case studies utilizing the geo-spatial data of KCA**	13:00 **Sesioni 2: Prezantim nga anëtarët e "Grupit Punues për Shfrytëzimin e të Dhënave Gjeo-Hapësinore" për metodën dhe rezultatin e rasteve studimore duke i shfrytëzuar të dhënat gjeo-hapësinore të AKK-së**
• Objective and Activities through the WG program Mr. Hisashi Mori (JICA Project Team) • Ministry of Culture, Youth and Sports Ms. Drenusha Behluli -Mehmeti • Urban planning for improving infrastructure for tourist facilities Ms. Lorika Hisari	• Objektiva dhe Aktivitetet e programit të Grupit Punues Z. Hisashi Mori (Ekipi Studimor JICA) • Ministria e Kulturës, Rinisë dhe Sportit Znj. Drenusha Behluli–Mehmeti • Planifikimi urban për përmirësimin e infrastrukturës për turizëm Znj. LorikaHisari
14:00 Coffee Break	14:00 Pauza e kafës
14:15 **Session3:"Possibilities and Proposals for Expanding the Utilization"**	14:15 **Sesioni 3: "Mundësitë dhe Propozimet për Përhapjen e Shfrytëzimit të të Dhënave Gjeo-Hapësinore"**
• Data utilization and dissemination Mr. Hisashi Mori (JICA Project Team) • Future vision of renovated mapping agency with fruits of the Project Dr. Murat Meha (KCA)	• Shfrytëzimi dhe shpërndarja e të dhënave Z. Hisashi Mori (Ekipi Studimor JICA) • Vizioni për të ardhmen i agjencionit të rinovuar të hartografisë, me produktet e Projektit Dr. Murat Meha (AKK)
15:00 Closing Remarks	15:00 Fjala përmbyllëse

Project Purpose:

- Development of geo-spatial data
- Zhvillimi i të dhënave gjeo-hapësinore
- Razvoj geo-prostornih podataka

- Development of human resources (of KCA) to be engaged in geo-spatial data-related work
- Zhvillimi i burimeve njerëzore (të AKK-së) për t'u inkuadruar në punët lidhur me të dhënat gjeo-hapësinore
- Razvijanje ljudskih resursa (KKA-a) da budu uključeni u posao u vezi sa geo-prostornim podacima

- Promotion of the utilization of geo-spatial data
- Promovimi i shfrytëzimit të të dhënave gjeo-hapësinore
- Promocija korisćenja geo-prostornih podataka

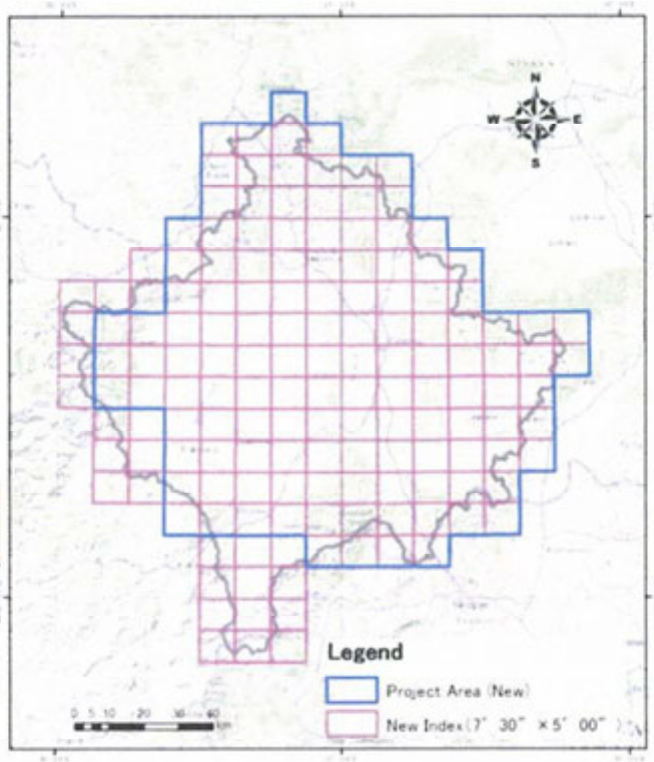
Outputs:

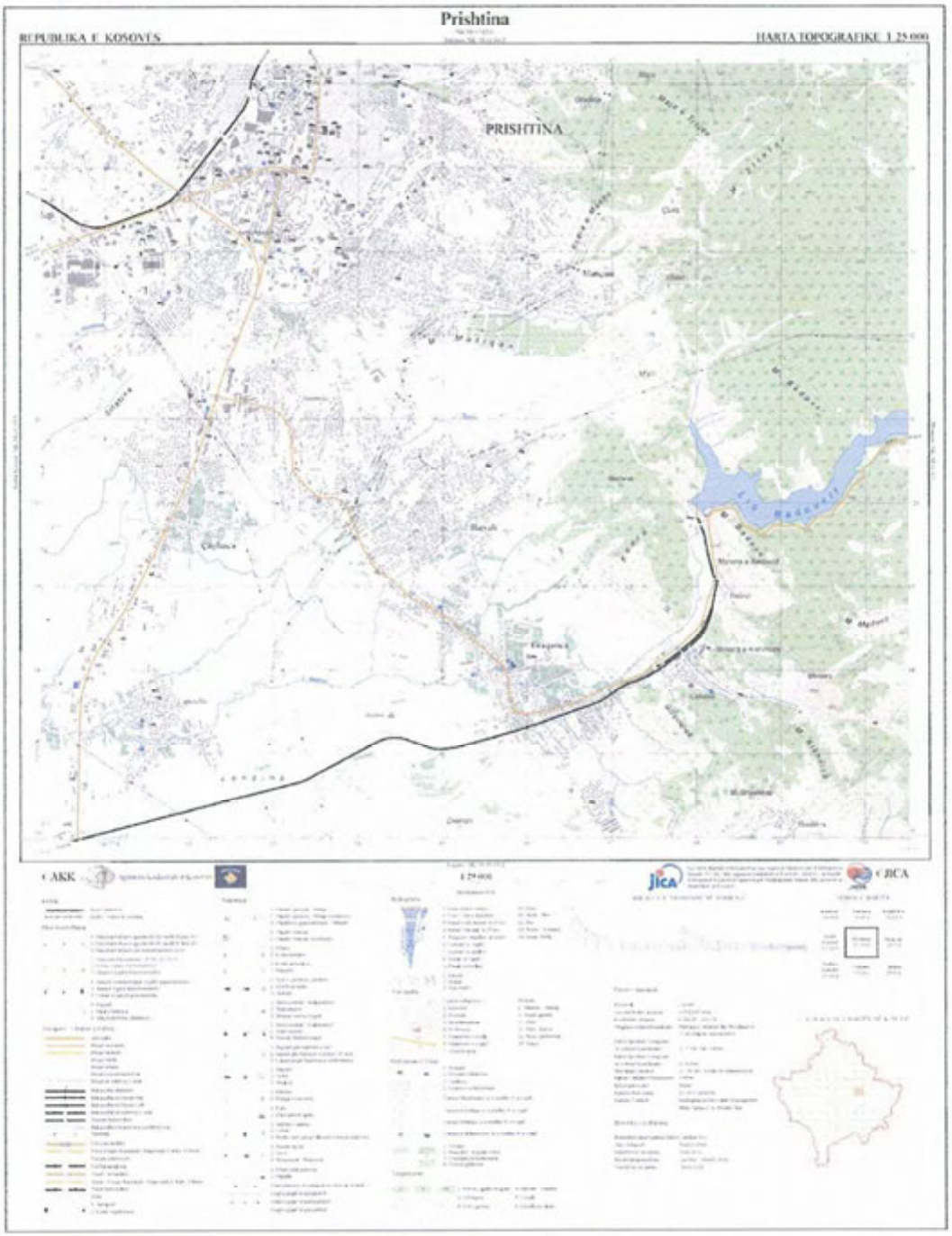
1/25,000 digital topographic map
Harta topografike digjitale 1/25,000
Digitalna topografska karta 1/25,000

1/25,000-level GIS data
Të dhënat në GIS të nivelit 1/25,000
Podaci u GIS nivoa 1/25,000

Development of specifications necessary for the creation, revision and provision of geospatial data
Zhvillimi i specifikacioneve të domosdoshme për krijimin, revidimin dhe ofrimin e të dhënave gjeohapësinore
Razvijanje specifikacija neophodnih za stvaranje, reviziju i pružanje geoprostornih podataka

Development of human resources relating to geo-spatial data
Zhvillimi i burimeve njerëzore në lidhje me të dhënat gjeo-hapësinore
Razvijanje ljudskih resursa u vezi sa geo-prostornim podacima

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REPUBLIKA E KOSOVËS
HARTA TOPOGRAFIKE 1:25 000
PRISHTINA
AKK
JICA

Appendix - 2

Republika e Kosovës

Republika Kosova-Republic of Kosovo

Qeveria e Kosovës –Vlada Kosova-Government of Kosovo

Ministria e Mjedisit dhe Planifikimit Hapësinor /Ministarstvo Sredine i Prostornog Planiranja/Ministry of Environment and Spatial Planning

Agjencia Kadastrale e Kosovës/Katastarska Agencija Kosova/Kosovo Cadastral Agency

Seminar on Human Resources Development Project on Geo-Spatial Information of KOSOVO

15.04.2015

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3	ALBERINA HAXHIJAJ	STUDENTE	UP-FILOLOGJIK		
4	Bashkim Kostruti	Hidrolog	IHMK		
5	HASAN HASANI	HIDROLOG	IHMK		gov.net
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7	ARMEND KASTRATI	KORDINATOR	MAP		
8	[illegible]	ARKITEKTE	MAP		
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17	KOLAS AHMETAJ	EKS. Kadastër	AKK		
18	Mentor Kosumi	EKS. Mollje	AKK		
19	MER HAJDINI	EKS. MATJES	AKK		
20	ABDURRAHMAN KULCU	DREJTOR DK	AKK		
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22	REXHAT MURAT	AKK - GIS	AKK		
23	AMIR SOGODEVA	GIS OPERATOR	AKK		
24	AVNI RUSTEMI	AKK-EKSPERT	AKK		

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28	Arbreshë Stanabaja	GIS Expert	AKK		
29	DUKAGJIN BERISHA	GJEODEZET	ZKK PRIZREN		
30	Durim Canziba	Gjeodet	Rahovec		
31	Xhelal Canziba	Gjeodet	Rahoveq		
32	AZICKI Bekim		AKK		
33	Gjezime Hajdini Maliqi	Gjeodete	ZKK - Gjilan		
34	IDRIZ GASHI	shef.O.T.Kuçi	MBPZHR		

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38	MUZAFER GAMA	KOORDINATOR I Proj.	AMK		
39	ALTSAN ~~BAKIJA~~	DREJTOR	IKMM		
40	NYSRET LATIFI	ZYRTARI I INFRASTRUKTURES	FSK-KFI		
41	Shigeluro Shibata	Programme Officer	UNDP		
42	Sadudin Berisha	Drejtori i DGNKP Gjilan	K.K. Gjilan		
43	Marjin Kervica	Zyr. i. Rregullo- i Tokave. MMPZHR	MMPZHR		
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48	Sali Fazliu	Jurist Shef: Sek. Pronës	Komuna e Gjilanit		
49	PAVLAHT BALAJ	ZYRTARI LARTË HË PDNJ- MKRS	MKRS		
50	DRITA LOSHI	GAZETARE	RTK	om	
51	Fadil Sheku	gjeodet	Iber Lepenc		
52	Sylki Halimi	gjeodet			
53	DEK. PITANJA	SR	AKA		
54	Fadile Hemi	Drej. Dukë	AKA		

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56	Lulzeta Berisha	Zyrtare për të drejtat e PAK	MKRS		
57	Armend Gashi	GIS Expert	AKK		
58	ESAT XANI	GIS EXPERT	AKK		
59	VALON BERISHA	Admin data base	MKRS		
60	DRENUSHE BEHLULI-MEHM.	ZYRTARE PËR TRASH. ARV.	MKRS		
61	ARMENTIJA ZAJMBEGIĆ	FOTO REPORTER	"BETA"		
62	VALBONA HASHANI	MENAXHERE E PROJEKTIT	AKK		
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64	RIZAH MURSELI	Volunteer professional	MMPIT/IPIT		

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67	ILIR KRYEZIU	ZYRTAR	MMPH / ~~DRPH~~ DN		
68	Arbër Jusufi	Gjeodet	KADASTER Gjakove		
69	FESTA NIXHA-NELA	arkitekt.	IPH/MMPH		
70	MEHDI KURRENKOLL	DREJTOR KOMUNAL	KOMUNA DRENICA		
71	BESART ABAZI	SPECIALIST i TI-së	AKK		
72	Blerina Hasani		GIZ		
73	ROLAND ~~MERXHA~~	GIZ	GIZ		~~ROLAND~~
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77	Rita Bafti	Përfaqësues	AKK		
78	ARDITA MEHMANI	Cadaste Expert	AIT		
79	ÄMIL KEÇICA	EKSPERT GIS	AKK		
80	Esat Krasniqi	autocad operator	Komuna Ferizaj		
81	Ajet Muriqi	Udhëheqës i Sekt. Profesionale	Komuna Ferizaj		
82	NAIM KELMENDI	GIS Specialist	MI		
83	AJET GASHI	GIS Lipjan	Komuna LIPJAN		
84	Petrit Tasholli	GIS Lipjan	komuna Lipjan		

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86	RREZART GASHI	EKSPERT LIGJOR	AKK		
87	Ibrahim Thaçi	drejtor	K. Podujevë		
88	VALON BESELICA	GJEODET	PODUJEVE		
89	Selajdin Hadërmurati	Gjeodet	Rahovec		
90	Valit Zeloli	Gjeodet, Ing.	ISTOG		
91	Ilusa Ahmeti	Gjeodet	ISTOG		
92	AFRIM KUKAJ	Gjeodet Ing	ISTOG		
93	MERTON AHMETAJ	GJEODET	ISTOG		
94	Mynyet Zallshi				

	Nr. No.	Emri mbiemri Name Surname	Posti Title	Institucioni Institution	Adresa elektronike e-mail address	Nënshkrimi Signature
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96	~~126~~	VLLAZNIM VUGITERI	GIS-EXPERT	AKK		
97	~~127~~	Akihiro Sugita	JICA Project Team	~~JICA~~ PASCO		jp (杉田)
98	~~128~~	Kensuke KIMURA	〃	〃		jp 木村
99	~~129~~	LORIKA HISARI	〃			
100	~~130~~	HISASHI MORI	〃	Pasco		.jp
101	~~131~~	Zenichi CHIBA	〃	Kokusai Kogyo		kk-grp.jp 千葉
	132					
	133					
	134					

(杉田)

Appendix - 3

Final Seminar on

Human Resource Development Project on Geo-Spatial Information of Kosovo

15 April, 2015

Q & A Session

Q1: Kosovo Institute for Protection of Monuments

Which part of the Kosovo territory is covered by 10% that is left out of the JICA Project, to be produced by KCA in future? (Person from the audience didn't introduce himself)

A1: JICA Project Team

The 10% includes the southern part of Kosovo (Dragash area) and parts of western Kosovo (*this was also shown on the map in Power Point presentation*)

Q2: Director of Municipal Cadaster Office, Gjakova Municipality

On bases of what or where did you base your work for the creation of the Map Symbols Regulation?

A2: Kosovo Cadastral Agency

Mr. Avni Rrustemi

We have created the Map Symbols Regulation on a basis of the experience of JICA Study Team experts, on basis of the Map Symbols Regulation of Japan as well as we have used the NATO maps for the ways of symbolization. From all these we have selected the most suitable symbols so we have harmonized them in order to come to a best solution.

Q3: Director of Municipal Cadaster Office, Gjakova Municipality

Can you also create other maps, of other scale, except those of 1:25,000?

A3: Kosovo Cadastral Agency

Mr. Avni Rrustem

With the equipment provided by the JICA Project as well as the conducted trainings we are able to create maps of other scales, but for these maps it is needed to create an adequate Map Symbols Regulation.

Republic of Kosovo

Map symbols regulation for 1: 25,000 Scale Digital Topographic Maps

of

Digital Topographic Mapping

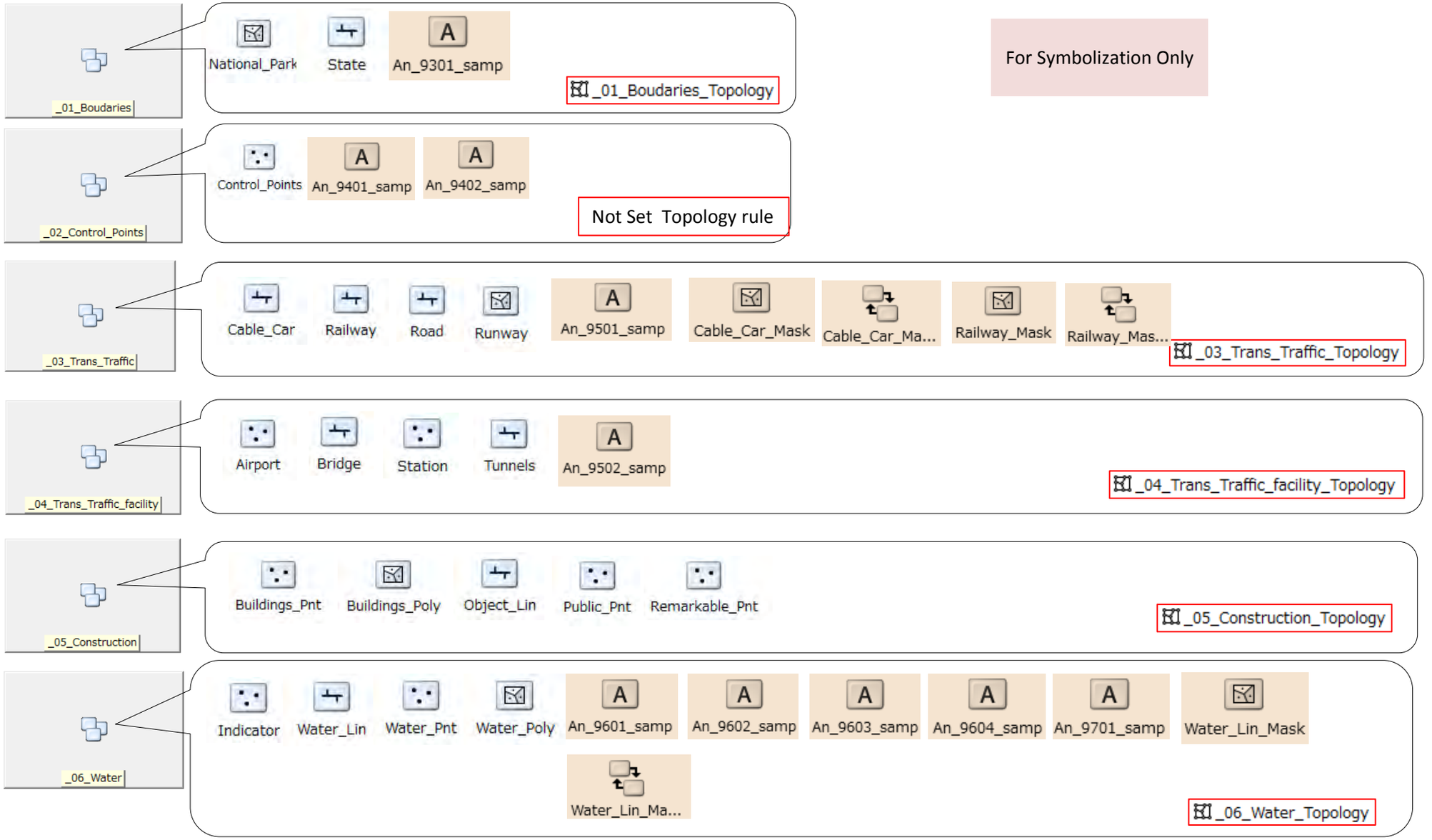
for

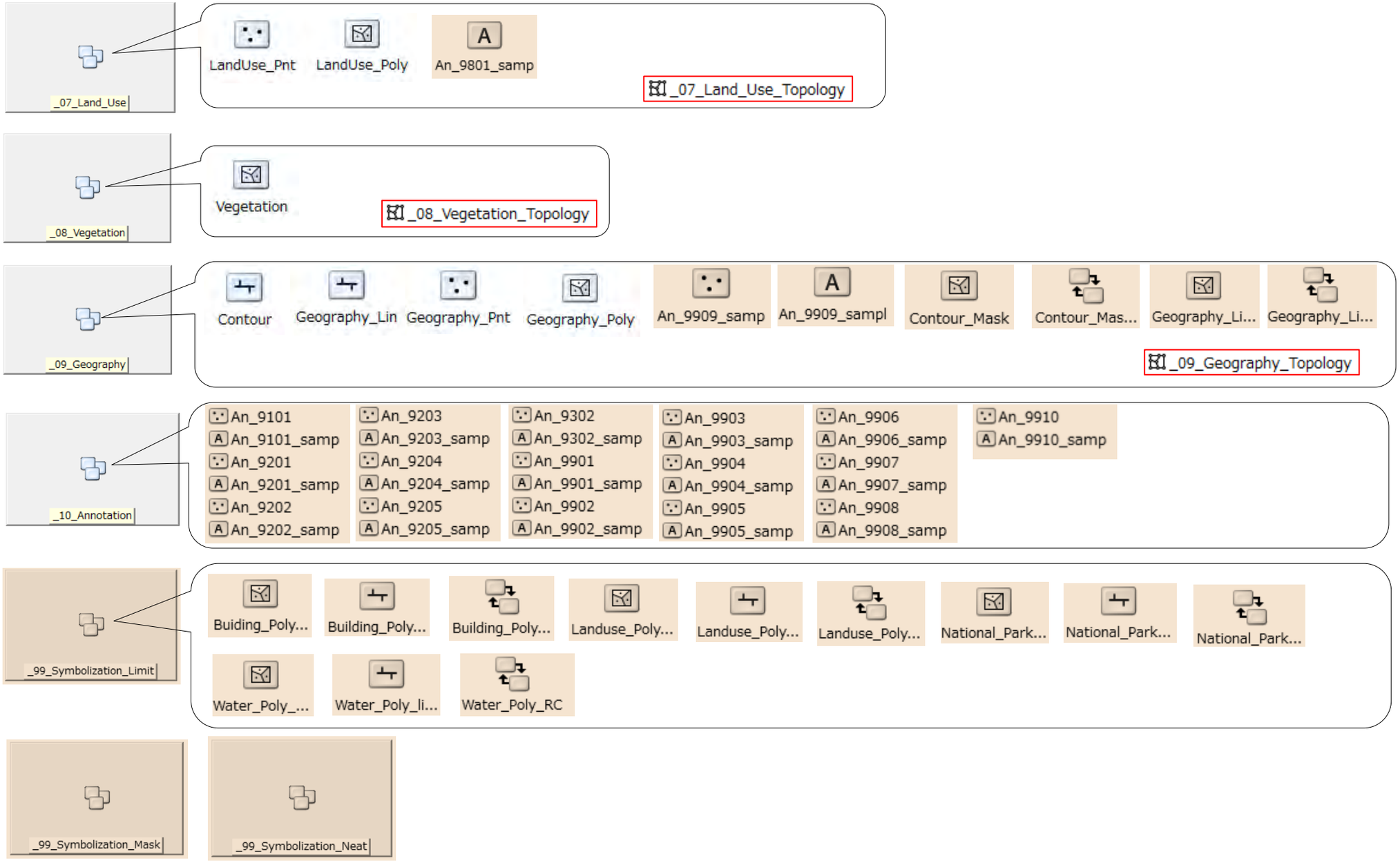
Human Resource Development Project on Geo-Spatial Information of Kosovo in the Republic of Kosovo

Map Symbols Regulation

Junuary 2015

GIS Data Structure




_07_Land_Use
LandUse_Pnt
LandUse_Poly
An_9801_samp
_07_Land_Use_Topology
_08_Vegetation
Vegetation
_08_Vegetation_Topology
_09_Geography
Contour
Geography_Lin
Geography_Pnt
Geography_Poly
An_9909_samp
An_9909_sampl
Contour_Mask
Contour_Mas...
Geography_Li...
Geography_Li...
_09_Geography_Topology
_10_Annotation
An_9101
An_9101_samp
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An_9910
An_9910_samp
_99_Symbolization_Limit
Buiding_Poly...
Building_Poly...
Building_Poly...
Landuse_Poly...
Landuse_Poly...
Landuse_Poly...
National_Park...
National_Park...
National_Park...
Water_Poly_...
Water_Poly_li...
Water_Poly_RC
_99_Symbolization_Mask
_99_Symbolization_Neat

KCA and JICA agreed map symbols revision as following on 27th Oct. 2014.

		Colours to use	BLACK; KOS_BLACK=K100 YELLOW; KOS_YELLOW=Y100 RED; KOS_RED=M100+Y100 ORANGE; KOS_ORANGE=M40+Y100 BROWN; KOS_BROWN=C50+M75+Y100 GREEN; KOS_GREEN=C80+Y100 GREEN30; KOS_GREEN30=C25+Y30 GREEN10; KOS_GREEN10=C10+Y10 GRAY20; KOS_GRAY20=K20 GRAY60; KOS_GRAY60=K60 BLUE; KOS_BLUE=C100 BULE30; KOS_BULE30=C30. These Colours composition will be assigned as standard Colour in ArcGIS the Representation Rule.
		apply Gray 60 Colour to specific symbols	"Symbols which are road, buildings and limits of cemeteries and built-up area" will be used GRAY 60 Colour in order to avoid masking and make symbols much more visible.
		cliff and steep representation	When 8202 and 8203 symbols could not be represented in appropriate appearance might be change the length of slope direction line (nip line) by cartographical judgments in order to avoid overlapping each and to show as the right appearance of geography.

Map symbols Rule in ArcGIS should be created in according to this specification.
However when occurring slightly differ between specification and real map "Symbol Rule in ArcGIS", it might be preferred ArcGIS rule.

		Symbols revision	
1	1101		1.2mm tic, 0.5mm line, 0.5mm diameter
3	2202	0.2mm diameter	0.3mm diameter
4	3101	Center line width 0.2mm	Center line width 0.1mm
5	3105	Line width 0.2mm	Line width 0.15mm
6	3106	0.3mm dotted line	0.2mm line width, dashed line 2.0mm / 0...4mm (space)
7	3201	Center line width 0.2mm?	Center line width 0.1mm
8	3204	Center line width 0.2mm?	Center line width 0.1mm
9	4103	Hatching	Filling Gray 20 Colour
10	4104	Unknown dimension which are between inside and out	Distance is 0.4mm.
11	4105	Unknown dashed line interval	Dashed line interval is 0.25mm dashed and 0.15mm space
12	4205	Text size	Text size is to be 1.5mmx2.5mm (proportion with height)
13	4206	Text size	Text size is to be 1.5mmx2.5mm (proportion with height)
14	4207	Symbol height	Size is to be 1.8mm. Breadth size might be in proportion with height.
15	4216	Text size	Text size is to be 1.5mmx2.5mm (proportion with height)
16	4217	Text size	Text size is to be 1.5mmx2.5mm (proportion with height)
17	4220	symbol height	Symbol height is 3.5mm. Breadth size might be in proportion with height as 1.5mm. The smoke character lines are "2".
18	4221	Symbol height	Symbol height is 2.0mm. Breadth size might be in proportion with height.
	4222	Unknown dimension which are between inside and out	Distance is 0.4mm.
20	5107	Pattern symbols arrangement	Symbol is 3.0mm diagonal pattern
21	5202	Unknown symbol height0.3mm line width	Symbol height 2mm, rapid direction lines (width) is 1.5mm
22	5305	Unknown line width and small size	Line width is 0.15mm and diameter 1.0mm
23	5306	Unknown dimension of symbol height	Heights are 2.0mm.
24	6103	Brown Colour	Brown Colour shall be used from standard Colour
25	6207	No symbol in legend	New symbol is shown by text "VD" which should be placed center of polygon
26	6208	No symbol in legend	New symbol is shown by text "Vd" which should be placed on a certain point.
27	6303	Green filling, pattern symbols arrangement	Remove base Colour in order to clarifying map appearance. It will be shown by symbol which is "8.0mm diagonal pattern". In case of the symbol could not placed fully inside the polygon, it does not need to adjust to be visible the symbol. i.e. narrow polygon and so on.
28	7105	Green filling	Remove base Colour in order to clarifying map appearance. It will be shown only pattern symbol.
29	7106	Green filling	Base Colour is KOS_GREEN10 in order to clarifying map appearance.
30	8104	Dot line	Dashed line 0.5mm / 0.5mm (space)
31	8202	Arrow symbol's line width 0.1mm	Line width 0.15mm
32	8203	Shadow line	Shadow line should be right from left.

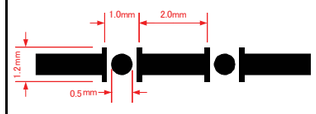
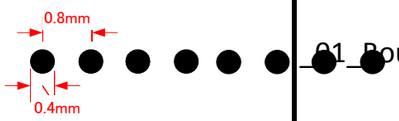
KCA and JICA agreed map symbols revision as following on 8th to 22nd Jun. 2015.

1	4104	Change to dashed line	The used line chenged to dashed line which interval is 0.4mm/0.2mm (space).
2	4303	Change appearance in Sep.	Change to the right angl in Specification item
3	6103	Add polygon filling	Fill such like block pattern with gray20% in polygon
3	6301	Add polygon filling	Fill “Kos_GREEN30% “ with dotted pattern
4	9203	Annotation: See page 31 to 35	change to 16pt
5	9204		change to 18pt
6	9205		change to 20pt
7	9302		change to 8pt -14pt
8	9401		change to 6pt
9	9402		change to 6pt
10	9501		change to 6pt
11	9502		change to 8pt
12	9601		change to 8pt -14pt
13	9602		change to 8pt -14pt
14	9603		change to 8pt -14pt
15	9604		change to 8pt -14pt
16	9701		change to 8pt
17	9801		change to 10pt
18	9901		change to 10pt
19	9902		change to 8pt
20	9903		change to 8pt -14pt
21	9904		change to 8pt -14pt
22	9905		change to 10pt
23	9906		change to 12pt
24	9907		change to 8pt
25	9908		change to 8pt When applied to as “Neighborhood” name which is a kind of dwelling area name, it might be required to expand letter space by referencing existing map.
26	9909		change to 6pt
27	9910		change to 6pt

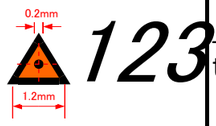
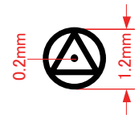
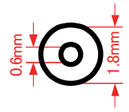
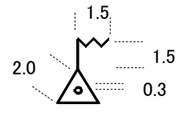
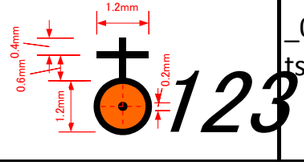
		Contour and road representation	As for appearance of contour line and road, JICA ask to change appearance which contour will be hidden by road in order to clarify road from crossing contour above road. This appearance could be gotten by changing the layering order.

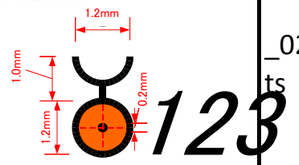
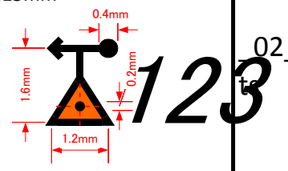
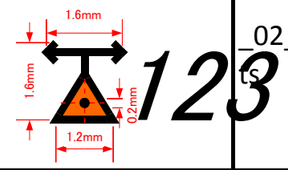
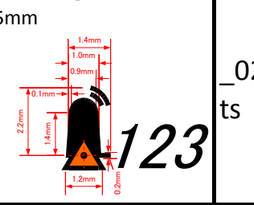
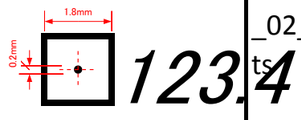
Map symbols for 1:25,000 scale Digital Topographic Map

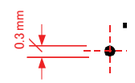
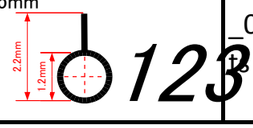
1.0 Boundaries

No.	Feature Class	Data Class	Feature Name	Code Number F.C	Code Number D.C	Code Number No.	Data Type	Definition	Acquisition criterion	Data Acquisition method	Symbol (Shape and Size)	GIS Data structure: Feature Data Set	GIS Data structure: Feature Class
	boundaries	International Boundary	State Boundary	1	1	1 **1101**	line	A real or imaginary line that marks where one area of state is separate from other state area.	All state boundary except undetermined part of boundary should be digitized.	The data will be acquired from the government office or KCA. The centre of state boundary shall be digitized.	Colour : Black Width: 0.5mm, 0.15mm 	_01_Boundaries	State
	boundaries	Other Boundary	National Park Boundary	1	2	1 **1201**	polygon (Line)	A real or imaginary line that marks where one area of National Park is separate from other area.	All National Park boundary except undetermined part of boundary should be digitized.	The data will be acquired from the ministry of environment and spatial planning. The centre of national park boundary shall be digitized. The direction of digitizing is always a clockwise.	Colour : Black 	_01_Boundaries	National_Park

2.0 Control Points

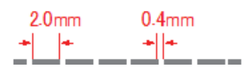
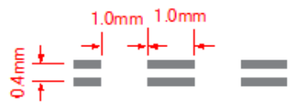
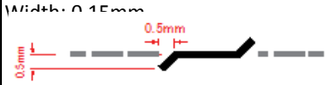
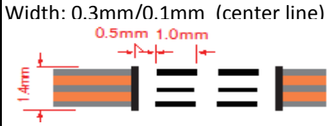
No.	Feature Class	Data Class	Feature Name	Code Number F.C	Code Number D.C	Code Number No.	Data Type	Definition	Acquisition Criterion	Data Acquisition Method	Symbol (Shape and Size)	GIS Data structure: Feature Data Set	GIS Data structure: Feature Class
	Control Points	Horizontal Control Points	1st order geodetic control point	2	1	1 (2101)	point	The first order geodetic control point is the point that has the most precise coordinates and the national geodetic network consists of these first order geodetic control points.	The existed 1st order geodetic control point should be digitized.	The data will be acquired in KCA. The coordinates of 1st order geodetic control point data will be provided by KCA. The centre of control point shall be digitized based on the coordinates of control point.	Colour : Black, Orange width : 0.15mm 	_02_Conrol_Points	Control_Ponits
	Control Points	Horizontal Control Points	2nd order geodetic control point	2	1	2 (2102)	point	The second order geodetic control point is the point that has less precise coordinates than 1st order geodetic control point and the national geodetic network consists of these second order geodetic control points.	The existed 2nd order geodetic control point should be digitized.	The data will be acquired in KCA. The coordinates of 2nd order geodetic control point data will be provided by KCA. The centre of control point shall be digitized based on the coordinates of control point.	Colour : Black width : 0.15mm 	_02_Conrol_Points	Control_Ponits
	Control Points	Horizontal Control Points	control point for aerial triangulation	2	1	3 (2103)	point	The control point for aerial triangulation is the point that was established for aerial triangulation using the existed geodetic control points and new stabilized control points.	The existed control point for aerial triangulation should be digitized.	The data will be acquired in KCA. The control point for aerial triangulation data will be provided by KCA. The centre of control point shall be digitized based on the coordinates of control point.	Colour : Black width : 0.15mm 	_02_Conrol_Points	Control_Ponits
	Control Points	Horizontal Control Points	Permanent GNSS - KOPOS	2	1	4 (2104)	point	The point that has precise coordinates and observes GNSS satellite continuously (24 hours).	The existed permanent GNSS - KOPOS point should be digitized.	The data will be acquired in KCA. The coordinates of permanent GNSS - KOPOS point data will be provided by KCA. The centre of the point shall be digitized based on the coordinates of point.	Colour : Black width : 0.15mm 	_02_Conrol_Points	Control_Ponits
	Control Points	Horizontal Control Points	Church as trigonometric point	2	1	5 (2105)	point	The mark at the top of church building that has coordinates in order to determine a azimuth.	The existed church as trigonometric point should be digitized.	The data will be acquired in KCA. The coordinates of church as trigonometric point data will be provided by KCA. The centre of the point shall be digitized based on the coordinates of point.	Colour : Black, Orange width : 0.15mm 	_02_Conrol_Points	Control_Ponits

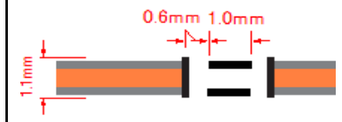
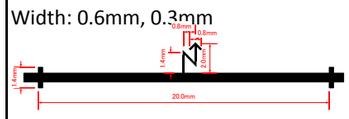
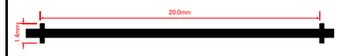
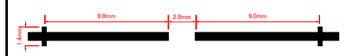
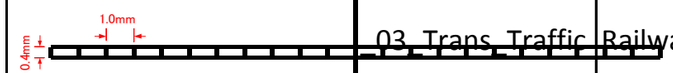
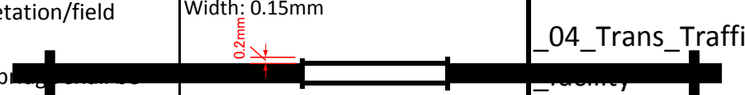
No.	Feature Class	Data Class	Feature Name	Code Number F.C	Code Number D.C	Code Number No.	Data Type	Definition	Acquisition Criterion	Data Acquisition Method	Symbol (Shape and Size)	GIS Data structure: Feature Data Set	GIS Data structure: Feature Class
	Control Points	Horizontal Control Points	Mosque as trigonometric point	2	1	6 **2106**	point	The mark at the top of mosque building that has coordinates in order to determine a azimuth.	The existed mosque as trigonometric point should be digitized.	The data will be acquired in KCA. The coordinates of mosque as trigonometric point data will be provided by KCA. The centre of the point shall be digitized based on the coordinates of point.	Colour : Black, Orange width : 0.15mm 	_02_Conrol_Points	Control_Ponits
	Control Points	Horizontal Control Points	Meteorological station as trigonometric point	2	1	7 **2107**	point	The mark at the top of meteorological station that has coordinates in order to determine a azimuth.	The existed meteorological station as trigonometric point should be digitized.	The data will be acquired in KCA. The coordinates of meteorological station as trigonometric point data will be provided by KCA. The centre of the point shall be digitized based on the coordinates of point.	Colour : Black, Orange width : 0.15mm 	_02_Conrol_Points	Control_Ponits
	Control Points	Horizontal Control Points	Antenna as trigonometric point	2	1	8 **2108**	point	The mark at the top of antenna that has coordinates in order to determine a azimuth.	The existed antenna as trigonometric point should be digitized.	The data will be acquired in KCA. The coordinates of antenna as trigonometric point data will be provided by KCA. The centre of the point shall be digitized based on the coordinates of point.	Colour : Black, Orange width : 0.15mm 	_02_Conrol_Points	Control_Ponits
	Control Points	Horizontal Control Points	Chimney as trigonometric point	2	1	9 **2109**	point	The mark at the top of chimney that has coordinates in order to determine a azimuth.	The existed chimney as trigonometric point should be digitized.	The data will be acquired in KCA. The coordinates of chimney as trigonometric point data will be provided by KCA. The centre of the point shall be digitized based on the coordinates of point.	Colour : Black, Orange width : 0.15mm 	_02_Conrol_Points	Control_Ponits
	Control Points	Vertical Control Points	Bench Marks	2	2	1 **2201**	point	The benchmark is the point that has a height value by leveling.	The existed benchmark should be digitized.	The data will be acquired by the field identification and in KCA The location and height of benchmark will be provided by KCA. The centre of benchmark shall be digitized.	Colour : Black Width: 0.15mm 	_02_Conrol_Points	Control_Ponits

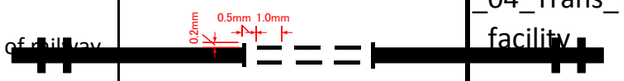
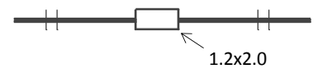
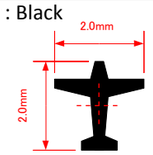
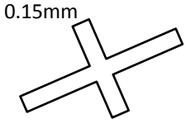
No.	Feature Class	Data Class	Feature Name	Code Number			Data Type	Definition	Acquisition Criterion	Data Acquisition Method	Symbol (Shape and Size)	GIS Data structure	
				F.C	D.C	No.						Feature Data Set	Feature Class
	Control Points	Vertical Control Points	Spot Height	2	2	2	point	The spot height is the point that has a height value.	The spot height where is located in the following area, top of mountain, saddle, road crossing, hill, depression plain area etc, should be digitized.	A photogrammetric measurement or leveling will be applied as a acquisition method. The centre of spot height shall be digitized.	Colour : Black 	_02_Conrol_Points	Control_Ponits
				2202									
	Control Points	Other Control Points	State Boundary Pillar	2	3	1	point	The state boundary pillar is the pillar that shows the state boundary with the coordinates.	All the state boundary pillar with coordinates should be digitized.	The data will be acquired from the government office or KCA. The centre of state boundary pillar shall be digitized based on the coordinates.	Colour : Black Width: 0.15mm 	_02_Conrol_Points	Control_Ponits
				2301									

3.0 Transportation/Traffic Facilities

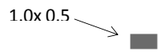
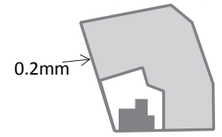
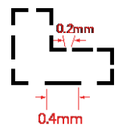
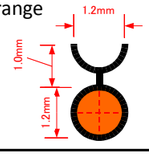
No.	Feature Class	Data Class	Feature Name	Code Number F.C	D.C	No.	Data Type	Definition	Acquisition criterion	Data Acquisition method	Symbol (Shape and Size)	GIS Data structure: Feature Data Set	Feature Class
	Transportation/Traffic Facilities	Road	Motorway	3	1	1 **3101**	line	A motorway is a public road particularly build and designated for the movement of mortar vehicle having carriageways physically separated for the movement in opposite directions of lanes a width of at least 3.5m with one lane for emergency stops in both sides of the motorway of width of at least 2.5m.	All motorway should be digitized.	Data will be acquired from the ministry of infrastructure/the field identification. The center of the motorway shall be digitized.	Colour : Gray60, Orange Width: 0.2mm/0.1mm (center line) 	_03_Trans_Traffic	Road
	Transportation/Traffic Facilities	Road	National Road	3	1	2 **3102**	line	A national road is a public road officially ranked as a national road linking two or more towns and which may serve as a link to regions outside Kosovo.	All the national road should be digitized.	Data will be acquired from the ministry of infrastructure/the field identification. The center of national road shall be digitized.	Colour : Gray60, Orange Width: 0.2mm 	_03_Trans_Traffic	Road
	Transportation/Traffic Facilities	Road	Regional Road	3	1	3 **3103**	line	A regional road is a public road linking important economic centers of two or more regions.	All the regional road should be digitized.	Data will be acquired from the ministry of infrastructure/the field identification. The center of regional road shall be digitized.	Colour : Gray60, Yellow Width 0.2mm 	_03_Trans_Traffic	Road
	Transportation/Traffic Facilities	Road	Local Road	3	1	4 **3104**	line	A local road is a public road that is officially categorized as a local road, which connects the inhabited areas within the settlements of one municipality.	All the local road should be digitized.	Data will be acquired from the ministry of infrastructure/the field identification. The center of local road shall be digitized.	Colour: Gray60 Width: 0.2mm 	_03_Trans_Traffic	Road
	Transportation/Traffic Facilities	Road	Urban road	3	1	5 **3105**	line	A urban road is a public road that connects habitable spaces within a municipality settlement.	A major urban road should be digitized.	Data will be acquired from the field identification. The center of urban road shall be digitized.	Colour: Gray60 Width: 0.15mm 	_03_Trans_Traffic	Road

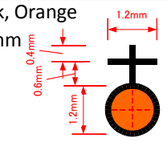
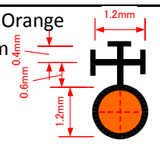
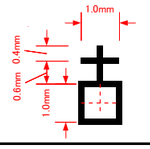
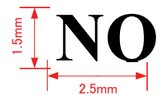
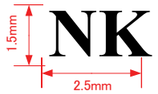
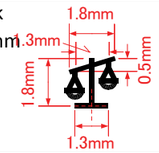
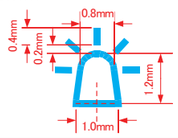
No.	Feature Class	Data Class	Feature Name	Code Number F.C	D.C	No.	Data Type	Definition	Acquisition criterion	Data Acquisition method	Symbol (Shape and Size)	GIS Data structure: Feature Data Set	Feature Class
	Transportation/Traffic Facilities	Road	Uncategorized road	3	1	6 **3106**	line	A uncategorized road is a road not designated as a public road, but used for traffic such as a road for forests utilization, accumulative lake road, and road for agriculture destination and similar.	The uncategorized road more than 250m or to connected the other road should be digitized.	Data will be acquired by the photo interpretation and the field identification. The centre of uncategorized road shall be digitized.	Colour: Gray60 Width: 0.15mm 	_03_Trans_Traffic	Road
	Transportation/Traffic Facilities	Road	Road Under construction	3	1	7 **3107**	line	A road that is under construct.	The road that is under construction more than 250m long should be digitized.	Data will be acquired by the photo interpretation/field identification. The centre of under construction road shall be digitized.	Colour: Gray60 Width: 0.2mm 	_03_Trans_Traffic	Road
	Transportation/Traffic Facilities	Road facilities	Motorway Bridge	3	2	1 **3201**	line	A permanent structure for a motorway built over a river, other water area and/or road, railway that allows people or vehicles to cross from one side to the other.	The bridge more than 10m long for a motorway will be digitized.	Data will be acquired by the photo interpretation/field identification. The center of bridge shall be digitized.	Colour: Black Width: 0.2mm/0.1mm (center line) 	_04_Trans_Traffic_facility	Bridge
	Transportation/Traffic Facilities	Road facilities	National, Regional, Local, Urban Road Bridge	3	2	2 **3202**	line	A permanent structure for a national, regional, local, urban road built over a river, other water area and/or road, railway that allows people or vehicles to cross from one side to the other.	The bridge more than 10m long for a national, regional, local, urban road will be digitized.	Data will be acquired by the photo interpretation/field identification. The center of bridge shall be digitized.	Colour: Black Width: 0.15mm 	_04_Trans_Traffic_facility	Bridge
	Transportation/Traffic Facilities	Road facilities	Bridge small	3	2	3 **3203**	line	A structure built for a uncategorized road over a river that allows people to cross from one side to the other.	The bridge more than 10m long for a uncategorized will be digitized.	Data will be acquired by the photo interpretation/field identification. The centre of bridge shall be digitized.	Colour : Black Width: 0.15mm 	_04_Trans_Traffic_facility	Bridge
	Transportation/Traffic Facilities	Road facilities	Motorway Tunnel	3	2	4 **3204**	line	A passage for the motorway that has been dug under the ground, through a mountain etc. for people, cars to go through.	The tunnel more than 20m long should be digitized.	Data will be acquired by photo interpretation and the field identification. The center of tunnel road shall be digitized.	Colour : Black Width: 0.3mm/0.1mm (center line) 	_04_Trans_Traffic_facility	Tunnel

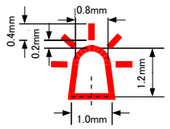
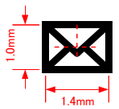
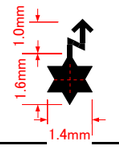
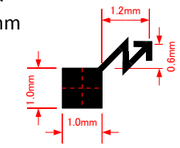
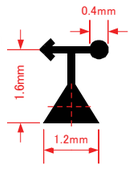
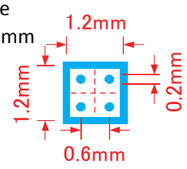
No.	Feature Class	Data Class	Feature Name	Code Number F.C	D.C	No.	Data Type	Definition	Acquisition criterion	Data Acquisition method	Symbol (Shape and Size)	GIS Data structure: Feature Data Set	Feature Class
	Transportation/Traffic Facilities	Road facilities	National, Regional, Local, Urban Road Tunnel	3	2	5 **3205**	line	A passage for the national, regional, local, urban road that has been dug under the ground, through a mountain etc. for people, cars to go through.	The tunnel more than 20m long should be digitized.	Data will be acquired by photo interpretation and the field identification. The centre of tunnel road shall be digitized.	Colour : Black Width: 0.2mm 	_04_Trans_Traffic_facility	Tunnel
	Transportation/Traffic Facilities	Railway	Electrified Railway	3	3	1 **3301**	line	A electrified railway is a transportation system that trains using the electricity run on the trucks.	All the electrified railway should be digitized.	Data will be acquired by the photo interpretation/field identification. The centre of tracks shall be digitized.	Colour: Black Width: 0.6mm, 0.3mm 	_03_Trans_Traffic	Railway
	Transportation/Traffic Facilities	Railway	Railway single track	3	3	2 **3302**	line	A railway single track is a transportation system that trains run on the single truck.	All the railway single track should be digitized.	Data will be acquired by the photo interpretation/field identification. The centre of single tracks shall be digitized.	Colour: Black Width: 0.6mm, 0.3mm, 0.15mm 	_03_Trans_Traffic	Railway
	Transportation/Traffic Facilities	Railway	Railway double track	3	3	3 **3303**	line	A railway double track is a transportation system that trains run on the double truck.	All the railway double track should be digitized.	The data will be acquired by the photo interpretation/field identification. The centre of railway double track shall be digitized.	Colour : Black Width: 0.6mm, 0.3mm 	_03_Trans_Traffic	Railway
	Transportation/Traffic Facilities	Railway	Railway under construction	3	3	4 **3304**	line	A railway (electrified, single track, double track) under construction.	All railway (electrified, single track, double track) under construction should be digitized.	Data will be acquired by the photo interpretation/field identification. The centre of constructed tracks shall be digitized.	Colour : Black Width: 0.6mm, 0.3mm 	_03_Trans_Traffic	Railway
	Transportation/Traffic Facilities	Railway	Abandoned Railway	3	3	5 **3305**	line	A railway that abandoned.	All the abandoned railways should be digitized.	Data will be acquired by field identification. The centre of railway track shall be digitized.	Colour: Black Width: 0.15mm 	_03_Trans_Traffic	Railway
	Transportation/Traffic Facilities	Railway facilities	Railway bridge	3	4	1 **3401**	line	A permanent structure for a railway built over a river and/or road that allow trains to cross from one side to the other.	The bridge more than 10m long for a railway will be digitized.	Data will be acquired by the photo interpretation/field identification. The center of bridge shall be digitized.	Colour : Black Width: 0.15mm 	_04_Trans_Traffic_facility	Bridge

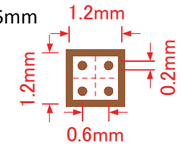
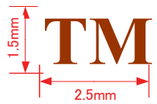
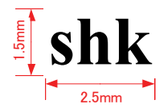
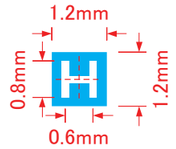
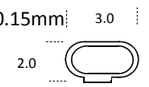
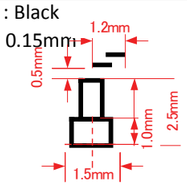
No.	Feature Class	Data Class	Feature Name	Code Number F.C	D.C	No.	Data Type	Definition	Acquisition criterion	Data Acquisition method	Symbol (Shape and Size)	GIS Data structure: Feature Data Set	Feature Class
	Transportation/Traffic Facilities	Railway facilities	Railway tunnel	3	4	2 **3402**	line	A passage that has been dug under the ground, through a mountain etc. for trains to go through for railway.	The tunnel (underground railway) more than 20m long should be digitized.	Data will be acquired by photo interpretation and the field verification. The centre of tunnel of railway shall be digitized.	Colour : Black Width: 0.15mm 	_04_Trans_Traffic_facility	Tunnel
	Transportation/Traffic Facilities	Railway facilities	Railway station	3	4	3 **3403**	point	A structure for the passengers to get on or get off a train.	All the railway station should be digitized.	Data will be acquired by photo interpretation and field identification. The center of railway station on the track shall be digitized.	Colour : Black (C100%M100%Y100%) 	_04_Trans_Traffic_facility	Station
	Transportation/Traffic Facilities	Aviation	Airport	3	5	1 **3501**	point	A place where a flights begin and stop flying, that has buildings for passengers to wait in.	All the airports should be digitized.	Data will be acquired by photo interpretation and the field identification. The centre of airport shall be digitized.	Colour : Black 	_04_Trans_Traffic_facility	Airport
	Transportation/Traffic Facilities	Aviation Facility	Runway	3	6	1 **3601**	polygon	A long specially prepared hard surface like a road that aircrafts take off or land.	All the runway should be digitized.	The data will be acquired by photo interpretation and the field identification. The edge of runway shall be digitized.	Colour : Black, Red Width: 0.15mm 	_03_Trans_Traffic	Runway
	Transportation/Traffic Facilities	Aviation Facility	Beacon signal	3	6	2 **3602**	point	A facility that emits a radio or radar signal used by airplane to help them find their position and direction.	All the beacon signal should be digitized.	The data will be acquired in the field identification. The centre of building or structure for the beacon sign shall be digitized.	Colour : Black 	_04_Trans_Traffic_facility	Airport
	Transportation/Traffic Facilities	Other Transportation /Traffics	Cable car	3	7	1 **3701**	line	A vehicle that is pulled along by a moving cable, used to take people from one place to another.	The cable car more than 30m should be digitized.	Data will be acquired by photo interpretation and the field identification. The centre of cable or rope shall be digitized.	Colour : Black Width: 0.15mm 	_03_Trans_Traffic	Cable_Car

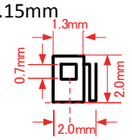
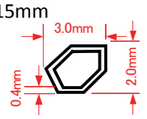
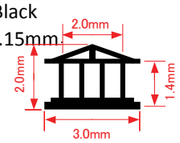
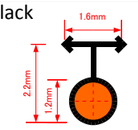
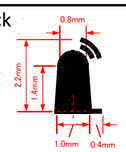
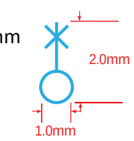
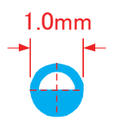
4.0 Constructions

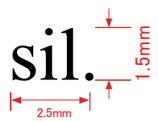
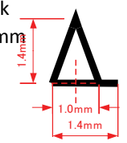
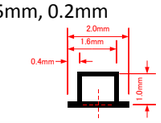
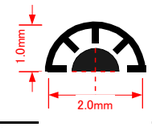
No.	Feature Class	Data Class	Feature Name	Code Number F.C	D.C	No.	Data Type	Definition	Acquisition Criterion	Data Acquisition Method	Symbol (Shape and Size)	GIS Data structure: Feature Data Set	Feature Class
	Constructions	Buildings	Independent Building/House	4	1	1 (**4101**)	polygon	A single or more double stories building/house.	The building/house whose short side length is more than 25 m should be digitized.	The data will be acquired by photo interpretation. The edge of building shall be digitized at scale. The direction of digitizing shall be clockwise.	Colour: Gray60 	_05_Construction	Buildings_Poly
	Constructions	Buildings	Independent Building/House (minimum)	4	1	2 (**4102**)	point	A building/house that is small.	All the building/house whose short side less than 25 m or equivalent should be digitized.	The data will be acquired by the photo interpretation. The centre of building/house shall be digitized.	Colour: Gray60 	_05_Construction	Buildings_Pnt
	Constructions	Buildings	Generalized buildings/houses	4	1	3 (**4103**)	Polygon ↓ Line	An area where buildings/houses are constructed in a compact mass.	The area where buildings/houses should be digitized. If the specified buildings, such as government building exits in the area, buildings should be digitized independently.	The data will be acquired by the photo interpretation/field identification. The edge of generalized buildings/houses shall be digitized at scale. The direction of digitizing shall be clockwise.	Colour: Gray60 /Gray20 width : 0.2mm (limits line) 	_05_Construction	
	Constructions	Buildings	Ruin Building	4	1	4 (**4104**)	polygon ↓ Line	Abandoned buildings/houses in the ruin.	The buildings/houses that the short side of building is more than 25 m should be digitized.	The data will be acquired by the field identification. The edge of ruin building shall be digitized. The direction of digitizing is a clockwise.	Colour : Black width : 0.15mm 	_05_Construction	Buildings_Poly
	Constructions	Buildings	Ruin Building (minimum)	4	1	5 (**4105**)	point	An abandoned buildings/houses in the ruin.	The buildings/houses that the short side of ruin building is less than 25 m should be digitized.	The data will be acquired by the field identification. The center of ruin building shall be digitized.	Colour : Black width : 0.15mm (0.25 dahed and 0.15 space) 	_05_Construction	Buildings_Pnt
	Constructions	Building Symbol	Mosque	4	2	1 (**4201**)	point	A building in which Muslim worship.	All the mosques should be digitized.	The information will be collected by the field identification. The centre of the main building shall be digitized.	Colour : Black, Orange width : 0.15mm 	_05_Construction	Public_Pnt

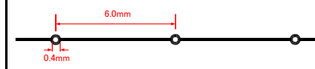
No.	Feature Class	Data Class	Feature Name	Code Number F.C	Code Number D.C	Code Number No.	Data Type	Definition	Acquisition Criterion	Data Acquisition Method	Symbol (Shape and Size)	GIS Data structure: Feature Data Set	GIS Data structure: Feature Class
	Constructions	Building Symbols	Catholic Church	4	2	2 (4202)	point	A building in which Catholic Christian worship.	All the catholic church should be digitized.	The information will be collected by the field identification. The centre of the main building shall be digitized.	Colour : Black, Orange width : 0.15mm 	_05_Construction	Public_Pnt
	Constructions	Building Symbols	Orthodox Church	4	2	3 (4203)	point	A building in which Orthodox Christian worship.	All the orthodox church should be digitized.	The information will be collected by the field identification. The centre of the main building shall be digitized.	Colour : Black, Orange width : 0.15mm 	_05_Construction	Public_Pnt
	Constructions	Building Symbols	Monastery	4	2	4 (4204)	point	A community of monks living under religious vows.	All the monastery should be digitized.	The information will be collected by the field identification. The centre of the main building shall be digitized.	Colour : Black width : 0.15mm 	_05_Construction	Public_Pnt
	Constructions	Building Symbols	Central Government Office	4	2	5 (4205)	point	A building used for a government office of state.	All the government office should be digitized.	The information will be collected by the field identification. The centre of the main building shall be digitized.	Colour : Black 	_05_Construction	Public_Pnt
	Constructions	Building Symbols	Municipal Office	4	2	6 (4206)	point	A building used for cities, towns etc.	All the municipal office should be digitized.	The information will be collected by the field identification. The centre of the main building shall be digitized.	Colour : Black 	_05_Construction	Public_Pnt
	Constructions	Building Symbols	Court	4	2	7 (4207)	point		All the court should be digitized.	The information will be collected by the field identification. The centre of the main building shall be digitized.	Colour : Black width : 0.15mm 	_05_Construction	Public_Pnt
	Constructions	Building Symbol	Police Station	4	2	8 (4208)	point	A place for an official organization whose job is to make sure that people obey the law, to catch criminals, and to protect people and property.	All the police station should be digitized.	The information will be collected by the field identification. The centre of the main building of police station shall be digitized.	Colour : Blue width : 0.15mm 	_05_Construction	Public_Pnt

No.	Feature Class	Data Class	Feature Name	Code Number F.C	Code Number D.C	Code Number No.	Data Type	Definition	Acquisition Criterion	Data Acquisition Method	Symbol (Shape and Size)	GIS Data structure: Feature Data Set	GIS Data structure: Feature Class
	Constructions	Building Symbol	Fire Station	4	2	9 (4209)	point	A building where the equipment used to stop fires from burning is kept, and where a firefighters stay until they are needed.	All the fire station should be digitized.	The information will be collected by the field identification. The centre of the main building of fire station shall be digitized.	Colour : Red width : 0.15mm 	_05_Construction	Public_Pnt
	Constructions	Building Symbol	Post office	4	2	10 (4210)	point	An office or building where the public has access to services of the postal system.	All the post office should be digitized.	The data will be acquired by the field identification. The centre of building for the post office shall be digitized.	Colour : Black width : 0.15mm 	_05_Construction	Public_Pnt
	Constructions	Building Symbols	Electric power station	4	2	11 (4211)	point	A building where electricity is produced to supply a large area.	All the electric power station should be digitized.	The data will be acquired in the field identification. The centre of building for the electric power station shall be digitized.	Colour : Black width : 0.15mm 	_05_Construction	Public_Pnt
	Constructions	Building Symbols	Transformer Station	4	2	12 (4212)	point	A place for changing electricity from one voltage to another.	All the transformer station should be digitized.	The data will be acquired in the field identification. The centre of building for the transformer station shall be digitized.	Colour : Black width : 0.15mm 	_05_Construction	Public_Pnt
	Constructions	Building Symbols	Meteorological station	4	2	13 (4213)	point	A station where weather conditions are studied or are forecasted.	All the meteorological station should be digitized.	The information will be collected in the field identification. The centre of the station shall be digitized.	Colour : Black width : 0.15mm 	_05_Construction	Public_Pnt
	Constructions	Building Symbols	Water Treatment Plant	4	2	14 (4214)	point	A place where a water is cleaned up for drinking.	All the water treatment plant should be digitized.	The information will be collected in the field identification. The centre of the plant shall be digitized.	Colour : Blue width : 0.15mm 	_05_Construction	Public_Pnt

No.	Feature Class	Data Class	Feature Name	Code Number F.C	Code Number D.C	Code Number No.	Data Type	Definition	Acquisition Criterion	Data Acquisition Method	Symbol (Shape and Size)	GIS Data structure: Feature Data Set	GIS Data structure: Feature Class
	Constructions	Building Symbols	Sewage treatment Plant	4	2	15 (4215)	point	A place where a sewage or drainage are cleaned up for effluent disposal.	All the sewage treatment plant should be digitized.	The information will be collected in the field identification. The centre of the plant shall be digitized.	Colour : Brown width : 0.15mm 	_05_Construction	Public_Pnt
	Constructions	Building Symbols	Waste treatment site	4	2	16 (4216)	point	A place where garbage is disposed.	All the waste treatment site should be digitized.	The information will be collected in the field identification. The centre of the site shall be digitized.	Colour : Brown 	_05_Construction	Public_Pnt
	Constructions	Building Symbols	School	4	2	17 (4217)	point	A place where children or student are taught.	All the school (elementary, secondary, high, university, colleges) should be digitized.	The information will be collected by the field identification. The centre of the main building for school (elementary, secondary, high, university, colleges) shall be digitized.	Colour : Black 	_05_Construction	Public_Pnt
	Constructions	Building Symbols	Hospital	4	2	18 (4218)	point	A building which sick or injured people are taken care of and receive medical treatment.	All the hospital and other medical center should be digitized.	The information will be collected by the field identification. The centre of the main building of hospital or other medical center shall be digitized.	Colour : Blue 	_05_Construction	Public_Pnt
	Constructions	Building Symbols	Stadium	4	2	19 (4219)	point	A building for sports, consisting of a field surrounded by rows of seats.	All the stadium should be digitized.	The information will be collected by the field identification. The centre of the stadium shall be digitized.	Colour : Black width : 0.15mm 	_05_Construction	Public_Pnt
	Constructions	Building Symbols	Factory	4	2	20 (4220)	point	A building or group of buildings in which goods are produced in large quantities, using machines.	Main or Important factory should be degitized	The information will be collected by the field identification. The centre of the main building of factory shall be digitized.	Colour : Black width : 0.15mm 	_05_Construction	Public_Pnt

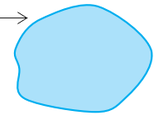
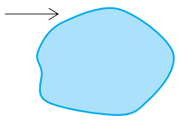
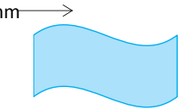
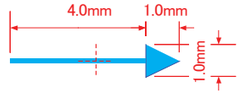
No.	Feature Class	Data Class	Feature Name	Code Number F.C	D.C	No.	Data Type	Definition	Acquisition Criterion	Data Acquisition Method	Symbol (Shape and Size)	GIS Data structure: Feature Data Set	Feature Class
	Constructions	Building Symbols	Petrol station	4	2	21 (4221)	point	A place where you can buy oil, diesel, kerosene and petro.	The major petorol station should be digitized.	The data will be acquired by the field identification. The centre of building for the petrol station shall be digitized.	Colour : Black Width : 0.15mm 	_05_Construction	Public_Pnt
	Constructions	Building Symbols	Fortress	4	2	22 (4222)	point	A place of ruin that is a strong building or group of buildings used by soldiers or an army for defending an important place.	All the ruin of fortress should be digitized.	The data will be acquired by the ministry of cultures and the field identification. The centre of ruin fortress shall be digitized.	Colour : Black Width : 0.15mm 	_05_Construction	Public_Pnt
	Constructions	Building Symbols	Archaeological site	4	2	23 (4223)	point	The site that remains of building, graves, tools etc of ancient societies.	All the archaeological site should be digitized.	The data will be acquired by the ministry of cultures and the field identification. The centre of archaeological site shall be digitized.	Colour : Black Width : 0.15mm 	_05_Construction	Public_Pnt
	Constructions	Small Objects	Antenna tower	4	3	1 (4301)	point	A tall structure, often made of metal, used for signaling, broadcasting, receiving for radio, television, mobile phone or Internet.	All the antenna tower should be digitized.	The data will be acquired by the photo interpretation/field identification. The centre of antenna tower shall be digitized.	Colour : Black 	_05_Construction	Remarkable_Pnt
	Constructions	Small Objects	Chimney	4	3	2 (4302)	point	A pipe inside a factory building for smoke from a fire to go out through the roof.	A large chimney should be digitized.	The data will be acquired by the photo interpretation/field identification. The centre of the chimney shall be digitized.	Colour : Black 	_05_Construction	Remarkable_Pnt
	Constructions	Small Objects	Wind mill for producing electricity	4	3	3 (4303)	point	A building or structure with parts that turn around in the wind, used for producing electrical power.	The main wind mill for producing electricity should be digitized.	The data will be acquired in the field identification. The centre of wind mill shall be digitized.	Colour : Blue Width : 0.15mm 	_05_Construction	Remarkable_Pnt
	Constructions	Small Objects	Water tank	4	3	4 (4304)	point	A large container for storing water.	The water tank that has more than 25m diameter should be digitized.	The data will be acquired by the photo interpretation/field identification. The centre of water tank shall be digitized.	Colour : Blue 	_05_Construction	Remarkable_Pnt

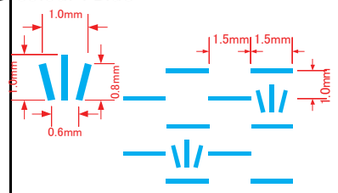
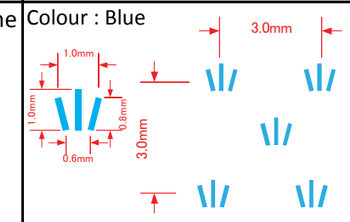
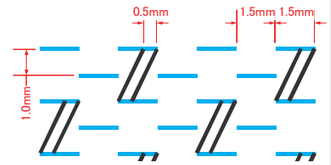
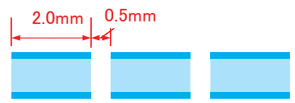
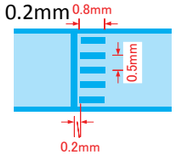
No.	Feature Class	Data Class	Feature Name	Code Number F.C	D.C	No.	Data Type	Definition	Acquisition Criterion	Data Acquisition Method	Symbol (Shape and Size)	GIS Data structure: Feature Data Set	Feature Class
	Constructions	Small Objects	Silo	4	3	4305	point	A tall structure like a tower that is used for storing grain, winter food for farm animals etc.	The major silo should be digitized.	The data will be acquired by the photo interpretation/field identification. The centre of silo shall be digitized.	Colour : Black 	_05_Construction	Remarkable_Pnt
	Constructions	Small Objects	Monument / Memorial	4	3	4306	point	A building, other large structure or a large area that is built to remind people of an important event or famous person.	All the monument / Memorial should be digitized.	The data will be acquired in the field identification. The centre of building or structure for the monument / Memorial shall be digitized.	Colour : Black Width: 0.15mm 	_05_Construction	Remarkable_Pnt
	Constructions	Small Objects	Memorial Panel	4	3	4307	point	A significant panel or board structure that is built to remind people of an important event or famous person.	The major memorial panel should be digitized.	The data will be acquired in the field identification. The centre of structure for the memorial panel shall be digitized.	Colour : Black Width: 0.15mm, 0.2mm 	_05_Construction	Remarkable_Pnt
	Constructions	Small Objects	Cave	4	3	4308	point	A large natural hole in the side of a cliff or hill or under the ground.	All the cave should be digitized.	The data will be acquired in the field identification. The centre of entrance of cave shall be digitized.	Colour : Black 	_05_Construction	Remarkable_Pnt
	Constructions	Public Facility	High tension power line	4	4	4401	line	A wires, lines that have a powerful electric current going through them with tower.	The high tension line more than 220Kv should be digitized.	The data will be acquired by the photo interpretation/field identification and the electric company. The connected line between the power transmission towers shall be digitized.	Colour : Black Width: 0.15mm 	_05_Construction	Object_Lin
	Constructions	Public Facility	Water pipe line	4	4	4402	line	A pipe line used for delivering water from a place to another place.	The water pipe line more than 250m long and 2m diameter of pipe should be digitized.	The data will be acquired by the photo interpretation/field identification. The centre of the pipe line shall be digitized.	Colour : Blue Width: 0.15mm 	_05_Construction	Object_Lin
	Constructions	Public Facility	Oil pipe line	4	4	4403	line	A pipe line used for delivering oil from a place to another place.	The oil pipe line more than 250m long and 2m diameter of pipe should be digitized.	The data will be acquired by the photo interpretation/field identification. The data will be acquired by the oil company. The centre of the pipe line shall be digitized.	Colour : Black Width: 0.15mm 	_05_Construction	Object_Lin

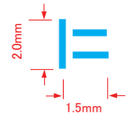
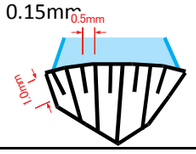
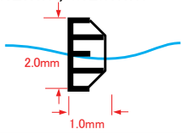
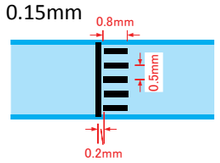
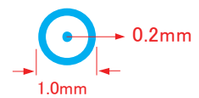
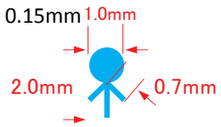
No.	Feature Class	Data Class	Feature Name	Code Number			Data Type	Definition	Acquisition Criterion	Data Acquisition Method	Symbol (Shape and Size)	GIS Data structure	
				F.C	D.C	No.						Feature Data Set	Feature Class
	Constructions	Public Facility	Gas pipe line	4	4	4 **4404**	line	A pipe line used for delivering gas from a place to another place.	The gas pipe line more than 250m long and 2m diameter of pipe should be digitized.	The data will be acquired by the photo interpretation/field identification. The data will be acquired by the gas company. The centre of the pipe line shall be digitized.	Colour : Black Width: 0.15mm 	_05_Construction	Object_Lin

Map symbols for 1:25,000 scale Digital Topographic Map

5.0 Water

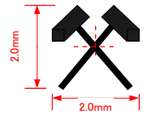
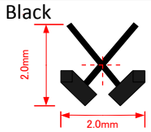
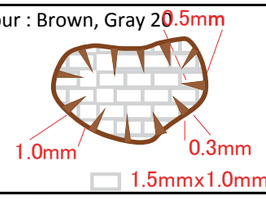
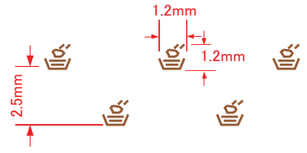
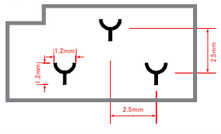
No.	Feature Class	Data Class	Feature Name	Code Number F.C	D.C	No.	Data Type	Definition	Acquisition criterion	Data Acquisition method	Symbol (Shape and Size)	GIS Data structure: Feature Data Set	Feature Class
	Water	Water Area	Lake	5	1	1 (**5101**)	polygon (Line)	A large area of water surrounded by land.	The lake whose size is more than 25m by 25m should be digitized.	The data will be acquired by the photo interpretation/field identification. The edge of lake shall be digitized. The direction of digitizing is clockwise.	Colour : Blue, Light Blue 0.15mm → 	_06_Water	Water_Poly
	Water	Water Area	Pond	5	1	2 (**5102**)	polygon (Line)	A small body of water formed naturally or created artificially.	The pond whose size is more than 25m by 25m should be digitized.	The data will be acquired by the photo interpretation/field identification. The edge of pond shall be digitized. The direction of digitizing is clockwise.	Colour : Blue, Light Blue Text : Timed new roman 6pt. 0.15m → 	_06_Water	Water_Poly
	Water	Water Area	River (wide)	5	1	3 (**5103**)	line	A wide river continuous flow of water having both sides in a long line across a country enters into a lake etc.	The river whose width is more than 20m should be digitized.	The data will be acquired by the photo interpretation. The boundary of a wide river shall be digitized. The river is always right side during digitizing.	Colour : Blue, Light Blue 0.15mm → 	_06_Water	Water_Poly
	Water	Water Area	River (symbol)	5	1	4 (**5104**)	line	A narrow river is a natural and continuous flow of water in a long line across a country into a river and a lake.	The river whose width is less than 20m should be digitized.	Data will be acquired by the photo interpretation. The centre of a river shall be digitized.	Colour : Blue Width: 0.15mm 0.15mm → 	_06_Water	Water_Lin
	Water	Water area	River flow indicator	5	1	5 (**5105**)	point	A direction of flow in a river.	The flow arrow should be expressed in a wide river.	The data will be acquired in the field identification/photo interpretation. For river width more than 25m, A flow arrow shall be expressed at the centre of river.	Colour : Blue Width: 0.15mm 	_06_Water	Indicator

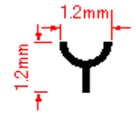
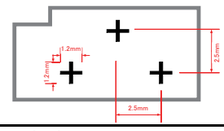
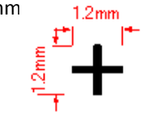
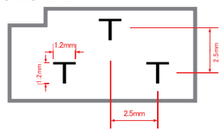
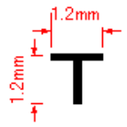
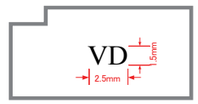
No.	Feature Class	Data Class	Feature Name	Code Number F.C	D.C	No.	Data Type	Definition	Acquisition criterion	Data Acquisition method	Symbol (Shape and Size)	GIS Data structure Feature Data Set	Feature Class
	Water	Water Area	Marsh	5	1	6 **5106**	Polygon	A area of low wet ground, often between the river and land, in which grasses or bushes may grow.	The marsh whose size is more than 250m by 250m should be digitized.	The data will be acquired by the photo interpretation/field identification. The edge of marsh shall be digitized. The direction of digitizing is clockwise.	Colour : Blue 	_06_Water	Water_Poly
	Water	Water Area	Swamp	5	1	7 **5107**	Polygon	A large area of low wet land near a river, where wild plants and trees grow.	The swamp whose size is more than 250m by 250m should be digitized.	The data will be acquired by the photo interpretation/field identification. The edge of swamp shall be digitized. The direction of digitizing is clockwise.	Colour : Blue 	_06_Water	Water_Poly
	Water	Water Area	Peat land	5	1	8 **5108**	Polygon	A area that are covered by a substance formed from decaying plants under the surface of ground, which can be burned instead of coal, or mixed with earth to help plants grow well.	The peat land whose size is more than 250m by 250m should be digitized.	The data will be acquired by the photo interpretation/field identification. The edge of peat land shall be digitized. The direction of digitizing is clockwise.	Colour : Blue, Gray 	_06_Water	Water_Poly
	Water	Water Area	Canal (≧ 25m)	5	1	9 **5109**	line	A long narrow stream of water for ships or boats to travel along, or to bring water from somewhere.	The canal having more than 25m width and more than 250m long should be digitized.	The data will be acquired by the photo interpretation and the field identification. The edge of canal shall be digitized. The canal is always right side during digitizing.	Colour : Blue Width: 0.15mm 	_06_Water	Water_Lin
	Water	Water Area	Canal (<25m)	5	1	10 **5110**	line	A long narrow stream of water for ships or boats to travel along, or to bring water from somewhere.	The canal having less than 25m width and more than 250m long should be digitized.	The data will be acquired by the photo interpretation and the field identification. The center of canal shall be digitized.	Colour : Blue Width: 0.15mm 	_06_Water	Water_Lin
	Water	Natural object in the water area	Water fall (big)	5	2	1 **5201**	line	A place where water falls straight down over a cliff or rock.	The water fall in a wide river that has more than 10m height difference should be digitized.	The data will be acquired in the field identification. The line over a water fall shall be digitized. The downriver is always right side during digitizing.	Colour : Blue Width: 0.2mm 	_06_Water	Water_Lin

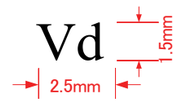
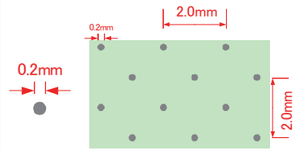
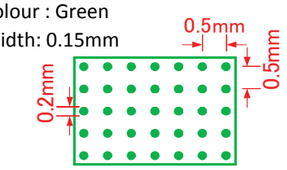
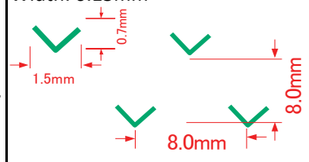
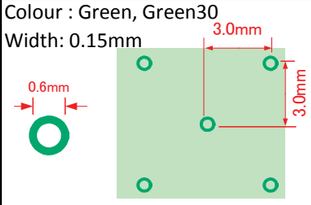
No.	Feature Class	Data Class	Feature Name	Code Number F.C	D.C	No.	Data Type	Definition	Acquisition criterion	Data Acquisition method	Symbol (Shape and Size)	GIS Data structure: Feature Data Set	Feature Class
	Water	Natural object in the water area	Water fall (small)	5	2	2 (5202)	point	A place where water falls straight down over a cliff or rock.	The water fall in a river (symbol) that has more than 10m height difference should be digitized.	The data will be acquired in the field identification. The centre of water fall shall be digitized.	Colour : Blue Width: 0.3mm 	_06_Water	Water_Pnt
	Water	Artificial object in the water area	Dam(big)	5	3	1 (5301)	line	A special wall built across a river, stream etc. to control the flows of water from especially to make reservoir or produce electricity.	The dam that is more than 20m width and 30 m height should be digitized.	The data will be acquired in the photo interpretation/the field identification. The edge of dam shall be digitized.	Colour : Black Width: 0.15mm 	_06_Water	Water_Lin
	Water	Artificial object in the water area	Dam(small)	5	3	2 (5302)	point	A special wall built across a river, stream etc. to control the flows of water from especially to make reservoir or produce electricity.	The dam that is less than 20m width and 30 m height should be digitized.	The data will be acquired in the photo interpretation/the field verification. The centre of top of dam shall be digitized.	Colour : Blue Width: 0.2mm, 0.15mm 	_06_Water	Water_Pnt
	Water	Artificial object in the water area	Weir	5	3	3 (5303)	line	A low structure built across a river or stream to control the flow of water.	The weir more than 20m should be digitized.	The data will be acquired by the field identification. The centre of weir shall be digitized. The downriver is always right side during digitizing.	Colour : Black Width: 0.15mm 	_06_Water	Water_Lin
	Water	Artificial object in the water area	Pier-Jetty	5	3	4 (5304)	line	A wide built out into the water, especially so that boats can stop next to it.	The pier-jetty that has more than 25m width and 25m long should be digitized.	The data will be acquired by the field identification. The edge of pier-jetty shall be digitized.	Colour : Black Width: 0.15mm 	_06_Water	Water_Lin
	Water	Artificial object in the water area	Well	5	3	5 (5305)	point	A deep hole in the ground from which people take water.	The well with more than 15m diameters that is used should be digitized.	The data will be acquired by the field identification. The centre of well shall be digitized.	Colour : Blue Width: 0.15mm 	_06_Water	Water_Pnt
	Water	Artificial object in the water area	Fountain	5	3	6 (5306)	point	A place with pool structure where water comes up naturally from the ground.	The fountains that is used permanently should be digitized.	The data will be acquired by the field identification. The centre of fountain shall be digitized.	Colour : Blue Width: 0.15mm 	_06_Water	Water_Pnt

Map symbols for 1:25,000 scale Digital Topographic Map

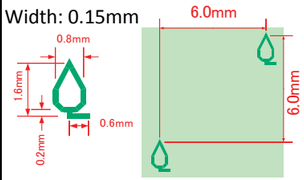
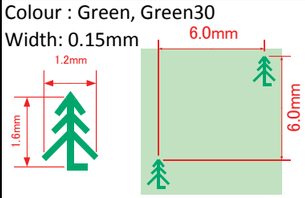
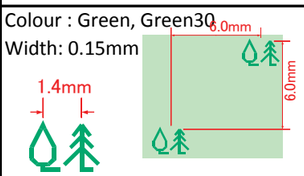
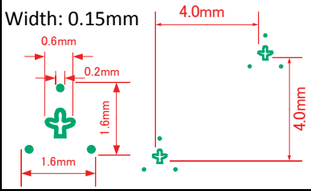
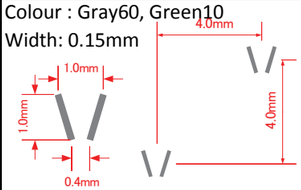
6.0 Land Use

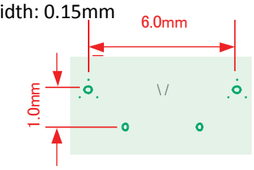
No.	Feature Class	Data Class	Feature Name	Code Number F.C	D.C	No.	Data Type	Definition	Acquisition criterion	Data Acquisition method	Symbol (Shape and Size)	GIS Data structure: Feature Data Set	Feature Class
	Land Use	Land facility	Mine	6	1	1 **6101**	point	A deep hole or series of holes in the ground from which coal, gold etc, is dug.	All the mine should be digitized.	The data will be acquired by the photo interpretation/field identification. The centre of mine shall be digitized.	Colour : Black 	_07_Land_Use	LandUse_Pnt
	Land Use	Land facility	Abandoned mine	6	1	2 **6102**	point	An abandoned deep hole or series of holes in the ground from which coal, gold etc, is dug.	All the abandoned mine should be digitized.	The data will be acquired by the field identification. The centre of abandoned mine shall be digitized.	Colour : Black 	_07_Land_Use	LandUse_Pnt
	Land Use	Land facility	Rock quarry	6	1	3 **6103**	polygon (Line)	A place where large amount of stone are dug out of the ground.	The rock quarry more than 200m by 200m should be digitized.	The data will be acquired by the photo interpretation and the field identification. The boundary of rock quarry shall be digitized. The direction of plotting is always clockwise.	Colour : Brown, Gray 20 	_07_Land_Use	LandUse_Poly
	Land Use	Land facility	Garbage storage facility	6	1	4 **6104**	polygon	A place where the waste materials that are thrown away, such as paper, empty containers, and old food are stored.	The garbage storage facility more than 200m by 200m should be digitized.	The data will be acquired by the photo interpretation and the field identification. The boundary of the garbage storage facility shall be digitized. The direction of digitizing is always clockwise.	Colour : Brown 	_07_Land_Use	LandUse_Poly
	Land Use	Religious Area	Muslim cemetery	6	2	1 **6201**	polygon (Line)	An area of land where dead Muslim people are buried.	The Muslim cemetery more than 50m by 50m should be digitized.	The data will be acquired by the photo interpretation and the field identification. The boundary of cemetery shall be digitized. The direction of digitizing is always clockwise.	Colour : Black、Gray60 Width: 0.15mm 	_07_Land_Use	LandUse_Poly

No.	Feature Class	Data Class	Feature Name	Code Number F.C	D.C	No.	Data Type	Definition	Acquisition criterion	Data Acquisition method	Symbol (Shape and Size)	GIS Data structure: Feature Data Set	Feature Class
	Land Use	Religious Area	Muslim cemetery (small)	6	2	2 **6202**	point	An area of land where dead Muslim people are buried.	The Muslim cemetery less than 50m by 50m should be digitized.	The data will be acquired by the photo interpretation and the field identification. The centre of cemetery shall be digitized.	Colour : Black 	_07_Land_Use	LandUse_Pnt
	Land Use	Religious Area	Christian cemetery	6	2	3 **6203**	polygon (Line)	An area of land where dead Christian people are buried.	The Christian cemetery more than 50m by 50m should be digitized.	The data will be acquired by the photo interpretation and the field identification. The boundary of cemetery shall be digitized. The direction of digitizing is always clockwise.	Colour : Black、Gray60 Width: 0.15mm 	_07_Land_Use	LandUse_Poly
	Land Use	Religious Area	Christian cemetery (small)	6	2	4 **6204**	point	An area of land where dead Christian people are buried.	The Christian cemetery less than 50m by 50m should be digitized.	The data will be acquired by the photo interpretation and the field identification. The centre of cemetery shall be digitized.	Colour : Black Width: 0.15mm 	_07_Land_Use	LandUse_Pnt
	Land Use	Religious Area	Jewish cemetery	6	2	5 **6205**	polygon (Line)	An area of land where dead Jewish people are buried.	The Jewish cemetery more than 50m by 50m should be digitized.	The data will be acquired by the photo interpretation and the field identification. The boundary of cemetery shall be digitized. The direction of digitizing is always clockwise.	Colour : Black、Gray60 Width: 0.15mm 	_07_Land_Use	LandUse_Poly
	Land Use	Religious Area	Jewish cemetery (small)	6	2	6 **6206**	point	An area of land where dead Jewish people are buried.	The Jewish cemetery less than 50m by 50m should be digitized.	The data will be acquired by the photo interpretation and the field identification. The centre of cemetery shall be digitized.	Colour : Black 	_07_Land_Use	LandUse_Pnt
	Land Use	Religious Area	Martyr cemetery	6	2	7 **6207**	polygon (Line)	A cemetery of the martyrs who have died in the Kosovo Liberation Army war.	The martyr cemetery more than 50m by 50m or tomb should be digitized.	The data will be acquired by the photo interpretation and the field identification. The boundary of cemetery shall be digitized. The direction of digitizing is always clockwise.	Colour : Black、Gray60 Width: 0.15mm 	_07_Land_Use	LandUse_Poly

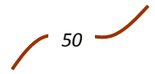
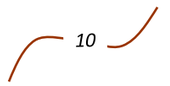
No.	Feature Class	Data Class	Feature Name	Code Number F.C	D.C	No.	Data Type	Definition	Acquisition criterion	Data Acquisition method	Symbol (Shape and Size)	GIS Data structure: Feature Data Set	Feature Class
	Land Use	Religious Area	Martyr cemetery (small)	6	2	8 **6208**	point	A cemetery of the martyrs who have died in the Kosovo Liberation Army war.	A cemetery of the martyrs who have died in the Kosovo Liberation Army war.	The data will be acquired by the photo interpretation and the field identification. The centre of cemetery shall be digitized.	Colour : Black 	_07_Land_Use	LandUse_Pnt
	Land Use	Plantation	Vineyard	6	3	1 **6301**	polygon	A piece of land where grapevines are grown in order to produce wine.	The vineyard more than 250m by 250m should be digitized.	The data will be acquired by the photo interpretation and the field identification. The boundary of vineyard shall be digitized. The direction of digitizing is always clockwise.	Colour : Gray60, Green 30 	_07_Land_Use	LandUse_Poly
	Land Use	Plantation	Orchard	6	3	2 **6302**	polygon (Line)	A piece of land where fruit trees are grown.	The orchard more than 250m by 250m should be digitized.	The data will be acquired by the photo interpretation and the field identification. The boundary of orchard shall be digitized. The direction of digitizing is always clockwise.	Colour : Green Width: 0.15mm 	_07_Land_Use	LandUse_Poly
	Land Use	Plantation	Other cultivated area	6	3	3 **6303**	polygon	A piece of land where is cultivated for other crops etc..	The other cultivated area more than 250m by 250m should be digitized.	The data will be acquired by the photo interpretation and the field identification. The boundary of other cultivated area shall be digitized. The direction of digitizing is always clockwise.	Colour : Green Width: 0.15mm 	_07_Land_Use	LandUse_Poly
	Land Use	Plantation	Forested site	6	3	4 **6304**	polygon	A field in which specified trees are planted.	The forested site more than 250m by 250m should be digitized.	The data will be acquired by the photo interpretation and the field identification. The boundary of forested site field shall be digitized. The direction of digitizing is always clockwise.	Colour : Green, Green30 Width: 0.15mm 	_07_Land_Use	LandUse_Poly

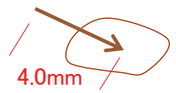
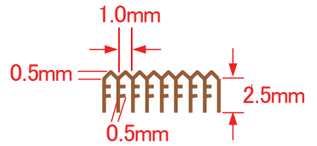
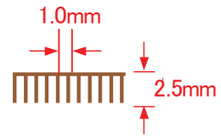
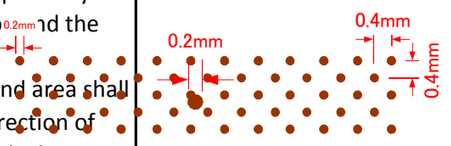
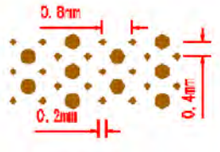
7.0 Vegetations

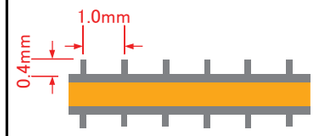
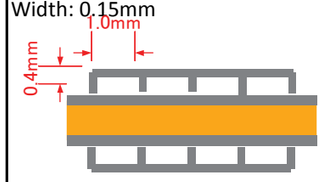
No.	Feature Class	Data Class	Feature Name	Code Number F.C	Code Number D.C	Code Number No.	Data Type	Definition	Acquisition criterion	Data Acquisition method	Symbol (Shape and Size)	GIS Data structure: Feature Data Set	GIS Data structure: Feature Class
	Vegetation	Vegetation	Broad leaf forest	7	1	1 (7101)	Polygon	A field in which broad leaf trees are grow.	The broad leaf forest more than 250m by 250m should be digitized.	The data will be acquired by the photo interpretation and the field identification. The boundary of broad leaf forest shall be digitized. The direction of digitizing is always clockwise.	Colour : Green, Green30 Width: 0.15mm 	_08_Vegitation	Vegitation
	Vegetation	Vegetation	Coniferous forest	7	1	2 (7102)	Polygon	A field in which needle leaf trees are grow.	The coniferous forest more than 250m by 250m should be digitized.	The data will be acquired by the photo interpretation and the field identification. The boundary of coniferous forest shall be digitized. The direction of digitizing is always clockwise.	Colour : Green, Green30 Width: 0.15mm 	_08_Vegitation	Vegitation
	Vegetation	Vegetation	Mixed forest	7	1	3 (7103)	Polygon	A field in which broad leaf trees and needle leaf trees are grow by mixture.	The mixed forest more than 250m by 250m should be digitized.	The data will be acquired by the photo interpretation and the field identification. The boundary of mixed forest shall be digitized. The direction of digitizing is always clockwise.	Colour : Green, Green30 Width: 0.15mm 	_08_Vegitation	Vegitation
	Vegetation	Vegetation	Scrub	7	1	4 (7104)	Polygon	A field where a low bushes and trees are grown in very dry soil.	The scrub more than 250m by 250m should be digitized.	The data will be acquired by the photo interpretation and the field identification. The boundary of scrub area shall be digitized. The direction of digitizing is always clockwise.	Colour : Green Width: 0.15mm 	_08_Vegitation	Vegitation
	Vegetation	Vegetation	Grassland	7	1	5 (7105)	Polygon	A field in which grasses are grow.	The grassland field more than 250m by 250m should be digitized.	The data will be acquired by the photo interpretation and the field identification. The boundary of grassland field shall be digitized. The direction of digitizing is always clockwise.	Colour : Gray60, Green10 Width: 0.15mm 	_08_Vegitation	Vegitation

No.	Feature Class	Data Class	Feature Name	Code Number			Data Type	Definition	Acquisition criterion	Data Acquisition method	Symbol (Shape and Size)	GIS Data structure	
				F.C	D.C	No.						Feature Data Set	Feature Class
	Vegetation	Vegetation	Grassland with trees	7	1	6 **7106**	Polygon	A field in which grasses are grow with trees.	The grassland with trees more than 250m by 250m should be plotted.	The data will be acquired by the photo interpretation and the field identification. The boundary of grassland with trees shall be digitized. The direction of digitizing is always clockwise.	Colour : Gray60, Green10 Width: 0.15mm 	_08_Vegitation	Vegitation

8.0 Geography

No.	Feature Class	Data Class	Feature Name	Code Number F.C	D.C	No.	Data Type	Definition	Acquisition criterion	Data Acquisition method	Symbol (Shape and Size)	GIS Data structure: Feature Data Set	Feature Class
	Geography	Contours	Main Contour Line	8	1	1 (**8101**)	line	A line that connects the points with the same height that has 50m height interval from zero meter high above mean sea level.	All the main contour line that is identified should be digitized.	The point that has the same height on the main contour lines shall be digitized using the aerial photography. The lower side is always right side while digitizing.	Colour : Brown Width: 0.15mm 	_09_Geography	Contour
	Geography	Contours	Normal Contour Line	8	1	2 (**8102**)	line	A line that connects the points with the same height that has 10m height interval between the main contour lines.	All the normal contour line that is identified should be digitized.	The point that has the same height on the normal contour lines shall be digitized using the aerial photography. The lower side is always right side while digitizing.	Colour : Brown Width: 0.1mm 	_09_Geography	Contour
	Geography	Contours	Intermediate Contour Line	8	1	3 (**8103**)	line	A line that connects the points with the same height that has 5m height interval between the normal contour lines.	All the intermediate contour line that is identified should be digitized.	The point that has the same height on the intermediate contour lines shall be digitized using the aerial photography. The lower side is always right side while digitizing.	Colour : Brown Width: 0.1mm 	_09_Geography	Contour
	Geography	Contours	Supplementary Contour Line	8	1	4 (**8104**)	line	A line that connects the points with the same height that has 2. 5m height interval between the Intermediate contour lines.	All the supplementary contour line that is identified should be digitized.	The point that has the same height on the supplementary contour lines shall be digitized using the aerial photography. The lower side is always right side while digitizing.	Colour : Brown Width: 0.1mm 	_09_Geography	Contour
	Geography	Common Geography	Depression: Large	8	2	1 (**8201**)	line	A part of a surface that is deeper or lower than the other parts.	The depression that is more than 250m by 250m should be digitized.	The data will be acquired by the 3D plotting. The boundary line of depression shall be digitized. The direction of digitizing is clockwise. The deepest point in the depression shall be digitized as	Colour : Brown Width: 0.1mm  *tick line width 0.1mm length 0.5 mm; spacing 5.0 mm*	_09_Geography	Geography_Lin

No.	Feature Class	Data Class	Feature Name	Code Number F.C	D.C	No.	Data Type	Definition	Acquisition criterion	Data Acquisition method	Symbol (Shape and Size)	GIS Data structure: Feature Data Set	Feature Class
	Geography	Common Geography	Depression : small	8	2	2 (8202)	point	A part of a surface that is deeper or lower than the other parts.	The depression that is less than 100m by 100m should be plotted.	The data will be acquired by the 3D plotting. The centre of depression shall be digitized.	Colour : Brown Width: 0.15mm 	_09_Geography	Geography_Pnt
	Geography	Common Geography	Cliff	8	2	3 (8203)	line	A high, steep side of a large area of rock or mountain	The cliff that is more than 100m long should be digitized.	The data will be acquired by the field identification. The edge of top cliff shall be digitized. The direction of digitizing is as follows, The lower side is always right side while digitizing.	Colour : Brown Width: 0.15mm 	_09_Geography	Geography_Lin
	Geography	Common Geography	Steep slope	8	2	4 (8204)	line	A high, steep side of a large area of sands or mountain	The steep slope that is more than 100m long should be digitized.	The data will be acquired by the field identification. The edge of top steep slope shall be digitized. The direction of digitizing is as follows, The lower side is always right side while digitizing.	Colour : Brown Width: 0.15mm 	_09_Geography	Geography_Lin
	Geography	Common Geography	Sand area	8	2	5 (8205)	polygon	An areas where are covered by sand.	The sand area more than 250m by 250m should be digitized.	The data will be acquired by the photo interpretation and the field identification. The boundary of sand area shall be digitized. The direction of digitizing is always clockwise.	Colour : Brown 	_09_Geography	Geography_Poly
	Geography	Common Geography	Sand gravel field	8	2	6 (8206)	Polygon	A place where is scattered a sand gravels.	The sand gravel field more than 250m by 250m should be digitized.	The data will be acquired by the field identification. The edge of the sand gravel field shall be digitized. The direction of digitizing is always clockwise.	Colour : Brown 	_09_Geography	Geography_Poly

No.	Feature Class	Data Class	Feature Name	Code Number			Data Type	Definition	Acquisition criterion	Data Acquisition method	Symbol (Shape and Size)	GIS Data structure	
				F.C	D.C	No.						Feature Data Set	Feature Class
	Geography	Common Geography	Embankment	8	2	7 **8207**	line	A wide wall of earth or stones built to support a road or rail way.	The embankment more than 3m width of top, more than 5m height and more than 250m long should be digitized.	The data will be acquired by a photo interpretation/a field identification. The edge of top shall be digitized. The direction of digitizing is as follows, The lower side is always right side while digitizing.	Colour: Gray60 Width: 0.15mm 	_09_Geography	Geography_Lin
	Geography	Common Geography	Cutting	8	2	8 **8208**	line	The cutting is the place where was cut in the mountain sloop.	The cutting more than 5m height and more than 250m long should be digitized.	The data will be acquired by a photo interpretation/a field identification. The edge of top shall be digitized. The direction of digitizing is as follows, The lower side is always right side while digitizing.	Colour: Gray60 Width: 0.15mm 	_09_Geography	Geography_Lin

9.0 Annotations

No.	Feature Class	Data Class	Feature Name	Code Number F.C	D.C	No.	Data Type	Definition	Acquisition criterion	Data Acquisition method	Symbol (Shape and Size)	GIS Data structure: Feature Data Set	Feature Class
	Annotations	State name	Name of nation	9	1	1 (**9101**)	text	A name of nation	All the nation/country name should be expressed.	The data will be acquired in the field identification and the related documents. The name shall be expressed in the centre of the targeted feature.	Colour:Black/Arial Italic CAPS 20pt REPUBLIC OF KOSOVO	_10_Anotation	An_9101 (An_9101 on Point)
	Annotations	Administrative name	Village under 1,000 name	9	2	1 (**9201**)	text	A name of village under 1,000	All the village under 1,000 name should be expressed.	The data will be acquired in the field identification and the related documents. The name shall be expressed in the centre of the targeted feature.	Colour:Black/Times new Roman Regular C/L 10pt Village under 1,000	_10_Anotation	An_9201 (An_9201 on Point)
	Annotations	Administrative name	Village over 1,000 name	9	2	2 (**9202**)	text	A name of village over 1,000	All the village over 1,000 name should be expressed.	The data will be acquired in the field identification and the related documents. The name shall be expressed in the centre of the targeted feature.	Colour:Black/Times New Roman Regular C/L 12pt Village over 1,000	_10_Anotation	An_9202 (An_9202 on Point)
	Annotations	Administrative name	Town under 10,000 name	9	2	3 (**9203**)	text	A name of town under 10,000	All the town under 10,000 name should be expressed.	The data will be acquired in the field identification and the related documents. The name shall be expressed in the centre of the targeted feature.	Colour:Black/Times New Roman Regular CAPS 16pt TOWN UNDER 10,000	_10_Anotation	An_9203 (An_9203 on Point)
	Annotations	Administrative name	Town over 10,000 to 25,000 name	9	2	4 (**9204**)	text	A name of town over 10,000 to 25,000	All the town over 10,000 to 25,000 name should be expressed.	The data will be acquired in the field identification and the related documents. The name shall be expressed in the centre of the targeted feature.	Colour:Black/Times New Roman Regular CAPS 18pt TOWN OVER 10,000 TO 25,000	_10_Anotation	An_9204 (An_9204 on Point)
	Annotations	Administrative name	City over 25,000 name	9	2	5 (**9205**)	text	A name of town over 25,000	All the city over 25,000 name should be expressed.	The data will be acquired in the field identification and the related documents. The name shall be expressed in the centre of the targeted	Colour:Black Times New Roman Regular CAPS 20pt TOWN OVER 25,000	_10_Anotation	An_9205 (An_9205 on Point)

No.	Feature Class	Data Class	Feature Name	Code Number F.C	D.C	No.	Data Type	Definition	Acquisition criterion	Data Acquisition method	Symbol (Shape and Size)	GIS Data structure: Feature Data Set	Feature Class
Annotation positioning of area features should be required letter-space, curved, and placed with an angular should follow as existing map.													
	Annotations	Other administrative name	National park name	9	3	1 **9301**	text	A name of national park	All the national park name should be expressed.	The data will be acquired in the field identification and the related documents. The name shall be expressed in the centre of the targeted feature. ***-:Area names are positioned so that the area represented is clearly defined.*** ***This might require the name to be letter- spaced, curved, or placed in an angular.***	Colour:Black/Arial Regular C/L 16pt -10pt (2pt step) NATIONAL PARK NATIONAL PARK NATIONAL PARK NATIONAL PARK	_01_Boundaries	As an Attribute of National Park An_9301
	Annotations	Other administrative name	Cultural heritage name	9	3	2 **9302**	text	A name of cultural heritage	The famous cultural heritage name should be expressed.	The data will be acquired in the field identification and the related documents. The name shall be expressed in the centre of or near the targeted feature. ***-:Area names are positioned so that the area represented is clearly defined.*** ***This might require the name to be letter- spaced, curved, or placed in an angular.***	Colour:Black/Arial Italic C/L 14pt - 8pt (2pt step) *Heritage* *Heritage* *Heritage* *Heritage* *When labeling to individual or small concentrated groups of symbols comprising a single feature, the type is positioned adjacent to the feature or symbol defined.* *The font size for such like features should be used 10pt.*	_10_Anotation	An_9302 (An_9302 on Point)
	Annotations	Control point name	Control point name	9	4	1 **9401**	text	A name of control point	All the control point name should be expressed.	The data will be acquired in KCA The name data will be provided by KCA. The name shall be expressed in the appointed location.	Colour:Black/Arial Italic C/L 6pt *Control point name; GI01*	_02_Control_Points	As an Attribute of Contorl Points An_9401
	Annotations	Control point name	Control point height	9	4	2 **9402**	text	A height value of control point	All the control point height should be expressed.	The data will be acquired in KCA The height data will be provided by KCA. The height value shall be expressed in the appointed location.	Colour:Black/Arial Italic C/L 6pt *123.4*	_02_Control_Points	As an Attribute of Contorl Points An_9402
	Annotations	Transportation /Traffic facility	Road name	9	5	1 **9501**	text	A name of motorway road	The motorway road name should be expressed.	The data will be acquired by the document from the ministry of transportation. The name of road shall be expressed along the targeted road.	Colour:Black/Arial Italic C/L 6pt *Motorway Road, M25-2*	_03_Trans_Traffic	As an Attribute of Road An_9501

No.	Feature Class	Data Class	Feature Name	Code Number F.C	D.C	No.	Data Type	Definition	Acquisition criterion	Data Acquisition method	Symbol (Shape and Size)	GIS Data structure: Feature Data Set	Feature Class
	Annotations	Transportation /Traffic facility	Airport name	9	5	2 **9502**	text	A name of airport	All the airport name should be expressed.	The data will be acquired by the field identification. The name shall be expressed in the centre of the targeted feature.	Colour:Black/Arial Regular C/L 8pt Airport	_04_Trans_Traffic	As an Attribute of Airport An_9502
	Annotations	Water area name	Lake name	9	6	1 **9601**	text	A name of lake	The name of major lake should be expressed.	The data will be acquired by the field identification. The name shall be expressed in the centre of the targeted feature. ***-:The label centered within the limits of the feature. When labeling large expanses of water, letter space should be required.***	Colour:Blue/Arial Italic C/L 14pt - 8pt (2pt step) *Lake* *Lake* *Lake* *Lake* *When the type could not place centre, the type is positioned adjacent to the feature or symbol defined. The font size for such like features should be used 10pt.*	_06_Water	As an Attribute of Water_Poly An_9601
	Annotations	Water area name	Pond name	9	6	2 **9602**	text	A name of pond	The name of major pond should be expressed.	The data will be acquired by the field identification. The name shall be expressed in the centre of the targeted feature. ***-:The label centered within the limits of the feature. When labeling large expanses of water, letter space should be required.***	Colour:Blue/Arial Italic C/L 14pt - 8pt (2pt step) *Pond* *Pond* *Pond* *Pond* *When the type could not place centre, the type is positioned adjacent to the feature or symbol defined. The font size for such like features should be used 10pt.*	_06_Water	As an Attribute of Water_Poly An_9602
	Annotations	Water area name	River name	9	6	3 **9603**	text	A name of river	The name of major river should be expressed.	The data will be acquired by the field identification. The name shall be expressed along the targeted feature. ***-: When labeling to double line river, it should be placed the name within the feature.*** ***If the feature has not enough to accommodate the whole name, it might be placed out of the double line river.***	Colour:Blue/Arial Italic C/L 14pt - 8pt (2pt step) *River* *River* *River* *River* *Single line river should be used 10pt.*	_06_Water	As an Attribute of Water_Poly and Water_Lin An_9603

No.	Feature Class	Data Class	Feature Name	Code Number F.C	D.C	No.	Data Type	Definition	Acquisition criterion	Data Acquisition method	Symbol (Shape and Size)	GIS Data structure: Feature Data Set	Feature Class
	Annotations	Water area name	Canal name	9	6	4 **9604**	text	A name of canal	The name of major canal should be expressed.	The data will be acquired by the field identification. The name shall be expressed along the targeted feature. ***-: When labeling to double line drain, it should be placed the name within the feature.*** ***If the feature has not enough to accommodate the whole name, it might be placed out of the double line canal.***	Colour:Blue/Arial Italic C/L 14pt - 8pt (2pt step) *Canal* *Canal* *Canal* *Canal* *Single line canal should be used 10pt.*	_06_Water	As an Attribute of Water_Lin An_9604
	Annotations	Natural object in the water area name	Fall name	9	7	1 **9701**	text	A name of water fall.	The name of major water fall should be expressed.	The data will be acquired by the field identification. The name shall be expressed by the upper side of feature in principal.	Colour:Blue/Arial Italic C/L 8pt *Waterfall*	_06_Water	As an Attribute of Water_Lin and Water_Pnt An_9701
	Annotations	Land use name	Mine name	9	8	1 **9801**	text	A name of mine	The name of major mine should be expressed.	The data will be acquired by the field identification. The name shall be expressed in the centre of targeted feature.	Colour:Black/Arial Regular C/L 10pt Mine	_07_Land_Use	As an Attribute of Landuse_pnt An_9801
	Annotations	Geography name	Mountain name	9	9	1 **9901**	text	A name of mountain	The name of major mountain should be expressed.	The data will be acquired by the field identification. The name shall be expressed in the centre of the targeted feature.	Colour:Black/Arial Italic C/L 10pt *Mountain* *The name should be placed on the center of Mountain peak or area.*	_10_Anotation	An_9901 (An_9901 on Point)
	Annotations	Geography name	Top of mountain name	9	9	2 **9902**	text	A name of top of mountain	The name of major top of mountain should be expressed.	The data will be acquired by the field identification. The name shall be expressed in the centre of the targeted feature.	Colour:Black/Arial Italic C/L 8pt *Mountain top* *123* *The name should be placed with elevation value as to coincide at the center of mountain peak.*	_10_Anotation	An_9902 (An_9902 on Point)
	Annotations	Geography name	Mountain range name	9	9	3 **9903**	text	A name of mountain range that is a long area of high land , especially at the top of a mountain.	The name of major mountain range should be expressed.	The data will be acquired by the field identification. The name shall be expressed along the targeted feature.	Colour:Black/Arial Italic CAPS 14pt - 8pt (2pt step) *MOUNTAIN RANGE* *MOUNTAIN RANGE* *MOUNTAIN RANGE* *MOUNTAIN RANGE* *When labeling to hypsographic features would be required extensive in size. The name is letter space and aligned parallel to the genera formation of the hypsographic features.*	_10_Anotation	An_9903 (An_9903 on Point)

No.	Feature Class	Data Class	Feature Name	Code Number F.C	D.C	No.	Data Type	Definition	Acquisition criterion	Data Acquisition method	Symbol (Shape and Size)	GIS Data structure: Feature Data Set	Feature Class
	Annotations	Geography name	Mountain ridge name	9	9	3 **9904**	text	A name of mountain ridge that is a long row of mountains that covers a large area.	The name of major mountain ridge should be expressed.	The data will be acquired by the field identification. The name shall be expressed along the targeted feature.	Colour:Black/Arial Italic C/L 14pt - 8pt (2pt step) *Mountain Ridge* *Mountain Ridge* *Mountain Ridge* *Mountain Ridge* *When labeling to hypsographic features would be required extensive in size. The name is letter space and aligned parallel to the genera formation of the hypsographic features.*	_10_Anotation	An_9904 (An_9904 on Point)
	Annotations	Geography name	Hill name	9	9	5 **9905**	text	A name of hill	The name of major hill should be expressed.	The data will be acquired by the field identification. The name shall be expressed in the centre of the targeted feature.	Colour:Black/Arial Italic C/L 10pt *Hill* *The name should be placed on the center of hill peak or area.*	_10_Anotation	An_9905 (An_9905 on Point)
	Annotations	Geography name	Canyon	9	9	6 **9906**	text	A name of canyon that is a deep valley with very steep sides of rock, that usually has a river running through it.	The name of major canyon should be expressed.	The data will be acquired by the field identification. The name shall be expressed along the targeted feature.	Colour:Black/Arial Italic C/L 12pt *Canyon* *The name is letter space and aligned parallel to the general formation of the canyon*	_10_Anotation	An_9906 (An_9906 on Point)
	Annotations	Geography name	Valley name	9	9	7 **9907**	text	A name of valley that is an area of lower land between two lines of hills or mountains, usually with a river flowing through it.	The name of major valley should be expressed.	The data will be acquired by the field identification. The name shall be expressed along the targeted feature.	Colour:Black/Arial Italic C/L 8pt *Valley* *The name is letter space and aligned parallel to the general formation of the valley*	_10_Anotation	An_9907 (An_9907 on Point)
	Annotations	Others	Others name	9	9	8 **9908**	text	A name of point features and other prominent features required to represent on map.	When applied to as “Neighborhood” name which is kind of dwelling area name, it might be required to expand letter space by referencing	The data will be acquired by the field identification and other materials The name shall be expressed adjacent to the targeted	Colour:Black/Times new Roman Regular C/L 8pt Medieval Monuments	_10_Anotation	An_9908 (An_9908 on Point)
	Annotations	Others	Contour Value	9	9	9 **9909**	text	A value of contour	All the contour height should be expressed.	The height value shall be expressed in the appointed location. The numbers are applied to INDEX contour.	Colour:brown/Arial Italic 6pt *500* *The contour values are not required to place toward higher direction.*	_09_Geography	An_9909 (An_9909 on Point)
	Annotations	Others	Merginal			 **9910**	text	Destination name		The destination name for "roads and railways" which are chosen appropriate name from neighbor map or a certain place of other shall be shown on outside of the map	Colour:Black/Arial Regular C/L 6pt Prishtinë	_10_Anotation	An_9910 (An_9910 on Point)