SCOPE OF WORK
FOR

THE STUDY FOR ESTABLISHMENT OF GEOGRAPHIC INFORMATION FOR IMPLEMENTATION OF NATIONAL PHYSICAL PLAN IN THE REPUBLIC OF MONTENEGRO

AGREED UPON AMONG

DEPARTMENT OF REAL ESTATE

DEPARTMENT FOR SPATIAL PLANNING
MINISTRY FOR ECONOMIC DEVELOPMENT,

AND

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

PODGORICA, 30. November 2006

Mr. Masao Shikano
Resident Representative of JICA Balkan Office
Japan International Cooperation Agency (JICA)

Mr. Rajko Jankovic
Director
Department of Real Estate (DRE)

Mr. Branimir Gvozdenovic
Minister
Ministry for Economic Development

I. INTRODUCTION

In response to a request of the Government of the Republic of Montenegro (hereinafter referred to as "the GOM"), the Government of Japan decided to conduct "The Study for Establishment of Geographic Information for Implementation of National Physical Plan in the Republic of Montenegro" (hereinafter referred to as "the Study"), in accordance with the relevant laws and regulations in force in Japan.

Accordingly, the Japan International Cooperation Agency (hereinafter referred to as "JICA"), the official agency responsible for the implementation of the technical cooperation programs of the Government of Japan, will undertake the Study in close cooperation with the authorities concerned of the GOM.

The present document sets forth the Scope of Work with regard to the Study and will be valid after notification of approval by JICA Headquarters through JICA Balkan office to the GOM.

II. OBJECTIVES OF THE STUDY

The objectives of the Study are:

1) To prepare new digital topographic maps covering as shown in Appendix-1(hereinafter referred to as "the Mapping Area"),at the scale of 1:25,000 including taking new aerial photographs of whole area of Montenegro ; and
2) To pursue technology transfer in the course of implementation of the Study.

III. SCOPE OF THE STUDY

In order to achieve the objectives mentioned above, the Study shall cover following items.

1. Aerial Photography

Color aerial photographs at the scale of 1:40,000 shall be taken. (Approximately 14,000 square kilometers)

2. Map Production for covering as the Mapping Area.

1) Control Point Survey, Leveling and Pricking
   Control point survey, leveling and pricking shall be carried out.
2) Aerial Triangulation
   Aerial triangulation shall be carried out.
3) Field Identification
   Topographic information shall be interpreted using the aerial photographs. The field identification shall be conducted in case that the information on the aerial photographs is difficult to be interpreted.
4) Digital Plotting
   Digital topographic data shall be plotted.
5) Editing and Symbolization
   The digital topographic data shall be edited and symbolized to print topographic maps at the scale of 1:25,000.
6) Field Completion
   Field completion shall be carried out.
7) CD-ROM production
   The digital topographic data shall be compiled into CD-ROM.

3. Technology Transfer

In order to facilitate technology transfer to the counterpart personnel, part of the above-mentioned items shall

be undertaken by the counterpart personnel under the technical supervision of the Study Team.

4. Dissemination of the Final Products

Recommendations for the wide and effective use of the topographic data produced under the Study shall be prepared.

IV. STUDY SCHEDULE

The Study will be implemented in accordance with the tentative schedule as shown in Appendix-2. The schedule, including report submission dates stated in the next clause (V), is tentative and subject to be modified when both sides agree upon and any necessity that arises in the course of the Study.

V. REPORTS AND FINAL PRODUCTS

JICA will prepare and submit the following reports in English and the final products of topographic mapping works to the GOM.

1. Inception Report
   Ten (10) copies at the commencement of the Study
2. Interim Report
   Ten (10) copies at the end of the first year
3. Progress Report
   Ten (10) copies at the end of the second year
4. Draft Final Report
   Ten (10) copies within twenty-five (25) months after the beginning of the Study
   DRE and DSP will submit its comments within one (1) month after the receipt of the Draft Final report.
5. Final Report
   Twenty (20) copies within one (1) month after the receipt of the comments on the Draft Final Report.
6. Final products of topographic mapping made only in Montenegrin

1) One (1) set of negative films of aerial photographs for whole country
2) One (1) set of contact prints of aerial photographs for whole country
3) One (1) set of digital data of aerial photographs for whole country
4) One (1) copy of result of ground control point survey for whole country
5) One (1) copy of result of aerial triangulation for whole country
6) One (1) set of 1:25,000 scale digital topographic data for the Mapping Area

VI. UNDERTAKING OF THE GOM

1. To facilitate the smooth conduct of the Study, the GOM shall take the following necessary measures :

1) To secure the safety of the Study Team ;

2) To permit the members of the Study Team to enter, leave and sojourn in Montenegro for the duration of their assignments therein and exempt them from foreign registration requirements and consular fees;

3) To exempt the members of the Study Team from taxes, duties and other charges on equipment, machinery and other materials brought into Montenegro for the implementation of the Study ;

4) To exempt the members of the Study Team from income tax and charges of any kind imposed on or in connection with any emoluments or allowance paid to the members of the Study Team for their service in connection with the implementation of the Study;

5) To provide the necessary facilities to the Study Team for the remittance as well as utilization of the funds introduced into Montenegro from Japan in connection with the implementation of the Study ;
6) To secure necessary permission to use aircraft for aerial photography in connection with the implementation of the Study ;
7) To facilitate legal entry with permission (or, to secure permission for the Study Team for entry) into private properties and restricted areas for the implementation of the Study ; and
8) To secure permission for the Study Team to take all data (including topographic maps, negative films, contact prints and digital data of aerial photographs) related to the Study out of Montenegro.

2. The GOM shall bear claims, if any arises, against the members of the Study Team resulting from, occurring in the course of, or otherwise connected with, the discharge of their duties in the implementation of the Study, except when such claims arise from gross negligence or willful misconduct on the part of the members of the Study Team.

3. The DRE and DSP shall act as counterpart agency to the Study team and also as coordinating body in relation with other governmental and non-governmental organizations concerned for the smooth implementation of the study.

4. The DRE and DSP shall, at its own expense, provide the Study Team with the following ;
1) available data and information related to the Study ;
2) security-related information on as well as measures to ensure the safety of the Study Team ;
3) information on as well as support in obtaining medical service ;
4) counterpart personnel ;
5) suitable office space with necessary office equipment and furniture ;
6) credentials or identification cards ; and
7) aircraft with pilot and camera with cameraman.

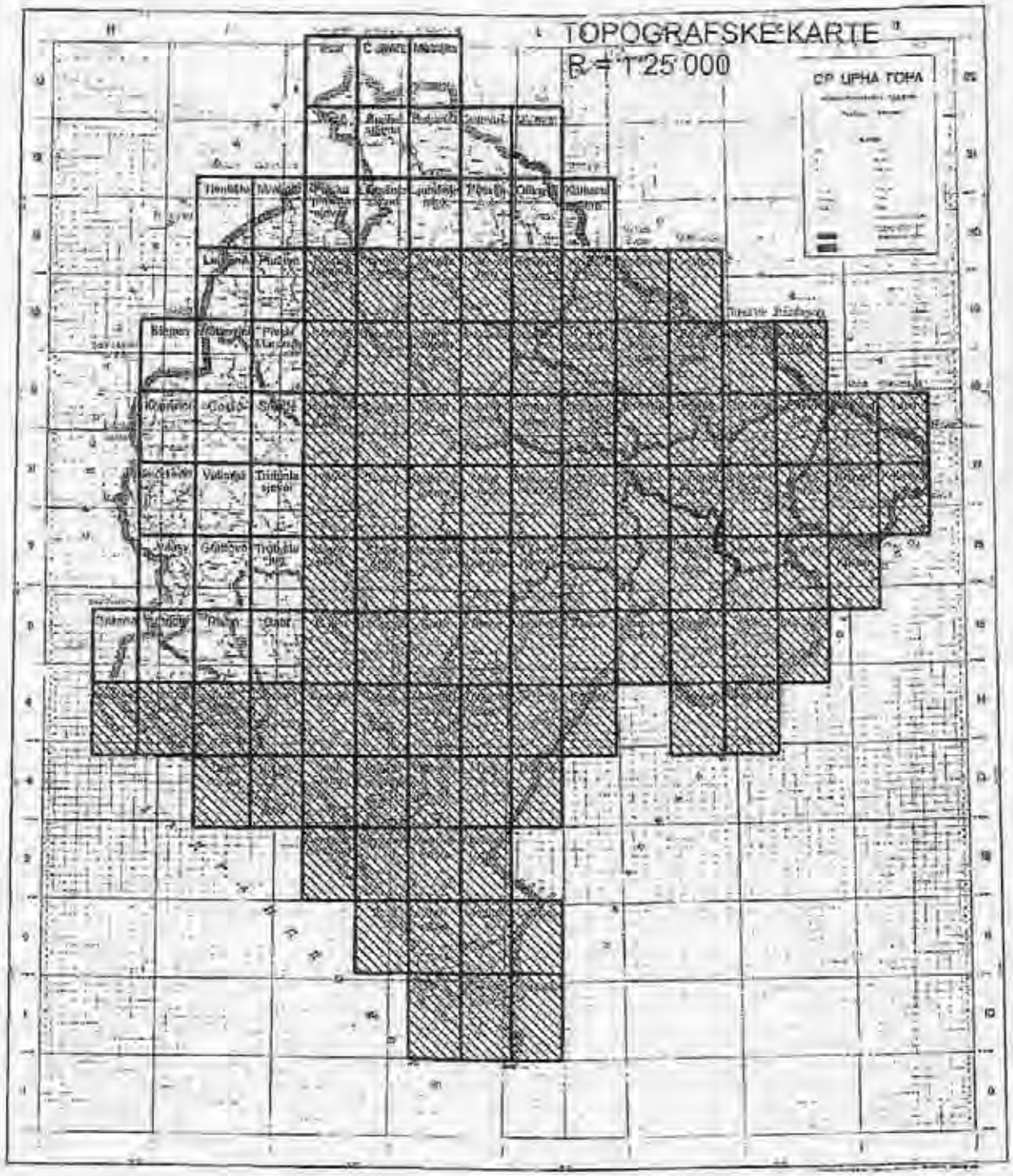
VII. UNDERTAKING OF JICA

For the implementation of the Study, JICA shall take the following measures :
1) to dispatch, at its own expense, the Study Team to Montenegro ; and
2) to pursue technology transfer to Montenegro counterpart personnel in the course of the Study.

VIII. OTHERS

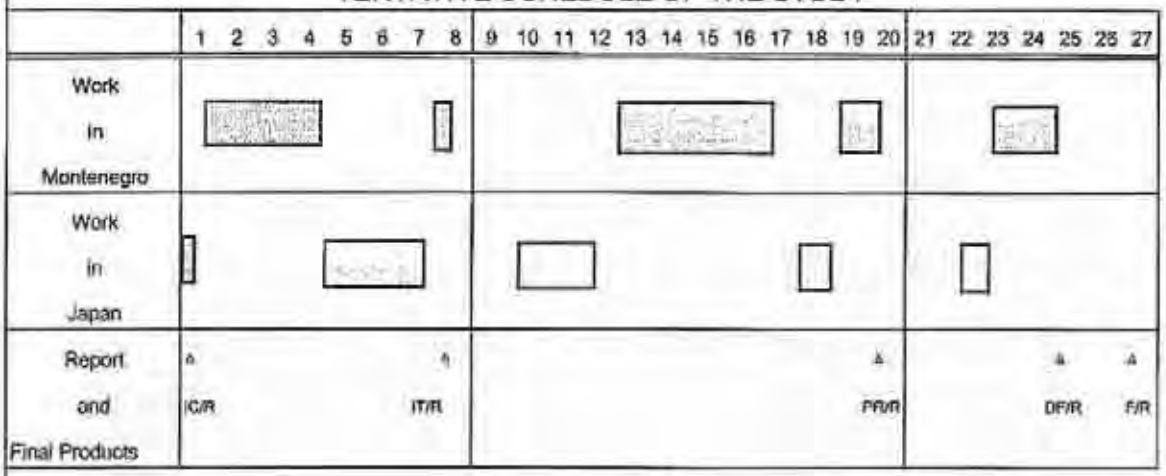
1. JICA, DRE and DSP shall consult with each other in respect of any matter that may arise from or in connection with the Study.
2. The Minutes of Meeting complement the Scope of Work.

Appendix-1



Apendix 2

TENTATIVE SCHEDULE OF THE STUDY



IC/R : Inception Report
IT/R : Interim Report
PR/R : Progress Report
DF/R : Draft Final Report
F/R : Final Report

MINUTES OF MEETING
ON
SCOPE OF WORK
FOR
THE STUDY FOR ESTABLISHMENT OF GEOGRAPHIC INFORMATION
FOR IMPLEMENTATION OF NATIONAL PHYSICAL PLAN
IN THE REPUBLIC OF MONTENEGRO

AGREED UPON AMONG

DEPARTMENT OF REAL ESTATE

DEPARTMENT FOR SPATIAL PLANNING
MINISTRY FOR ECONOMIC DEVELOPMENT,

AND

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

PODGORICA, 30 November , 2006

Mr. Masao Shikano
Resident Representative of JICA Balkan Office
Japan International Cooperation Agency (JICA)

Mr. Rajko Jankovic
Director
Department of Real Estate (DRE)

Mr. Branimir Gvozdenovic
Minister
Ministry of Economic Development

The Japanese Preparatory Study Team (hereinafter referred to as "the Study Team") organized by Japan International Cooperation Agency (hereinafter referred to as "JICA") and headed by Mr. Yuichi Sugano visited the Republic of Montenegro from 24 October to 17 November 2006 to discuss the Scope of Work for "The Study for Establishment of Geographic Information for Implementation of National Physical Plan in the Republic of Montenegro" (hereinafter referred to as "the Study"). During their stay in the Republic of Montenegro, the Team held a series of meetings with the officials of Department of Real Estate (hereinafter referred to as "the DRE") Department for Spatial Planning, Ministry of Environmental Protection and Physical Planning (hereinafter referred to as "the DSP") and the authorities concerned a list of participants is given in Appendix.

Based on the discussions, the DRE, DSP and the Study Team agreed to the Scope of Work for the Study.

The main issues discussed by both sides in relation to the Scope of Work for the Study are summarized below.

1. Counterpart Personnel

Both sides recognized the necessity of technology transfer to the staff of the DRE and DSP as relevant organizations of the Government of the Republic of Montenegro so that the DRE and DSP builds up the capability to produce and revise digital topographic maps by themselves. Based on the recognition, the DRE and DSP shall provide sufficient counterpart personnel at its own expense in the course of the Study.

2. Securing the Safety

The Study Team requested to secure the safety for the Study Team especially against the danger of land mines during the field survey.

The DRE and DSP agreed to arrange required measures for the Study Team in cooperation with relevant organizations.

The staff of the DRE and DSP shall execute a series of required field survey works in the Study area.

3. Aerial Photography

Both sides agreed, in case that aerial photography is not completed within the scheduled duration in terms of area coverage and quality which will be designated in the contract on account of the unseasonable weather or inevitable accidents, to extend the duration of aerial photography and the following Study within the limit of one (1) year, and the DRE and DSP take the responsibility to take necessary administrative action for aerial photography.

Both sides also agreed to consult with each other in respect of changing the method of the Study, in case the aerial photography is not completed within the limit of one (1) year due to the above-mentioned reason.

4. Office Space and Equipment

The DRE and DSP confirmed to provide the furnished office space in the DRE and DSP with necessary equipment and utilities such as desks, chairs, photocopy machines, telephone lines and internet access, etc.

5. Equipment, Vehicles and articles of consumption for aerial photography

The DRE and DSP requested that the study equipment which will be used during the implementation of the Study, should be provided to the DRE and DSP after the completion of the Study, in order to improve the technology and to finish the mapping for the remaining territory of the country.

Regarding difficulties in providing enough vehicles and articles of consumption for aerial photography, the DRE and DSP expressed their wish that those items required for the Study Team would be arranged by JICA,.

The Study Team promised to convey this request to JICA Headquarters.

6. Import of Equipment

Both sides agreed that the DRE and DSP shall act as consignee of the equipment, and shall carry out all the necessary procedure, such as duty-free clearance, etc., and if duty is not exempted, the DRE and DSP shall pay all the necessary expenses for import procedure of the equipment.

Both sides also agreed that the equipment provided in the Study shall be used exclusively for the implementation of the Study under the supervision of the Study Team.

7. Training of Counterpart Personnel in Japan

The DRE and DSP requested that counterpart personnel take advantage of training in Japan related to the Study to promote effective technology transfer.

The Study Team promised to convey this request to JICA Headquarters.

8. Publicity of the Final Report and Products

The Study Team requested the DRE and DSP that the final report and products to be prepared by the Study shall be open to the public immediately after completion upon request of users.

The Study Team also requested the DRE and DSP that all products, which will be produced in the course of the Study, shall be supplied to projects of other donors.

The DRE and DSP understood the request and agreed to take full responsibility for necessary procedure.

Appendix

LIST OF ATTENDANTS

Montenegro

Department of Real Estate

Rajko Jankovic	Director
Snjezana Soskic	Leader of GIS Project
Janko Vukotic	Technical Staff of GIS Project
Milutin Baturan	Technical Staff of GIS Project
Boris Stojkovic	Technical Staff of GIS Project
Bozo Pavicevic	Technical Staff of GIS Project
Radmira Juvicevic	Department of Photogrametry
Verizara Femic	Geodetic Surveyor
Nikola Milacic	Geodetic Surveyor

Department for Spatial Planning,

Ministry of Environmental Protection and Physical Planning

Vesna Rakcevic	Deputy Minister / Director of the Department
Budislava Kuc	Advisor
Marina Pavicevic	Advisor

Ministry of International Economic Relations and European Integration

Masa Vukotic	Advisor
Ivan Lazarevic	Advisor

JAPAN

Yuichi Sugano	Leader of the Preparatory Study Team
Naoki Takayama	Member of the Team
Yuichi Nishida	Member of the Team
Katsumasa Abe	Member of the Team
Tsuneo Tanaka	Member of the Team
Motoko Katayama	Member of the Team
Satoshi Murakami	JICA Balkan Office

MINUTES OF MEETING
FOR
THE INCEPTION REPORT
OF
THE STUDY FOR ESTABLISHMENT OF GEOGRAPHIC INFORMATION
FOR IMPLEMENTATION OF NATIONAL PHYSICAL PLAN
IN
THE REPUBLIC OF MONTENEGRO

AGREED UPON BETWEEN

DEPARTMENT OF REAL ESTATE (DRS)
MINISTRY OF FINANCE

DEPARTMENT OF SPATIAL PLANNING (DSP)
MINISTRY FOR ECONOMIC DEVELOPMENT

AND

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

PODGORICA
13 March, 2007

Mr. Kazuo Furuketa
Leader
JICA Study Team
Japan International Cooperation Agency
(JICA)

Mr. Rajko Jankovic
Director
Department of Real Estate

Ms. Vesna Rakcevic
Deputy Minister
Department for Spatial Planning
Ministry of Economic Development

In compliance with the Scope of work for the Study for the Establishment of Geographic Information for Implementation of National Physical Plan in The Republic of Montenegro (hereinafter referred to as "the Study"), it was agreed upon between Department of Real Estate (hereinafter referred to as DRE), the Department of Spatial Planning, (hereinafter referred to as DSP) and Japan International Cooperation Agency (hereinafter referred as JICA) on November 30th, 2006.

Based on the Scope of Work, JICA dispatched the Study Team to Montenegro for the implementation of the Study from February 27th, 2007.

Prior to the commencement of the 1st field survey for the Study, the Study Team has held a meeting for the presentation and explanation of the Inception Report with the officials of DRE and DSP on March 13th, 2007. The list of attendance is shown in the Appendix.

In accordance with the respective principal technology, a series of discussions concerning the study items, implementation plan and work schedule etc., has been carried out at the offices of DRE for Spatial Data Infrastructure and DSP for GIS during the period from 5th to 12th of March.

As a whole, the Montenegro side, (DRE and DSP) agreed on the Inception Report prepared by the Study Team. However, during the discussions on the content of the Inception Report, the following points were concluded and the JICA Study Team promised to convey these points to the JICA Headquarters in Japan.

1. To reformulate a part of the sentence: "Of the processes involved in the survey project, the Montenegro side will carry out everything, from the photo control survey/air marking, aerial photography and aerial triangulation to the creation of the digital elevation model (hereinafter DEM), while the survey team will provide technical assistance." to the sentence: "The Montenegro side, technically supported by the Study Team will carry out the photo control survey/air marking, and aerial photography, and will try to finish as much as possible the aerial triangulation to the creation of the digital elevation model (hereinafter DEM), and the rest of the work will be finished by the Study Team in Japan."
2. In order to promote the transfer of technology and enhance the techniques transferred through the implementation process of the Study, The Department of Real Estate (DRE) requested to the Study team technical training in Japan for some of the staff of DRE.

Appendix

List of attendants

<DRE>

Rajko Jankovic(Director)

Snjezana Soskic(Photogrametry-chef)
Radmira Jovicevic(Mapping)
Enisa Eastoder (Digital Ploting)
Tanja Sekulic(Digital Editing)
Boris Stojkovic(Gis Database Structure)
Milutin Baturan(Photogrametrty-Preparation)
Slavica Dragojevic(Aeral Triangulation)
Snjezana Radevic(Creation DEM)
Sanja Jankovic(Creation of contour lines)
Bozo Pavicevic(GIS)
Velieza Femic(Survey-chef)
Radomir Jankovic (Cameraman)
Milos Damjanvic(Pilot)
Milivoj Radanovic(Pilot)

<DSP>

Vesna Rakcevic(Assistant Ministry)

Budislava Kuc(Advisor)
Vojislavka Durdic(Advisor)

<Ministry of Economic Development>
Masa Vukotic(Advisor)
<JICA Study team>
Kazuo Furukata (Team Leader)
Kazuhiro Ishizuka(Field Survey)
Satoru Nishio(Map Symbolization)
Motoko Katayama(Interpreter)

<OBSERVER>
Masakatu Abe (JICA Technical Advisor)

MINUTES OF MEETING

ON

INTERIM REPORT

FOR

THE STUDY FOR ESTABLISHMENT OF GEOGRAPHIC INFORMATION FOR IMPLEMENTATION OF NATIONAL PHYSICAL PLAN IN THE REPUBLIC OF MONTENEGRO

AGREED UPON BETWEEN

DEPARTMENT OF REAL ESTATE (DRS)
MINISTRY OF FINANCE,

DEPARTMENT OF SPATIAL PLANNING (DSP)
MINISTRY FOR ECONOMIC DEVELOPMENT

AND

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

PODGORICA
5, December, 2007

Mr. Kazuo Fukukata
Leader
JICA Study Team
Japan International Cooperation Agency
(JICA)

Mr. Mićo Orlandić
Director
Department of Real Estate
Ministry of Finance

Ms. Budislava Kuć
Head
Department of Spatial Planning
Ministry of Economic Development

Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched the Study Team to Montenegro for the implementation of the final phase of works in the first fiscal year of the Study for Establishment of Geographic Information for Implementation of National Physical Plan in the Republic of Montenegro (hereinafter referred to as "the Study") from November 8 to December 22, 2007, in compliance with the Scope of Work for the Study, which was agreed upon between the Department of Real Estate (hereinafter referred to as "DRE"), the Department of Spatial Planning (hereinafter referred to as "DSP") and JICA on November 30, 2006.

Prior to commencement of the works in Montenegro, the Study Team presented the Interim Report to the DRE and DSP, and held a series of meetings for explanation of the Report, implementation plan, work schedule and the specifications etc., with the officials of DRE and DSP.

As a whole, based on the meetings, the JICA Study Team and Montenegro side (DRE and DSP) agreed upon the Interim Report and the following issues on December 5, 2007. The list of those in attendance is shown in Appendix-1.

1. Reporting:

   The Progress Report, to be prepared by the Study Team early in the next physical year as indicated in the Scope of Works (S/W), shall be withdrawn. However, the Draft Final Report will fulfill reporting on all remaining activities of the Study in place of the Progress Report.

2. Specifications:

   DRE has decided on the Geodetic Reference System-80 (hereinafter referred to as "GRS-80") consisting of elements such as the ellipsoidal references, projection system and parameters to be adopted for small scale National Base Maps to replace the former geodetic reference system (Gauss Kreuger), and this has been added to the Specifications of the Study. In addition, a number of topographic features required on the maps were also added and modified to the Specifications as a result of photo interpretation works in the field.

   In compliance with this alteration of the geodetic reference system and revision of topographic features, the mapping works for the establishment of National Geographic Information of the Study shall be carried out based on these renewed Specifications.

The detail of GRS-80 and revised topographic feature items are indicated in Appendix-2, attached.

3. Control points

The coordinates of existing control points provided by DRE shall be transferred into the new system (GRS-80) in order to indicate each point on the maps. The list of coordinates is shown in Appendix-3.

Furthermore, both sides reconfirmed matters pertaining to 1) equipment that has been prepared for DRE and DSP by JICA for the effective implementation of the Study, and 2) results of aerial photography such as the film negatives, contact prints, 1.6X enlargements and digital data, etc. that were completed at the end of September, and provided to DRE by the Study Team.

The list of 1) equipment and 2) results of aerial photography are given in Appendix-4 and 5.

NOTE (Number of attachment) :

Appendix-1 :	1 page
Appendix-2 :	6 pages
Appendix-3 :	2 pages
Appendix-4 :	4 pages
Appendix-5 :	4 pages

List of attendants

[Department of Real Estate : DRE]

Mico ORLANDIĆ	Director
Dragan KOVAĆEVIĆ	Deputy Director
Snjezana ŠOŠKIĆ	Photogrammetry section
Miljana LJUVOVIĆ	GIS section
Milutin BATURAN	Photogrammetry section
Radmila JOVIĆEVIĆ	Photogrammetry section
Bozo PAVIĆEVIĆ	GIS section
Velieza FEMIĆ	Survey section
Boris STOJKOVIĆ	Photogrammetry section

[Department of Spatial Planning : DSP]

Budislava KUC	Head of Planning
Vojislavka DURDIC	Advisor

[JICA Study Team]

Kazuo FURUKATA	Team Leader
Kohei ISOBE	Expert of Photogrammetry
Motoko KATAYAMA	Coordinator & Interpreter

[Observer]

Masakatsu ABE	JICA Technical Advisor

1. Geodetic Reference System

Name of System : Geodetic Reference System 1980 (GRS-80)

1	Semi-major axis	6,378,137m
2	Inverse Flattening	298.257222101

Name of Reference System in Height : n/a

Projection System : Universal Transverse Mercator (ZONE34)

1	Scale Factor at Origin	0.9996
2	Meridian of Origin	21°00'00" East of Greenwich
3	Latitude of Origin	Equator
4	False Easting	500,000.00m
5	False Easting	0.00m
6	Unit of Measurement	Meter (Two Places of decimals)

Transformation Parameter :

1	dx	-261.89858m
2	dy	-221.21591m
3	dz	-743.87680m
4	rx	+4.99487"
5	ry	+14.45241"
6	rz	-15.13857"
7	s	-2.03665ppm

Dimension of co-ordinate System : 3

2. Revision of the Specifications

- addition, feature item "Sport Ground (Point Feature)"
- addition, feature item "Runway (Line Feature)"
- modification, "Flood zone(2020, polygon)" to "Flood zone(6101, point)
- modification, "Photo control point(7036)" to "GPS control point(7036)"
- modification, "GPS point(7037)" to GPS reference station(7037)"

5.4.9

The transformed coordinates` points form WGS84 by the national reference system in the Republic of Montenegro.

For transformed coordinates` points from global reference system WGS 84 by the national reference system uses Helmert`s three dimension (3D) 7 parameter data which were transformed:

$$X_2 = X_1 + t_X + dmX_1 + \varepsilon_Z Y_1 - \varepsilon_Y Z_1$$

$$Y_2 = Y_1 + t_Y - \varepsilon_Z X_1 + dmY_1 + \varepsilon_X Z_1$$

$$Z_2 = Z_1 + t_Z + \varepsilon_Y X_1 - \varepsilon_X Y_1 + dmZ_1$$

In this matter, *tx,ty,tz* are translated by the coordinate axis in meter terms, *Ex,Ey,Ez* are rotations by the coordinate axis in radian terms and *dm* is the parameter of scale in millionth parts.

For the parameter translation, rotation and scale will be used:

Preliminary parameters of Helmert' s transformation from the Global Referent System WGS84 by the national referent system of the Republic of Montenegro will be used for the parameter of translation, rotation and proportion scale.

1. General data concerning preliminary parameters defining.

Total number of shared points: 74

Arrangement shared points: approximately uniformly

Area of validity: Territory of Republic of Montenegro

Total number of units: 222

Total number of unidentified: 7

Redundancy: 215

2. Value of transformation parameters and their standards

* Parametar=Parameter

Vrijednost=Value

Standard=Standard

Translacija=Translation

Rotacija=Rotation

Razmjera=Scale

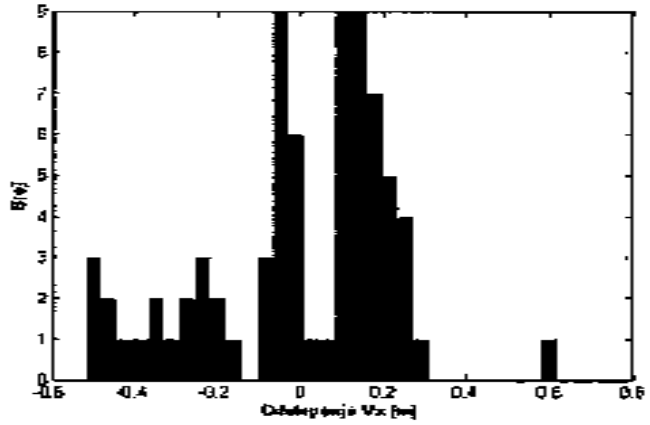
Parametar	Vrijednost	Standard
Translacija t_x	−261.88858m	0.05067m
Translacija t_y	−221.21591m	0.05067m
Translacija t_z	−743.97680m	0.05067m
Rotacija e_x	+4.99487"	0.34767"
Rotacija e_y	+14.45241"	0.23495"
Rotacija e_z	−15.13857"	0.37839"
Razmjera r_m	−2.03665 ppm	0.98923 ppm

3. Statistics of deviation in X−axis is direction of national System (Vx), in Y−axis is direction of National System (Vy) and total deviation (Vd):

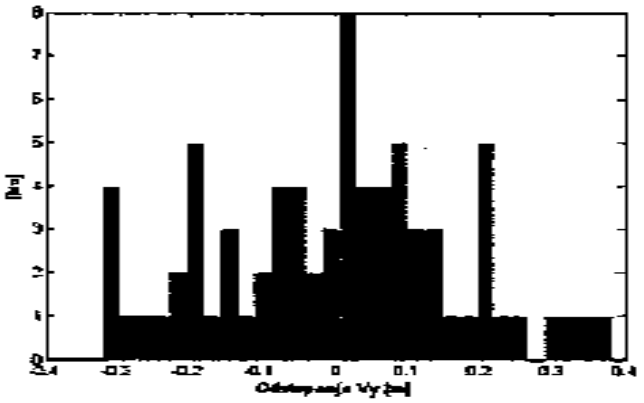
* Pokazatelj: Indicator:
Sredina: MIDDLE
Maksimum:Maximum
Minimum:Minimum
Standard:Standard
Na tacki R 160 : On the R160 control points
Na tacki T 97: On the T97 control points

Pokazatelj	Vx	Vy	Vd
Sredina	0.000 m	0.000 m	0.250 m
Maksimum	+0.617 m (na tački R160)	+0.384 m (na tački R160)	0.727 m (na tački R160)
Minimum	−0.519 m (na tački T97)	−0.323 m (na tački T222)	0.014 m (na tački T76)
Standard	0.228 m	0.169 m	0.282 m

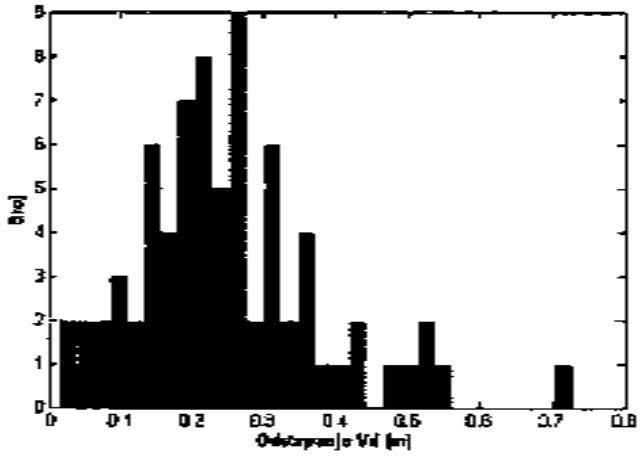
4. Histogram of deviation in X-axis direction of National System (Vx)



5. Histogram of deviation in Y-axis direction of national System (Vy)



6. Histogram of total deviation (Vd)



5.4.9. Transformacija koordinata tačaka iz WGS84 u Državni referentni sistem Republike Crne Gore

Za transformeciju koordinata tačaka iz globalnog referentnog sistema WGS84 u Državni referentni sistem koristiće se Helmertova trodimenzionalna (3D) sedmoparametarska datumska transformacija to:

$$X_2 = X_1 + t_X + dmX_1 + \varepsilon_Z Y_1 - \varepsilon_Y Z_1$$

$$Y_2 = Y_1 + t_Y - \varepsilon_Z X_1 + dmY_1 + \varepsilon_X Z_1$$

$$Z_2 = Z_1 + t_Z + \varepsilon_Y X_1 - \varepsilon_X Y_1 + dmZ_1$$

pri čemu su: t_X, t_Y, t_Z translacije po koordinatnim osama u metrima, $\varepsilon_X, \varepsilon_Y, \varepsilon_Z$ su rotacije po koordinatnim osama u radijanima, a dm je parametar razmjere u milionitim dijelovima;

Za parametre translacije, rotacije i razmjere koristiće se:

Preliminarni parametri Helmertove transformacije iz globalnog referentnog sistema WGS84 u Državni referentni sistem Republike Crne Gore

1. Opšti podaci o određivanju preliminarnih parametara

Ukupan broj zajedničkih tačaka:	74
Raspored zajedničkih tačaka:	približno ravnomjeran
Područje važenja:	teritorija Republike Crne Gore
Ukupan broj jednačina:	222
Ukupan broj nepoznatih:	7
Redundanca:	215

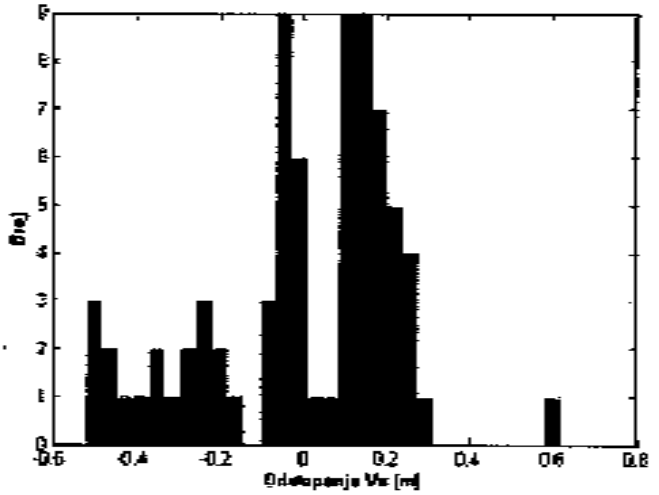
2. Vrijednosti parametara transformacije i njihovih standarda:

Parametar	Vrijednost	Standard
Translacija t_x	−261.89858m	0.05067m
Translacija t_y	−221.21591m	0.05067m
Translacija t_z	−743.87680m	0.05067m
Rotacija e_x	+4.99487"	0.34767"
Rotacija e_y	+14.45241"	0.23495"
Rotacija e_z	−15.13857"	0.37839"
Razmjera r_m	−2.03665 ppm	0.98923 ppm

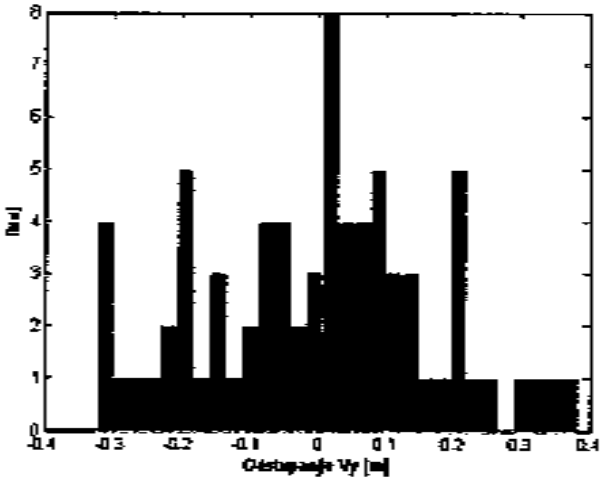
3. Statistika odstupanja u pravcu ose X državnog sistema (Vx), ose Y državnog sistema (Vy) i ukupnog odstupanja (Vd):

Pokazatelj	Vx	Vy	Vd
Sredina	0.000 m	0.000 m	0.250 m
Maksimum	+0.617 m (na tački R160)	+0.384 m (na tački R160)	0.727 m (na tački R160)
Minimum	−0.519 m (na tački T97)	−0.323 m (na tački T222)	0.014 m (na tački T76)
Standard	0.228 m	0.169 m	0.282 m

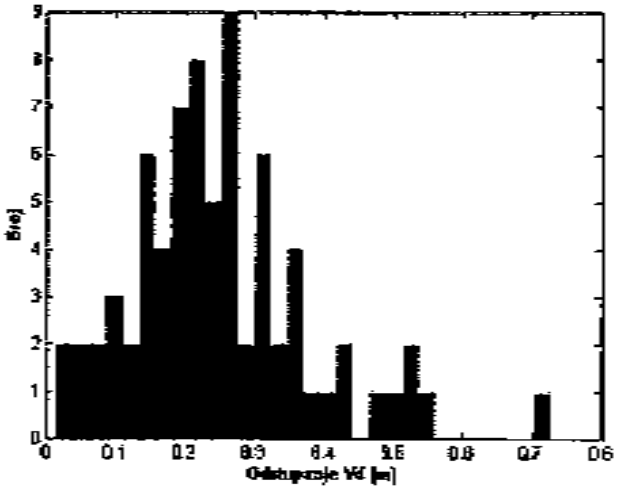
4. Histogram odstupanja po osi X državnog sistema (Vx):



5. Histogram odstupanja po osi Y državnog sistema (Vy):



6. Histogram ukupnog odstupanja (Vd):



Unit:			m
Coordinate type:			Geodetic
Reference ellipsoid:			1984
Projection set:			undefined

Point No	Latitude			Longitude			Height
	°	'	"	°	'	"	m
1	43	32	1.662989	19	0	58.233734	1276.7581
2	43	28	21.125173	19	1	0.244318	961.9008
3	43	26	37.399822	19	7	33.310048	978.2688
4	43	25	44.118024	19	16	15.851998	1087.7559
5	43	21	29.986984	19	7	4.785085	1121.1842
6	43	18	16.815374	19	15	12.951845	993.9380
7	43	21	0.058289	19	20	44.4527	796.470
8	43	21	8.451808	19	27	22.67384	1457.476
9	43	18	40.187454	19	4	38.386759	1582.1284
10	43	13	40.842385	19	15	3.440307	1361.8402
11	43	16	27.135606	19	21	13.253358	857.3372
12	43	15	58.504951	19	27	29.000365	1106.1807
13	43	16	1.707262	19	31	12.52713	1323.2681
14	43	11	12.913129	19	29	28.300024	1012.8283
15	43	13	29.647246	19	22	49.069258	1200.7979
16	43	8	8.88831	19	24	14.30452	1205.0325
17	43	8	57.085851	19	17	28.76142	871.5786
18	43	9	22.538538	19	7	21.634067	1465.5221
19	43	12	2.055698	19	1	40.080990	1073.0024
20	43	4	50.256602	19	8	28.31329	1479.991
21	43	4	13.885006	19	15	57.495013	1589.0491
22	43	10	45.725786	19	34	51.434940	965.6291
23	43	8	28.780383	19	43	48.690691	909.1289
24	43	5	46.071438	19	48	15.266556	892.0001
25	43	2	6.635206	19	45	8.239328	872.2302
26	43	4	16.052088	19	38	14.529997	786.8642
27	43	4	37.038441	19	31	41.183608	1492.933
28	42	59	23.706456	19	40	42.846194	874.7892
29	42	57	9.897134	19	47	17.16928	876.3918
30	43	0	7.612611	18	52	30.812835	884.4814
31	43	3	19.222009	19	53	58.191492	1245.2352
32	42	59	48.891059	19	58	58.581152	1344.0069
33	42	59	49.439878	19	26	13.204412	860.6794
34	42	57	27.140242	19	34	40.804113	864.3383
35	42	54	55.376498	19	39	6.633877	1405.4472
36	42	56	25.688038	19	23	56.462312	1726.6022
37	42	53	55.812694	19	30	49.575159	1081.0031
38	42	53	33.574029	19	57	36.155602	830.8502
39	42	50	53.941514	20	2	41.230223	1314.4887
40	42	47	8.835504	19	57	46.212309	1552.0848
41	42	44	57.375443	19	56	46.286546	1460.4225
42	42	49	38.410507	19	52	49.637434	743.5711
43	42	51	30.277715	19	45	46.523349	1045.1468
44	42	49	25.80746	19	40	14.890556	1425.8074
45	42	44	27.528919	19	47	19.147582	799.0556
46	42	39	18.734141	19	47	0.100008	950.7209
47	42	40	36.513566	19	52	11.40549	933.7014
48	42	40	10.410236	20	0	28.430896	1092.7969
49	42	36	26.597971	20	3	5.974702	1517.4747
50	42	35	44.869878	19	56	54.07585	1010.0045

Point No	Latitude			Longitude			Height
	°	'	"	°	'	"	m
51	42	33	22.601523	19	50	12.468894	983.529
52	42	29	14.341174	19	48	2.729923	1038.0408
53	42	32	39.345182	20	0	4.346166	1751.0066
54	42	31	3.893256	20	4	20.301037	1190.9361
55	42	30	49.814574	20	10	12.527912	1108.9592
56	42	28	24.342539	20	12	44.044494	1140.1769
57	42	23	45.440419	20	17	55.213376	1091.1587
58	42	17	13.260757	20	13	32.824998	1838.4049
59	42	18	58.004838	20	7	40.931008	1515.2827
60	43	19	29.677918	19	53	34.197563	1169.0079
61	43	15	55.633999	19	50	52.945937	1420.7660
62	43	15	17.961912	19	50	2.834617	727.0983
63	43	16	11.872592	19	46	59.397196	1058.786
64	43	9	54.516174	19	42	45.632364	1249.1646
65	43	8	45.634769	19	50	0.809644	893.6618
66	43	11	14.261508	19	56	7.339764	1483.6049
67	43	3	10.40179	19	51	26.364809	1033.4015
68	42	58	39.329378	19	53	58.458245	1225.3156
69	43	6	13.976853	19	1	6.732084	1745.8848
70	43	0	29.733867	19	58	54.456909	1108.8723
71	42	59	4.775154	19	4	34.843081	1142.8304
72	43	0	57.307381	19	10	0.59206	1279.0952
73	42	58	43.870403	19	16	55.102252	1799.7504
74	43	4	43.548142	19	44	1.050246	1569.7719
75	43	0	8.044764	19	41	41.173244	1040.8318
77	42	58	22.818428	19	32	20.878878	1130.0102
78	42	53	26.854061	19	31	32.344561	1143.626
79	42	53	24.789982	19	39	48.546362	1079.2067
80	42	54	59.695071	19	46	6.545445	999.1268
81	42	53	51.072706	19	58	6.295322	959.9521
82	42	53	22.987065	19	5	57.131733	1514.7232
83	42	48	1.975821	19	3	52.5670	1465.4208
84	42	49	19.567739	19	2	30.694099	1177.8191
85	42	50	55.471729	18	52	33.480891	937.8144
86	42	49	34.186222	18	45	43.432163	874.6106
87	42	49	1.993107	18	37	49.189348	867.0126
88	42	46	7.042205	18	30	25.175796	760.7754
89	42	43	36.003504	18	35	24.121342	855.9206
90	42	42	27.381604	18	41	51.561315	1101.46
91	42	45	17.448272	18	49	11.450782	890.66
92	42	48	30.988353	18	56	20.857118	875.9562
93	42	44	51.832124	19	3	44.017157	798.2693
94	42	42	29.923002	19	10	50.95147	925.7155
96	42	38	2.242232	18	34	53.374411	1215.5914
97	42	52	13.758144	19	18	40.183341	785.1945
98	42	48	40.993611	19	23	32.195847	836.6587
99	42	49	20.350714	19	31	22.346085	1005.5012
100	42	44	21.693999	19	36	47.171884	1287.0943
101	42	44	13.425231	19	29	42.48921	1046.8424
102	42	43	1.903446	19	22	12.221359	266.4938
103	42	46	48.331276	19	16	36.181982	916.1697
104	42	37	56.65145	19	3	40.727563	930.9941
105	42	38	8.814007	19	14	36.311739	998.0805
106	42	38	15.634002	19	17	0.115787	980.1068

Point No	Latitude			Longitude			Height
	°	'	"	°	'	"	m
107	42	33	9.971772	19	9	28.174814	51.057
108	42	40	45.918269	19	32	28.826308	1166.072
109	42	35	43.964896	19	30	43.930090	1715.0978
110	42	38	39.771542	19	28	37.666028	1034.532
111	42	39	12.685489	19	22	39.822618	218.2857
112	42	31	32.68059	18	14	15.706926	428.5878
113	42	31	3.20355	19	20	34.790609	133.2606
114	42	33	51.652875	19	27	40.372895	1256.1364
115	42	20	23.882592	19	31	57.957231	1423.7842
116	42	29	8.91056	19	26	32.122659	886.3894
117	42	22	55.62734	18	25	14.554808	473.7401
118	42	26	31.980793	19	22	12.619503	784.3147
119	42	22	27.799209	19	19	23.781131	94.9276
120	42	28	29.122704	19	19	41.336046	89.7642
122	42	27	50.965049	19	1	9.623914	703.0541
123	42	22	53.49802	19	8	59.217398	97.955
124	42	19	13.634822	19	14	6.189081	49.3013
125	42	18	54.027591	19	20	39.005512	314.778
126	42	18	43.414208	19	7	51.818758	49.4398
127	42	41	2.209626	19	51	34.939506	1031.0223
128	42	36	27.033505	18	56	7.788388	1024.0825
129	42	34	5.590294	18	52	30.063213	950.6656
130	42	33	20.80088	18	46	46.522934	-6708.6926
131	42	34	8.578628	18	52	12.217491	8454.2324
132	42	32	12.461531	18	39	11.288407	860.4227
133	42	24	9.777814	18	55	3.020156	744.6407
134	42	22	29.795933	18	49	25.464622	1326.2364
135	42	21	37.062371	18	2	40.568604	148.3443
136	42	17	7.321444	19	0	8.262266	464.8922
137	42	37	19.888394	18	40	52.367789	652.3246
138	42	32	39.642694	18	37	35.40853	930.4600
139	42	31	53.764404	18	43	51.523728	1319.5651
140	42	26	26.669288	18	46	42.483874	41.6942
141	42	17	51.174202	18	45	9.524008	287.6425
142	42	33	19.413232	18	31	3.121885	1108.0926
143	42	29	37.130483	18	27	12.11941	383.5758
144	42	27	40.522544	18	32	49.542261	241.342
145	42	27	36.246411	18	40	33.684033	41.8609
146	42	23	35.04144	18	35	16.34624	185.2348
147	42	23	29.609986	18	42	17.336217	88.2487
148	42	19	49.092711	18	53	5.158509	77.0046
149	42	12	12.135375	18	57	11.530775	95.5333
150	42	13	13.020506	19	4	30.733048	58.3008
151	42	11	11.348664	19	10	20.138707	465.0266
152	42	8	30.975662	19	3	5.86906	131.9636
153	42	5	0.044053	19	8	10.211851	117.925
154	42	8	46.450282	19	14	49.035845	456.2817
155	42	3	51.585327	19	22	24.085097	541.6362
156	42	1	23.402021	19	14	46.665524	407.0855
157	41	59	14.705482	19	19	2.859048	98.7641
158	41	59	22.133994	19	9	21.625316	180.156
159	41	55	47.124856	19	13	57.989446	73.7417
160	41	53	10.507597	19	21	27.446449	68.9586
T230	42	18	54.027593	19	20	39.005513	314.7779

Point No	Latitude			Longitude			Height
	°	'	"	°	'	"	m
T67	42	33	34.727384	19	0	53.215681	1465.7287
T70	43	21	8.451794	19	27	22.673853	1457.4762
T75	42	54	3.264100	18	32	19.599316	1411.2408
T77	42	46	7.107647	18	59	50.402873	2041.6744
T81	42	54	29.319656	19	42	27.72592	2106.6231
T92	42	57	49.430738	20	7	18.022014	1803.2835
T91/320	42	34	9.055109	18	32	38.983818	1836.139
T95	42	29	41.687864	19	30	12.390703	1876.0586

Administration list of equipments for the Study

Project Name : The Study for Establishment of Geographic Information for Implementation of National Physical Plan in the Republic of Montenegro

Cooperation Period : 02/2007 - 03/2009

Counterpart Organizations (User) : Department of Real Estate (DRE), Ministry of Finance

Equipment Provider : VEKOM d.o.o.

Procurement : Kokusai Kogyo Co.,Ltd.

No.	Brand	Code	Description	Quantity
1	LEICA	737438	TCR1202 R300, 2"(0.6mgon) total station with reflector less EDM, laser plummet, 1 keyboard with touch screen, standard applications, user manual, and container.	2
2	LEICA	743000	GTS22, 2nd keyboard with touch screen, for TPS1200 instruments, for telescope position 2, fitted.	2
3	LEICA	741963	GSD02, communication side cover, including bluetooth, for non-motorized TPS1200 instruments(TC, TCR models). Required for SmartAntenna adapter and RadioHandle.	2
4	LEICA	741965	GAD 104, SmartAntenna Adapter. Required to attach SmartAntenna and/or radio modem in GFU14 housing onto TPS1200. Requires communication side cover.	2
5	LEICA	733250	ATX1230, SmartAntenna to be used together with the TPS1200 series total stations or the GTX1230 Receiver.	2
6	LEICA	734275	MCF64, CompactFlash Card 64MB.	2
7	LEICA	734700	GEV189, Data transfer cable, Lemo to USB connector(incl. USB electronics), 2.0m. Connects TPS/DNA to PC for data transfer. PC driver and user manual included on CD.	2
8	LEICA	733258	MCFAD1, CompactFlash PC Card adapter.	2
9	LEICA	667718	GHM007 Instruments height meter	2
10	LEICA	722045	GHT196 Distance holder for height meter	2
11	LEICA	734167	TPS1200 Application "Reference Line"	2
12	LEICA	734168	TPS1200 Application "Sets of Angles".	2
13	LEICA	734169	TPS1200 Application "DTM Stakeout".	2
14	LEICA	734181	TPS1200 Application "Reference Plane".	2
15	LEICA	733270	GEB221, Lithium-Ion battery, 4Ah, rechargeable. To be used with TPS1200 and GPS1200 series.	4
16	LEICA	733271	GKL221, Charger PRO. To be used with up to two charging adapters GDI221 or GDI222, Charger cable and net adapter included.	2
17	LEICA	733323	GDI221, Adapter for GKL221 for charging 2 Li-Ion batteries GEB221, GEB211.	4
18	LEICA	394752	GST20-9, Wooden heavy duty tripod	2
19	LEICA	385500	GLS11 Reflector pole, telescopic, with circular bubble, cm and ft graduation, extends to 2.15m.	2
20	LEICA	403428	GZW12 Extension 1m long, for reflector pole GLS11 and carriers	4
21	LEICA	641617	GPR121 Circular prism, with holder and target plate.	2
22	LEICA	667451	GVP609, Container for 2 Circular prism, 2 Carriers/Laser plummets and 2 tribrachs.	1
23	LEICA	734165	GVP627, Hard container for System1200 SmartRover, SmartPole, RX1250 and SmartStation.	2
24	LEICA	734711	Leica Geo Office Software, not protected.	1
25	LEICA	734713	Software protection key(USB) for single user licence.	1
26	LEICA	734719	L1/L2 data-processing for GPS, for code and phase, protected option.	1

Administration list of equipments for the Study

Project Name : The Study for Establishment of Geographic Information for Implementation of National Physical Plan in the Republic of Montenegro

Cooperation Period : 02/2007 - 03/2009

Counterpart Organizations (User) : Department of Real Estate (DRE), Ministry of Finance

Equipment Provider : VEKOM d.o.o.

Procurement : Special Lot by JICA

No.	Brand	Code	Description	Quantity
1	LEICA		LPS Core Photogrammetry Suite Core includes IMAGINE Advantage and "imblock" (prior IMAGINE OrthoBASE functionality, plus new feature). Licenses	2
2	LEICA		LPS Stereo (License only)	2
3	LEICA		LPS ATE (License only)	1
4	LEICA		LPS Terrain Editor (License only)	1
5	LEICA		LPS Mossaic PRO (License only)	1
6	LEICA		ORIMA TE GPS for LPS (License only)	1
7	LEICA		PRO 600 for LPS/DPW	2
8	LEICA		Topompuse	2
9	LEICA		Stereo Analyst for ArcGIS	1

Equipment Provider : VEKOM d.o.o.

Procurement : Lot-1 by JICA

No.	Brand	Code	Description	Quantity
1	BENTLAY		MicroStation V8 XM Edition (CAD Platform)	3
2	ESRI		Arcinfo 9.2 (GIS Software)	1
3	ESRI		Spatial Analyst for ArcGIS (Extension software for Arcinfo)	1
4	PLANAR		SD 2020 (Stereoscopic Display)	2

Equipment Provider : INFORMATIKA MONTRNEGRO

Procurement : Lot-2 by JICA

No.	Brand	Code	Description	Quantity
1	Microsoft		Mocrosoft Office Professional 2003 (Word Processing Software)	4
2	Adobe		Photoshop CS2 (Digital Imaging Editor)	2
3	Adobe		Illustlator CS2 (Vector Graphic Software)	1
4	Dell		Precision 490 NVIDIA Quadro FX-3500, E197FP (Workstation with display)	2
5	Dell		Precision 490 NVIDIA Quadro FX-3500 (Workstation without display)	2
6	CISCO		WS-C3560G-24TS-S CATALYST356024 10/100/1000T+4SFP Standard Image (switch)	1
7	APC		SUA2200 (UPS)	4

Administration list of equipments for the Study

Project Name : The Study for Establishment of Geographic Information for Implementation of National Physical Plan in the Republic of Montenegro

Cooperation Period : 02/2007 - 03/2009

Counterpart Organizations (User) : Department of Real Estate (DRE), Ministry of Finance

Equipment Provider : INFORMATIKA MONTENEGRO

Procurement : Lot-3 by JICA

No.	Brand	Code	Description	Quantity
1	HP	Q7546A	Laserjet Printer LJ 5200dtn	1
2	HP	Q7715A	64MB 100-pin DDR DIMM	1
3	HP	Q7516A	Black Print Cartridge	3
4	HP	C6075B	Plotter Designjet 1055cm plus	1
5	HP	C4871AL	HP 80 Black Ink cartridge	3
6	HP	C4846AL	HP 80 Cyan Ink cartridge	3
7	HP	C4847AL	HP 80 Magenta Ink cartridge	3
8	HP	C4848AL	HP 80 Yellow Ink cartridge	3
9	HP	C4820A-US	HP 80 Black Printhead	3
10	HP	C4821A-US	HP 80 Cyan Printhead	3
11	HP	C4822A-US	HP 80 Magenta Printhead	3
12	HP	C4823A-US	HP 80 Yellow Printhead	3
13	HP	CI861A-US	HP Bright White Inkjet Paper (36in＊150ft)	10
14	HP	51642B-US	HP Matte Film (36in＊125ft)	10

Equipment Provider : BUFFALO in Japan

Procurement : Kokusai Kogyo Co.,Ltd.

1	BUFFALO	HD-Q2.0TSU2	External Hard Disk Drive (2.0 Tera Bites) for Areial Photo Data Storage	1

Administration list of equipments for the Study

Project Name : The Study for Establishment of Geographic Information for Implementation of National Physical Plan in the Republic of Montenegro

Cooperation Period : 02/2007 - 03/2009

Counterpart Organizations (User) : Department of Spatial Planning (DSP), Ministry of Economic Development

Equipment Provider : VEKOM d.o.o.

Procurement : Special Lot by JICA

No.	Brand	Code	Description	Quantity
1	LEICA		Stereo Analyst for ArcGIS	1

Equipment Provider : VEKOM d.o.o.

Procurement : Lot-1 by JICA

No.	Brand	Code	Description	Quantity
1	ESRI		Arcinfo 9.2 (GIS Software)	1
2	ESRI		Spatial Analyst for ArcGIS (Extension software for Arcinfo)	1

Equipment Provider : INFORMATIKA MONTENEGRO

Procurement : Lot-2 by JICA

No.	Brand	Code	Description	Quantity
1	Microsoft		Mocrosoft Office Professional 2003 (Word Processing Software)	1
2	Adobe		Photoshop CS2 (Digital Imaging Editor)	1
3	Dell		Precision 490 NVIDIA Quadro FX-3500, E197FP (Workstation with display)	1
4	APC		SUA2200 (UPS)	1

Aerial Photo INDEX (negative film, contact print, digital data)

Appendix-5

Course	No	–	No		No	–	No		No	–	No		No	–	No		No	–	No		Total
1	3175	–	3167	9																	9
2	3168	–	3161	4	3217	–	3218	2	3162	–	3166	5									11
3	3157	–	3146	12																	12
4	3129	–	3145	17																	17
5	3128	–	3104	25																	25
6	3076	–	3103	28																	28
7	3075	–	3073	3	3054	–	3026	29													32
8	2989	–	3026	37																	37
9	2968	–	2949	41																	41
10	2878	–	2830	17	3072	–	3085	8	2930	–	2905	26									51
11	2934	–	2859	26	2879	–	2904	27													53
12	2933	–	2905	29	2877	–	2846	32	* Three exposures (2875,2876,2877) affected by cloud to be re-taken												61
13	2575	–	2603	29	3056	–	3063	8	2824	–	2846	22	2235	–	2233	3					60
14	2574	–	2542	33	2823	–	2799	25	2236	–	2241	6									64
15	2506	–	2541	36	2776	–	2789	14													50
16	2505	–	2461	45	2795	–	2792	4													49
17	2434	–	2405	30	2444	–	2460	17	2790	–	2791	2									49
18	2369	–	2404	37																	37
19	2367	–	2328	40	* One exposure to be taken at the west end (near the border with Croatia) : lack of stereo scopic image																40
20	2125	–	2115	11	2210	–	2211	2	2323	–	2326	3	2114	–	2104	11	2214	–	2217	4	2326	–	2327	2	33
21	3227	–	3226	2	2079	–	2085	7	2321	–	2318	4	2209	–	2206	4	2090	–	2102	13					30
22	2078	–	2071	8	2077	–	2079	3	2089	–	2086	14	2222	–	2219	4					29
23	2039	–	2021	19	2195	–	2202	8													27
24	2003	–	2020	18	2203	–	2203	1													19
25	2040	–	2055	16																	16
26	2126	–	2136	11																	11
27	2146	–	2155	10	2194	–	2194	1													11
28	2137	–	2146	9	2193	–	2193	1													10
29	2156	–	2161	6	2192	–	2192	1													7
30	2165	–	2171	7																	7
31	2172	–	2177	6																	6
101	3176	–	3179	4																	4
102	3180	–	3196	17																	17
103	3211	–	3198	14																	14
104	2947	–	2931	17																	17
105	2232	–	2224	9																	9
106	2796	–	2798	3	2246	–	2242	5	* Three exposures (2244, 2245, 2246) affected by cloud to be re-taken												8
107	2250		2257	8																	8
108	2436	–	2443	8																	6
109	2284	–	2276	9																	9
110	2293	–	2285	9																	9
111	2294		2317	24																	24
112	2190	–	2178	13																	13
113	2267	–	2275	9																	9
114	3225	–	3220	6																	6
115	2259	–	2258	9																	9
46	TOTAL																				1,094

Aerial Photo INDEX (1.6 fold enlargement for field identification)

Course	Printed photo number																												Total
1																													0
2																													0
3																													0
4																													0
5																													0
6	3083	3085	3087	3089	3091	3093	3095	3097	3099	3101	3103																		11
7	3049	3047	3045	3043	3041	3039	3037	3035	3033	3031	3029	3027	3025																13
8	2997	2999	3001	3003	3005	3007	3009	3011	3012	3014	3016	3018	3020	3022	3024														15
9	2978	2976	2974	2972	2970	2968	2966	2964	2962	2960	2958	2956	2954	2952	2950	2948													16
10	2064	2062	2060	3071	3069	3067	3065	2929	2927	2926	2923	2921	2919	2917	2915	2913	2911	2909	2907	2905									20
11	2847	2849	2851	2853	2855	2857	2859	2878	2880	2882	2884	2886	2888	2890	2892	2894	2896	2898	2900	2902	2904								21
12	2618	2616	2614	2612	2610	2608	2606	2877	2875	2873	2871	2869	2867	2865	2863	2861	2859	2857	2855	2853	2851	2849	2847						23
13	2589	2591	2593	2595	2597	2599	2601	2603	3060	3062	3064	2825	2827	2829	2831	2833	2835	2837	2839	2841	2843	2845	2235	2233					24
14	2560	2558	2554	2552	2550	2548	2546	2544	2822	2820	2818	2816	2814	2812	2810	2808	2806	2804	2002	2000	2238	2237	2239	2241	2241				25
15	2619	2621	2623	2625	2631	2633	2635	2637	2639	2539	2541	2541	2776	2778	2780	2782	2784	2786	2788										19
16	2493	2491	2489	2487	2485	2483	2481	2479	2477	2475	2473	2471	2469	2467	2465	2463	2461	2794	2792										18
17	2424	2422	2420	2418	2416	2414	2412	2410	2408	2406	2444	2446	2448	2450	2452	2454	2456	2458	2460	2760									20
18	2380	2382	2384	2386	2388	2390	2392	2394	2396	2398	2400	2402																	12
19	2361	2349	2347	2345	2343	2341	2339	2337	2335	2333	2331	2329	2527	2529															14
20	2125	2123	2119	2117	2115	2113	2111	2109	2107	2105	2103	2210	2215	2217	2322	2323	2325												17
21	2079	2081	2083	2085	2321	2319	2209	2208	2087	2091	2093	2095	2097	2099	2101														15
22	2070	2074	2072	2070	2068	2066	2064	2062	2060	2058	2056	2221	2219	2877															14
23	2037	2035	2033	2031	2029	2027	2025	2023	2021	2195	2197	2199	2201																13
24	2003	2005	2007	2009	2011	2013	2015	2017	2019	2203																			10
25	2044	2046	2048	2050	2052																								5
26	2128	2130	2132	2134																									4
27	2154	2152	2150	2148	2146																								5
28	2137	2139	2141	2143	2145																								5
29	2158	2156	2160	2192																									4
30	2165	2167	2169	2171																									4
31	2174	2176																											2
101																													0
102																													0
103	3210	3208	3206	3204	3202	3200	3198																						7
104	2046	2044	2042	2930	2936	2934	2932																						7
105	2229	2227	2225																										3
106	2708	2246	2245	2244																									4
107	2250	2254																											2
108	2440	2442																											2
109	2283	2281	2279	2277																									4
110	2287	2285																											2
111	2297	2303	2305	2309	2311	2315																							6
112	2180	2182	2184	2186	2188																								5
113	2267	2269	2271	2273																									4
114	3224	3222	3220																										3
115	2286	2284	2282	2280	2250																								5
46	TOTAL																												404

Aerial Photo INDEX (1.6 fold enlargement for DRE)

Course	Printed photo number																												Total
1	3173	3171	3169	3167																									4
2	3166	3165	3162	3164	3166	3215	3216	3217	3219																				9
3	3157	3155	3153	3151	3149	3147																							6
4	3130	3132	3134	3136	3138	3140	3142	3144																					8
5	3104	3106	3108	3110	3112	3114	3116	3118	3120	3122	3124	3126	3128																13
6	3077	3079	3081																										3
7	3037	3051	3053	3055	3073	3075																							6
8	2989	2991	2993	2995																									4
9	2980	2982	2984	2986	2988																								5
10	2668	2668	2670	2672	2674	2676																							6
11	2635	2637	2639	2641	2643	2645																							6
12	2620	2622	2624	2626	2628	2630	2632																						7
13	2579	2577	2579	2581	2583	2585	2587																						7
14	2560	2562	2564	2566	2568	2570	2572	2574																					8
15	2507	2509	2511	2513	2515	2517																							6
16	2495	2497	2499	2501	2503	2505																							6
17	2426	2428	2430	2432	2434																								5
18	2368	2370	2372	2374	2376	2378																							6
19	2355	2357	2359	2361	2363	2365	2367																						7
20																													0
21																													0
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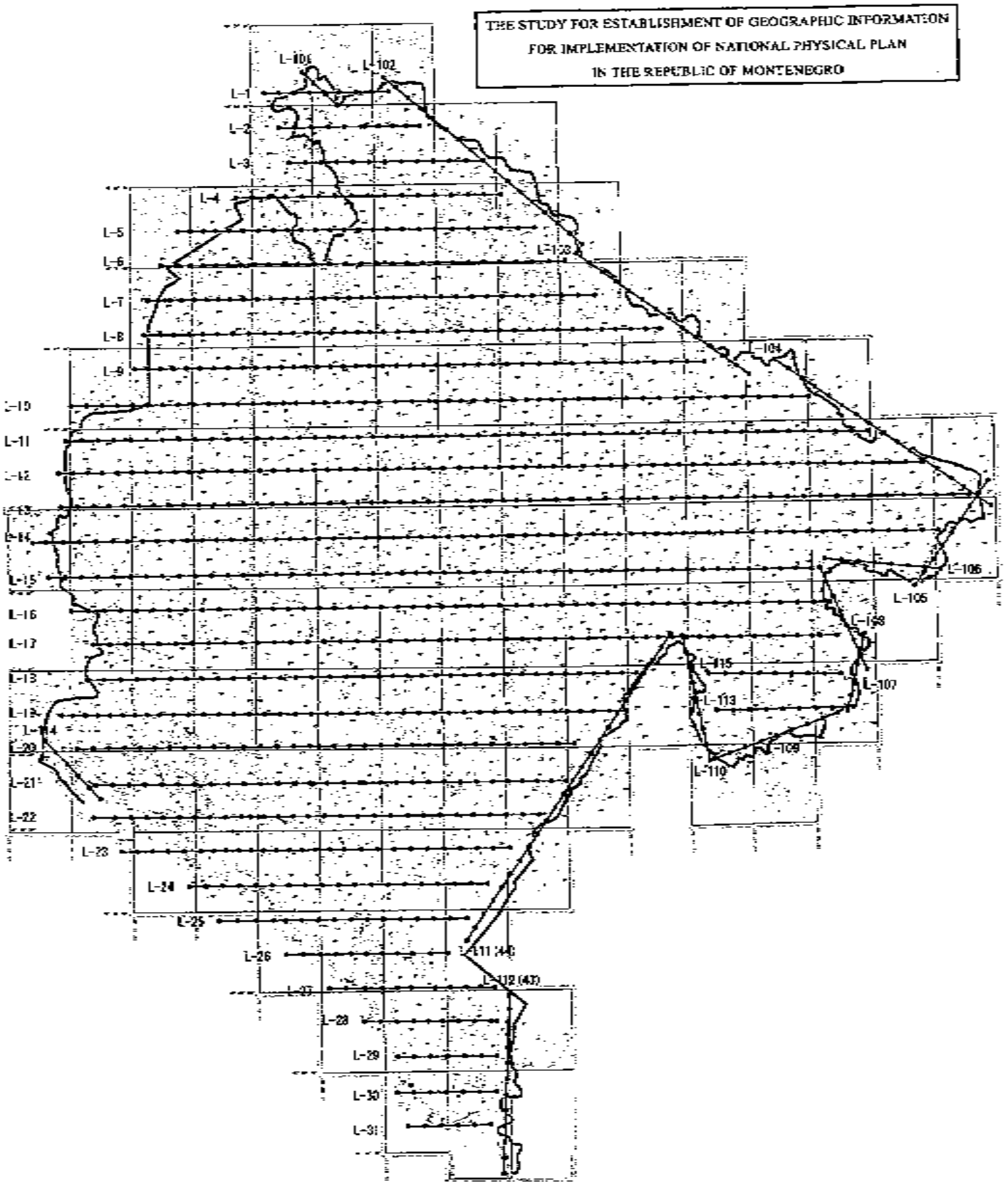
26																													0
27																													0
28																													0
29																													0
30																													0
31																													0
101	3177	3179																											2
102	3181	3183	3185	3187	3189	3191	3193	3195	3196																				9
103																													0
104																													0
105																													0
106																													0
107																													0
108																													0
109																													0
110																													0
111																													0
112																													0
113																													0
114																													0
115																													0
46	TOTAL																												133


THE STUDY FOR ESTABLISHMENT OF GEOGRAPHIC INFORMATION
FOR IMPLEMENTATION OF NATIONAL PHYSICAL PLAN
IN THE REPUBLIC OF MONTENEGRO
L-101
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L-112 (41)

Crna Gora
UPRAVA ZA NEK
Broj 02-660
Podgorica, 18-02 2009

MINUTES OF MEETING

ON

DRAFT FINAL REPORT

FOR

THE STUDY FOR ESTABLISHMENT OF GEOGRAPHIC INFORMATION FOR IMPLEMENTATION OF NATIONAL PHYSICAL PLAN IN THE REPUBLIC OF MONTENEGRO

AGREED UPON BETWEEN

DEPARTMENT OF REAL ESTATE (DRS)
MINISTRY OF FINANCE,

DEPARTMENT OF SPATIAL PLANNING (DSP)
MINISTRY FOR ECONOMIC DEVELOPMENT

AND

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

PODGORICA
18, February, 2009

Mr. Kazuo Furukata
Leader
JICA Study Team
Japan International Cooperation Agency
(JICA)

Mr. Mićo Orlandić
Director
Department of Real Estate
Ministry of Finance

Ms. Budislava Kuć
Head
Department of Spatial Planning
Ministry of Economic Development

Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched the Study Team to Montenegro for the implementation of the final phase of the Study for Establishment of Geographic Information for Implementation of National Physical Plan in the Republic of Montenegro (hereinafter referred to as "the Study") from January 27 to February 25, 2009, in compliance with the Scope of Work for the Study, which was agreed upon between the Department of Real Estate (hereinafter referred to as "DRE"), the Department of Spatial Planning (hereinafter referred to as "DSP") and JICA on November 30, 2006.

Prior to commencement of the works in Montenegro, the Study Team submitted the Draft Final Report to the DRE and DSP, and held a meeting to brief contents of the Report, implementation plan, and work schedule for the final assignment of the Study on January 29 and February 3, 2009.

Through the confirmation of the Draft Final Report by the DRE and DSP, the Study Team held a meeting for discussions in order to finalize it as the "Final Report" with the officials of both organizations on February 11, 2009.

On the whole, based on the meetings, the Study Team and Montenegro side (DRE and DSP) agreed upon the Minutes of Meeting with regard to the following issues on February 18, 2009. A list of those in attendance is shown in Appendix-1.

1. Draft Final Report:

   On the basis of the requests by the DRE and DSP, the Study Team has revised the explanations described in the Draft Final Report, concerning to the "Chapter 4 Technology transfer and Evaluation," "Chapter 6 Relevant Organizations and Status Quo of Montenegro," and "Chapter 7 Conclusions and Recommendations." The revised parts of the Draft Final Report are indicated in Appendix-2, attached.

2. Specifications:

   The Spatial Data Specifications were concluded in Rev.1.4, based on the modification and addition for proper indication of map symbols and annotations that were confirmed as a result of map symbolization work carried out in Japan. The revised parts of the Specifications are indicated in Appendix-3, attached.

List of attendants

[Department of Real Estate : DRE]

Mico ORLANDIC	Director
Snjezana SOSKIC	Head, Photogrammetry section
Milutin BATURAN	Photogrammetry section, Aerial Triangulation
Radmila JOVICEVIC	Photogrammetry section, GIS
Jelena DEKOVIC	Photogrammetry section, Digital Mapping & GIS
Sanja DURISIC	Photogrammetry section, Digital Mapping & GIS
Branka NOVOVIC	Photogrammetry section, Map Symbolization
Jelica Jelovac	Photogrammetry section, Map Symbolization

[Department of Spatial Planning : DSP]

Budislava KUC	Head of Planning
Vojislavka DURDIC	Advisor

[JICA Study Team]

Kazuo FURUKATA	Team Leader
Satoru NISHIO	Expert of Geodetic Survey
Kohei ISOBE	Expert of Photogrammetry
Yoshimitsu FUKUMOTO	Expert of Map Symbolization
Masahiko OTSUKA	Coordinator & Interpreter

[Observer]

Masakatsu ABE	JICA Technical Advisor

Draft Final Report

transfer and the start of the second-phase technology transfer. As a result, DRE was considered to have the technical capability required to carry out aerial triangulation independently.

Additionally, fact-finding surveys (questionnaire and test formats) on aerial triangulation was conducted in DRE, which showed the result that many staff members were capable of carrying out the operations of aerial triangulation (see charts (1), (2), and (3)). From this result, the technical level of DRE was found to be high enough to carry out the operations. However, it also turned out that the staff members had little experience in using the new equipment supplied by JICA (see charts (4) and (5)).

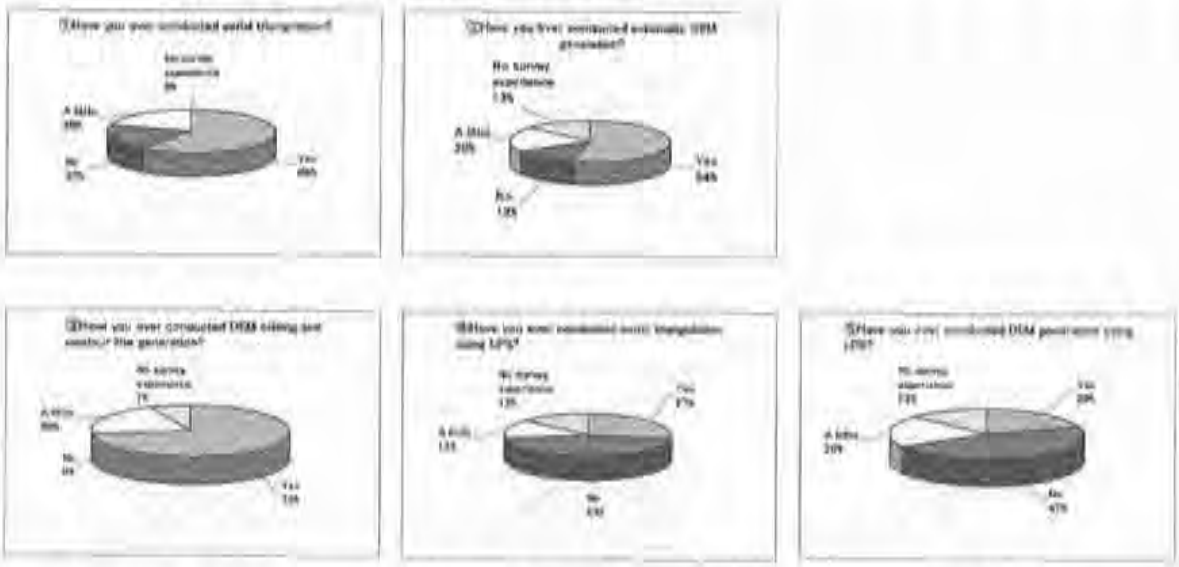


Fig 31 : Results of questionnaire survey and test on aerial triangulation and DEM contour line generation

4.4 Digital Plotting

4.4.1 Description of Technology Transfer

The technology transfer was targeted at two plotting operators so that DRE could carry out the operations by itself after the technology transfer was completed. However, other members of the organization were also allowed to attend the lectures for technology transfer, the results of which were evaluated by testing the chosen two operators. Thus, an environment was provided in which other members could acquire the technologies when they wished.

(1) Target technologies in technology transfer

- Digital plotting
- Inspections (logical and visual inspections)

(2) Methods

The technology transfer was conducted in the form of lectures and practical training using models used in the technology transfer for aerial triangulation. OJT was adopted for the digital plotting and data compilation regarding the scope of work of which DRE was in charge (two sheets).

(3) Executed items and descriptions

- Methods for using stereo models, index maps, and materials required to conduct digital plotting and using digital plotter applications and feature tables
- Method for plotting road facilities and railroad facilities based on understanding of the importance of agreement of end points and other items important for the creation of a network structure
- Method for plotting rivers, lakes and marshes, and sea features (particularly based on the importance of continuity for rivers as for roads and railroads because network structuring is adopted for rivers)
- Techniques for plotting topographic expression items other than contour lines with an emphasis on the expression of rock cliffs of which there are many in Montenegro
- Method for plotting small objects such as buildings
- Method for expressing using symbols small features difficult to be identified in photo interpretation while referring to materials and former topographic maps
- Method for printing plotted data and visually inspecting them for omissions and excessive plotting using materials and aerial photographs
- Methods for summarizing and managing survey results in accuracy control sheets

4.4.2 Evaluation

The technology transfer was conducted, as in the technology transfer for aerial triangulation, mainly in the form of lectures and practical training using actual data. However, the persons in charge had experience in digital photogrammetry and were quick to understand the operations without problems. Fact finding surveys (questionnaire and test format) into the state of numerical plotting within DRE, found that many members have numerical plotting experience (see charts (3), (4) and (5)). As the make up of participants when the questionnaires were held may have been appropriate, there may be some discrepancies in the results, but the evaluation was that there were few employees with an understanding of the specifications of products used in this field (see charts (1) and (2)). Knowledge of specifications is indispensible for preparing a 1:25,000 spatial data infrastructure, but it is difficult to teach this to all of the employees carrying out this work.

- Displacement of features related to roads and railroads (such as slopes), transfer of symbols in case of overlapping, editing of orientations of features with orientations
- Method for editing data of network structures such as roads, railroads, and rivers, which requires that the lines consisting them should be connected with each other
- Method for editing data that needs topological structures of planes such as land uses, which requires that there should be boundary lines and only one representative point within a domain surrounded by the boundary lines
- Method for joining with other maps
- Method for editing contour lines created from DEMs
- Method for entering and editing annotations and control point values to be created during editing
- Methods for logical inspection of data types (plane, line, point, and annotation), logical inspection of network data and land uses (topological data of planes), and other general logical inspection (self-intersection of lines, etc.)
- Method for visually inspecting digitally edited data by printing and comparing it with original materials
- Method for creating field completion sheets by printing digitally compiled data and writing on the printouts survey instructions of unknown points identified up to this process
- Method for summarizing and managing survey results in accuracy control sheets

4.5.2 Evaluation

The digital data compilation was completed mostly without problems regarding the two sheets on which DRE worked in the technology transfer. In order to complete the remaining 30% accurately, it is necessary to appoint staff, besides the operators as inspectors, and to prepare a work environment where they can inspect separate from the other operators. As a result of a questionnaire survey and a test, it was found that few staff members were capable of carrying out digital data compilation for a GIS database (see charts (1), (2), and (3)). Furthermore, it also turned out that the staff members had little experience in conducting inspections, such as visual and logical inspections, on the created data (see charts (4), (5), and (6)).

The suggested solution is often conducted in Japan and does not imply that there is anything special about DRE. Inspections conducted by persons other than the operators are considered to ensure elimination of defects in data.

(1) Evaluation for DRE

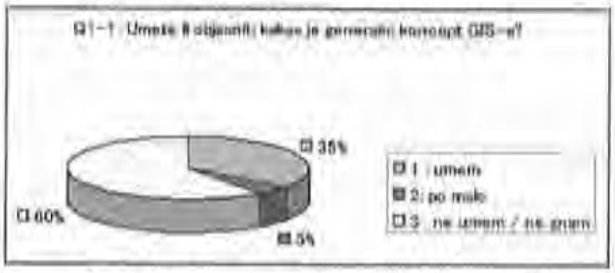


Fig 39 : Questions about GIS in general

After the GIS training for about one month, the DRE staff mastered the basic operations of ArcGIS and learned to edit and process digital topographic map data as circumstances demand. They are considered to have an extremely high level of capability in this regard. They also mastered approximately all of the spatial analysis functions and learned to create a desired map by superimposing various data on each other. They also acquired skills to conduct GIS data structuring and create data for map symbolization by capturing DXF data created on a digital plotter into GIS.

In sum, the DRE staff members who received GIS training are considered not to have a major problem in the knowledge on GIS and the operating skills for ArcGIS. However, the result of the questionnaire survey conducted at workshops that only 35% of all the participants that did not take the training understood GIS.

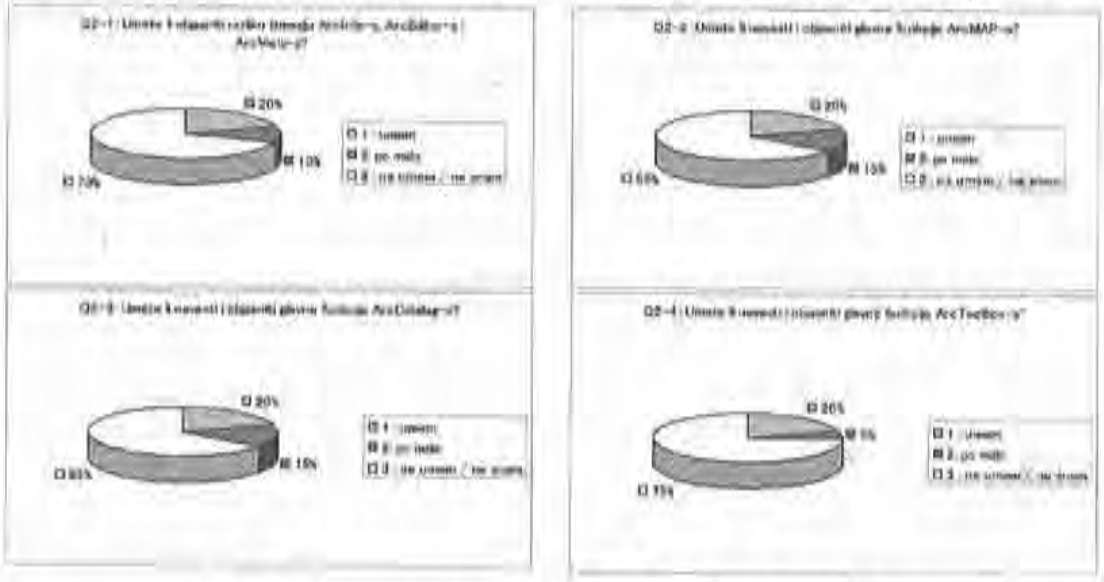


Fig 40 : Questionnaire survey result about ArcGIS functions

GIS is a well established technology, used as a tool for needed analysis in the process of projecting and making plans, so it is considered to be a necessary technique in DRE. Therefore, the general level of knowledge and skills of DRE needs to be improved mainly by the trainees who received this GIS training.

(2) Evaluation for DSP

DSP so far conducted its major operations using CAD and the staff members had little experience in using GIS. In the initial stage of training, therefore, they were slow to create the desired data or map for an assignment and often needed assistance each time. Since this resulted from a general lack of experience, they

A workshop was held to clarify how high a technical capability had been acquired by DRE, which must develop the spatial data infrastructure for the remaining 30% of the area by itself, to smoothly and quickly attain the project purpose defined by JICA as "being able to create, maintain, and update digital topographic maps using its own technology in the future" and to allow the participants to understand the actual conditions at the same time.

Photo 28 : Discussion for extracting problems

The participants of the workshop numbered 25 to 30 in total and mainly consisted of the staff of the photogrammetry division participating in the technology transfer as well as the engineers and people concerned in the field survey division who were in a collaborative relationship required to create digital topographic maps and all the members of the study team.

The workshop was conducted using the Project Cycle Management technique and incorporating many opportunities of discussion to allow all the participants to share problems from the same point of view and find clues to the problem solution and development.

(1) Extraction of problems faced by DRE

A good amount of time was spent discussion the problem extraction process, which allowed the division managers and other participants to talk at length about issues from technical as well as organizational and social viewpoints regardless of the positions they held and thus identify problems actually faced by DRE.

Almost all the DRE staff members took this rare opportunity to give their opinions on problems, voice complaints, and ideals that they had held for a long time, regardless of organizational distances or difference of rank. This led to a lively discussion and, consequently, many problems were identified, such as the following.

- Low motivations
- Insufficient management to maintain quality (Process and accuracy)
- Insufficient digital plotting software
- Obsolete PCs and peripheral devices
- Insufficient security system (such as anti-virus protection)

Photo 29 : Workshop

(2) Creation of PDM for accomplishing objectives

a large revenue source for the nation and therefore necessitates quick survey. Unlike before, however, the survey and registration methods in accordance with EU standards must be adopted, so Montenegro is working on the modernization of operations extending from the understanding of the legal system to the actual detailed clerical work with cooperation from the World Bank and GTZ.

In addition, while DRE used to conduct almost all its operations on its own, some of them are gradually being switched to private contractors in an effort to improve the efficiency and speed of the operations for the sake of implementation of the medium-term plan.

This outsourcing allows DRE to assign many engineers to sectors such as creation of digital topographic maps and thus enhance the previously understaffed development operation for various spatial data infrastructures. Thus, both the early development of the National Spatial Data Infrastructure (NSDI) and the early implementation of the "e-Government" initiatives set forth in the strategies of the medium-term plan can be expected.

DRE, currently disclosing the status quo of GIS-based real estate ownership in detail through its own web service in the regular operations, is one of the most advanced government organizations in terms of GIS.

6.1.2 Department of Spatial Planning (DSP)

DSP is an organization responsible for making many of the plans to be implemented by the Montenegrin Government regarding, for example, urban and regional development, tourism development, and environmental conservation. They are mainly engaged in the following operations based on the national budget and with cooperation from donor organizations:

1. Creating and deciding on state plans and promoting them in order to realize them.
2. Participating in passing laws and other regulations about spatial organization and marine resources.
3. International and regional collaboration related to state plans, as well as cooperation with NGOs (Non-governmental organizations).
4. Analysis and publishing current state plans.

Fig 48 : Long-term plan established by DSP

5. Work relating to publishing town planning and technical matters from state plans.
6. Keeping, classifying and systematizing state plan documentation.

The aims in creating these state plans are equal economic development in the areas where effective and national spatial development is being undertaken conservation of nature and biological diversity, promoting residential infrastructure respecting sustainable environmental development principles, and placing particular importance on the growth of tourism.

The following are some representative examples of the state plans that DSP is currently in charge of implementing.

(1) Potential survey aimed at tourism development of 17 seaside cities

At present, survey operations are in progress on 17 of 48 candidate areas. All of these selected areas meet the conditions that they are located along the coastline on the Adriatic Sea and already have accommodation facilities. The potential survey required for future development with thematic focus on tourism is being conducted on the budget specifically allocated to this operation.

(2) Environmental conservation and tourism development for Skadarsko Lake National Park

Skadarsko Lake, a beautiful lake near the capital city of Podgorica, is split by a border line approximately in the center and half the lake belongs to Albania, the neighboring country. It is one of the four national parks designated in Montenegro with a trove of wild animals and plants, many of which are specified as endangered species. DSP is conducting, with the assistance from GTZ, a survey aimed at tourism development at three selected places in the lake while preserving the environment. Many of the operations are executed by contracted private consultants under the guidance of plan establishment experts dispatched from GTZ.

(3) Supervision of comprehensive regional development plan

DSP is designated as a supervisor in the comprehensive regional development plan being implemented by 21 municipalities in Montenegro with the assistance of UNDP and is supporting the establishment of the best plan for each of the municipalities in a manner consistent with the national plans.

(4) Comprehensive development plan in the mountainous area

At present, the majority of tourists visiting Montenegro come to the coastal areas on the Adriatic Sea and are not much attracted by another world heritage site (natural) and the area surrounding it. Consequently, the accommodation facilities and road and traffic networks are underdeveloped. To ensure stable revenue from tourism, it is necessary to develop this area as soon as possible. DSP has started conducting surveys in collaboration with the Ministry of Tourism and Environmental Protection.

7.2.4 Recommendations on Digital Photogrammetry in General (DRE)

Digital photogrammetry is the most important technological factor in technology transfer conducted in this study and it is also important for DRE's independent development. As there are different elements in the different processes of digital photogrammetry, recommendations are provided for each process as follows. Elements for which recommendations are made are selected based on the results of tests and reviews made by Japanese staff during OJT and questionnaire surveys conducted during workshops.

(1) Digital aerial triangulation

Through workshops and questionnaire surveys, it was found that there are a total of 6 staff members who can conduct aerial triangulation. Based on this fact, it seemed that the technology transfer made to C/Ps would be diffused adequately to other staff members. Most of the staff members, however, have experience in aerial triangulation using conventional software and it was revealed that they have not much experience in handling the new type of equipment provided by JICA. It is desirable, therefore, that DRE actively use the new equipment also in works other than the development of the 1:25,000 scale spatial data infrastructure in order to accumulate experience.

(2) Digital plotting

Although there are quite a large number of staff members who have experience in digital plotting, the number of staff members who can understand the product specifications established in this study is small. It is vital that those in charge of digitizing maps in the photogrammetry department understand the specifications in order to construct a 1:25,000 scale spatial data infrastructure in the future.

In order to construct a spatial data infrastructure accurately, therefore, it is considered that the best solution is to let the C/Ps who were the recipients of the technology transfer organize and offer study sessions on both the product specifications and the work methods at DRE. And, these C/Ps' workload of offering such sessions can be reduced if they are charged with different parts of the study sessions depending on their knowledge and skill.

(3) Digital data compilation

Many staff members have some experience in digital data compilation to create digital topographic maps but only a very small number of them can conduct digital data compilation for GIS databases. It was also found that they have only a little experience in verification of the created data, such as visual inspection and logical inspection.

It is necessary for other staff members to master technologies required for "digital data compilation with

recommended that DRE review the annual schedule for GIS training and develop sample data and manuals for this training.

2) Quality control

It was found through the GIS training that engineers at DRE have a fairly high level of GIS technology. Understanding of the various functions taught in the technology transfer was high, and work was extremely smooth and fast, however, sometime there were errors.

As it is expected that GIS data constructed at DRE will be the most important basic data for Montenegro, and this data will be used by a large number of domestic and international organizations, quality control is a very important issue at DRE.

Taking the above situations into account, it is necessary to prepare a checklist for each step and to construct highly reliable data when developing GIS data.

(2) DSP

1) Continued utilization of GIS

At DSP, the utilization of GIS has just begun and GIS-related technologies and knowledge owned by DSP are not at a high enough level. As DSP is a key organization responsible for planning, it is desirable that GIS be utilized at DSP as a tool to create a range of maps (future planning maps, laws and regulations maps, natural resources protection maps, forest conservation maps, etc.).

It is recommended, therefore, that GIS technology and manuals obtained through the technology transfer in this study be utilized effectively and such utilization of GIS be promoted in day-to-day operation. It is also recommended that DSP staff members attend the GIS training offered by UNDP to improve GIS-related skills.

2) The role of spatial data infrastructure in DSP

- Digital topographic map of scale 1: 25 000 which will be given to DSP, will be indispensable in the already underway, documentation in the field of spatial land-use planning, as well as for creating a new one.
- These maps will represent a base for creating a GIS database for the field of planning, space organization and construction.

3) Construction of national-level GIS databases for the National Development Plan

At the GIS technology transfer in this study, data composed of 2 sheets of digital topographic maps of a

owned by different organizations needs to be shared. For promoting the utilization and exploitation of GIS in Montenegro, it is highly important to establish a "GIS exploitation and utilization promotion committee" (tentative name) to be composed of various concerned organizations to discuss how to construct a GIS data set required by the nation. It is anticipated that efforts like these will promote the sharing of information. It is also possible that participants in UNDP's GIS training courses and this study's GIS technology transfer will be utilized in common by concerned organizations and new GIS training courses will be developed in which those experienced participants act as resource persons.

7.2.7 Recommendations on PC and Database-related Safety Measures

During this study, a number of computer viruses were found in computers at DRE including those offered by JICA. Although the level of threat was rather low at the beginning, and at one point the situation got to the point where the plotting system for the technology transfer would not even start-up, and as a result, work often had to be discontinued. After conducting inspection within DRE, it was found that viruses were widespread not only among computers used for the study but also among virtually all of the DRE's computers connected through its LAN.

For avoiding the risk of being exposed to the threat of viruses that can corrupt data or cause drain of important information, it is necessary to take highly reliable security measures.

DRE understood the importance of mentioned problem and it took measures from the second half of 2008, at the same time as investing in equipment such as computers and software. Thanks to that, at the time of writing this report, antivirus programs had already been installed in each computer in DRE, and that helped in establishing a good base for further system protection.

However, the computer viruses have become a global problem, mainly because they spreads very fast, so it is expected that every employee take care of their own computer. Regarding the fact that not only the engineers participating in this Study, but the entire DRE staff use computers, it is hoped that, adequate measures will be taken, such as making updating virus software compulsory and ensuring that each DRE employee understands the importance of taking antivirus measures.

7.2.8 Recommendations on Information Disclosure

As aerospace technology advances rapidly, less than 1-meter high-resolution satellite images can be obtained freely by any individual from around the world. As a result, confidentiality of topographic maps has been diminishing and, not surprisingly, information such as the topographic map is increasingly disclosed in many nations around the world.

In Montenegro, diverse laws and regulations have been revised following the nation's gaining of independence and for preparation toward EU membership and, as a result of the "Law on Free Access to

Specification

Montenegro 1:25,000 Spatial Database Data Specification

Rev. 1.4

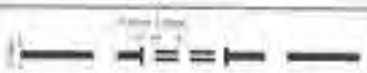
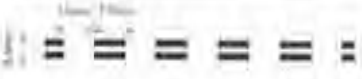
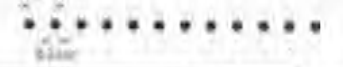
February 18, 2009

Department of Real Estate
JICA

Update History

Date	Remarks	Editor
05dec2007	・ We added a parameter of Spatial reference system as "1.2 Spatial reference system". ・ We did the following addition / change to "2.1 List of Feature item" Change : floodZone (polygon , 3020) → floodZone (Point , 6101) PhotoControlPoint(7036) → GPSControlPoint(7036) GPSPoint(7037) → GPSReferenceStation(7037) Addition : runway(Line,6040) sportsGround(Point,6100) ・ We did the following addition / change to "3.1 Definition of Feature" Addition : floodZone(6101) It is the area where a flood occurs. Acquire it thru a field work and an existing document Runway (6040) The runway of the airplane. Acquire the shape of the runway Change : floodZone(3020) : Acquire it thru a field work and an existing documents →floodZone(6101)It is the area where a flood occurs. Acquire it thru a field work and an existing documents PhotoControlPoint → GPSControlPoint GPSPoint → GPSReferenceStation ・ We did the following addition / change to "3.3 Definition of Graphics" Addition : runway(6040) , sportsGround(6100) Change : floodZone(3020) → floodZone(6101) PhotoControlPoint(7036) → GPSControlPoint(7036) GPSPoint(7037) → GPSReferenceStation(7037)	Kobel Iiobe
05Dec2008	・ We did the following addition / change to "2.1 List of Feature item" Addition : summerVillage(annotation, 8022) partofCity(annotation, 8023) explanationAnnotation(annotation, 8038) Change : commonName (annotation, 8011) →commonName(2mm) (annotation, 8024) →commonName(2.8mm) (annotation, 8025) →commonName(3.6mm) (annotation, 8026) →commonName(4.4mm) (annotation, 8027) The correction of the document : It adds a document of "With annotation" to the feature that annotation was necessary. ・ We did the following addition / change to "3.1 Definition of Feature" Addition : summerVillage(8022, annotation) They are villages in the summer. partofCity(8023, annotation) They are suburbs in the city. explanationAnnotation(8038, annotation) Change : commonName (8011):Apply name commonly used for particular place. →commonName(2mm) (8024): Apply name commonly used for particular place. The size of the character is 2mm. →commonName(2.8mm) (8025): Apply name commonly used for particular place. The size of the character is 2.8mm. →commonName(3.6mm) (8026): Apply name commonly used for particular place. The size of the character is 3.6mm. →commonName(4.4mm) (8027): Apply name commonly used for particular place. The size of the character is 4.4mm. The correction of the document : It is added a feature definition document to the document which is defined only to input by an old map. ・ We did the following addition / change to "3.3 Definition of Graphics". Addition : summerVillage(8022, annotation) partofCity(8023, annotation) explanationAnnotation(8038, annotation) Change : commonName (annotation, 8011) →commonName(2mm) (annotation, 8024) →commonName(2.8mm) (annotation, 8025) →commonName(3.6mm) (annotation, 8026) →commonName(4.4mm) (annotation, 8027) The correction of the document : It adds "fontSize" to the feature that annotation was necessary.	Kobel Iiobe
03Nov2008	・ We did the following addition / change to "3.1Definition of Feature". Change : "sName" of the attribute deleted it Addition : "subName" of the attribute added the necessary feature. ・ We did the following addition / change to "3.3 Definition of Graphics". Change : We changed a color and a line weight of some feature.	Kobel Iiobe
20Feb2009	・ We did the following addition / change to "3.3 Definition of Graphics". Change : We changed a color and a line weight of some feature. ・ We did the following addition / change to "4.1 Method of Evaluation" Change : Manually compare visible features by referencing ortho photo (or re-observation) at least 100 places on prints. →Manually compare visible features by referencing ortho photo (or re-observation) at least 31 places on prints. Sampling: Evaluate 10% (Percentage of Area) or more randomly extracted on each map sheet. →Sampling: Evaluate 5% (Percentage of Area) or more randomly extracted on each map sheet.	Kobel Iiobe

	riverSurface	polygon	2019		color: blue, lightBlue width: 0.15
	parkSite	polygon	2021		color: gray, lightGreen width: 0.10
	oliveGrove	polygon	2022		color: gray, lightGreen width: 0.10
roadn(30)	highway	line	3001		color: gray, orange width: 0.2
	highwayTunnel	line	3002		color: gray, white width: 0.2, 0.15 Annotation: Font: gothic Size: 2mm
	highwayBridge	line	3003		color: gray, white width: 0.2, 0.15 Annotation: Font: gothic Size: 2mm
	mainroad	line	3004		color: gray, orange width: 0.2
	mainroad Tunnel	line	3005		color: gray, white width: 0.2, 0.15 Annotation: Font: gothic Size: 2mm
	mainroad Bridge	line	3006		color: gray, white width: 0.2, 0.15 Annotation: Font: gothic Size: 2mm
	regionalroadAndConnectingroad	line	3007		color: gray, yellow width: 0.2
	regionalroadAndConnectingroadTunnel	line	3008		color: gray, white width: 0.2, 0.15 Annotation: Font: gothic Size: 2mm
	regionalroadAndConnectingroadBridge	line	3009		color: gray, white width: 0.2, 0.15 Annotation: Font: gothic Size: 2mm

localroad	line	3010		color: gray, white width: 0.2
localroad Tunnel	line	3011		color: gray, white width: 0.2, 0.15 Annotation: Font: gothic Size: 2mm
localroad Bridge	line	3012		color: gray, white width: 0.2, 0.15 Annotation: Font: gothic Size: 2mm
unpavedroad	line	3013		color: gray width: 0.3
unpavedroadTunnel	line	3014		color: gray, white width: 0.15, 0.15 Annotation: Font: gothic Size: 2mm
unpavedroadBridge	line	3015		color: gray, white width: 0.15, 0.15 Annotation: Font: gothic Size: 2mm
street	line	3016		color: gray, white width: 0.2
streetTunnel	line	3017		color: gray, white width: 0.2, 0.15 Annotation: Font: gothic Size: 2mm
streetBridge	line	3018		color: gray, white width: 0.2, 0.15 Annotation: Font: gothic Size: 2mm
underconstructionroad	line	3019		color: gray, white width: 0.2
undercons tructionroadTunnel	line	3020		color: gray, white width: 0.2, 0.15
undercons tructionroadBridge	line	3021		color: gray, white width: 0.2, 0.15
carriage Road	line	3022		color: gray, white width: 0.2
footpath	line	3023		color: gray

				Font: roman Size: 3.5mm
adjoinState	point	8012	e.g. ALBANIJA	ccolor: black annotation: Font: gothic, italic Size: 5.0mm
commonName	point	8013	e.g. Pudono	color: black annotation: Font: gothic Size: 2.0mm
hill	point	8014	e.g. *Rudina*	color: black annotation: Font: gothic, italic Size: 2.5mm
mountain	point	8015	e.g. *Boska*	color: black annotation: Font: gothic, italic Size: 3.0mm
roadDirectionAnnotation	point	8016	e.g. Skopje	color: black annotation: Font: gothic Size: 1.5mm
adjoinMapName	point	8017	e.g. Miravci	color: black annotation: Font: roman Size: 2.0mm
capeName	point	8018	e.g. RcStolac	color: black annotation: Font: roman Size: 2.0mm
islandName	point	8019	e.g. Katic	color: black annotation: Font: roman Size: 1.5mm
inletName	point	8020	e.g. U. Stolac	color: bule annotation: Font: roman Size: 1.5mm-2.0mm
seaNmae	point	8021	e.g. JADRANSKO MORE	color: bule annotation: Font: roman Size: 3.0mm-4.0 mm
summerVIlage	point	8022	e.g. Gradac	color: black annotation: Font: roman Size: 2.0 mm
partOfCity	point	8023	e.g. STARI BAR	color: black annotation: Font: roman Size: 2.5 mm
commonName(2mm)	point	8024	e.g. Bigoica	color: black annotation: Font: gothic Size: 2.0mm
commonName(2.8	point	8025	e.g. Sutorman	color: black annotation:

4 Method of Evaluation and Quality Requirement

4.1 Method of Evaluation

Data Quality Element	Data Quality Sub Element	Name of Measure	Interior / Exterior	Automatic / Manual	Quantitative / Countable	Full / Sampling	Description of Measure
Completeness	Excess	Test A	E	M	Q	S	Manually compare all visible features in the area by referencing ortho photo on prints.
		Test B	E	M	Q	F	Manually check elements which ware entered from colleted materials.
	Omission	Test A	E	M	Q	S	Manually compare all visible features in the area by referencing ortho photo on prints.
		Test B	E	M	Q	F	Manually check elements which ware entered from colleted materials.
Logical Consistency	Conceptual Consistency						
	Domain Consistency	Test A	I	A	Q	F	Execute check program which examines field name field type, field size, multiplicity, record valid range.
		Test B	I	A	Q	F	Check Dataset extent is only inside map sheet border
	Formal Consistency	Test	I	A	Q	F	Data can be opened by ArcGIS as Coverage format with no opening error. Data can be opened by ArcGIS as GeoTiff format with no opening error (for raster).
	Topological Consistency	Test	I	A	Q	F	Execute check program which examines redundant area line and point, selftwisted line and area
Positional Accuracy	Absolute Exterior Positional Accuracy						
	Relative Interior Positional Accuracy	Test	E	M	C	S	Manually compare visible features by referencing ortho photo (or re-observation) at least 21 places on prints.
	Gridded Data Positional Accuracy						
Temporal Accuracy	Accuracy of a Time Measurement						
	Temporal Consistency						
	Temporal Validity	Test	I	A	Q	F	Execute check program which examines temporal validity on attribute field.
Thematic Accuracy	Thematic Classification Correctness	Test	E	M	Q	S	Manually compare all visible features in the area by referencing ortho photo on prints.
	Non Quantitative Attribute Accuracy	Test	E	M	Q	F	Manually check elements which are entered from colleted materials.
	Quantitative Attribute Accuracy						

Interior: Use only dataset itself
Exterior: Use other data source or
Automatic: Computerized processing,
Manual: Require manual examination
Quantitative: Calculate percentage of error,
Countable: Count total number of error
Full: Evaluate all contents
Sampling: Evaluate 5% (Percentage of Area) or more randomly extracted on each map sheet

MEMORADOM

FOR

THE STANDARD OF MAP SYMBOLS

FOR

THE STUDY FOR ESTABLISHMENT OF GEOGRAPHIC INFORMATION

FOR IMPLEMENTATION OF NATIONAL PHYSICAL PLAN

IN

THE REPUBLIC OF MONTENEGRO

AGREED UPON BETWEEN

DEPARTMENT OF REAL ESTATE (DRE)

MINISTRY OF FINANCE

AND

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

PODGORICA
26 June, 2007

Mr. Kazuo Furukata
Leader
JICA Study Team
Japan International Cooperation Agency
(JICA)

Mr. Mićo Orlandić
Director
Department of Real Estate
Ministry of Finance

Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched the Study Team to Montenegro for the implementation of the 2nd phase of the Study for Establishment of Geographic Information for Implementation of National Physical Plan in the Republic of Montenegro (hereinafter referred to as "the Study") from April 23, 2007, in compliance with the Scope of Work for the Study, which was agreed upon by the Department of Real Estate (hereinafter referred to as "DRE"), the Department of Spatial Planning (hereinafter referred to as "DSP"), and JICA on November 30, 2006.

At the beginning of the 2nd phase of the field survey, the Study Team held a meeting for the explanation of the schedule and work items etc., with the officials of DRE and DSP.

In compliance with the Inception Report and above meeting, the officials from respective technical section (Photogrammetry, Field Survey and GIS) of DRE and the Study Team held a series of discussions during their assignment in Montenegro, in order to create the Specifications and Standard for Map Symbols, based on the existing standard of DRE.

The standard of Map Symbols shall be utilized effectively not only for this Study such as the photo interpretation of field survey, mapping & editing of photogrammetry and data structuration of GIS as well, but also for all of the mapping works of 1:25,000 and GIS, as a foundation of DRE in the future.

As a whole, both sides agreed upon the Standard for Map Symbols as a part of Specifications. The Standard of Map Symbol is shown in the Appendix.

MEMORADOM

FOR

THE INFORMATION OF POWER TRANSMISSION LINES

FOR

THE STUDY FOR ESTABLISHMENT OF GEOGRAPHIC INFORMATION

FOR IMPLEMENTATION OF NATIONAL PHYSICAL PLAN

IN

THE REPUBLIC OF MONTENEGRO

AGREED UPON BETWEEN

DEPARTMENT OF REAL ESTATE (DRE)

MINISTRY OF FINANCE

AND

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

PODGORICA
17 December, 2007

Mr. Kazuo Furukata
Leader
JICA Study Team
Japan International Cooperation Agency
(JICA)

Mr. Mićo Orlandić
Director
Department of Real Estate
Ministry of Finance

Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched the Study Team to Montenegro for the implementation of the 4th phase of the works in the first physical year for Establishment of Geographic Information for Implementation of National Physical Plan in the Republic of Montenegro (hereinafter referred to as "the Study") from November 8 to December 22, 2007, in compliance with the Scope of Work (S/W) for the Study, which was agreed upon by the Department of Real Estate (hereinafter referred to as "DRE"), the Department of Spatial Planning (hereinafter referred to as "DSP"), and JICA on November 30, 2006.

During the period of their stay in the Republic of Montenegro, the Study Team held a series of discussions with the officials of DRE. Based on the discussions, following problem for the mapping works emerged between Study Team and DRE.

The S/W shows that the "available data and information related to the Study shall be provided to the Study Team by Montenegro side". Along the S/W and Specifications, analogue data of "Power transmission lines" as the information to be indicated on the maps has been contributed to the Study Team at the end of August. However, DRE revealed that the Electric Power Agency will not provide remaining parts of digitized data to the Study Team in time of their stay in Montenegro.

As a result of discussions, both side agreed that the digitized data of "Power transmission lines" shall be plotted on the maps by DRE and add to the data prepared by the Study Team in the future.

MINUTES OF MEETING

ON

TECHNICAL ITEMS

FOR

THE STUDY FOR ESTABLISHMENT OF GEOGRAPHIC INFORMATION FOR IMPLEMENTATION OF NATIONAL PHYSICAL PLAN IN THE REPUBLIC OF MONTENEGRO

AGREED UPON BETWEEN

DEPARTMENT OF REAL ESTATE (DRE)
MINISTRY OF FINANCE,

AND

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

PODGORICA
5, JUNE, 2008

Mr. Kazuo Furukata
Leader
JICA Study Team
Japan International Cooperation Agency
(JICA)

Mr. Mićo Orlandić
Director
Department of Real Estate (DRE)
Ministry of Finance

In case any modifications become necessary, DRE shall provide the correct data by digital format to the Study Team by the middle of July.

4. Format of map sheet:

DRE shall decide the format of the map sheet (including the legend items) based on the sample of two(2) sheets prepared by the Study Team and shall supply a final format to the Study Team by the middle of July.

5. Framework of map:

Map sheets shall be divided into a size of 7' 30" x 7' 30" with the exception of some extension sheets based on the projection system of Gauss Krouger.

Geodetical and planimetrical coordinates shall be indicated on the maps based on the GRS-80 and Bessel 1841.

6. Font type of database:

In order to create the database for GIS, the following font shall be adopted in this Study.

- type of font : YU L Swiss 154
- name of file : YLSWIS.TTF

Appendix-1

List of attendants

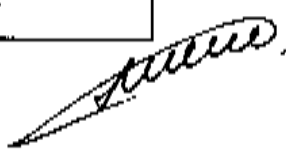
Department of Real Estate (DRE)	
Mićo ORLANDIĆ	Director
Snježana ŠOŠKIĆ	Photogrammetry section
Milutin BATURAN	Photogrammetry section
Radmila JOVIĆEVIĆ	Photogrammetry section
Veliza FEMIĆ	Survey section
JICA Study Team	
Kazuo FURUKATA	Team leader
Kohei ISOBE	Expert of photogrammetry
Yoshimitsu FUKUMOTO	Expert of map symbolization
Motoko KATAYAMA	Coordinator & Interpreter
Observer	
Shinichi SAKABE	JICA Technical advisor

THE STUDY
FOR
ESTABLISHMENT OF GEOGRAPHIC INFORMATION
FOR
IMPLEMENTATION OF NATIONAL PHYSICAL PLAN
IN
THE REPUBLIC OF MONTENEGRO

NAME LIST

1:25,000 MAP SHEET

1	112-4	·	4	Ifsar
2	113-3	·	3	Čajniče
3		-	4	Metaljka
4	129-1	-	4	Tjentište
5	129-2	-	2	Vikoč
6		-	3	Mratinje
7		-	4	Pivska planina-sjever
8	129-3	-	2	Lebršnik
9		-	3	Stepen
10		-	4	Vratkovići
11	129-4	-	1	Plužine
12		-	2	Pivska planina-jug
13		-	3	Pivski Manastir
14		-	4	Bezuje
15	130-1	-	1	Šuplja stijena
16		-	2	Boljanići
17		-	3	Ljubišnja-zapad
18			4	Ljubišnja-istok
19	130 2	-	1	Gotovuša
20		-	2	Kaluđerovci
21		-	3	Pljevlja
22		-	4	Otilovići
23	130-3	-	1	Durmitor-sjever
24		-	2	Žabljak
25		-	3	Durmitor-jug
26		-	4	Bare Žugića
27	130-4	-	1	Đurđevića Tara
28		-	2	Katabun
29		-	3	Brajkovača
30		-	4	Gostilovina
31	131-1	-	3	Kamena Gora
32	131-3	-	1	Kovren
33		-	2	Brodarevo
34		-	3	Donji Kolašin
35		-	4	Bijelo Polje-zapad



36	131-4	-	1	Gostun
37		-	3	Bijelo Polje-istok
38		-	4	Osmanbegovo Selo
39	132-3	-	3	Pešterska polje
40	146-2	-	2	Bileća-sjever
41		-	4	Bileća-jug
42	146-4	-	2	Grančarevo
43		-	4	Dubravka
44	147-1	-	1	Koprivice
45		-	2	Goslić
46		-	3	Počekovići
47		-	4	Velimlje
48	147-2	-	1	Srijede
49		-	2	Jasenovo Polje
50		-	3	Trubjela-sjever
51		-	4	Nikšić
52	147-3	-	1	Vilusi
53		-	2	Grahovo
54		-	3	Orjen
55		-	4	Risan
56	147-4	-	1	Trubjela-jug
57		-	2	Carev Most
58		-	3	Bata
59		-	4	Čevo
60	148-1	-	1	Šavnik
61		-	2	Boan
62		-	3	Gvozd
63		-	4	Kapetanovo jezero
64	148-2	-	1	Sinjavina-zapad
65		-	2	Sinjavina-istok
66		-	3	Velje Duboko
67		-	4	Manastir Morača

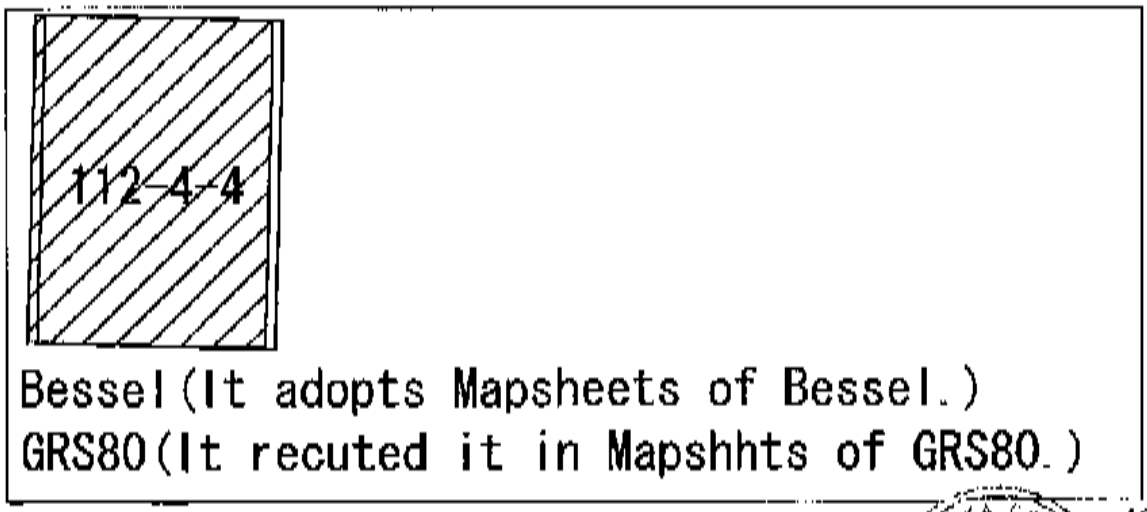
68	148-3	–	1	Glava Zete
69		–	2	Morakovo
70		–	3	Danilovgrad
71		–	4	Spuž
72	148-4	–	1	Mrtvo Duboko
73		–	2	Lijeva Rijeka
74		–	3	Bioče
75		–	4	Vjetrenik
76	149-1	–	1	Mojkovac
77		–	2	Majstorovina
78		–	3	Kolašin
79		–	4	Zekova Glava
80	149-2	–	1	Brzava
81		–	2	Mušnica
82		–	3	Berane-zapad
83		–	4	Berane-istok
84	149-3	–	1	Opasanica
85		–	2	Komovi
86		–	3	Žijovo
87		–	4	Gropa e Selces
88	149-4	–	1	Andrijevica
89		–	2	Murino
90		–	3	Gusinje
91		–	4	Plav
92	150-1	–	1	Savin Bor
93		–	2	Paučina
94		–	3	Vrelo Ibra
95		–	4	Rožaje
96	150-2	–	1	Tutin
97		–	3	Kaličane
98	150-3	–	1	Čakor
99		–	2	Rugovska Kisura
100		–	3	Bogićevica
101	158-2	–	2	Sutorina

102	159-1	-	1	Herceg Novi
103		-	2	Tivat
104		-	4	Zaliv Trašte
105	159-2	-	1	Kotor
106		-	2	Cetinje
107		-	3	Budva
108		-	4	Sveti Stefan
109	159-4	-	2	Petrovac na Moru
110	160-1	-	1	Orasi
111		-	2	Podgorica-zapad
112		-	3	Rijeka Crnojevića
113		-	4	Vranjina
114	160-2	-	1	Podgorica-istok
115		-	2	Bezjovo
116		-	3	Tuzi
117		-	4	Drume
118	160-3	-	1	Virpazar
119		-	2	Petrova Ponta
120		-	3	Bar
121		-	4	Stari Bar
122	160-4	-	1	Skadarsko jezero
123		-	3	Vladimir
124		-	4	Taraboš
125	161-1	-	1	Poprat
126	161-2	-	1	Jezerce
127		-	2	Dragobija
128	170-1	-	2	Ulcinj
129	170-2	-	1	Šasko jezero
130		-	2	Fraskanjel

2. Revision of the Specifications:

- addition, feature item "summerVillage(8022, annotation)"
- addition, feature item "partofCity(8023, annotation)"
- addition, feature item "explanationAnnotation(8028, annotation)"
- modification, "commonName (8013, annotation)" to "commonName(2mm) (8024, annotation)"
- modification, "commonName (8013, annotation)" to "commonName(2.8mm) (8025, annotation)"
- modification, "commonName (8013, annotation)" to "commonName(3.6mm) (8026, annotation)"
- modification, "commonName (8013, annotation)" to "commonName(4.4mm) (8027, annotation)"

5. Framework of map:



MINUTES OF MEETING

ON

TECHNICAL ITEMS

FOR

THE STUDY FOR ESTABLISHMENT OF GEOGRAPHIC INFORMATION FOR IMPLEMENTATION OF NATIONAL PHYSICAL PLAN IN THE REPUBLIC OF MONTENEGRO

AGREED UPON BETWEEN

DEPARTMENT OF REAL ESTATE (DRE) MINISTRY OF FINANCE,

AND

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

PODGORICA
NOVEMBER 3, 2008

Mr. Kazuo Furukata
Leader
JICA Study Team
Japan International Cooperation Agency
(JICA)

Mr. Miloš Orlandić
Director
Department of Real Estate (DRE)
Ministry of Finance

Japan International Cooperation Agency (hereinafter, "JICA") dispatched the Study Team to Montenegro for the implementation of the second phase of works in the second fiscal year of the Study for Establishment of Geographic Information for Implementation of National Physical Plan in the Republic of Montenegro (hereinafter, "the Study") from September 25, 2008, in compliance with the Scope of Work for the Study, which was agreed upon between the Department of Real Estate (hereinafter, "DRE"), the Department of Spatial Planning (hereinafter, "DSP") and JICA on November 30, 2006.

Prior to commencement of the works in Montenegro, the Study Team held a series of meetings to brief the officials of DRE and DSP on the implementation plan, work schedule, and to solve the problems which occurred in Japan during the editing process and so forth.

As a whole, based on the meetings, the Study Team and the Montenegro side (DRE) agreed upon the Minutes of Meeting on Technical Items with regard to the following issues on October , 2008. The list of those in attendance is shown in Appendix-1, attached.

1. International boundary lines

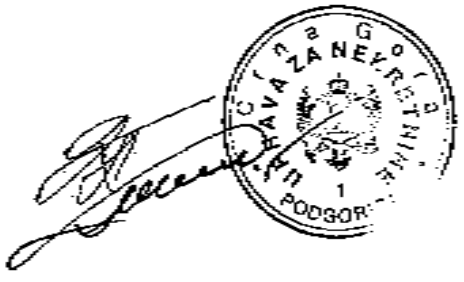
   Based on the information given by Mr. Djole Bogdanović, Montenegro representative for the International Border Committee, the red colored lines indicated on the existing 1:25,000 maps provided by DRE to the Study Team shall be adopted as the official international boundary lines.

2. Municipality boundary line

   The unclear overlapping lines that were indicated in places between several municipalities, and encountered during the editing process in Japan, have been corrected by DRE and provided to the Study Team as the official municipality boundary lines.

3. Control point data

   Control points with three dimensional coordinates (X,Y and H) shall be adopted as the existent control point to be indicated on the maps within various control point data (including X, Y only) provided by DRE to the Study Team.



4. Specifications

Some of the topographic features required for the GIS database were added to and/or modified in the Specifications as a result of the editing procedures in Japan. In compliance with the revisions, editing work for the Study shall be carried out based on these renewed Specifications.

The revised topographic feature items are indicated in Appendix-2, attached.

5. Correction of map sheet name

The name of one of the map sheets among the list agreed upon in May 2008 is to be revised as follows:

Sheet No. = 130-2-2

Sheet Name = Kaludjerovci - - - - -> Kaludjerovici

6. Format of map sheet

The decorations on the map sheet, such as the legend, scale bar, sheet name, adjacent sheet name, map history, and so on has been decided by DRE according to the sample copy indicated in Appendix-3, attached.

7. Map symbolization

Based on the confirmation between DRE and the Study Team with printed several type of maps prepared by the Study Team, some of the symbols represent the topographic features has been modified in the specifications by DRE in order to express harmonious arrangement of colors, lines and features each other clearly on the maps. Selected sample copy of map type attached in Appendix-4.

Appendix-1

List of attendants

Department of Real Estate (DRE)

Mićo ORLANDIĆ	Director
Snježana ŠOŠKIĆ	Photogrammetry section
Milutin BATURAN	Photogrammetry section
Velizar FEMIĆ	Survey section

JICA Study Team

Kazuo FURUKATA	Team leader
Kohei ISOBE	Expert of photogrammetry
Yoshimitsu FUKUMOTO	Expert of map symbolization
Kazutoshi MASUDA	Expert of GIS
Masahiko OTSUKA	Coordinator & Interpreter

Црна Гора
МИНИСТАРСТВО ЗА ЕКОНОМСКИ РАЗВОЈ
Број 10-981/30
Подгорица, 03.11. 2008 Год.

Crna Gora
UPRAVA ZA NEKRETNINE
PODGORICA
Primljeno: 04.10.2008
Org. jed. | Broj | Prilog | Vrijednost
02 - 4960

MEMORANDUM

(1) Japan International Cooperation Agency (hereinafter referred to as "JICA") and the Department of Real Estate (hereinafter referred to as "DRE"), the Department of Spatial Planning (hereinafter referred to as "DSP") define "the Products" of the Study for Establishment of Geographic Information for Implementation of National Physical Plan in the Republic of Montenegro in below.
The Products (Spatial Data Infrastructure) are consists of
a) Digital National Base Map
b) GIS database

(2) The copyright on "the Products" belongs to both of DRE and JICA.

(3) DRE takes an obligation to DSP to provide as priority all data which are necessary for executing regular works in accordance with "The Law on state survey and cadastre of real estate in Montenegro".

(4) DRE and JICA keep the master-copy of "the Products" in each.

(5) JICA agreed to allow DRE to modify, update or convert "the Products". Copyright on updated, modified or converted "the Products" belong to only DRE.

(6) JICA agreed to allow DRE to provide "the Products" not only for governmental organizations but also to sell the private sector and the general public according to the fair market price for sustainable, economical development in Montenegro.

(7) DRE agreed to allow JICA to provide "the Products" to person or organization in Japan who agreed below condition.
a) Not use "the Products" in any profitable purpose.
b) Not transfer "the Products" to any other people or organization.
c) Only use the purpose in applied to JICA.

November 3, 2008
Podgorica, Montenegro

Miso ORLANDIĆ
Director
Department of Real Estate

Budislava KUČ
Chief
Department of Spatial Planning

Kazuo FURUKATA
Leader
JICA Study Team

Republika Crna Gora
VLADA REPUBLIKE CRNE GORE
UPRAVA ZA NEKRETNINE
Broj: 02-3821/1
Podgorica, 26.09.07 *godine*

"JICA" Study Team
Team Leader
- Kazuo Frukata -

Uprava za nekretnine - Vlade Republike Crne Gore će koristiti Aero snimke (Contract snimke na cijeloj teritoriji i snimke uvećane za 160%, na 30% teritorije Republike Crne Gore) za budući projekat.

S poštovanjem,

DIREKTOR,
Mićo Orlandić

Montenegro 1:25,000 Spatial Database Data Specification

Rev. 1.4

February 18, 2009

Department of Real Estate
JICA

Update History

Date	Ramarks	Edit by
05dec2007	・ We added a parameter of Spatial reference system to "1.2 Spatial reference system". ・ We did the following addition / change in "2.3 List of Feature Item". Change： floodZone (polygon , 2020) → floodZone (Point , 6101) PhotoControlPoint(7036) → GPSControlPoint(7036) GPSPoint(7037) → GPSReferenceStation(7037) Addition： runway(Line,6040) sportsGround(Point,6100) ・ We did the following addition / change in "3.1 Definition of Feature". Addition： flodZone(6101) :It is the area where a flood occurs. Acquire it than a field work and an existing document. Runway（6040）:The runway of the airplane. Acquire the shape of the runway. Change： flodZone(2020) : Acquire it than a field work and an existing document. →flodZone(6101)It is the area where a flood occurs. Acquire it than a field work and an existing document. PhotoControlPoint → GPSControlPoint GPSPoint → GPSReferenceStation ・ We did the following addition / change in "3.3 Definition of Graphics". Addition： runway(6040) , sportsGround(6100) Change： floodZone(2020) → floodZone(6101) PhotoControlPoint(7036) → GPSControlPoint(7036) GPSPoint(7037) → GPSReferenceStation(7037)	Kohei Isobe
05Jun2008	・ We did the following addition / change in "2.3 List of Feature Item". Addition： summerVillage(annotation, 8022) partofCity(annotation, 8023) explanationAnnotation(annotation, 8028) Change： commonName (annotation, 8013) →commonName(2mm) (annotation, 8024) →commonName(2.8mm) (annotation, 8025) →commonName(3.6mm) (annotation, 8026) →commonName(4.4mm) (annotation, 8027) The correction of the document： It adds a document of "With annotation" to the feature that annotation was necessary. ・ We did the following addition / change in "3.1 Definition of Feature". Addition： summerVillage(8022, annotation) : They are villages in the summer. partofCity(8023, annotation) : They are sections in the city. explanationAnnotation(8028, annotation) Change： commonName (8013):Apply name commonly used for particular place. →commonName(2mm) (8024): Apply name commonly used for particular place. The size of the character is 2mm. →commonName(2.8mm) (8025): Apply name commonly used for particular place. The size of the character is 2.8mm. →commonName(3.6mm) (8026): Apply name commonly used for particular place. The size of the character is 3.6mm. →commonName(4.4mm) (8027): Apply name commonly used for particular place. The size of the character is 4.4mm. The correction of the document： It is added a feature definition document to the document which it defines only to input by an old map. ・ We did the following addition / change in "3.3 Definition of Graphics". Addition： summerVillage(8022, annotation) partofCity(8023, annotation) explanationAnnotation(8028, annotation) Change： commonName (annotation, 8013) →commonName(2mm) (annotation, 8024) →commonName(2.8mm) (annotation, 8025) →commonName(3.6mm) (annotation, 8026) →commonName(4.4mm) (annotation, 8027) The correction of the document： It adds "font&size" to the feature that annotation was necessary.	Kohei Isobe
03Nov2008	・ We did the following addition / change in "3.1Definition of Feature". Change： "eName" of the attribute deleted it. Addition： "mName" of the attribute added the necessary feature. ・ We did the following addition / change in “3.3 Definition of Graphics”. Change： We changed a color and a line weight of some feature.	Kohei Isobe
20Feb2009	・ We did the following addition / change in “3.3 Definition of Graphics”. Change： We changed a color and a line weight of some feature. ・ We did the following addition / change in “4.1 Method of Evaluation”. Change： Manually compare visible features by referencing ortho photo (or re-observation) at least 100 places on prints. →Manually compare visible features by referencing ortho photo (or re-observation) at least 21 places on prints. Sampling: Evaluate 10% (Percentage of Area) or more randomly extracted on each map sheet →Sampling: Evaluate 5% (Percentage of Area) or more randomly extracted on each map sheet	Kohei Isobe

Contents

1 General

1.1 Objective

Spatial Dataset of The data Specification is applied for various purposes as Montenegro national base map scale at 1:25,000. Also it is to be used for various kinds of GIS as frame work. data.

1.2 Spatial Reference System

Spatial reference system and unit of measure is follows;

Name of Reference System :	
Name of Ellipsoid :	Geodetic Reference System1980（GRS80）
Semi-major axis :	6378137
Inverse Flattening :	298.257222101
Name of Reference System in Hight :	n/a
Projection System :	Universal Transverse Mercator（ZONE34）
Scale Factor at Origin :	0.9996
Meridian of Origin :	21°00’00” East of Greenwich
Latitude of Origin :	Equator
False Easting :	500,000.00m
False Northing :	0.00m
Unit of Measurement :	Meter（Two Places of decimals）
Transformation Parameter : （Beseel→GRS80）	dx = 261.89858m, dy = 221.21591m, dz = 743.87680, rx = +4.99487", ry = +14.45241", rz = -15.13857", s = 2.03665ppm
Dimension of co-ordinateSystem :	3

This parameter is available for only 25,000 product specifications, and other reduced scales can't use this.

1.3 Data Format

Data format of dataset is follows;

Table 1-2: Data format

Data format for Vector data	ArcGIS Coverage（ESRI）.Only Primary feature (Label/Point, Arc, and Polygon) is applied for Spatial scheme. Composite (Route, Section, and Region) and Secondary feature (Tick, Link, and Annotation) are not applicable.
Data format for Raster data	GeoTIFF Projection system information or Latitude/Longitude is applied for allocation infomation.
Resolution of Raster data	0.50m
Display Scale	1:25,000
Unit of Dataset	7’30” by 7’30” (1:25,000 map Sheet Division)

1.4 Language

Language for Dataset itself and additional information are follows;
Language: Montenegron, English（write down Montenegro with English as rule）

1.5 Graphics

1.5.1 Color Space

Regulations of color space for displaying data on computer monitor and printing maps are follows;

Table 1-3: Color Space

Name of Color	Value in RGB Space	Value in CMYK Space	Remarks
White	255,255,255	0,0,0,0	-
Black	0,0,0	0,0,0,100	-
Red	255,0,0	1,96,91,0	-
Green	0,255,0	93,0,100,0	-
LightGreen	128,255,128	51,0,57,0	-
Blue	0,0,255	96,93,0,0	-
LightBlue	0,255,255	84,0,0,0	-
Yellow	255,255,0	3,2,91,0	-
Orange	255,128,0	1,62,100,0	-
Brown	128,0,0	33,94,95,25	-
Gray	128,128,128	43,31,28,13	-
LightGray	192,192,192	23,16,13,2	-

1.5.2 Line Width

Regulations of Line width for displaying data on computer monitor and printing maps arefollows;

Table 1-4: Line Width

Name of Width	Width in mm	Width in Point	Remarks
5	0.05	0.142	-
10	0.10	0.283	-
15	0.15	0.425	-
20	0.20	0.567	-
30	0.30	0.850	-
40	0.40	1.134	-
50	0.50	1.417	-
60	0.60	1.701	-
70	0.70	1.984	-
80	0.80	2.268	-
90	0.90	2.551	-
100	1.00	2.853	-
120	1.20	3.402	-
140	1.40	3.969	-
160	1.60	4.535	-
180	1.80	5.102	-
200	2.00	5.669	-

1.6 Element Identifier

id and uuid naming rules are follows;

Table 1-5: Regulations for Element Identifier

id	id must be maintained as unique number in each coverage. id is given from 1 to bigger in sequence with increment 1. Only for internal system use.
uuid (Universally Unique IDentifier)	uuid must be maintained as unique number in the product uuid consists of name of mapsheet name and id. mapsheet number: expressed by 5digits element id: expressed by 8digits

1.7 Feature item name encoding

Every feature item has code for simplification of feature item name. Formal names of feature item are encoded as 4 digits according as coverage naming conventions.

1.8 Data entry history attribute

All the elements must have a history attribute. Regulations are follows;

Table 1-6: Regulations for entry history attribute

expression	History attribute are expressed as 6 digits. e.g. 200903 (yyyymm)
timing of history attribute	Timing of history attribute is when field identification has taken.
updating	Added and modified elements must have a new history attribute. History of element deletion is not required to record.

2 Overview of Product

2.1 Components of Dataset

Single dataset consists of 1 Workspace and 23 Coverages as 1 mapsheet except raster component.

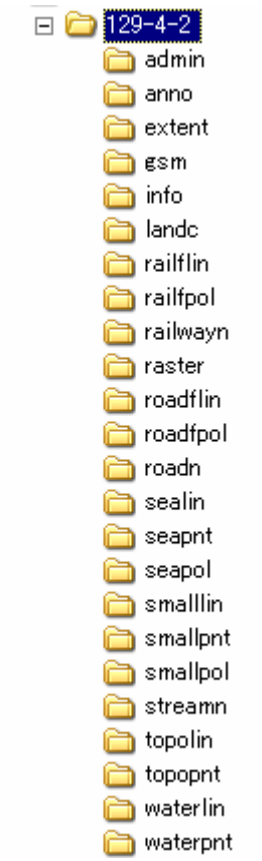


Figure 2-1: Components of Dataset per mapsheet（example of mapsheet No.129-4-2）

2.2 Components of Coverage

Components and its outline of coverage are follows. Package consists of coverages depending on type of feature of coverage.
Formal names of coverage are shortened for less than 8 characters (in the bracket) as a file name according as coverage naming conventions.

Table 2-1: Components of Coverage (and referenceRaster)

Name of workspace	Name of package	Name of coverage	Description of coverage
Name of Mapsheet (e.g. 129-4-2)	administrativeArea	Extent (extent)	Line data of state and other extents
		administrativeArea (admin)	Line data of municipality area
	landClassification	landClassification (landc)	Topological Polygon data of land classification
	roadSpace	roadNetwork (roadn)	Topological line data of road network
		polygonalRoadFacility(roadfpol)	Polygon data of road feature
		linearRoadFacility (roadflin)	Line data of road feature
	railwaySpace	railwayNetwork (railwayn)	Topological line data of railway network
		polygonalRailwayFacility (railfpol)	Polygon data of railway feature
		linearRailwayFacility (railflin)	Line data of railway feature
	waterSpace(river/lake)	streamNetwork (streamn)	Topological line data of stream network
		pointFeatureRelatedWater(waterpnt)	Point data of feature related water
		linearFeatureRelatedWater(waterlin)	Line data of feature related water
	waterSpace(sea)	polygonalwaterSpace(seapol)	Polygon data of feature of the sea
		pointFeatureOfTheSea (seapnt)	Point data of feature of the sea
		linearFeatureOfTheSea (sealin)	Line data of feature of the sea
	smallObject	polygonalSmallObject(smallpol)	Polygon data of small object
		linearSmallObject(smalllin)	Line data of small object
		pointSmallObject(smallpnt)	Point data of small object
	topographicFeature	polygonalTopographicFeature (topopol)	Polygon data of topographic feature
		linearTopographicFeature (topolin)	Line data of topographic feature

		pointTopographicFeature (topopnt)	Point data of topographic feature
		gridSurfaceModel (gsm)	Point data of regular grid 3-d surface model
	annotation	annotation(anno)	Point data of annotation
	referenceRaster	n/a	Raster data of ortho photo. Folder for the orthophoto shall be named “raster”

2.3 List of Feature Item

List of Feature Item is follows.

Table 2-2: List of Feature Item

Name of coverage	Name of feature Item	Element type	Code	Remarks
extent(10)	state	Line	1001	with annotation
	nationalPark	Line	1002	with annotation
admin(11)	administrativeArea	Line	1101	with annotation
landc(20)	cultivatedLand	polygon	2001	-
	vineyard	polygon	2002	-
	orchard	polygon	2003	-
	riceField	polygon	2004	-
	plantedForest	polygon	2005	-
	deciduousForest	polygon	2006	-
	coniferousForest	polygon	2007	-
	mixedForest	polygon	2008	-
	shrub	polygon	2009	-
	meadow	polygon	2010	-
	brier	polygon	2011	-
	coppice	polygon	2012	-
	sands	polygon	2013	-
	rock	polygon	2014	-
	clay	polygon	2015	-
	peat	polygon	2016	-
	lake	polygon	2017	with annotation
	marsh	polygon	2018	with annotation
	riverSurface	polygon	2019	-
	parkSite	polygon	2021	-
	oliveGrove	polygon	2022	-
roadn(30)	highway	line	3001	-
	highwayTunnel	line	3002	with annotation
	highwayBridge	line	3003	with annotation
	mainlroad	line	3004	-
	mainlroadTunnel	line	3005	with annotation
	mainlroadBridge	line	3006	with annotation
	regionalroadAndConnectingroad	line	3007	-
	regionalroadAndConnectingroadTunnel	line	3008	with annotation
	regionalAndConnectingroadBridge	line	3009	with annotation
	localroad	line	3010	-
	localroadTunnel	line	3011	with annotation
	localroadBridge	line	3012	with annotation
	unpavedroad	line	3013	-
	unpavedroadTunnel	line	3014	with annotation
	unpavedroadBridge	line	3015	with annotation
	street	line	3016	-
	streetTunnel	line	3017	with annotation
	streetBridge	line	3018	with annotation
	underconstructionroad	line	3019	-
	underconstructionroadTunnel	line	3020	-

	underconstructionroadBridge	line	3021	-
	carriageRoad	line	3022	-
	footpath	line	3023	-
	footpathBridge	line	3024	-
	smallBridge	Line	3025	-
roadfpol (31)	tollroadGate	polygon	3101	-
roadflin (31)	roadEmbankment	line	3121	-
	roadCutting	line	3122	-
railwayn (40)	singletrackRailway	line	4001	
	singletrackRailwayTunnel	line	4002	with annotation
	singletrackRailwayBridge	line	4003	-
	doubletrackRailway	line	4004	-
	doubletrackRailwayTunnel	line	4005	with annotation
	doubletrackRailwayBridge	line	4006	-
	underconstructionRailway	line	4007	-
	underconstructionRailwayTunnel	line	4008	with annotation
	underconstructionRailwayBridge	line	4009	-
	electricalRailway	line	4010	-
	electricalRailwayTunnel	line	4011	with annotation
	electricalRailwayBridge	line	4012	-
	narrowtrackRailway	line	4013	-
	abandonedRailway	line	4014	-
	sidingRailway	line	4015	-
	cableway	line	4016	-
railfpol (41)	railwayStation	polygon	4101	with annotation
railflin (41)	railwayEmbankment	line	4121	-
	railwayCutting	line	4122	-
streamn(50)	streamUnder5m	line	5001	with annotation
	streamOver5m	line	5002	with annotation
	creekWithCliffInMountain	line	5003	with annotation
	creekWithCliffInFlatland	line	5004	with annotation
	penerateStream	line	5005	with annotation
	canalUnder5m	line	5006	with annotation
	canalOver5m	line	5007	with annotation
	seasonalStream	line	5008	with annotation
	dryWaterway	line	5009	with annotation
waterpnt (51)	largeSpring	point	5101	with annotation
	smallSpring	point	5102	with annotation
	sourceSalutary	point	5103	with annotation
	watrerflow	point	5104	-
	waterTap	point	5105	with annotation
	waterReservoir	point	5106	with annotation
	seasonalWaterReservoir	point	5107	with annotation
	waterTankTower	point	5108	-
	pool	point	5109	-
	hydroPowerStation	point	5110	with annotation
	sewageWaterPlant	point	5111	-
	waterGate	point	5112	-

	pumpStation	point	5113	-
	waterWorks	point	5114	-
	waterMill	point	5115	-
	well	point	5116	-
	ferryPlatform	point	5117	-
	wharf(river)	point	5118	-
	hydrant	point	5119	
waterlin (51)	waterfall	line	5141	with annotation
	aquaDuct	line	5142	-
	waterPipeLine	line	5143	-
	concreteDam	line	5144	-
	filledDam	line	5145	-
	barrage	line	5146	-
	jetty	line	5147	-
	lakeEmbankment	line	5148	-
	riverEmbankment	line	5149	-
	waterPipeLineUnderground	line	5150	-
	breakwater(river)	line	5151	-
	woodenPier	line	5152	-
Seapol (52)	reefs	polygon	5201	-
	slopesAtTheWharf	polygon	5202	-
	waterProtectionBlock	polygon	5203	-
	tidal	polygon	5204	-
Sealin (52)	depthContour (2m)	line	5221	-
	depthContour (5m)	line	5222	-
	depthContour (10m)	line	5223	with annotation
	depthContour (20m)	line	5224	-
	depthContour (50m)	line	5225	-
	depthContour (100m)	line	5226	with annotation
	shoreline	line	5227	
	periousWatersArea	line	5228	-
	submarineCable	line	5229	-
	unnavigableArea	line	5230	-
	breakwater	line	5231	-
	largePier	line	5232	-
	saltPan	line	5233	-
Seapnt (52)	atoll,more than 2m subwater	point	5250	-
	atoll,less than 2m subwater	point	5251	-
	shoreReef	point	5252	-
	Shore reef,dired out in low tide level	point	5253	-
	wrecked ship,above the surface	point	5254	-
	wrecked ship,below the surface	point	5255	-
	inanchorArea	point	5256	-
	port,anchored station	point	5257	with annotation
	fishing port,marina	point	5258	-
	lightingBuoys	point	5259	-
	buoysForMooring	point	5260	-
	buoys	point	5261	-
	lightHouse	point	5262	with annotation
	cableHouse	point	5263	-

	breakwater(small)	point	5264	-
	smallPier	point	5265	-
smallpol (60)	house	polygon	6001	-
	building	polygon	6002	-
	builtUpArea	polygon	6003	-
	factory	polygon	6004	with annotation
	hangar	polygon	6005	-
	ruins	polygon	6006	-
	greenHouse	polygon	6007	-
	fortress	polygon	6008	with annotation
	stadium	polygon	6009	-
	barrack	polygon	6010	with annotation
	christianCemetery	polygon	6011	-
	muslimCemetery	polygon	6012	-
	jewishCemetery	polygon	6013	-
	memorialCemetary	polygon	6014	-
	silo	polygon	6015	-
smalllin (60)	oilPipeLine	line	6031	-
	gasPipeLine	line	6032	-
	powerLine	line	6033	-
	beltConveyer	line	6034	-
	retainingWall	line	6035	-
	rowOfTrees	line	6036	-
	stoneWall	line	6037	-
	fence	line	6038	-
	earthenWall	line	6039	-
	runway	line	6040	
smallpnt (60)	churchWith2domes	point	6051	with annotation
	churchWith1dome	point	6052	with annotation
	mosuque	point	6053	with annotation
	synagogue	point	6054	with annotation
	chapel	point	6055	with annotation
	monastery	point	6056	with annotation
	religiusMonument	point	6057	with annotation
	christianIndividualGrave	point	6058	with annotation
	islamicIndividualGrave	point	6059	with annotation
	judacIndividualGrave	point	6060	with annotation
	ruinedHouse	Point	6061	-
	castle	point	6062	-
	school	point	6063	-
	hospital	point	6064	-
	mountaineeringHouse	point	6065	-
	cabin	point	6066	-
	monument	point	6067	with annotation
	memorialPanel	point	6068	-
	municipalityOffice	point	6069	-
	postOffice	point	6070	-
	policeOffice	point	6071	-
	fireStation	point	6072	-
	court	point	6073	-
	observationTower	point	6074	-

	factoryChimney	point	6075	-
	petrolStation	point	6076	-
	tank	point	6077	-
	windMill	point	6078	-
	sawmill	point	6079	-
	rubbleGround	point	6080	-
	gasWell	point	6081	-
	antenna	point	6082	-
	antennaOnBuilding	point	6083	-
	mobileAntenna	point	6084	-
	meteorologicalStation	point	6085	-
	airport	point	6086	-
	aeronauticalRighthouse	point	6087	-
	thermalPowerStation	point	6088	-
	transformer	point	6089	-
	isolatedTree	point	6090	-
	groupOfTrees	point	6091	-
	mine	point	6092	with annotation
	cave	point	6093	with annotation
	waterCave	point	6094	with annotation
	collapseCave	point	6095	-
	abandonedMine	point	6096	-
	landfillSite	point	6097	-
	karstValley	point	6098	-
	kilometerPost	point	6099	-
	sportsGround	Point	6100	-
	floodZone	Point	6101	-
topolin (70)	contour50m	line	7001	-
	contour10m	line	7002	-
	contour5m	line	7003	-
	contour2.5m	line	7004	-
	cliff	line	7005	-
	steepSlope	line	7006	-
	embankment	line	7007	-
	smallEmbankment	line	7008	-
	slopeProtection	line	7009	-
	diggingPlace	line	7010	-
	depressions	line	7011	-
	mountainStream	line	7012	-
	breakLine	line	7013	-
topopnt (70)	trigonometricPoint	point	7021	with annotation
	churchAsTrigPoint2domes	point	7022	-
	churchAsTrigPoint	point	7023	with annotation
	mosqueAsTrigPoint	point	7024	with annotation
	synagogueAsTrigPoint	point	7025	with annotation
	meteorologicalObservatoryAsTrigPoint	point	7026	with annotation
	antennaAsTrigPoint	point	7027	with annotation
	borderPillarAsTrigPoint	point	7028	with annotation
	chimneyAsTrigPoint	point	7029	with annotation
	benchmark	point	7030	with annotation
	spotHeight	point	7031	with annotation

	borderPillar	point	7032	with annotation
	woodenBorderPillar	point	7033	-
	boundariesMarker	point	7034	-
	crossInTheStone	point	7035	with annotation
	GPSControlPoint	point	7036	with annotation
	GPSReferenceStation	point	7037	with annotation
TopPol (70)	gritPlaceOfTheMountainous	Polygon	7050	-
gsm(71)	gridSurfaceModel	point	7101	-
anno(80)	peak	point	8001	with annotation
	ridge	point	8002	with annotation
	mountainRange	point	8003	with annotation
	mountainPath	point	8004	with annotation
	canyon	point	8005	with annotation
	valley	point	8006	with annotation
	villageUnder1000	point	8007	with annotation
	villageOver1000	point	8008	with annotation
	townUnder10000	point	8009	with annotation
	town10000To25000	point	8010	with annotation
	townOver25000	point	8011	with annotation
	adjoinState	point	8012	with annotation
	hill	point	8014	with annotation
	mountain	point	8015	with annotation
	roadDirectionAnnotation	point	8016	with annotation
	adjoinMapName	point	8017	with annotation
	capeName	point	8018	with annotation
	islandName	point	8019	with annotation
	inletName	point	8020	with annotation
	seaNmae	point	8021	with annotation
	summerVillage	point	8022	with annotation
	partOfCity	point	8023	with annotation
	commonName(2mm)	point	8024	with annotation
	commonName(2.8mm)	point	8025	with annotation
	commonName(3.6mm)	point	8026	with annotation
	commonName(4.4mm)	point	8027	with annotation
	explanationAnnotation	point	8028	with annotation
raster (90)	orthophoto	raster	9001	-

3 Requirement of Feature

3.1 Definition of Feature

administrativeArea Package

extent (extent)

Collect boundary of State and other boundaries necessary to display on topographic map.
Collect on 2-dimentional. Multiplicity of Attribute"mName" and"eName" must be same.

Derived from Montenegro25000Sdi

Geometric Attribute:

element[1] : geometricalLine

Attribute table:

field name	field type	field size	multiplicity	remarks
extent#	n/a	n/a	1	Internal id systematically maintained by software
extent-id	text	14	1	implied 1:1 with "id"
extent_item	text	4	1	from itemOfAdministrativeArea
extent_history	int	6	1	"200903" as default
extent_mName	text	50	1	annotation in Montenegron

itemOfExtent

Attribute of "extent_item":

item	definition	remarks
state (1001)	Country or nation with its own sovereign independent government .Collect boundary of state with annotation.	-
nationalPark (1002)	A large area of public land chosen by a government for its importance and usually given special protection .Collect boundary of national parks whose information in provided by government by low with annotation.	Derived from relevant document.

administrativeArea (admin)

Collect boundary of municipality boundaries necessary to display on topographic map. Collect on 2-dimentional. Multiplicity of Attribute"mName" and"eName" must be same.

Derived from Montenegro25000Sdi

Geometric Attribute:

element[1] : geometricalLine

Attribute table:

field name	field type	field size	multiplicity	remarks
admin#	n/a	n/a	1	Internal id systematically maintained by software
admin-id	text	14	1	implied 1:1 with "id"
admin_item	text	4	1	fixed as"administrativeArea
admin_history	int	6	1	"200903" as default
admin_mName	text	50	1	annotation in Montenegron

Attribute of "admin_item":

item	definition	remarks
administrativeBoundary (1101)	Collect boundary of municipality with annotation.	Derived from relevant document.

landClassification Package

landClassification (landc)

Collect boundary of Landuse polygons and give it attribute. Every point on XY plane must belong to one of “itemOfLandClassification”. Collect on 2-dimentional. Multiplicity of Attribute”mName” and”eName” must be same. For data exchange between other CAD and GIS file format, single Label/Point is able to have “itemOfLandClassification” as seed for individual polygon.

Derived from Montenegro25000Sdi

Geometric Attribute:

element[1]topographicSurface :

Attribute table:

field name	field type	field size	Multiplicity	remarks
landc#	n/a	n/a	1	Internal id. Systematically maintained by software
landc-id	text	14	1	implied 1:1 with “id”
「	text	4	1	from itemOfLandClassification
landc_history	int	6	1	“200903” as default
landc_mName	text	50	0..1	annotation in Montenegron

itemOfLandClassification

Attribute of “landc_item”:

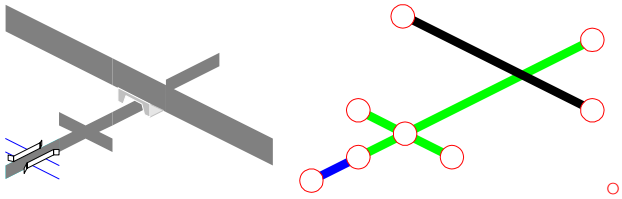
item	Definition	remarks
cultivatedLand (2001)	Cultivated land in general except those items listed as follows(e. g. grape, corn, potato, strawberry, tobacco, hop, nursery field and so on) or apply small scale field (one lot 50mx50m:0.25ha or less). Apply large scale cultivated grass land(pasture) for hay harvest. Double cropping e.g. wheat, corn, and etc, it should be included in this item.	-
vineyard (2002)	Apply large scale vineyard 50mx50m or more in area.	-
orchard (2003)	Apply large scale orchard 50mx50m or more in area, e.g. citrus, apple, peach, pear, chestnut, nut and so on.	-
riceField (2004)	Apply large scale ricefield 50mx50m or more.	-
plantedForest (2005)	Apply afforestation area, e.g. popular/pine plantation and so on.	-
deciduousForest	Apply natural leafy forest such as approx, 5m	-

(2006)	or more in height.	
coniferousForest (2007)	Apply natural evergreen forest such as approx, 5m or more in height.	-
mixedForest (2008)	Apply natural mixed forest such as approx, 5m or more in height.	-
shrub (2009)	Apply shrub or bush under approx, 5m in height.	-
meadow(2010)	Apply natural grass land e.g. meadow in highland.	
brier(2111)	Apply large scale brier 50mx50m or more in area.	-
coppice(2012)	Apply large scale Coppice 50mx50m or more in area.	-
sands (2013)	Apply sand or gravel land e.g. land in dry riverbed.	-
rock (2014)	Apply rocky land.	-
clay (2015)	Apply clay land.	-
peat (2016)	Apply peat land.	-
lake (2017)	Colect boundary. At river mouse lboundary moust be closed.	with annotation
marsh (2018)	Collect marsh boundary.	with annotation
riverSurface (2019)	Collect boundary of water course. Width 10m or more shall be collected. The mouse of a river must be divided with lake at reasonable place.	-
parkSite (2021)	Apply public park, circus, plaza, amusementpark and so on.	-
oliveGrove(2022)	Apply large scale oliveGrove 50mx50m or more in area.	-

roadSpace Packge

roadNetwork (roadn)

Collect network of road centerline. Collect on 2-dimentional. Element must connect between intersection and intersection or end. There is no intersection (Node) at overpass or underpass (see description below) Multiplicity of Attribute”mName” and”eName” must be same.



○ : Intersection (Node)

Derived from Montenegro25000Sdi

Geometric Attribute :

element[1] : topologicalLine

Attribute table:

field name	field type	field size	multipil icity	remarks
roadn#	n/a	n/a	1	Internal id. Systematically maitained by software
roadn-id	text	14	1	implied 1:1 with “id”
roadn_item	text	30	1	from itemOfRoadNetwork
roadn_history	int	6	1	“200903” as default
roadn_mName	text	50	1	annotation in Montenegron

itemOfRoadNetwork

Attribute of “roadn_item”:

item	definition	remarks
highway (3001)	Apply an exclusive road with tollgate for vehicles 8-11m or more in width. Collect center line	-
highwayTunel (3002)	Collect center line of tunnel. Both end of element must be connected with part of high-way.	with annotation
highwayBridge (3003)	Collect center line of bridge Both end of element must be connected with part of high-way. length 25m or more.	with annotation
mainroad (3004)	Apply main road paved by concrete orasphalt, approx 7m or more in track	-

	width. Collect center line.	
mainroadTunnel (3005)	Collect center line of tunnel. Both end of element must be connected with part of arterial road.	with annotation
mainroadBridge (3006)	Collect center line of bridge Both end of element must be connected with part of arterial road. Length 25m or more.	with annotation
regionalroadAndConnectingroad (3007)	Apply regional road paved by thin asphalt or other type, approx 5.5m track width. Collect center line	-
regionalroadAndConnectingroadTunnel (3008)	Collect center line of tunnel. Both end of element must be connected with part of arterial narrow road.	with annotation
regionalroadAndConnectingroadBridge (3009)	Collect center line of bridge Both end of element must be connected with part of arterial narrow road. Length 25m or more.	with annotation
localroad (3010)	Apply macadam road, thin asphalt road, maintained carridge roadm approx 3.5-5m track width. Collect center line	-
localroadTunnel (3011)	Collect center line of tunnel. Both end of element must be connected with part of local road.	with annotation
localroadBridge (3012)	Collect center line of bridge Both end of element must be connected with part of local road. Length 25m or more.	with annotation
unpavedroad (3013)	Apply standard carridge road or non-maintained carridge road, approx 2.5-3.5m track width. Collect center line	-
unpavedroadTunnel (3014)	Collect center line of tunnel. Both end of element must be connected with part of unpaved road.	with annotation
unpavedroadBridge (3015)	Collect center line of bridge Both end of element must be connected with part of unpaved road. Length 25m or more.	with annotation
street (3016)	Apply road in urban/ town/ village. Collect center line. Shall be generalized depending on density of streets.	-
streetTunel (3017)	Collect center line of tunnel. Both end of element must be connected with part of street.	with annotation
streetBridge (3018)	Collect center line of bridge Both end of element must be connected with part of street. Length 25m or more.	with annotation
underconstructionroad (3019)	Apply road underconstruction. Collect center line.	-
underconstructionroadTun	Collect center line of tunnel. Both end of element must be connected with part of	-

nel (3020)	underconstruction road.	
underconstructionroadBridge (3021)	Collect center line of bridge Both end of element must be connected with part of underconstruction road. Length 25m or more.	-
carriageRoad(3022)	The way which was made so that a carriage went in old days. Investigate a thing in the old map.The existing thing acquires it.The unidentified thing acquires it on a foot path.	-
footpath (3023)	Apply horse path and foot path approx 2m or less in track width. Collect center line.	-
footpathBridge (3024)	Apply walking exclusive bridge such as wooden/ suspension bridge and so on. Collect center line of bridge Both end of element must be connected with part of footpath. Length 25m or more.	-
smallBridge(3025)	The small bridge which isn't connected to the way. Apply to things more than 10m.	-

linerRoadFacility (roadflin)

Collect liner feature of road facility. . Collect on 2-dimentional. Line must be directional element.

Derived from roadFacility

Geometric Attribute :

element[1] : geometricalLine

Attribute table:

field name	field type	field size	multiplicity	remarks
roadflin#	n/a	n/a	1	Internal id. Systematically maitained by software
roadflin-id	text	14	1	implied 1:1 with “id”
roadflin_item	text	30	1	from itemOfRoadFacility
roadflin_history	int	6	1	“200903” as default

itemOfLinerRoadFacility

Attribute of “roadflin_item”:

item	Definition	remarks
roadEmbankment (3121)	Collect upper edge of embankment. Lower edge must be on the right side of the upper edge. As a rule, height 3m ore more and length 75m or more shall be taken.	-

roadCutting (3122)	Collect upper edge of cutting. Lower edge must be on the right side of the upper edge. As a rule, height 3m ore more and length 75m or more shall be taken.	-

polygonalRoadFacility (roadfpol)

Collect polygonal feature of road facility. . Collect on 2-dimentional.

Derived from roadFacility

Geometric Attribute :

element[1] : geometricalSurface

Attribute table:

field name	field type	field size	mulitiplicity	remarks
roadfpol#	n/a	n/a	1	Internal id. Systematically maitained by software
roadfpol-id	text	14	1	implied 1:1 with “id”
roadfpol_item	text	30	1	fixed as “tollRoadGate”
roadfpol_history	int	6	1	“200903” as default

Attribute of “roadfpol_item”:

item	Definition	remarks
tollroadGate (3101)	Collect toll road gate buildings.	

railwaySpace

railwayNetwork (railwayn)

Collect network of railway centerline. Collect on 2-dimentional. Element must connect between intersection and intersection or end. There is no intersection (Node) at overpass or underpass (same as roadNetwork) Multiplicity of Attribute"mName" and"eName" must be same.

Derived from Montenegro25000Sdi

Geometric Attribute :

element[1] : topologicalLine

Attribute table:

field name	field type	field size	multiplicity	remarks
railwayn#	n/a	n/a	1	Internal id. Systematically maitained by software
railway-id	text	14	1	implied 1:1 with "id"
railway_item	text	30	1	from itemOfRailwayNetwork
railway_history	int	6	1	"200903" as default
railway_mName	text	50	1	annotation in Montenegron

itemOfRailwayNetwork

Attribute of "railway_item":

item	definition	remarks
singletrackRailway (4001)	Collect center line of track.	-
singletrackRailwayTunnel (4002)	Collect center line of Tunnel Both end of element must be connected with part of singletrackRailway.	with annotation
singletrackRailwayBridge (4003)	Collect center line of bridge Both end of element must be connected with part of singletrackRailway. Length 25m or more.	-
doubletrackRailway (4004)	Collect center of double tracks.	-
doubletrackRailwayTunnel (4005)	Collect Tunnel Both end of element must be connected with part of doubletrackRailway.	with annotation
doubletrackRailwayBridge (4006)	Collect bridge Both end of element must be connected with part of doubletrackRailway. Length 25m or more.	-
underconstructionRailway (4007)	Apply underconstruction railway.	-
underconstructionRailway	Apply underconstruction railway tunnel.	with annotation

Tunnel (4008)		
underconstructionRailway Bridge (4009)	Apply underconstruction railway railway. Length 25m or more.	-
electricalRailway (4010)	Apply electrified railway	-
electricalRailwayTunnel (4011)	Collect Tunnel Both end of element must be connected with part of electricalRailway.	with annotation
electricalRailwayBridge (4012)	Collect bridge Both end of element must be connected with part of electricalRailway. Length 25m or more.	-
narrowtrackRailway (4013)	Apply narrow track railway.	Derived from relevant document.
abandonedRailway (4014)	Apply abasndoned railway.	-
sidingRailway (4015)	Apply siding track for service.	-
cableway (4016)	Apply ski lift, ropeway and so on.	-

linerRailwayFacility (railflin)

Collect liner feature of railway facility. Collect on 2-dimentional. Line must be directional element.

Derived from railwayFacility

Geometric Attribute :

element[1] : geometricalLine

Attribute table:

field name	field type	field size	multiplicity	remarks
railflin#	n/a	n/a	1	Internal id. Systematically maitained by software
railflin-id	text	14	1	implied 1:1 with “id”
railflin_item	text	30	1	from itemOfLinerRailwayFacility
railflin_history	int	6	1	“200903” as default

itemOfLinerRailwayFacility

Attribute of “railflin_item”:

item	Definition	remarks
railwayEmbankment (4121)	Collect upper edge of embankment. Lower edge must be on the right side of the upper edge. As a rule, height 3m ore more and length 75m or more shall be taken.	-
railwayCutting (4122)	Collect upper edge of cutting. Lower side must be on the right side of the upper edge. As a rule, height 3m ore more and length 75m or more shall be taken.	-

PolygonalRailwayFacility (railfpol)

Collect polygonal feature of railway facility. Collect on 2-dimentional. Multiplicity of Attribute"mName" and"eName" must be same.

Derived from railwayFacility

Geometric Attribute :

element[1] : geometricalSurface

Attribute table:

field name	field type	field size	,multiplicity	remarks
railfpol#	n/a	n/a	1	Internal id. Systematically maitained by software
railfpol-id	text	14	1	implied 1:1 with "id"
railfpol_item	text	30	1	fixed as "railwayStation"
railfpol_history	int	6	1	"200903" as default
railfpol_mName	text	50	1	annotation in Montenegron

Attribute of "railfpol_item":

item	Definition	remarks
railwayStation (4101)	Collect areas of platform, and roof of platforms station.	With annotation.

waterSpace

streamNetwork (streamn)

Collect network of stream centerline. Network must be tree structure. Collect on 2-dimentional. Element must connect between intersection and intersection or end. There is no intersection (Node) at overpass or underpass (same as roadNetwork) Multiplicity of Attribute"mName" and"eName" must be same.

Derived from Montenegro25000Sdi

Geometric Attribute :

element[1] : topologicalLine

Attribute table:

field name	field type	field size	multiplicity	remarks
streamn#	n/a	n/a	1	Internal id. Systematically maitained by software
streamn-id	text	14	1	implied 1:1 with "id"
streamn_item	text	30	1	from itemOfStreamNetwork
streamn_history	int	6	1	"200903" as default
streamn_mName	text	50	1	annotation in Montenegron

itemOfStreamNetwork

Attribute of "streamn_item":

item	definition	remarks
streamUnder5m (5001)	Stream center line. width less than 5m.	With annotation.
streamOver5m (5002)	Stream center line. width 5m or more	With annotation.
creekWithCliffInMountain (5003)	Stream center line. As a rule, height 3m or more creek shall be taken.	With annotation.
creekWithCliffInFlatland (5004)	Stream center line. As a rule, height 3m or more creek shall be taken.	With annotation.
penerateStream (5005)	Center line for intermittently steream.	With annotation.
canalUnder5m (5006)	Canal center line. Width less than 5m.	With annotation.
canalOver5m (5007)	Canal center line. Width 5m or more.	With annotation.
seasonalStream(5008)	Stream center line. Seasonally appeared.	with annotation.
dryWaterway(5009)	The waterway which water doesn't usually flow through. Investigate a thing in the old map.The existing thing acquires it.	-

pointFeatureRelatedWater (waterpnt)

Collect point feature of related with water. Collect on 2-dimentional. Multiplicity of Attribute"mName" and"eName" must be same.

Derived from featureRelatedWater

Geometric Attribute :

element[1] : geometricalPoint

Attribute table:

field name	field type	field size	multiplicity	remarks
waterpnt#	n/a	n/a	1	Internal id. Systematically maitained by software
waterpnt-id	text	14	1	implied 1:1 with "id"
waterpnt_item	text	30	1	from itemOfPointFeatureRelatedWater
waterpnt_history	int	6	1	"200903" as default
waterpnt_mName	text	50	0..1	annotation in Montenegron

itemOfPointFeatureRelatedWater

Attribute of "waterpnt_item":

item	definition	remarks
largeSpring (5101)	Apply natural spring to be specified the remarkable / famous one only. e.g. annotated springs on the existing map.	With annotation.
smallSpring(5102)	Apply a thing in the old map.	With annotation.
sourceSaluatry (5103)	Apply natural source of salutary or hot spring.	With annotation.
waterflow (5104)	Symbol of water flow direction.collect every river and every mapsheet.	-
waterTap (5105)	Apply source of water supply to hold large facility.	with annotation
waterReservoir (5106)	Apply 10mx10m in area or 10m in Tank's diameter on the ground.	with annotation
seasonalWaterReservoir (5107)	A water tank to use by a season. Investigate a thing in the old map.The existing thing acquires it.	with annotation
waterTankTower (5108)	Apply 10m or more in height.	-
pool (5109)	Apply 50mx25m or morei in area e.g. swimming pool.	-
hydroPowerstation (5110)	Apply large scale hydro power station. Buildings and other structure shall be collected by other feature.	With annotation.

sewageWaterPlant (5111)	Apply large scale sewage plant.	-
waterGate (5112)	Apply large scale Watergate e.g. irrigation use.	-
pumpStation (5113)	Apply large scale pumpstation e.g. irrigation use or drinking water facility.	-
waterWorks (5114)	Apply purification plant for drinking water.	-
waterMill(5115)	A mill that has machinery powered by moving water. Investigate a thing in the old map.The existing thing acquires it.	-
well(5116)	A place where water comes out of the ground as a natural spring. Investigate a thing in the old map.The existing thing acquires it.Distribute it with an attribute	-
ferryPlatform(5117)	Apply on the main ferry platform.	-
wharf(river)(5118)	Apply in the waterfront of the ferry.	-
hydrant(5119)	Water source in street. Investigate a thing in the old map.The existing thing acquires it.	-

LinerFeatureRelatedWater (waterlin)

Collect liner feature of related water. Collect on 2-dimentional. Line must be directional element. Multiplicity of Attribute"mName" and"eName" must be same.

Derived from featureRelatedWater

Geometric Attribute :

element[1] : geometricalLine

Attribute table:

field name	field type	field size	multiplicity	remarks
waterlin#	n/a	n/a	1	Internal id. Systematically maitained by software
waterlin-id	text	14	1	implied 1:1 with "id"
waterline_item	text	30	1	from itemOfLinerFeatureRelatedWater
waterlin_history	int	6	1	"200903" as default
waterlin_mName	text	50	0..1	annotation in Montenegron

itemOfLinerFeatureRelatedWater

Attribute of “waterlin_item”:

item	definition	remarks
waterfall (5141)	Apply large scale water fall, e.g. 10m or more in height.Collect line on top end of waterfall	With annotation.
aquaDuct (5142)	Apply canal bridge. Collect center line of aqua duct.	-
waterPipeLine (5143)	Apply water pipe line diameter 50cm or more on ground or underground.	-
concreteDam (5144)	Collect line on top end of dam and bottom end. Both lines must be connected to each other. Collect line clockwise (Target must be right hand sise of the line).	-
filledDam (5145)	Collect line on top end of dam and bottom end. Both lines must be connected to each other. Collect line clockwise (Target must be right hand sise of the line).	-
barrage (5146)	Collect line on top end of dam	-
jetty (5147)	Collect center line of jetty.	-
lakeEmbankment (5148)	Embankment for lake. Collect line on top edge. Bottom edge must be on the right side of the top edge. As a rule, height 3m ore more and length 75m or more shall be taken.	-
riverEmbankment (5149)	Embankment for river. Collect line ontop end. Bottom side must be on the right side of the top edge. As a rule, height 3m ore more and length 75m or more shall be taken.	-
waterPipeLineUnderground (5150)	As a rule, apply water pipeline under the ground. Express based on existing data. Collect centerline of water supply line.	-
breakWater(river)(5151)	Barrier protecting land from waves. Length more than 100m more than 3m in height, Apply on the breakwater in accord with these conditions.	-
woodenPier(5152)	It is a pier made of the wood. Investigate a thing in the old map.The existing thing acquires it.	-

waterSpace(sea)

PolygonalWaterSpace (seapol)

Acquire a boundary line of the feature in a closed domain. Collect on 2-dimentional. Multiplicity of Attribute"mName" and"eName" must be same.

Derived from Montenegro25000Sdi

Geometric Attribute :

element[1] : geometricalSurface

Attribute table:

field name	field type	field size	multiplicity	remarks
seapol#	n/a	n/a	1	Internal id. Systematically maitained by software
seapol -id	text	14	1	implied 1:1 with "id"
seapol _item	text	30	1	from itemOfStreamNetwork
seapol _history	int	6	1	"200903" as default
seapol _mName	text	50	1	annotation in Montenegron

itemOf PolygonalWaterSpace

Attribute of "seapol _item":

item	definition	remarks
reefs (5201)	A ridge of coral or rock in a body of water. Acquire the external form line of reefs more than 1mm in a figure.	-
slopesAtTheWharf(5202)	The place that brings down a ship from the land in the sea. Acquire the slope that lifts up a ship to the land as a closed domain.	-
waterProtectionBlock(5203)	The block which reduces a wave. Acquire a structure for prevention of erosion of the shore in a domain and post a circle symbol of 0.5mm in the domain at an equal interval.	-
tidal(5204)	Land submerged at high tide. Apply in the tidel area.	-

LinearFeatureOfTheSea (sealin)

Acquire the Centerline of the feature of the sea. Collect on 2-dimentional. Multiplicity of Attribute"mName" and"eName" must be same.

Derived from Montenegro25000Sdi

Geometric Attribute :

element[1] : geometricalLine

Attribute table:

field name	field type	field size	multiplicity	remarks
sealin#	n/a	n/a	1	Internal id. Systematically maitained by software
sealin -id	text	14	1	implied 1:1 with "id"
sealin_item	text	30	1	from itemOfStreamNetwork
seaplin_history	int	6	1	"200903" as default
sealin_mName	text	50	1	annotation in Montenegron

itemOf PolygonalWaterSpace

Attribute of "sealin_item":

item	definition	remarks
depthContour (2m) (5221)	The curve that linked the equal point of the depth of the sea. Express the depth of the sea and trace an old map and make it.	-
depthContour (5m) (5222)	The curve that linked the equal point of the depth of the sea.Express the depth of the sea and trace an old map and make it.	-
depthContour (10m) (5223)	The curve that linked the equal point of the depth of the sea.Express the depth of the sea and trace an old map and make it.	With annotation.
depthContour (20m) (5224)	The curve that linked the equal point of the depth of the sea.Express the depth of the sea and trace an old map and make it.	-
depthContour (50m) (5225)	The curve that linked the equal point of the depth of the sea.Express the depth of the sea and trace an old map and make it.	-
depthContour (100m) (5226)	The curve that linked the equal point of the depth of the sea.Express the depth of the sea and trace an old map and make it.	With annotation.
shoreline(5227)	Display the orthographic projection	With annotation.

	of the shoreline. Omit the small unevenness that does not affect a scene of the water part. The underground department does not display it. There is the water of the shore at the time of the high tide, and the shoreline displays orthographic projection o of the line.	
periousWatersArea(5228)	Surface of the water bottom is shallow and acquires the range of the shallows which there is a hindrance in the navigation of the ship.	-
submarineCable(5229)	The cable which was installed in the bottom of the sea. Acquire the position of underground cables such as the electricity.	-
unnavigableArea(5230)	The area that prohibits the navigation of the ship. Acquire the range where the navigation of the ship is prohibited.	-
breakwater(5231)	Barrier protecting land from waves. Acquire breakwaters more than 125m in a figure.	-
largePier(5232)	A barrier built out to sea to protect a harbor from heavy waves. Acquire wharfs more than 125m in a figure.	-
saltPan(5233)	Basin with high salt content. Acquire a boundary line of Salt pan.	-

PointFeatureOfTheSea (seapnt)

Acquire the center of the feature of the sea. Collect on 2-dimentional. Multiplicity of Attribute"mName" and"eName" must be same.

Derived from Montenegro25000Sdi

Geometric Attribute :

element[1] : geometricalPoint

Attribute table:

field name	field type	field size	multiplicity	remarks
seapnt#	n/a	n/a	1	Internal id. Systematically maitained by software
seapnt -id	text	14	1	implied 1:1 with "id"
seapnt_item	text	30	1	from itemOfStreamNetwork
seapnt _history	int	6	1	"200903" as default
seapnt_mName	text	50	1	annotation in Montenegron

itemOf PolygonalWaterSpace

Attribute of "seapnt_item":

item	definition	remarks
atoll,MoreThan2m Subwater(5250)	Coral island surrounding lagoon. Acquire the position of the atoll which became the form of the ring of under depth of the water 2m.	-
atoll,LessThan2m Subwater(5251)	Coral island surrounding lagoon. Acquire the position of the atoll which became the form of rings more than depth of the water 2m.	-
shoreReef(5252)	A ridge of coral or rock in a body of water. Acquire the external form line of reefs less than 1mm in a figure.	-
shoreReef,DiredOutInLowTide Level(5253)	A ridge of coral or rock in a body of water. Acquire the position of an atoll appearing at the time of ebb tide on the surface of the water.	-
wreckedShip,AboveThe Surface(5254)	A wrecked ship. Acquire the position of the wrecked ship which sank into the surface of the water bottom.	-
wreckedShip,BelowThe Surface(5255)	A wrecked ship. Acquire the position of a wrecked ship appearing on the surface of the water.	-
inanchorArea(5256)	The area that mustn't let a ship. anchorAcquire a position forbidding taking down an anchor.	-

port,AnchoredStation(5257)	A large-scale port. Acquire the position of the port.	With annotation.
fishingPort(5258)	A small port. Apply in fishing port and marina.	-
hydrant(5259)	Water source in street. Investigate a thing in the old map.The existing thing acquires it.	-
lightingBuoys(5260)	Floating signal. Acquire the position of a glittering buoy.	-
buoysForMooring(5261)	Floating signal. Acquire a buoy for mooring.	-
buoys(5262)	Floating signal. Acquire a buoy	-
lightHouse(5263)	Coastal building with light for sailors. Acquire the position of the lighthouse.	With annotation.
cableHouse(5264)	The building which manages submarineCable. Acquire the position of the management institution of the submarine cable.	-
breakwater(small) (5265)	Barrier protecting land from waves. Acquire breakwaters less than 125m in a figure.	-
smallPier(5266)	A barrier built out to sea to protect a harbor from heavy waves. Acquire wharfs more less 125m in a figure.	-

smallObject

pointSmallObject (smallpnt)

Collect point feature of landmark feature. Collect on 2-dimentional. Feature expresses sysmbol of landmark. Other feature must be applied incase landmark has buildings.Multiplicity of Attribute"mName" and"eName" must be same. Place symbol inside of the object or building if it is to be expressed its entity.by polygon.

Geometric Attribute :

element[1] : geometricalPoint

Attribute Table:

field name	field type	field size	multiplicity	remarks
smallpnt#	n/a	n/a	1	Internal id. Systematically maitained by software
smallpnt-id	text	14	1	implied 1:1 with "id"
smallpnt_item	text	30	1	from itemOfPointSmallObject
smallpnt_history	int	6	1	"200903" as default
smallpnt_mName	text	50	1	annotation in Montenegron

itemOfPointSmallObject

Attribute of "smallpnt_item":

item	definition	remarks
churchWith2domes (6051)	Apply large scale church with 2 or more domes.	with annotation
churchWith1dome (6052)	Apply large scale church with a dome.	with annotation
mosuque (6053)	Apply all kind of mosuques.	with annotation
synagogue (6054)	Apply all kind of sysnagogues.	with annotation
chapel (6055)	Apply small scale church.	with annotation
monastery (6056)	Apply all kind of monastery.	with annotation
religiusMonument(6057)	Something designed and built as a lasting public tribute to a person. Investigate it by old map and a field work.All the necessary things make it.	with annotation
christianIndividualGrave(6058)	A Christian independent gravestone. Investigate a thing in the old map.The existing thing acquires it.	with annotation
islamicIndividualGrave(6059)	An independent gravestone of the Islam. Investigate a thing in the old	with annotation

	map.The existing thing acquires it.	
judacIndividualGrave(6060)	An independent gravestone of the Judaism. Investigate a thing in the old map.The existing thing acquires it.	with annotation
ruinedHouse(6061)	A ruined house. Apply a symbol.The size like house.The big thing acquires it in the ruins.	-
castle (6062)	Apply all kind of castle.	-
school (6063)	Apply all kind of school and university.	-
hospital (6064)	Apply all kind of hospital (medical center) excluded sanatorium and clinic.	-
mountaineeringHouse (6065)	Apply all kind of mountain lodge/ house.	-
cabin (6066)	Small simple house, especially one made of wood in forest or mountain areas. Apply cabin to small house in the forest or in the mountain side.	-
monument (6067)	Apply memorial monuments.	with annotation
memorialPanel (6068)	Apply large scale memorial panel only.	-
municipalityOffice (6069)	Apply municipality office.	Derived from relevant document.
postOffice (6070)	Apply head office of post office only, satellite small office excluded.	Derived from relevant document.
policeOffice (6071)	Apply head office of police office only, satellite small office excluded.	-
fireStation (6072)	Apply all kind of fire station.	-
court (6073)	Apply large scale court only.	-
observationTower (6074)	Apply to the watch tower including the clock tower.	-
factoryChimney (6075)	Apply 25m or more in height.	-
petrolStation (6076)	Apply petrolstations for vehicles.	-
tank (6077)	Apply 10m or more in diameter.	-
windmill(6078)	Device harnessing wind power. Investigate a thing in the old map.The existing thing acquires it.	-
sawmill(6079)	Factory where wood is sawed. Investigate a thing in the old	-

	map.The existing thing acquires it.	
rubbleGround(6080)	An open excavation from which stone is extracted by cutting. Investigate a thing in the old map.The existing thing acquires it.	-
gasWell(6081)	Apply in the gas well.	-
anntena (6082)	Apply 50m or more in height for radio/ TV station.	-
antennaOnBuilding(6083)	Apply 50m or more in height for radio/ TV station.	-
mobileAntenna(6084)	Apply 50m or more in height for mobile phone anntena.	-
meteologicalStation (6085)	Apply large scale meteorological observatory.	-
airport (6086)	Place point inside polygon of “airportFacilitySite ”as symbol.	-
aeronauticalLighthouse(6087)	An aerial lighthouse. Investigate a thing in the old map.The existing thing acquires it.	-
thermalPowerStation (6088)	Apply large scale thermal powerstation.	-
transformer (6089)	Apply transformer linked with power line.	-
isoratedtree (6090)	Apply remarkable tree on the photos.	-
groupOfTrees (6091)	Apply remarkable special trees on the photos.	-
mine(6092)	Apply remarkable mine on the photos.	with annotation
cave(6093)	Apply remarkable cave on the photos.	with annotation
waterCave(6094)	Apply remarkable water cave on the photos.	with annotation
collapseCave(6095)	Acquire a thing in the old map.The thing which is photo decipherment possibility acquires it.	
abandonedMine(6096)	Apply remarkable abaondoned mine on the photos.	-
landfillSite(6097)	Acquire it by a field work.	-
karstVally(6098)	Apply at the bottom of the karst Valley.	-
kilometerPost(6099)	The kilometer post of the river. Investigate a thing in the old	-

	map.The existing thing acquires it.	
sportsGround（6100）	Apply in the small athletic ground.	-
flodZone(6101)	It is the area where a flood occurs Acquire it than a field work and an existing document.	-

linerSmallObject (smalllin)

Collect liner feature of landmark feature. Collect on 2-dimentional.

Geometric Attribute :

element[1] : geometricalLine

Attribute table:

field name	field type	field size	mulitiplicity	remarks
smalllin#	n/a	n/a	1	Internal id. Systematically maitained by software
smalllin-id	text	14	1	implied 1:1 with “id”
smalllin_item	text	30	1	from itemOfLinerSmallObject
smalllin_history	int	6	1	“200903” as default

itemOfLinerSmallObject

Attribute of “smalllin_item”:

item	definition	remarks
oilPipeLine (6031)	Apply large scale oil pipe line on ground only.	Derived from relevant document.
gaspipeLine (6032)	Apply large scale gas pipe line on ground only.	Derived from relevant document.
powerLine (6033)	Apply high tension power line (110kv or more) only.	Derived from relevant document.
beltConbeyer (6034)	Apply facility for transporting materials and so on.	-
retainingWall (6035)	Apply 100m or more in length and 2m or more in height.	-
rowOfTrees (6036)	Apply colonnade of 100m or more in length, e.g. windbreak.	-
stoneWall (6037)	Acquire things more than 75m.	-
fence (6038)	Acquire things more than 75m.	-
earthenWall (6039)	Acquire things more than 75m.	-
runway（6040）	The runway of the airplane. Acquire the shape of the runway.	-

polygonalSmallObject (smallpol)

Collect polygonal feature of landmark feature. Collect on 2-dimentional. Multiplicity of Attribute"mName" and"eName" must be same.

Geometric Attribute :

element[1] : geometricalSurface

Attribute table:

field name	field type	field size	multiplicity	remarks
smallpol#	n/a	n/a	1	Internal id. Systematically maitained by software
smallpol-id	text	14	1	implied 1:1 with "id"
smallpol_item	text	30	1	from itemOfPolygonalSmallObject
history	int	6	1	"200903" as default
smallpol_mName	text	50	0..1	annotation in Montenegron

itemOfPolygonalSmallObject

Attribute of "smallpol_item":

item	definition	remarks
house (6001)	10mx10m or more only. Composition of houses can be generalized as biger than 10m x10m.	Generarization may be adopted as a rule.
building (6002)	10mx10m or more only. Composition of buildings can be generalized as biger than 10m x10m.	Generarization may be adopted as a rule.
builtUpArea(6003)	Apply in the difficult point a building crowds, and to distinguish it.	-
factory (6004)	Apply industorial/ production facilities including storage in factory. 25m x75m or more only.	With annotation.
hangar (6005)	Apply hangar 75mx25m or more only.	-
ruins (6006)	Apply ruins/ remaing old an ancient/ medieval civilization.	Generarization may be adopted as a rule.
greenHouse (6007)	Apply permanent greenhouse of 75mx25mor more in area.	-
fortress (6008)	Apply fortress/ rampart.	With annotation.
stadium (6009)	Apply large scale building/ facility for all kind of sport.	-
barrack(6010)	A building of the facility.	with annotation

	Investigate it by a field work.The size applies from size of the independent building degree.	
christianCemetery (6011)	Apply 25mx25m or more in area.	-
muslimCemetery (6012)	Apply 25mx25m or more in area.	-
jeiwshCemetery (6013)	Apply 25mx25m or more in area.	-
memorialCemetary (6014)	Apply 25mx25m or more in area.	-
silo (6015)	Container for grain or animal feed. Apply large scale silo 10m or more indiameter.	-

topographicFeature

PointTopographicFeature (topopnt)

Collect point features for topographic expressions.. Collect on 3-dimentional. Multiplicity of Attribute"mName" and"eName" must be same.

Derived from topographicFeature

Geometric Attribute :

element[1] : geometricalPoint

Attribute table:

field name	field type	field size	multiplicity	remarks
topopnt#	n/a	n/a	1	Internal id. Systematically maitained by software
topopnt-id	text	14	1	implied 1:1 with "id"
topopnt_item	text	30	1	from itemOfPointTopographicFeature
topopnt_history	int	6	1	"200903" as default
topopnt_mName	text	50	1	annotation in Montenegron
topopnt_coordX	double	-	1	from survey observation
topopnt_coordY	double	-	1	from survey observation
topopnt_coordZ	double	-	1	from survey observation

itemOfPointTopographicFeature

Attribute of "topopnt_item":

item	definition	remarks
trigonometricalPoint (7021)	Information derived from existing 1:25,000 topomaps or coordinates.	With annotation.
churchAsTrigPoint2domes (7022)	Information derived from existing 1:25,000 topomaps or coordinates.	With annotation.
churchAsTrigPoint (7023)	Information derived from existing 1:25,000 topomaps or coordinates.	With annotation.
mosuqueAsTrigPoint (7024)	Information derived from existing 1:25,000 topomaps or coordinates.	With annotation.

synagogueAsTrigPoint (7025)	Information derived from existing 1:25,000 topomaps or coordinates.	With annotation.
meteologicalObsrvatoryAsTrigPoint (7026)	Information derived from existing 1:25,000 topomaps or coordinates.	With annotation.
anntenaAsTrigPoint (7027)	Information derived from existing 1:25,000 topomaps or coordinates.	With annotation.
borderPillarAsTrigPoint (7028)	Information derived from existing 1:25,000 topomaps or coordinates.	With annotation.
chimneyAsTrigPoint (7029)	Information derived from existing 1:25,000 topomaps or coordinates.	With annotation.
benchmark (7030)	Apply fundamental benchmarks.	With annotation. Derived from relevant document.
spotHeight (7031)	Apply Photogrammetric observation, point per 4km2 as standard dense.	With annotation.
boderPillar (7032)	Information derived from existing 1:25,000 topomaps or coordinates. pillars must be on “state”.	With annotation.
woodenBorderPillar(7033)	The stake of the wooden border	
boundariesMarker(7034)	The mark of the border	
crossInTheStone (7035)	Information derived from existing 1:25,000 topomaps or coordinates.	With annotation.
GPSContorolPoint (7036)	Apply GPS control survey result.	Derived from relevant document.
GPSReferenceStation(7037)	The electronic GPS control point which it always surveys. Apply GPS station survey result.	

linerTopographicFeature (topolin)

Collect liner feature of topographic objects. Collect on 3-dimentional. Line must be directional element. Multiplicity of Attribute"mName" and"eName" must be same.

Derived from topographicFeature

Geometric Attribute :

element[1] : geometricalLine

Attribute table:

field name	field type	field size	muliplicity	remarks
topolin#	n/a	n/a	1	Internal id. Systematically maitained by software
topolin-id	text	14	1	implied 1:1 with "id"
topolin_item	text	30	1	from itemOfLinerTopographicFeature
topolin_history	int	6	1	"200903" as default
topolin_coordZ	double	-	1	single value represents element height

itemOfLinerTopographicFeature

Attribute of "topolin_item":

item	definition	remarks
contourLine50m (7001)	50m index contour line. Continuously collect line on any itemof feature. Line will be indirectly generated by "gridSurfaceModel","breakLine"	-
contourLine10m (7002)	10m major contour line. Continuously collect line on any itemof feature. Line will be indirectly generated by "gridSurfaceModel","breakLine"	-
contourLine5m (7003)	5m supplimentaly contour line. Continuously collect line on any itemof feature. Line will be indirectly generated by"gridSurfaceModel","breakLine". Additionaly expressed on flatten area.	-
contourLine2.5m (7004)	2.5m supplimentaly contour line. Continuously collect line on any itemof feature. Line will be indirectly generated by"gridSurfaceModel","breakLine" Additionaly expressed on very flatten area.	-
cliff (7005)	As a rule, height 3m ore more and length 75m or more shall be taken. 1. (minimal: width 2mm or less): Collect line of top edge of cliff. Bottom edge must be on the right side of the top edge (clockwise). 2. (With real width): collect line of top edge and bottom edge of cliif as single line. Cliff itself must be on the right side of the line (clockwise).	-
steepSlope (7006)	As a rule, height 3m ore more and length 75m or more shall be taken.	-

	1. (minimal: width 2mm or less): Collect line of top edge of steepSlope. Bottom edge must be on the right edge of the top edge (clockwise). 2. (With real width): collect line of top edge and bottom edge of SteepSlope as single line. Cliff itself must be on the right side of the line (clockwise).	
embankment (7007)	Confining or supporting ridge .Acquire Embankment which is bigger than Small Embankment.	-
small Embankment (7008)	Confining or supporting ridge .A top more than under 0.2mm, 3mm in length more than 3m in height,Apply on the embankment in accord with these conditions.	-
slopeProtection (7009)	The structure which protects a slope. Apply to things more than 1.4mm.	-
diggingPlace (7010)	The place that does digging of a rock. More than 3m in height,4mm in length, the width of the slope more than 1.2mm. Apply on the Digging place in accord with these conditions.	-
depressions (7011)	The topography which became hollow. Apply in Depressions.	-
mountainStream (7012)	A narrow passage between two rocky slopes on a mountain. Contour line shape applies in the point becoming the valley. Make it by a program automatically.	-
breakLine (7013)	Apply water courses in mountain, major ridges, and any kind of characteristic terrain edges.. 1 line per 4km2 as standard dense.	-

polygonalTopographicFeature (topopol)

Collect polygonal feature of topographic objects. Collect on 2-dimentional. Line must be directional element. Multiplicity of Attribute"mName" and"eName" must be same.

Geometric Attribute :

element[1] : geometricalSurface

Attribute table:

field name	field type	field size	multiplicity	remarks
topopol#	n/a	n/a	1	Internal id. Systematically maitained by software
topopol-id	text	14	1	implied 1:1 with "id"
topopol_item	text	30	1	from itemOfPolygonalSmallObject
history	int	6	1	"200903" as default
topopol_mName	text	50	0..1	annotation in Montenegron

itemOfPolygonalTopographicFeature

Attribute of “topopol_item”:

item	definition	remarks
gritPlaceOfTheMountainous (7050)	The domain of the rocky place. Apply in the grit place of the mountainous area.	-

gridSurfaceModel (gsm)

Regular grid 3-dimetional points. Collect on every 20m on XY plane as feature code 7101.

Derived from Montenegro25000Sdi

Geometric Attribute :

element[1] : geometricalPoint

Attribute table:

field name	field type	field size	muliplicity	remarks
gsm_coordZ	double	-	1	-

annotation

annotation (anno)

Collect point data for Annotation with no graphic elements. Collect on 2-dimentional. Multiplicity of Attribute"mName" and"eName" must be same.

Derived from Montenegro25000Sdi

Geometric Attribute :

element[1] : geometricalPoint

Attribute table:

field name	field type	field size	multiplicity	remarks
anno#	n/a	n/a	1	Internal id. Systematically maitained by software
anno-id	text	14	1	implied 1:1 with "id"
anno_item	text	30	1	from itemOfAnnotation
anno_history	int	6	1	"200903" as default
anno_mName	text	50	1	annotation in Montenegron

itemOfAnnotation

Attribute of "anno_item":

item	definition	remarks
peak (8001)	The pointed summit of a mountain. Apply for the name of the mountain peak.	With annotation.
ridge (8002)	A long narrow hilltop or range of hills. Apply for the name of the mountain ridge.	With annotation.
mountainRange (8003)	A number of mountains or hills forming a connected row or group. Apply for the name of the mountain range.	With annotation.
mountainPath (8004)	The highest point on a mountain road. Apply for the name of the mountain path.	With annotation.
canyon (8005)	A deep narrow valley with steep sides, often with a stream running through it. Apply for the name of the canyon.	With annotation.
valley (8006)	A long low area of land, often with a river or stream running through it That is surrounded by higher ground. Apply for the name of the valley.	With annotation.

villageUnder1000 (8007)	Apply village population less than 1000.	With annotation.
villageOver1000 (8008)	Apply village population 1000 or more.	With annotation.
townUnder10000 (8009)	Apply town population 10000 or more.	With annotation.
town10000T25000 (8010)	Apply town population 10000－25000.	With annotation.
townOver25000 (8011)	Apply town population 25000 or more.	With annotation.
adjoinState (8012)	Apply State name adjoin with the commonName(2mm)state.	With annotation.
hill (8014)	Apply hill name hight applox less than 700m from bottom.	With annotation.
mountain (8015)	Apply mountain name hight applox 700m or more from bottom.	With annotation.
roadDirectionAnnotation (8016)	Apply road direction annotation.	With annotation.
adjoinMapName (8017)	Place adjoin map name beside outside of the neatline. see map regend regulation.	With annotation.
capeName(8018)	Apply for the name of the cape.	With annotation.
islandName(8019)	Apply for the name of the island.	With annotation.
inletName(8020)	Apply for the name of the inlet.	With annotation.
seaNmae(8021)	Apply for the name of the sea.	With annotation.
summerVillage(8022)	They are villages in the summer	With annotation.
partOfCity(8023)	They are sections in the city	With annotation.
commonName(2mm)(8024)	Apply name commonly used for particular place. The size of the character is 2mm	With annotation.
commonName(2.8mm) (8025)	Apply name commonly used for particular place. The size of the character is 2.8mm	With annotation.
commonName(3.6mm) (8026)	Apply name commonly used for particular place. The size of the character is 3.6mm	With annotation.
commonName(4.4mm) (8027)	Apply name commonly used for particular place. The size of the character is 4.4mm	With annotation.
explanationAnnotation (8028)	It uses it for feature needing a supplementary explanation.	With annotation.

referenceRaster

orthoPhoto

Ortho rectified by “gridSurfaceModel” aerial photo image data as a code 9001. Specificationsare follows;

orthoPhoto Specification:

item	definition	remarks
Fomat	GeoTIFF (uncompressed, scanlined)	-
Data unit	1:25,000 map division	-
Cordinate system	Latitude/Longitude	-
Resolution	50cm(GSD)	
out of cropping area	White (r255;g255;b255)	sliver area between mapsheet division and image border.

Store file as GeoTIFF format on every mapsheet.

Derived from referenceRaster

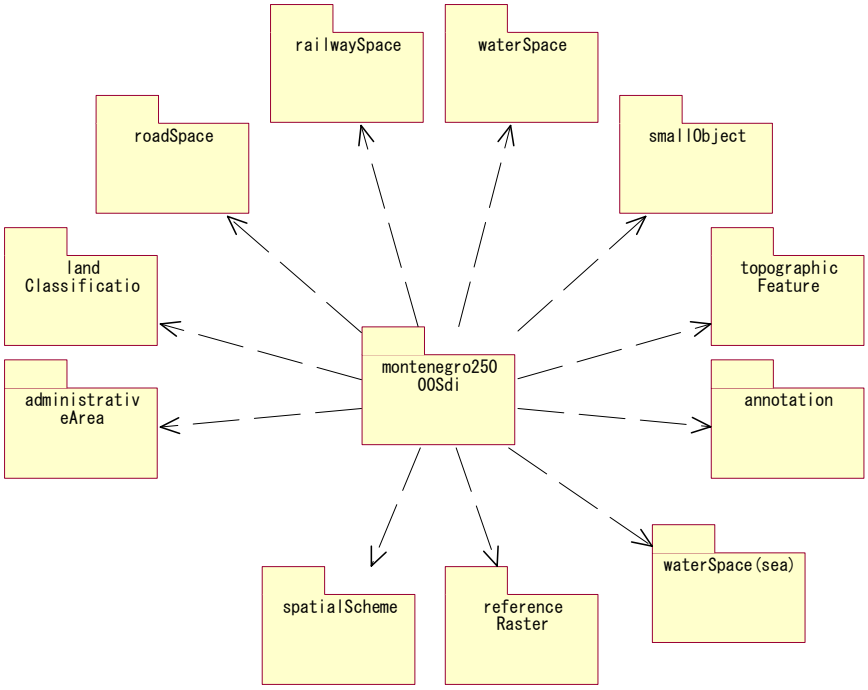
Geometric Attribute :

element : georeferencedRater

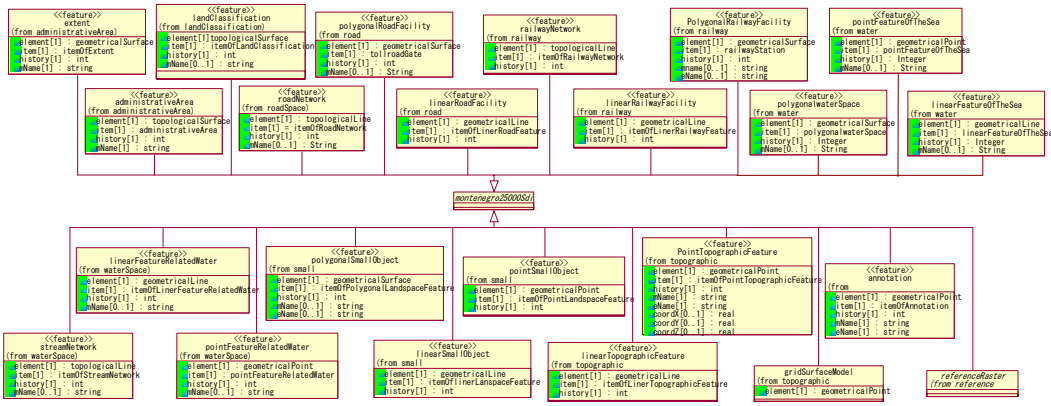
3.2 Definition of Data structure

Data Structure and its attribute are defined following UML static class diagram.

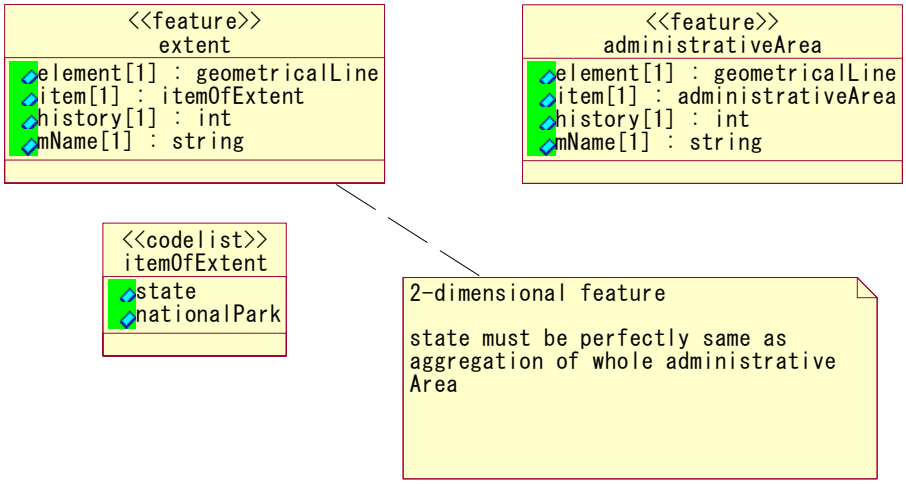
Logocal View



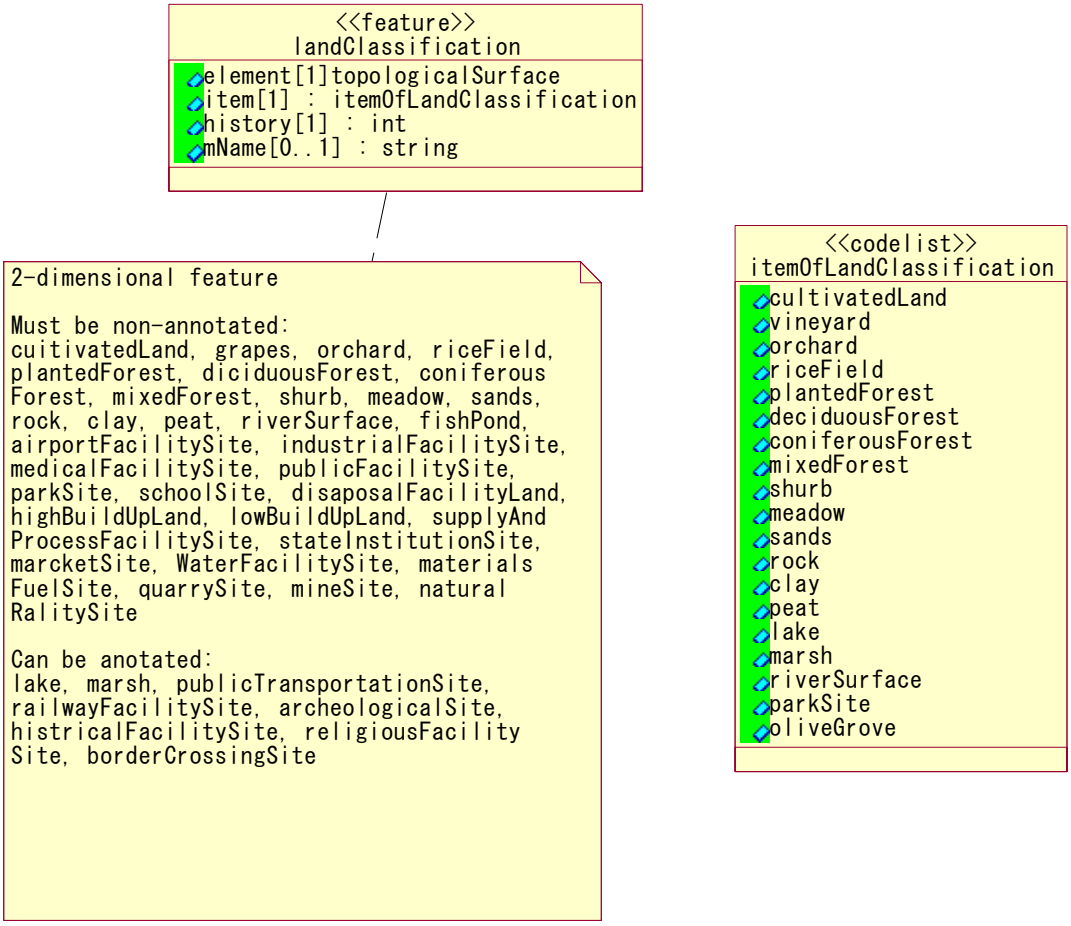
Montenegro25000Sdi Packge



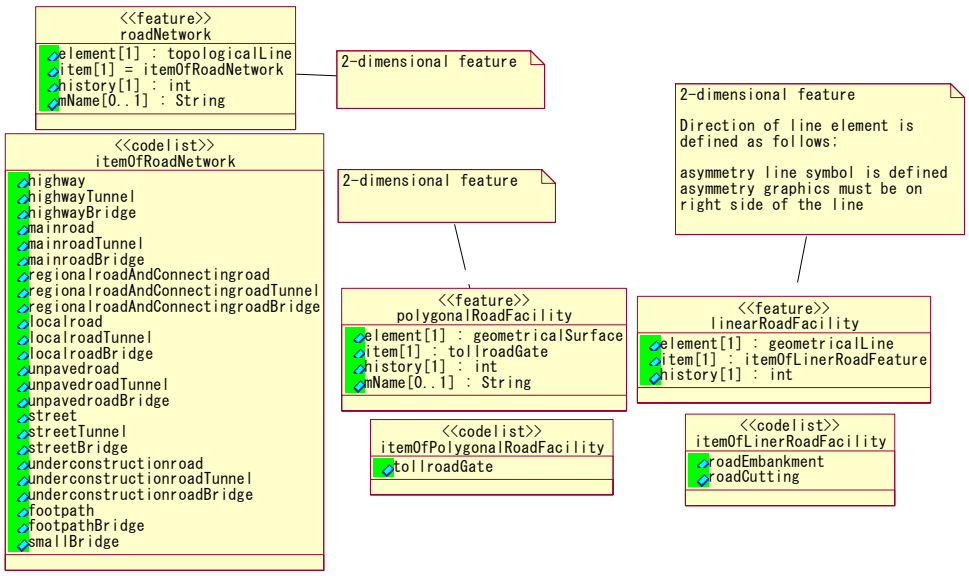
administrativeArea Packge



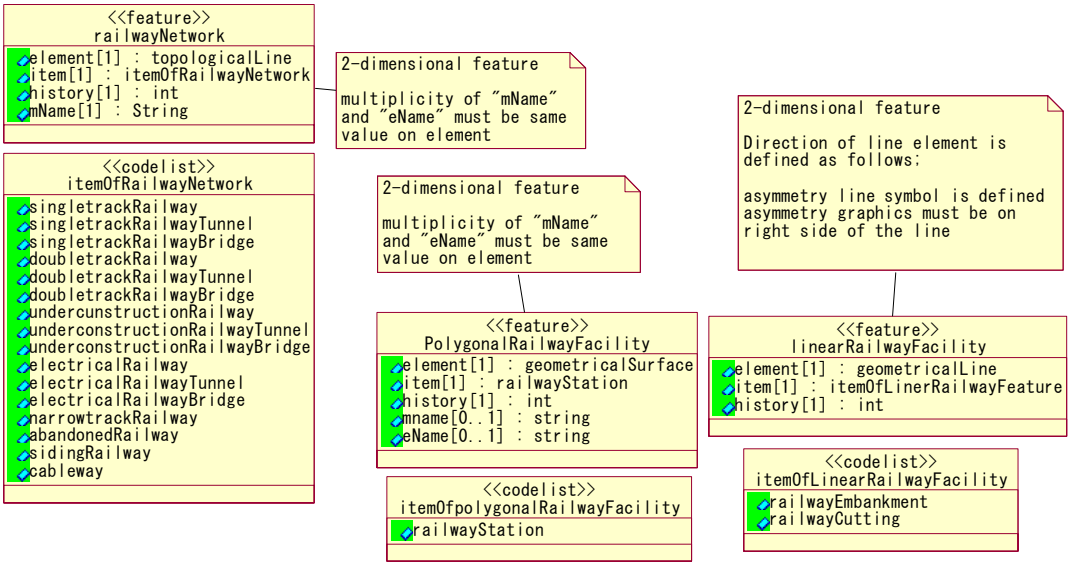
landlassfication Package



roadSpace Packge

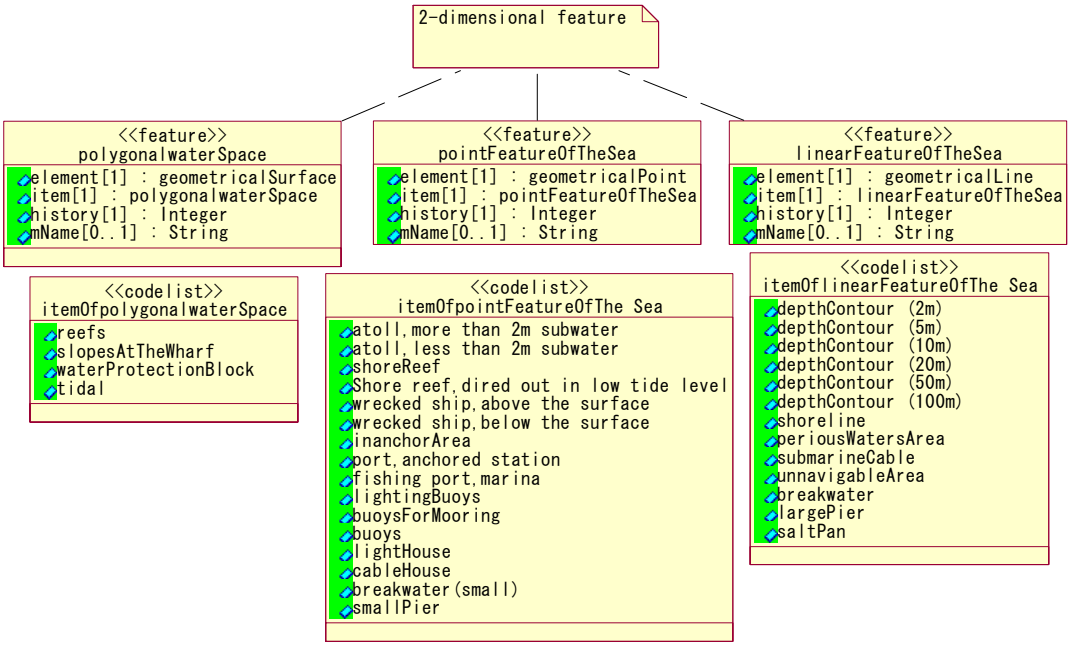


railwaySpace Package

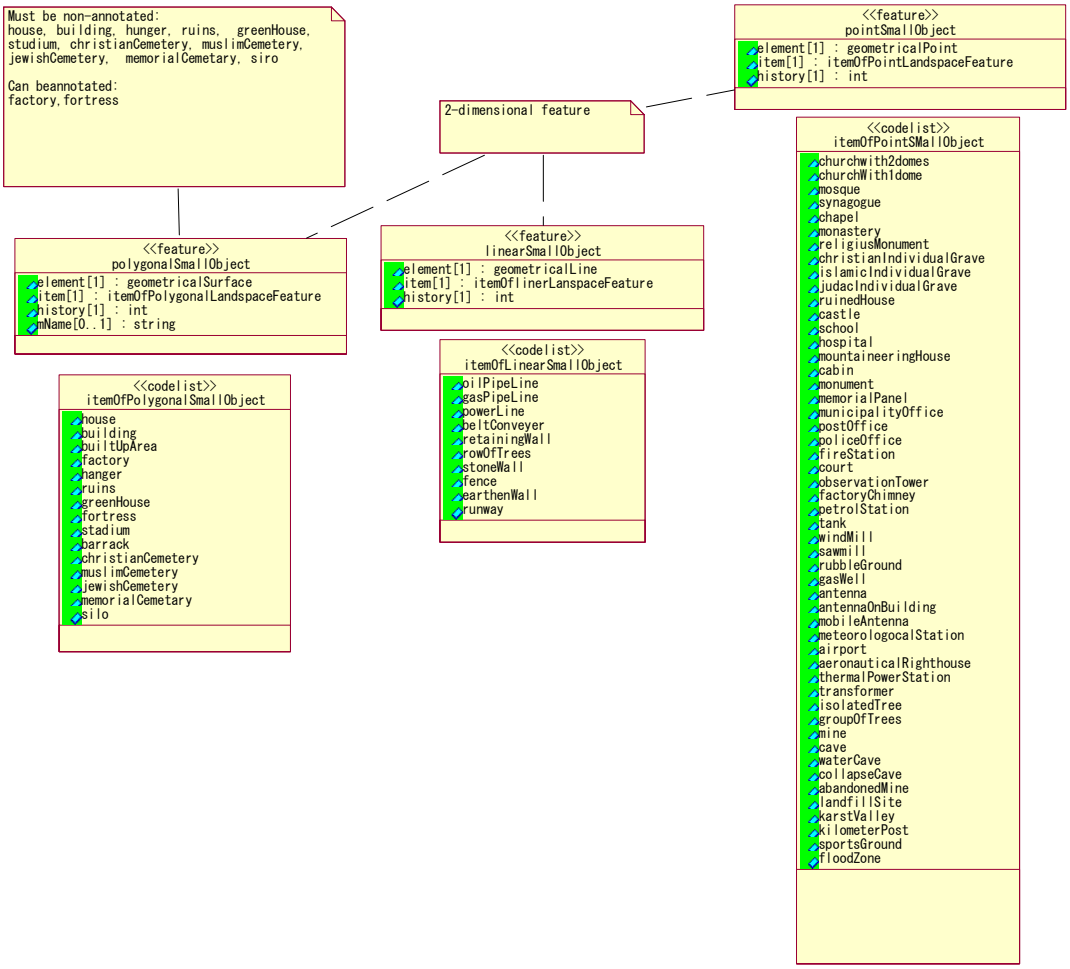


waterSpace Packge

waterSpace(sea) Packge

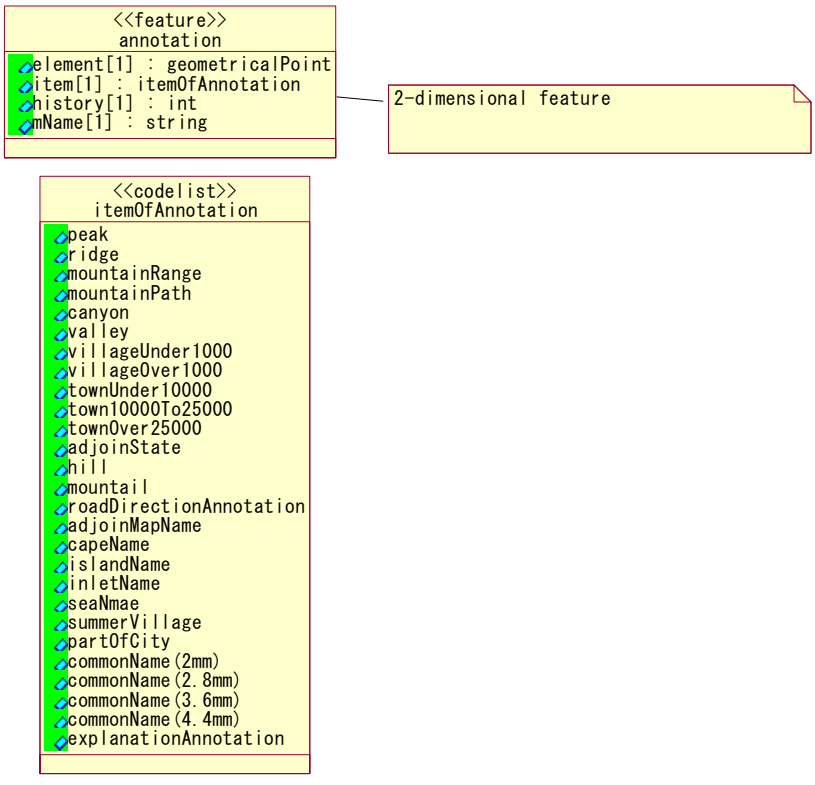


smallObject Package

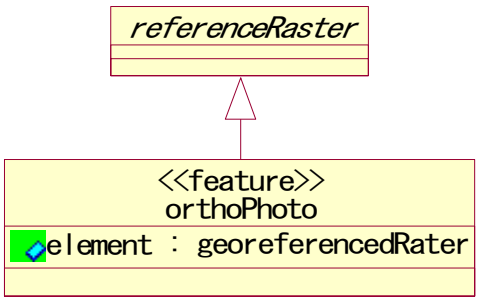


topographicFeature Package

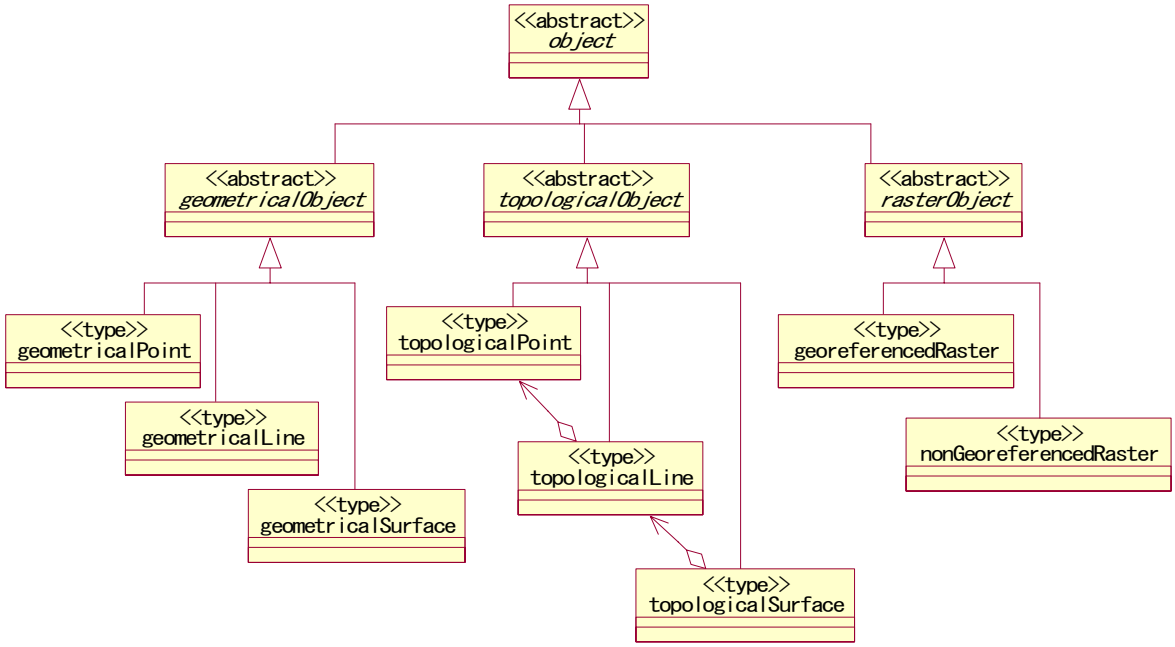
annotation Package



referenceRaster Package



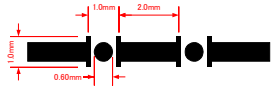
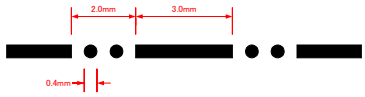
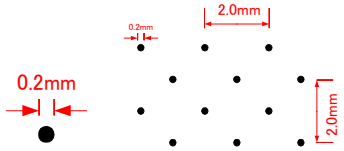
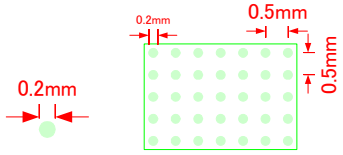
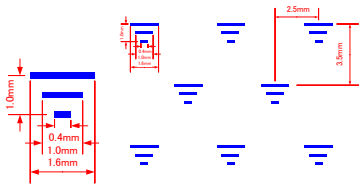
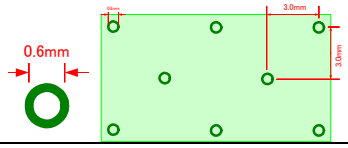
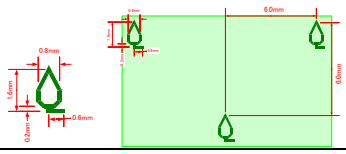
spatialScheme Package

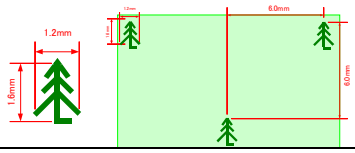
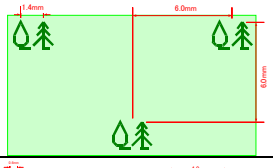
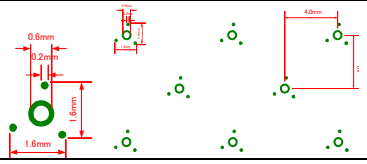
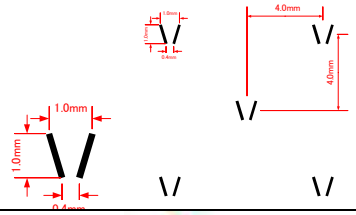
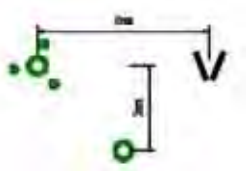
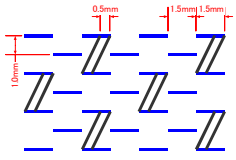
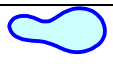
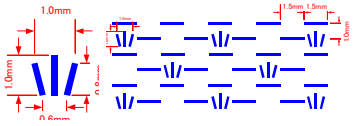


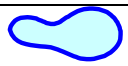
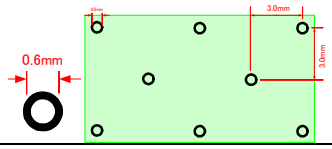
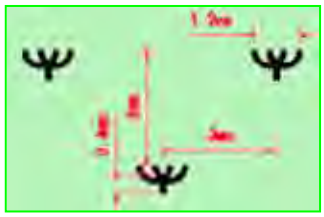
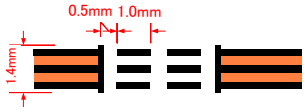
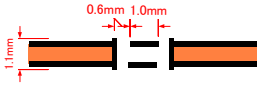
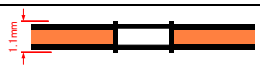
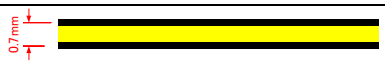
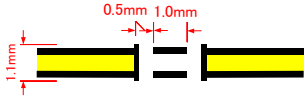
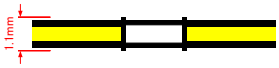
3.3 Definition of Graphics

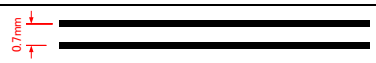
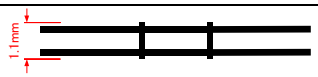
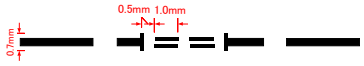
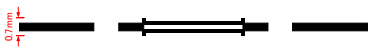
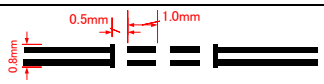
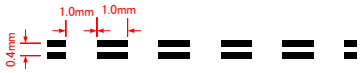
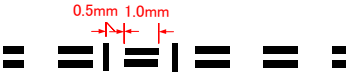
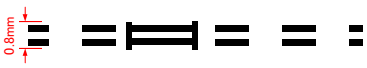
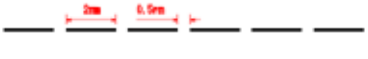
Regulations of graphics of featres for displaying data on computer monitor and printing maps arefollows;
* As a general condition, dimension values in these figures indicate distance between centers of lines (Not outline).

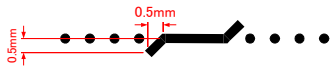
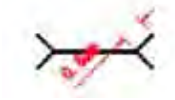
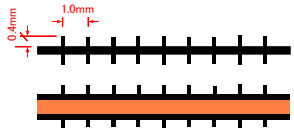
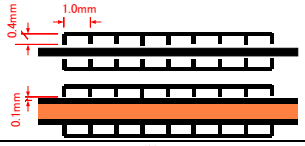
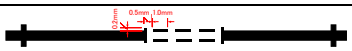
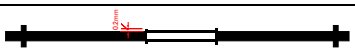
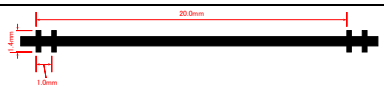
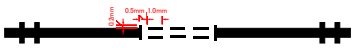
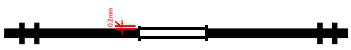
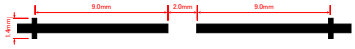
Table 3-1: Graphics

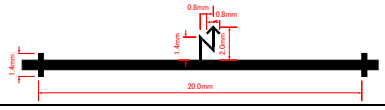
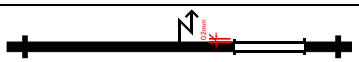
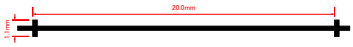
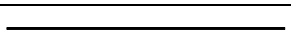
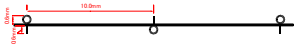
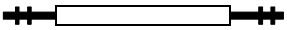
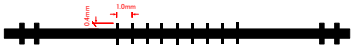
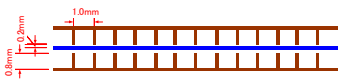
Name of coverage	Name of feature item	Element type	Code of item	graphics	Remarks
extent (10)	state	line	1001		color: black width: 0.6, 0.15 Annotation: Font:- Size:-
	nationalPark	line	1002		color: black Anotation: Font: gothic Size: 2mm
admin (11)	administrativeArea	line	1101		color: black width: 0.4 Anotation: Font: gothic Size: 3mm
landc(20)	cultivated Land	polygon	2001	N/A	-
	vineyard	polygon	2002		color: gray
	orchard	polygon	2003		color: lightGreen width: 0.10
	riceField	polygon	2004		color: blue width: 0.10
	plantedForest	polygon	2005		color: green, lightGreen width: 0.10 width: 0.10
	deciduous Forest	polygon	2006		color: green, lightGreen width: 0.10 width: 0.10

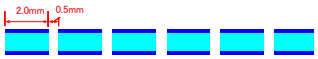
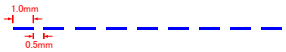
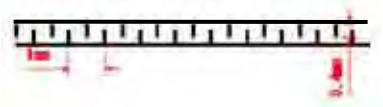
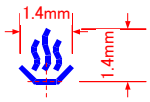
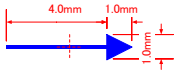
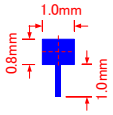
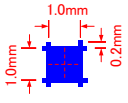
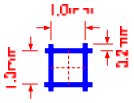
	coniferousForest	polygon	2007		color: green, lightGreen width: 0.10 width: 0.10
	mixedForest	polygon	2008		color: green, lightGreen width: 0.10 width: 0.10
	shrub	polygon	2009		color: green width: 0.10
	meadow	polygon	2010		color: gray width: 0.10
	brier	polygon	2011		Color: gray Width:0.10 width: 0.10
	coppice	polygon	2012		Color: gray,green Width:0.10
	sands	polygon	2013		color: brown
	rock	polygon	2014		color: brown
	clay	polygon	2015	N/A	-
	peat	polygon	2016		color: blue, gray width: 0.10
	lake	polygon	2017	 e.g. *DOJRANSKO EZERO*	color: blue, lightBlue width: 0.15 Annotation: Font: gothic, italic Size: 2.5mm
	marsh	polygon	2018	 e.g. Lilici	color: blue width: 0.10 Annotation: Font: gothic, italic Size: 2.5mm

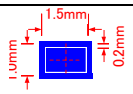
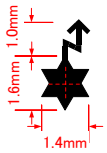
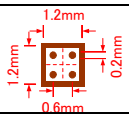
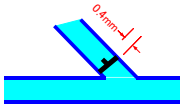
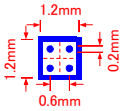
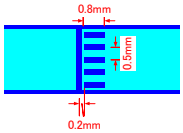
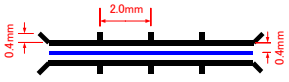
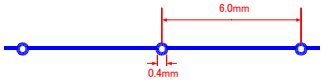
	riverSurface	polygon	2019		color: blue, lightBlue width: 0.15
	parkSite	polygon	2021		color: gray, lightGreen width: 0.10
	oliveGrove	polygon	2022		color: gray, lightGreen width: 0.10
roadn(30)	highway	line	3001		color: gray, orange width: 0.2
	highwayTunnel	line	3002		color: gray, white width: 0.2, 0.15 Annotation: Font: gothic Size: 2mm
	highwayBridge	line	3003		color: gray, white width: 0.2, 0.15 Annotation: Font: gothic Size: 2mm
	mainroad	line	3004		color: gray, orange width: 0.2
	mainroad Tunnel	line	3005		color: gray, white width: 0.2, 0.15 Annotation: Font: gothic Size: 2mm
	mainroad Bridge	line	3006		color: gray, white width: 0.2, 0.15 Annotation: Font: gothic Size: 2mm
	regionalroadAndConnectingroad	line	3007		color: gray, yellow width: 0.2
	regionalroadAndConnectingroadTunnel	line	3008		color: gray, white width: 0.2, 0.15 Annotation: Font: gothic Size: 2mm
	regionalroadAndConnectingroadBridge	line	3009		color: gray, white width: 0.2, 0.15 Annotation: Font: gothic Size: 2mm

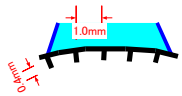
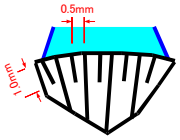
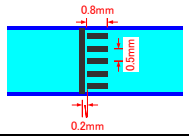
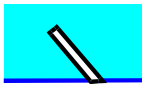
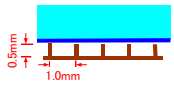
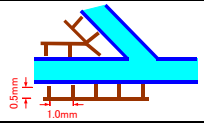
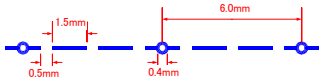
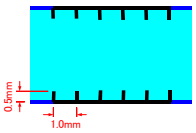
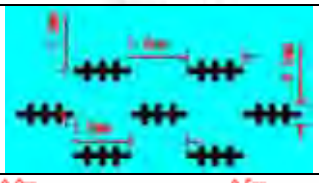
	localroad	line	3010		color: gray, white width: 0.2
	localroad Tunnel	line	3011		color: gray, white width: 0.2, 0.15 Annotation: Font: gothic Size: 2mm
	localroad Bridge	line	3012		color: gray, white width: 0.2, 0.15 Annotation: Font: gothic Size: 2mm
	unpavedroad	line	3013		color: gray width: 0.3
	unpavedroadTunnel	line	3014		color: gray, white width: 0.15, 0.15 Annotation: Font: gothic Size: 2mm
	unpavedroadBridge	line	3015		color: gray, white width: 0.15, 0.15 Annotation: Font: gothic Size: 2mm
	street	line	3016		color: gray, white width: 0.2
	streetTunnel	line	3017		color: gray, white width: 0.2, 0.15 Annotation: Font: gothic Size: 2mm
	streetBridge	line	3018		color: gray, white width: 0.2, 0.15 Annotation: Font: gothic Size: 2mm
	undercons tructionroad	line	3019		color: gray, white width: 0.2
	undercons tructionroadTunnel	line	3020		color: gray, white width: 0.2, 0.15
	undercons tructionroadBridge	line	3021		color: gray, white width: 0.2, 0.15
	carriage Road	line	3022		color: gray, white width: 0.2
	footpath	line	3023		color: gray

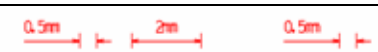
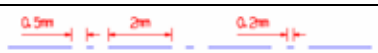
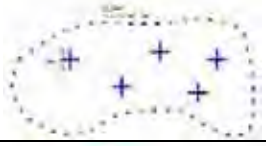
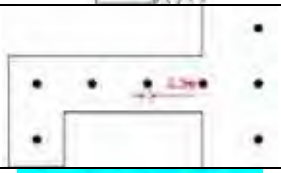
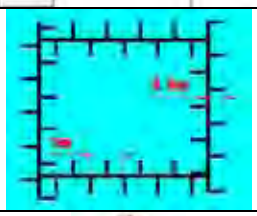
	fitpathBridge	line	3024		color: gray width: 0.3
	small Bridge	line	3025		color: gray, white width: 0.2
roadfpol(31)	tollroadGate	polygon	3101		color: gray, white width: 0.15
roadflin (31)	roadEmbankment	line	3121		color: gray width: 0.15
	roadCutting	line	3122		color: gray width: 0.15
railwayn (40)	singletrackRailway	line	4001		color: black width: 0.6, 0.3
	singletrackRailwayTunnel	line	4002		color: black, white width: 0.6, 0.3, 0.15 Annotation: Font: gothic Size: 2mm
	singletrackRailwayBridge	line	4003		color: black, white width: 0.6, 0.3, 0.15 Annotation: Font: gothic Size: 3mm
	doubletrackRailway	line	4004		color: black width: 0.6, 0.3
	doubletrackRailwayTunnel	line	4005		color: black, white width: 0.6, 0.3, 0.15 Annotation: Font: gothic Size: 2mm
	doubletrackRailwayBridge	line	4006		color: black, white width: 0.6, 0.3, 0.15
	undersconstructionRailway	line	4007		color: black width: 0.6, 0.3
	undersconstructionRailwayTunnel	line	4008		color: black, white width: 0.6, 0.3, 0.15 Annotation: Font: gothic Size: 2mm
	undersconstructionRailwayBridge	line	4009		color: black, white width: 0.6, 0.3, 0.15

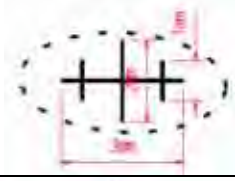
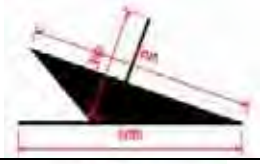
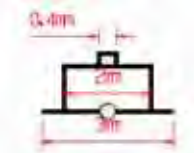
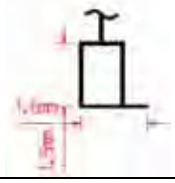
	electrical Railway	line	4010		color: black width: 0.6, 0.3, 0.15
	electrical RailwayTunnel	line	4011		color: black, white width: 0.6, 0.3, 0.15 Annotation: Font: gothic Size: 2mm
	electrical RailwayBridge	line	4012		color: black, white width: 0.6, 0.3, 0.15
	narrowtrackRailway	line	4013		color: black width: 0.3
	abandonedRailway	line	4014		color: black, white width: 0.15
	sidingRailway	line	4015		color: black width: 0.15
	cableway	line	4016		color: black width: 0.15
railfpol (41)	railwatStation	polygon	4101		color: black, white width: 0.15 Annotation: Font: roman Size: 1.5
railflin (41)	railwayEmbankment	line	4121		color: black width: 0.15
	railwatCutting	line	4122		color: black width: 0.15
streamn (50)	streamUnder5m	line	5001	 e.g. *Biolska r.*	color: blue width: 0.15 Annotation: Font:gothic, italic Size: 2mm
	streamOver5m	line	5002	 e.g. *Crna r.*	color: blue, lightBlue width: 0.15 Annotation: Font: gothic, italic Size: 3mm
	creekWithCliffInMountain	line	5003	 e.g. *Dukavec*	color: blue, brown width: 0.15 Annotation: Font: gothic, italic Size: 1.5mm
	creekWithCliffInFlatland	line	5004	 e.g. *Varnica*	color: blue, brown width: 0.15 Annotation: Font: gothic, italic Size: 1.5mm
	penerateStream	line	5005	 e.g. *Lutur* *stream itself is invisible.	color: blue width: 0.15 Annotation: Font: gothic, italic Size: 1.5mm

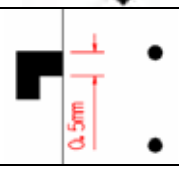
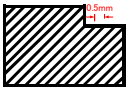
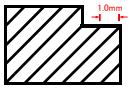
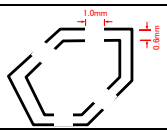
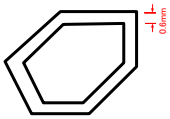
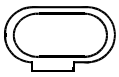
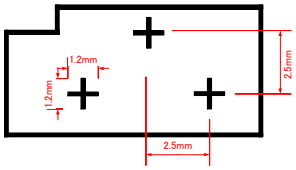
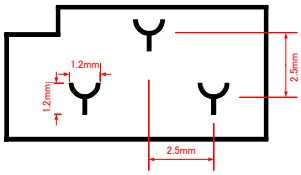
	canalUnder5m	line	5006		color: blue width: 0.15 Annotation: Font: gothic, italic Size: 1.5mm
	canalOver5m	line	5007		color: blue, lightBlue width: 0.15 Annotation: Font: gothic, italic Size:3mm
	seasonalStream	line	5008		color: blue width: 0.15 Annotation: Font:gothic, italic Size: 2mm
	dry Waterway	line	5009		color: gray width: 0.15
waterpnt (51)	largeSpring	point	5101		color: blue width: 0.15 Annotation: Font: gothic, italic Size: 1.5mm
	smallSpring	point	5102		color: blue width: 0.15 Annotation: Font: gothic, italic Size: 1.5mm
	sourceSalutary	point	5103		color: blue width: 0.15 Annotation: Font: gothic, italic Size: 1.5mm
	watrerflow	point	5104		color: blue, width: 0.15
	waterTap	point	5105		color: blue width: 0.15 Annotation: Font: gothic, italic Size: 1.5mm
	waterReservoir	point	5106		color: blue, width: 0.15 Annotation: Font: gothic, italic Size: 1.5mm
	seasonal WaterReservoir	point	5107		color: blue, width: 0.15 Annotation: Font: gothic, italic Size: 1.5mm
	waterTankTower	point	5108		color: blue width: 0.15

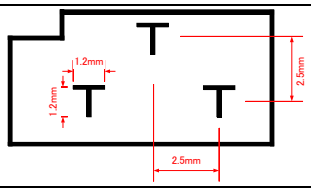
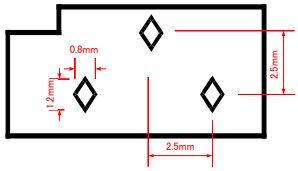
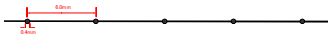
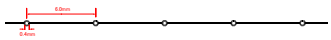
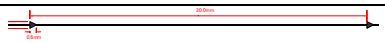
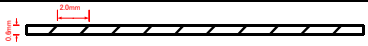
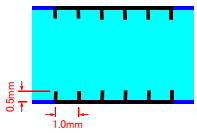
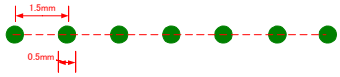
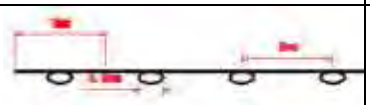
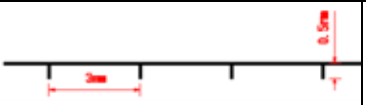
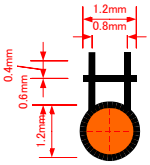
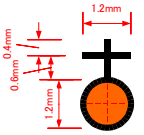
	pool	point	5109		color: blue, width: 0.15
	hydroPowerStation	point	5110		color: black width: 0.15 Annotation: Font: roman Size: 1.5mm
	sewageWaterPlant	point	5111		color: brown width: 0.15
	waterGate	point	5112		color: black width: 0.2
	pumpStation	point	5113		color: blue width: 0.15
	waterworks	point	5114		color: blue width: 0.15
	waterMill	point	5115		color: black width: 0.15
	well	point	5116		color: black width: 0.15
	ferry Platform	point	5117		color: black width: 0.15
	wharf(river)	point	5118		color: black width: 0.15
	hydrant	point	5119		color: black width: 0.20
waterlin (51)	waterfall	line	5141		color: blue width: 0.2 Annotation: Font: gothic Size: 1.5mm
	aquaDuct	line	5142		color: black, blue width: 0.2
	waterPipeLine	line	5143		color: blue width: 0.15

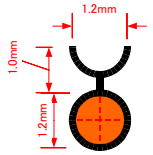
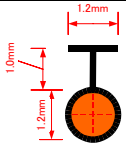
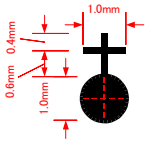
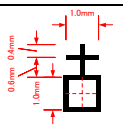
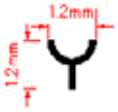
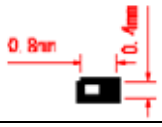
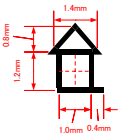
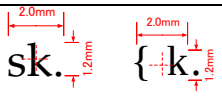
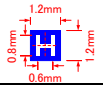
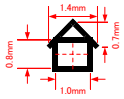
	concreteDam	line	5144		color: black width: 0.2
	filledDam	line	5145		color: black, white width: 0.15
	barrage	line	5146		color: black width: 0.2
	jetty	line	5147		color: black, white width: 0.15
	lakeEmbankment	line	5148		color: brown width: 0.15
	riverEmbankment	line	5149		color: brown width: 0.15
	waterPipeLineUnderground	line	5150		color: blue width: 0.15
	breakwater(river)	line	5151		color: black width: 0.15
	wooden Pier	line	5152		color: black width: 0.15
Seapol (52)	reefs	polygon	5201		color: blue width: 0.10
	slopesAt The Wharf	polygon	5202		color: black width: 0.10
	water Protection Block	polygon	5203		color: black width: 0.10
	tidal	polygon	5204		color: gray width: 0.20 width: 0.10
Sealin (52)	depth Contour (2m)	line	5221		color: blue width: 0.10

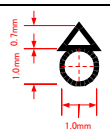
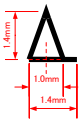
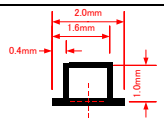
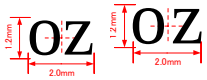
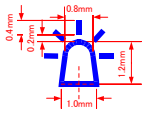
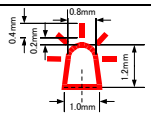
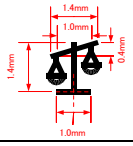
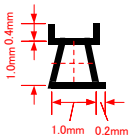
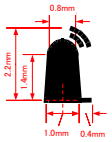
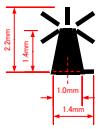
	depth Contour (5m)	line	5222		color: blue width: 0.10
	depth Contour (10m)	line	5223		color: blue width: 0.10
	depth Contour (20m)	line	5224		color: blue width: 0.10
	depth Contour (50m)	line	5225		color: blue width: 0.10
	depth Contour (100m)	line	5226		color: blue width: 0.10
	shoreline	line	5227		color: blue width: 0.10
	perious Waters Area	line	5228		color: blue width: 0.20
	submarin eCable	line	5229		color: black width: 0.20
	unnaviga bleArea	line	5230		color: black width: 0.10
	breakwate r	line	5231		color: black width: 0.10
	largePier	line	5232		color: black width: 0.10
	saltPan	line	5233		color: black width: 0.10
Seapnt (52)	atoll,more than 2m subwater	point	5250		color: blue width: 0.20
	atoll,less than 2m subwater	point	5251		color: blue width: 0.20
	shoreReef	point	5252		color: black width: 0.20

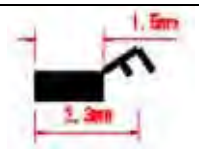
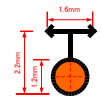
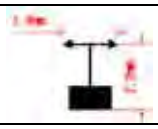
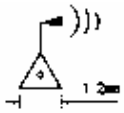
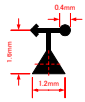
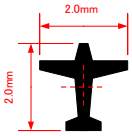
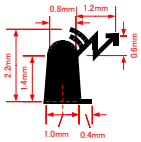
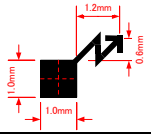
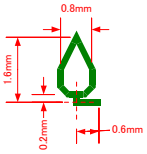
	shore reef,dired out in low tide level	point	5253		color: black width: 0.20
	wrecked ship,abov e the surface	point	5254		color: black width: 0.20
	wrecked ship,belo w the surface	point	5255		color: black width: 0.20
	inanchor Area	point	5256		color: black width: 0.20
	port,anch ored station	point	5257		color: bule width: 0.20 Annotation: Font: gothic Size: 2.0mm
	fishing port,mari na	point	5258		color: black width: 0.20
	lighting Buoys	point	5259		color: black width: 0.20
	buoysFor Mooring	point	5260		color: black width: 0.20
	buoys	point	5261		color: black width: 0.20
	light House	point	5262		color: black width: 0.20 Annotation: Font: gothic Size: 1.5mm
	cable House	point	5263		color: black width: 0.20

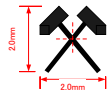
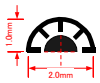
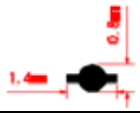
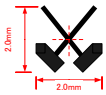
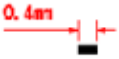
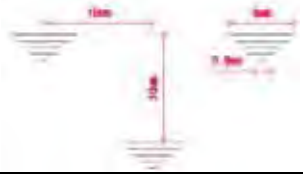
	breakwater(small)	point	5264		color: black width: 0.10
	smallPier	point	5265		color: black width: 0.10
smallpol(60)	house	polygon	6001		color: gray
	building	polygon	6002		color: gray
	builtUpArea	polygon	6003		color: gray
	factory	polygon	6004		color: gray, white width: 0.15 Annotation: Font: roman Size: 1.5mm
	hangar	polygon	6005		color: gray, white width: 0.15
	ruins	polygon	6006		color: gray, white width: 0.15
	greenhouse	polygon	6007		color: green, white width: 0.15
	fortress	polygon	6008		color: gray, white width: 0.15 Annotation: Font: roman Size: 1.5mm
	stadium	polygon	6009		color: gray, white width: 0.15
	barrack	polygon	6010		color: gray, white width: 0.15 Annotation: Font: roman Size: 1.5mm
	christianCemetary	polygon	6011		color: gray width:0.15
	muslimCemetary	polygon	6012		color: gray width:0.15

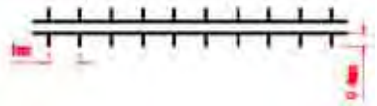
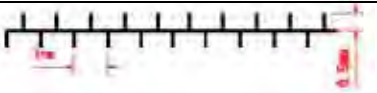
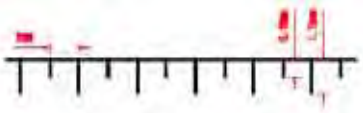
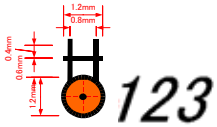
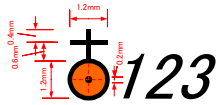
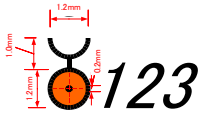
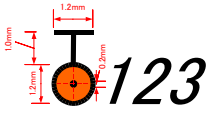
	jewishCemetary	polygon	6013		color: gray width:0.15
	memorialCemetary	polygon	6014		color: gray width:0.15
	silo	polygon	6015		color: gray,black
smalllin(60)	oiliPipeLine	line	6031		color:black width: 0.15
	gasPipeLine	line	6032		color:black width: 0.15
	powerLine	line	6033		color:black width: 0.15
	beltConveyer	line	6034		color: black, white width: 0.15
	retainingWall	line	6035		color:black width: 0.15
	rowOfTrees	line	6036		color: green
	stoneWall	line	6037		color: gray width: 0.15
	fence	line	6038		color: gray width: 0.15
	earthenWall	line	6039		color: gray width: 0.15
	runway	line	6040		color: gray width: 0.15
smallpnt(60)	churchWith2domes	point	6051		color: black, orange width: 0.15 Annotation: Font: roman Size: 1.5mm
	churchWith1dome	point	6052		color: black, orange width: 0.15 Annotation: Font: roman Size: 1.5mm

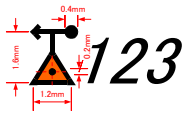
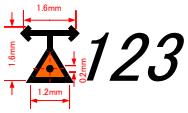
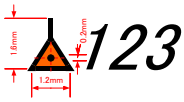
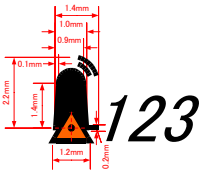
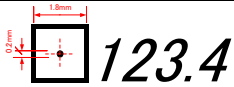
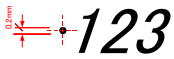
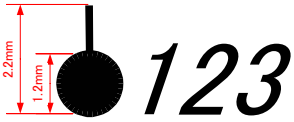
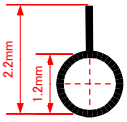
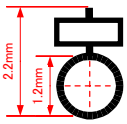
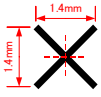
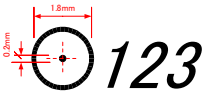
	mosuque	point	6053		color: black, orange width: 0.15 Annotation: Font: roman Size: 1.5mm
	synagogue	point	6054		color: black, orange width: 0.15 Annotation: Font: roman Size: 1.5mm
	chapel	point	6055		color: black width: 0.15 Annotation: Font: roman Size: 1.5mm
	monastery	point	6056		color: black width: 0.15 Annotation: Font: roman Size: 1.5mm
	religiusMonument	point	6057		color: black width: 0.15
	christian Individual grave	point	6058		color: black width: 0.15 Annotation: Font: roman Size: 1.5mm
	islamic Individual grave	point	6059		color: black width: 0.15 Annotation: Font: roman Size: 1.5mm
	judac Individual grave	point	6060		color: black width: 0.15 Annotation: Font: roman Size: 1.5mm
	ruined House	polygon	6061		color: black width: 0.15
	castle	point	6062		color: black width: 0.15
	school	point	6063		color: black
	hospital	point	6064		color: Blue, white width: 0.15
	mountaineeringHouse	point	6065		color: black width: 0.15

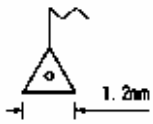
	cabin	point	6066		color: black width: 0.15
	monument	point	6067		color: black width: 0.15 Annotation: Font: roman Size: 1.5mm
	memorialPanel	point	6068		color: black width: 0.15, 0.2
	municipalityOffice	point	6069		color: black
	postOffice	point	6070		color: black width: 0.15
	policeOffice	point	6071		color: blue width: 0.15
	fireStation	point	6072		color: red width: 0.15
	court	point	6073		color: black width: 0.15
	observationTower	point	6074		color: black width: 0.15
	factoryChimney	point	6075		color: black width: 0.15
	petrolStation	point	6076		color: black width: 0.15
	tank	point	6077		color: black width: 0.15
	windMill	point	6078		color: black width: 0.15

	sawmill	point	6079		color: black width: 0.15
	rubble Ground	point	6080		color: black width: 0.15
	gasWell	point	6081		color: black width: 0.15
	antenna	point	6082		color: black, orange width: 0.15
	antenna On Building	point	6083		color: black width: 0.15
	mobile Antenna	point	6084		color: black width: 0.15
	meteorologicalStation	point	6085		color: black width: 0.15
	airport	point	6086		color: black
	aeronautical Lighthouse	point	6087		color: black width: 0.15
	thermalPowerStation	point	6088		color: black width: 0.15
	transformer	point	6089		color: black width: 0.15
	isolatedTree	point	6090		color: green width: 0.15
	groupOfTrees	point	6091		color: green width: 0.15

	mine	point	6092		color: black width: 0.15 Annotation: Font: roman Size: 1.5mm
	cave	point	6093		color: black width: 0.15 Annotation: Font: roman Size: 1.5mm
	water Cave	point	6094		color: black width: 0.15 Annotation: Font: roman Size: 1.5mm
	collapse Cave	point	6095		color: black width: 0.15
	abandonedMine	point	6096		color: black width: 0.15
	landfill Site	point	6097		color: black width: 0.15
	karst Valley	point	6098		color: brown width: 0.1
	kilometer Post	point	6099		color: black width: 0.15
	sportsGround	point	6100		color: black width: 0.15
	flood Zone	point	6101		color: blue, lightBlue width: 0.15
topolin (70)	contour50m	line	7001		color: brown width: 0.15
	contour10m	line	7002		color: brown width: 0.1
	contour5m	line	7003		color: brown width: 0.1
	contour2.5m	line	7004		color: brown

	cliff	line	7005		color: brown width: 0.15
	steepSlope	line	7006		color: brown width: 0.15
	embankment	line	7007		color: gray width: 0.15
	small Embankment	line	7008		color: gray width: 0.15
	slope Protection	line	7009		color: gray width: 0.15
	digging Place	line	7010		color: gray width: 0.15
	depressions	line	7011		color: brown width: 0.1
	mountain Stream	line	7012		color: brown width: 0.15
	breakLine	line	7013	N/A	Invisible feature on topomap
topopnt (70)	trigonometricPoint	point	7021		color: black, orange width: 0.15 annotation: Font: gothic, italic Size: 1.5mm
	churchAsTrigPoint2domes	point	7022		color: black, orange width: 0.15 annotation: Font: gothic, italic Size: 1.5mm
	churchAsTrigPoint	point	7023		color: black, orange width: 0.15 annotation: Font: gothic, italic Size: 1.5mm
	mosqueAsTrigPoint	point	7024		color: black, orange width: 0.15 annotation: Font: gothic, italic Size: 1.5mm
	synagogueAsTrigPoint	point	7025		color: black, orange width: 0.15 annotation: Font: gothic, italic Size: 1.5mm

	meteorologicalObservatoryAsTrigPoint	point	7026		color: black, orange width: 0.15 annotation: Font: gothic, italic Size: 1.5mm
	antennaAsTrigPoint	point	7027		color: black, orange width: 0.15 annotation: Font: gothic, italic Size: 1.5mm
	borderPillarAsTrigPoint	point	7028		color: black, orange width: 0.15 annotation: Font: gothic, italic Size: 1.5mm
	chimneyAsTrigPoint	point	7029		color: black, orange width: 0.15 annotation: Font: gothic, italic Size: 1.5mm
	benchmark	point	7030		color: black width: 0.15 annotation: italic, 1.6mm
	spotHeight	point	7031		color: black width: 0.15 annotation: Font: gothic, italic Size: 1.5mm
	borderPillar	point	7032		color: black width: 0.15 annotation: italic, annotation: Font: gothic, italic Size: 1.5mm
	woodenBorderPillar	point	7033		color: black width: 0.15
	boundaries Marker	point	7034		color: black width: 0.15
	crossInTheStone	point	7035		color: black width: 0.15 annotation: italic, 1.6mm
	GPSControlPoint	point	7036		color: black width: 0.15 annotation: Font: gothic, italic Size: 1.5mm

	GPS Reference Station	point	7037		color: black width: 0.15 annotation: Font: gothic, italic Size: 1.5mm
TopPol (70)	gritPlace OfThe Mountain ous	Polygon	7050		color: brown width: 0.15
gsm (71)	gridSurfa ceModel	point	7101	N/A	Invisible feature on topomap
anno (80)	peak	point	8001	e.g. *Mali Ruen*	color: black annotation: Font: gothic, italic Size: 2.0mm
	ridge	point	8002	e.g. *Prevrtentec*	color: black annotation: Font: gothic, italic Size: 2.0mm
	mountain Range	point	8003	e.g. *Ilinska Planina*	color: black annotation: Font: gothic, italic Size: 4.0mm
	mountain Path	point	8004	e.g. Bukovo	color: black annotation: Font: gothic Size: 2.5mm
	canyon	point	8005	e.g. *Mariovska Klisura*	color: black annotation: Font: gothic, italic Size: 4.0mm
	valley	point	8006	e.g. *Jolbrun*	color: black annotation: Font: gothic, italic Size: 2.0mm
	villageUn der1000	point	8007	e.g. Klisura	color: black annotation: Font: roman Size: 2.0mm
	villageOv er1000	point	8008	e.g. Pirava	color: black annotation: Font: roman Size: 2.5mm
	townUnd er10000	point	8009	e.g. VALANDOVO	color: black annotation: Font: roman Size: 2.5mm
	town1000 0To25000	point	8010	e.g. GEVGELIJA	color: black annotation: Font: roman Size: 3.0mm

	townOver 25000	point	8011	e.g. PRELEP	color: black annotation: Font: roman Size: 3.5mm
	adjoinStat e	point	8012	e.g. *ALBANIJA*	ccolor: black annotation: Font: gothic, italic Size: 5.0mm
	common Name	point	8013	e.g. Pudono	color: black annotation: Font: gothic Size: 2.0mm
	hill	point	8014	e.g. *Rudina*	color: black annotation: Font: gothic, italic Size: 2.5mm
	mountain	point	8015	e.g. *Boska*	color: black annotation: Font: gothic, italic Size: 3.0mm
	roadDirec tionAnnot ation	point	8016	e.g. Scopje	color: black annotation: Font: gothic Size: 1.5mm
	adjoinMa pName	point	8017	e.g. Miravci	color: black annotation: Font: roman Size: 2.0mm
	capeNam e	point	8018	e.g. RcStolac	color: black annotation: Font: roman Size: 2.0mm
	islandNa me	point	8019	e.g. Katic	color: black annotation: Font: roman Size: 1.5mm
	inletNam e	point	8020	e.g. U. Stolac	color: bule annotation: Font: roman Size: 1.5mm-2.0mm
	seaNmae	point	8021	e.g. JADRANSKO MORE	color: bule annotation: Font: roman Size: 3.0mm-4.0 mm
	summerV illage	point	8022	e.g. Gradac	color: black annotation: Font: roman Size: 2.0 mm
	partOfCit y	point	8023	e.g. STARI BAR	color: black annotation: Font: roman Size: 2.5 mm
	common Name(2m m)	point	8024	e.g. Bigoica	color: black annotation: Font: gothic Size: 2.0mm

	commonName(2.8mm)	point	8025	e.g. Sutorman	color: black annotation: Font: gothic Size: 2.8mm
	commonName(3.6mm)	point	8026	e.g. Buljarca	color: black annotation: Font: gothic Size: 3.6mm
	commonName(4.4mm)	point	8027	e.g. Maini	color: black annotation: Font: gothic Size: 4.4mm
	explanationAnnotation	point	8028	e.g. ht.	color: black annotation: Font: gothic Size: 1.5mm
orthoPhoto (90)	orthophoto	raster	9001	N/A	-

4 Method of Evaluation and Quality Requirement

4.1 Method of Evaluation

Data Quality Element	Data Quality Sub Element	Name of Measure	Interior / Exterior	Automatic / Manual	Quantitative / Countable	Full / Sampling	Description of Measure
Completeness	Excess	Test A	E	M	Q	S	Manually compare all visible features in the area by referencing ortho photo on prints.
		Test B	E	M	Q	F	Manually check elements which ware entered from colleted materials.
	Omission	Test A	E	M	Q	S	Manually compare all visible features in the area by referencing ortho photo on prints.
		Test B	E	M	Q	F	Manually check elements which ware entered from colleted materials.
Logical Consistency	Conceptual Consistency						
	Domain Consistency	Test A	I	A	Q	F	Execute check program which examines field name field type, field size, multiplicity, record valid range.
		Test B	I	A	Q	F	Check Dataset extent is only inside map sheet border
	Formal Consistency	Test	I	A	Q	F	Data can be opened by ArcGIS as Coverage format with no opening error. Data can be opened by ArcGIS as GeoTiff format with no opening error (for raster).
	Topological Consistency	Test	I	A	Q	F	Execute check program which examines redundant area line and point, selftwisted line and area
Positional Accuracy	Absolute Exterior Positional Accuracy						
	Relative Interior Positional Accuracy	Test	E	M	C	S	Manually compare visible features by referencing ortho photo (or re-observation) at least 21 places on prints.
	Gridded Data Positional Accuracy						
Temporal Accuracy	Accuracy of a Time Measurement						
	Temporal Consistency						
	Temporal Validity	Test	I	A	Q	F	Execute check program which examines temporal validity on attribute field.
Thematic Accuracy	Thematic Classification Correctness	Test	E	M	Q	S	Manually compare all visible features in the area by referencing ortho photo on prints.
	Non Quantitative Attribute Accuracy	Test	E	M	Q	F	Manually check elements which are entered from colleted materials.
	Quantitative Attribute Accuracy						

Interior: Use only dataset itself , Exterior: Use other data source or
Automatic: Computerized processing, Manual: Require manual examination
Quantitative: Calculate percentage of error, Countable: Count total number of error
Full: Evaluate all contents
Sampling: Evaluate 5% (Percentage of Area) or more randomly extracted on each map sheet

4.2 Quality Requirement

4.2.1 extent, admin

Data Quality Element		Requirement	Method
Completeness	Excess	Error: 0%, Comparison between collected information and dataset	Test B
	Omission	Error: 0% Comparison between collected information and dataset	Test B
Logical Consistency	Conceptual Consistency		
	Domain Consistency	Feature item range error: 0%	Test A
		Geographical extent error: 0%	Test B
	Formal Consistency	Error: 0%	Test
	Topological Consistency	Error: 0%	Test
Positional Accuracy	Absolute Exterior Positional Accuracy		
	Relative Interior Positional Accuracy	XY error S.D.: 0.7mm or less Comparison between collected information and dataset	Test
	Gridded Data Positional		
Temporal Accuracy	Accuracy of a Time Measurement		
	Temporal Consistency		
	Temporal Validity	Error: 0% (In / Out of Period Range)	Test
Thematic Accuracy	Thematic Classification Correctness	Error: 0% Comparison between collected information and dataset	Test
	Non Quantitative Attribute Accuracy	Error: 0% Comparison between collected information and dataset	Test
	Quantitative Attribute Accuracy		

4.2.2 landc

Data Quality Element		Requirement	Method
Completeness	Excess	Correctness: 2σ (95.44%)	Test A
	Omission	Correctness: 2σ (95.44%)	Test A
Logical Consistency	Conceptual Consistency		
	Domain Consistency	Feature item range error: 0%	Test A
		Geographical extent error: 0%	Test B
	Formal Consistency	Error: 0%	Test
	Topological Consistency	Error: 0%	Test
Positional Accuracy	Absolute Exterior Positional Accuracy		
	Relative Interior Positional Accuracy	XY error Max: 0.7mm or less Comparison between ortho photo and dataset	Test
	Gridded Data Positional		
Temporal Accuracy	Accuracy of a Time Measurement		
	Temporal Consistency		
	Temporal Validity	Error: 0% (In or Out of Period Range)	Test
Thematic Accuracy	Thematic Classification Correctness	Correctness: 2σ (95.44%) Comparison between collected information and dataset	Test
	Non Quantitative Attribute Accuracy	Error: 0% Comparison between collected information and dataset	Test
	Quantitative Attribute Accuracy		

4.2.3 roadn, railwayn

Data Quality Element		Requirement	Method
Completeness	Excess	Error: 0%	Test B
	Omission	Error: 0%	Test B
Logical Consistency	Conceptual Consistency		
	Domain Consistency	Feature item range error: 0%	Test A
		Geographical extent error: 0%	Test B
	Formal Consistency	Error: 0%	Test
	Topological Consistency	Error: 0%	Test
Positional Accuracy	Absolute Exterior Positional Accuracy		
	Relative Interior Positional Accuracy	XY error Max: 0.7mm or less Comparison between ortho photo and dataset	Test
	Gridded Data Positional		
Temporal Accuracy	Accuracy of a Time Measurement		
	Temporal Consistency		
	Temporal Validity	Error: 0% (In or Out of Period Range)	Test
Thematic Accuracy	Thematic Classification Correctness	Correctness: 2σ (95.44%) Comparison between collected information and dataset	Test
	Non Quantitative Attribute Accuracy	n/a	n/a
	Quantitative Attribute Accuracy		

4.2.4 streamn

Data Quality Element		Requirement	Method
Completeness	Excess	Error: 0%	Test A
	Omission	Error: 0%	Test A
Logical Consistency	Conceptual Consistency		
	Domain Consistency	Feature item range error: 0%	Test A
		Geographical extent error: 0%	Test B
	Formal Consistency	Error: 0%	Test
	Topological Consistency	Error: 0%	Test
Positional Accuracy	Absolute Exterior Positional Accuracy		
	Relative Interior Positional Accuracy	XY error Max: 0.7mm or less Comparison between ortho photo and dataset	Test
	Gridded Data Positional		
Temporal Accuracy	Accuracy of a Time Measurement		
	Temporal Consistency		
	Temporal Validity	Error: 0% (In or Out of Period Range)	Test
Thematic Accuracy	Thematic Classification Correctness	Error: 2σ (95.44%) Comparison between collected information and dataset	Test
	Non Quantitative Attribute Accuracy	Error: 0% Comparison between collected information and dataset	Test
	Quantitative Attribute Accuracy		

4.2.5 roadfpol, roadflin, railflin, smalllin, smallpnt

Data Quality Element		Requirement	Method
Completeness	Excess	Error: 0%	Test A
	Omission	Error: 0%	Test A
Logical Consistency	Conceptual Consistency		
	Domain Consistency	Feature item range error: 0%	Test A
		Geographical extent error: 0%	Test B
	Formal Consistency	Error: 0%	Test
	Topological Consistency	Error: 0%	Test
Positional Accuracy	Absolute Exterior Positional Accuracy		
	Relative Interior Positional Accuracy	XY error Max: 0.7mm or less Comparison between ortho photo and dataset	Test
	Gridded Data Positional		
Temporal Accuracy	Accuracy of a Time Measurement		
	Temporal Consistency		
	Temporal Validity	Error: 0% (In or Out of Period Range)	Test
Thematic Accuracy	Thematic Classification Correctness	Correctness: 2σ (95.44%) Comparison between collected information and dataset	Test
	Non Quantitative Attribute Accuracy	n/a	n/a
	Quantitative Attribute Accuracy		

4.2.6 railfpol, waterpnt, waterline, seapol, sealin, seapnt, smalllpol, topopol

Data Quality Element		Requirement	Method
Completeness	Excess	Error: 0%	Test A
	Omission	Error: 0%	Test A
Logical Consistency	Conceptual Consistency		
	Domain Consistency	Feature item range error: 0%	Test A
		Geographical extent error: 0%	Test B
	Formal Consistency	Error: 0%	Test
	Topological Consistency	Error: 0%	Test
Positional Accuracy	Absolute Exterior Positional Accuracy		
	Relative Interior Positional Accuracy	XY error Max: 0.7mm or less Comparison between ortho photo and dataset	Test
	Gridded Data Positional		
Temporal Accuracy	Accuracy of a Time Measurement		
	Temporal Consistency		
	Temporal Validity	Error: 0% (In or Out of Period Range)	Test
Thematic Accuracy	Thematic Classification Correctness	Correctness: 2σ (95.44%) Comparison between collected information and dataset	Test
	Non Quantitative Attribute Accuracy	Error: 0% Comparison between collected information and dataset	Test
	Quantitative Attribute Accuracy		

4.2.7 topolin

Data Quality Element		Requirement	Method
Completeness	Excess	Error: 0%	Test A
	Omission	Error: 0%	Test A
Logical Consistency	Conceptual Consistency		
	Domain Consistency	Feature item range error: 0%	Test A
		Geographical extent error: 0%	Test B
	Formal Consistency	Error: 0%	Test
	Topological Consistency	Error: 0%	Test
Positional Accuracy	Absolute Exterior Positional Accuracy		
	Relative Interior Positional Accuracy	Z error Max: 5m or less, Comparison between stereoscopic view and dataset	Test
	Gridded Data Positional		
Temporal Accuracy	Accuracy of a Time Measurement		
	Temporal Consistency		
	Temporal Validity	Error: 0% (In or Out of Period Range)	Test
Thematic Accuracy	Thematic Classification Correctness	Error: 0%	Test
	Non Quantitative Attribute Accuracy	n/a	n/a
	Quantitative Attribute Accuracy		

4.2.8 topopnt

Data Quality Element		Requirement	Method
Completeness	Excess	Error: 0%	Test B
	Omission	Error: 0%	Test B
Logical Consistency	Conceptual Consistency		
	Domain Consistency	Feature item range error: 0%	Test A
		Geographical extent error: 0%	Test B
	Formal Consistency	Error: 0%	Test
	Topological Consistency	Error: 0%	Test
Positional Accuracy	Absolute Exterior Positional Accuracy		
	Relative Interior Positional Accuracy	Z error Max: 3.3m or less, Comparison between stereoscopic view or re-observation and dataset	Test
	Gridded Data Positional		
Temporal Accuracy	Accuracy of a Time Measurement		
	Temporal Consistency		
	Temporal Validity	Error: 0% (In or Out of Period Range)	Test
Thematic Accuracy	Thematic Classification Correctness	Correctness: 2σ (95.44%) Comparison between collected information and dataset	Test
	Non Quantitative Attribute Accuracy	Error: 0% Comparison between collected information and dataset	Test
	Quantitative Attribute Accuracy		

4.2.9 gsm

Data Quality Element		Requirement	Method
Completeness	Excess	Error: 0%, Comparison with grid point and dataset	Test A
	Omission	Error: 0%, Comparison with grid point and dataset	Test A
Logical Consistency	Conceptual Consistency		
	Domain Consistency	Feature item range error: 0%	Test A
		Geographical extent error: 0% Extent is minimum rectangle which covers map sheet	Test B
	Formal Consistency	Error: 0%	Test
	Topological Consistency	Error: 0%	Test
Positional Accuracy	Absolute Exterior Positional Accuracy		
	Relative Interior Positional Accuracy	Z error S.D.: 6.12m or less * Re-observe surface by manual or automatic correlation	Test
	Gridded Data Positional		
Temporal Accuracy	Accuracy of a Time Measurement		
	Temporal Consistency		
	Temporal Validity	Error: 0% (In or Out of Period Range)	Test
Thematic Accuracy	Thematic Classification Correctness	n/a	n/a
	Non Quantitative Attribute Accuracy	n/a	n/a
	Quantitative Attribute Accuracy		

*1/1,000 of flight height as expected height accuracy for automatic correlation

4.2.10 anno

Data Quality Element		Requirement	Method
Completeness	Excess	Error: 0%, Comparison between collected information and dataset	Test A
	Omission	Error: 0% Comparison between collected information and dataset	Test A
Logical Consistency	Conceptual Consistency		
	Domain Consistency	Feature item range error: 0%	Test A
		Geographical extent error: 0%	Test B
	Formal Consistency	Error: 0%	Test
	Topological Consistency	Error: 0%	Test
Positional Accuracy	Absolute Exterior Positional Accuracy		
	Relative Interior Positional Accuracy	n/a	n/a
	Gridded Data Positional		
Temporal Accuracy	Accuracy of a Time Measurement		
	Temporal Consistency		
	Temporal Validity	Error: 0% (In or Out of Period Range)	Test
Thematic Accuracy	Thematic Classification Correctness	Correctness: 2σ (95.44%)	Test
	Non Quantitative Attribute Accuracy	Error: 0%	Test
	Quantitative Attribute Accuracy		

4.2.11 raster

Data Quality Element		Requirement	Method
Completeness	Excess	n/a	n/a
	Omission	n/a	n/a
Logical Consistency	Conceptual Consistency		
	Domain Consistency	n/a	n/a
		Geographical extent error: 0%	Test B
	Formal Consistency	Error: 0% Come with correct resolution and coordinate system infomation	Test
	Topological Consistency	n/a	n/a
Positional Accuracy	Absolute Exterior Positional Accuracy		
	Relative Interior Positional Accuracy	XY error Max.: 0.7mm or less Comparison between ortho photo and dataset	Test
	Gridded Data Positional		
Temporal Accuracy	Accuracy of a Time Measurement		
	Temporal Consistency		
	Temporal Validity	n/a	n/a
Thematic Accuracy	Thematic Classification Correctness	n/a	n/a
	Non Quantitative Attribute Accuracy	n/a	n/a
	Quantitative Attribute Accuracy		

5 Metadata

Montenegro Metadata profile (MMP1.0) shall be adopted for metadata of the product. Montenegro metadata profile is based on Japan Metadata profile (JMP 2.0).
Necessary elements are extracted from full profile of JMP2.0.
xml metadata file refer xml scheme on to Japan Geographic Survay Insutitute.
(http://zgate.gsi.go.jp/jmp/JMP20.xsd)

5.1 Unit of Metadata

Metadata file shall be drobided for 25,000 dataset, and each mapsheet.

5.2 Metadata profile

Metadata profile and there explanations are following;
(M) means mandatory element, (O) means optional element.

<MD_Metadata>
- <fileIdentifier>(O): unique identifier as a text. Use this strongly recommended
- <langage><isoCode>(M): choose code from iso language codelist English is “eng”
- <charecterSet>(M): choose character encoding method from iso codelist utf8 is “004”.
- <parentIdentifier>(O): define parent metadata name. “Montenegro25000series”
- <contact>(M): information for contact.
  - <organisationName>(M)
  - <contactInfo>(O)
    - <phone>(O)
      - <voice>(O)
      - <facsimile>(O)
    - <address>(O)
      - <deliveryPoint>(O)
      - <electronicMailAddress>(O)
    - <onlineResource>(O)
      - <linkage>(M): Descrive URL
  - <role>(O): “010” means publisher
- <dataStamp>(M): date that created this file
- <metadataStandardName>(O): MMP
- <metadataStandardVersion>(O): 1.0
- <referenceSystemInfo><MD_ReferenceSystem>(O)
  - <referenceSystemIdentifier>(M)
    - <authority>(O): name of the document
      - <title>(M): name of the title
      - <date>(M)
        - <date>(M)
        - <dateType>(M): “003” is reviced date
    - <code>(M): “State_Coordinate System(Bessel)”
- <identificationInfo><MD_DataIdentification>(M)
  - <citation>(M): data source that are used for this product
    - <title>(M): name of citation data source
    - <date>
      - <date>
      - <dateType>(M): “001” is creatred date
  - <abstract>(M): free text
  - <purpose>(O): free text
  - <status>(O): “001” means completed.
  - <discriptiveKeywords><MD_Keywords>(O)
    - <keyword>(M) : key word for data classification
    - <type>(O): “002” means location
  - <resourceConstraints><MD_Constraints>(M)
    - <useLimitation>(M): free text
  - <spatialRepresentationType>(O): “001” means vector.
  - <spatialResolution>(O)
    - <equivalrntScale>(O)
      - <denominator>(M)
  - <spatialResolution>(O)

- <distance>(O)
  - <value>(M)
  - <uom>(M): unit of measure
    - <UnitOfMeasure>(M)
      - <name>(M)
      - <measurementType>(O): length, height, width, distance and so on
- <language><isoCode>(M): “eng” means English
- <characterSet>(M): choose character encoding method from iso codelist utf8 is “004”.
- <topicCategory>(M): “019” means public project and communication
- <extent>(M)
  - <description>(O): summary of extent of dataset
  - <EX_BOundingPolygon>(O)
    - <extentTypeCode>(O)
    - <extentReferenceSystem>(M)
      - <authority>(M): name of the document
        - <title>(M): name of the title
        - <date>(M)
          - <date>(M)
          - <dateType>(M): “003” is reviced date
      - <code>(M): “State Coordinate System(Bessel)”
    - <polygon>(M)
      - <polygon><exterior><linearRIng><coordinates>(M):polygon node coordinates.
  - <EX_GeographicBoundingBox>
    - <extentTypeCode>(O)
    - <extentReferenceSystem>(M)
      - <authority>(M): name of the document
        - <title>(M): name of the title
        - <date>(M)
          - <date>(M)
          - <dateType>(M): “003” is reviced date
      - <code>(M): “State Coordinate System(Bessel)”
    - <westBoundLongitude>(M): latitude/longitude in decimal
    - <eastBoundLongitude>(M): latitude/longitude in decimal
    - <southBoundLatitude>(M): latitude/longitude in decimal
    - <northBoundLatitude>(M): latitude/longitude in decimal
- <distributionInfo><MD_Distribution>(O)
  - <distributionFormast><MD_Format>(M): information of data format
    - <name>(M): name of data format
    - <version>(M): version of data format

5.3 Sample metadata

Spatial Dataset of The data Specification is applied for various purposes as Montenegro national

```
<?xml version="1.0" encoding="UTF-8"?>
<MD_Metadata xsi:schemaLocation="http://zgate.gsi.go.jp/ch/jmp/ constraint
http://zgate.gsi.go.jp/ch/jmp/JMP20.xsd" xmlns:xsi="http://www.w3.org/2001/XMLSchema-
instance" xmlns="http://zgate.gsi.go.jp/ch/jmp/" xmlns:jmp20="http://zgate.gsi.go.jp/ch/jmp/">
 <identificationInfo>
  <MD_DataIdentification>
   <citation>
    <title>1:40,000 Panchromatic Aerial Phtography</title>
    <date>
     <date>2007-05-01</date>
     <dateType>001</dateType>
    </date>
   </citation>
   <abstract>Level 25, 000 Spatial Database Mapsheet  129-4-2</abstract>
   <purpose>For Topographic map scale 1:25,000, and for GIS application purpose.</purpose>
   <status>001</status>
   <resourceConstraints>
    <MD_Constraints>
     <useLimitation>Use only for not commecial purpose</useLimitation>
    </MD_Constraints>
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            <date>
              <date>2007-05-10</date>
              <dateType>003</dateType>
            </date>
          </authority>
          <code>State Coordinate System (Bessel)</code>
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510374.30,4636829.80</coordinates>
              </LinearRing>
            </exterior>
          </polygon>
        </polygon>
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      <EX_GeographicBoundingBox>
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          <authority>
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            <date>
              <date>2007-05-10</date>
              <dateType>003</dateType>
            </date>
          </authority>
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          <dateType>003</dateType>
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   </phone>
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   </address>
   <onlineResource>
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   </onlineResource>
  </contactInfo>
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 </contact>
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 <metadataStandardName>MMP</metadataStandardName>
 <metadataStandardVersion>1.0</metadataStandardVersion>
</MD_Metadata>
```

☺

Administration list of equipments for the Study

Project Name : The Study for Establishment of Geographic Information for Implementation of National Physical Plan in the Republic of Montenegro

Cooperation Period : 02/2007 - 03/2009

Counterpart Organizations (User) : **Department of Real Estate (DRE), Ministry of Finance**

Equipment Provider : VEKOM d.o.o.

Procurement : Kokusai Kogyo Co.,Ltd.

No.	Brand	Code	Description	Quantity
1	LEICA	737438	TCR1202 R300, 2"(0.6mgon) total station with reflector less EDM, laser plummet, 1 keyboard with touch screen, standard applications, user manual, and container.	2
2	LEICA	743000	GTS22, 2nd keyboard with touch screen, for TPS1200 instruments, for telescope position 2, fitted.	2
3	LEICA	741963	GSD02, communication side cover, including bluetooth, for non-motorized TPS1200 instruments(TC, TCR models). Required for SmartAntenna adapter and RadioHandle.	2
4	LEICA	741965	GAD 104, SmartAntenna Adapter. Required to attach SmartAntenna and/or radio modem in GFU14 housing onto TPS1200. Requires communication side cover.	2
5	LEICA	733250	ATX1230, SmartAntenna to be used together with the TPS1200 series total stations or the GTX1230 Receiver.	2
6	LEICA	734275	MCF64, CompactFlash Card 64MB.	2
7	LEICA	734700	GEV189, Data transfer cable, Lemo to USB connector(incl. USB electronics), 2.0m. Connects TPS/DNA to PC for data transfer. PC driver and user manual included on CD.	2
8	LEICA	733258	MCFAD1, CompactFlash PC Card adapter.	2
9	LEICA	667718	GHM007 Instruments height meter	2
10	LEICA	722045	GHT196 Distance holder for height meter	2
11	LEICA	734167	TPS1200 Application "Reference Line"	2
12	LEICA	734168	TPS1200 Application "Sets of Angles".	2
13	LEICA	734169	TPS1200 Application "DTM Stakeout".	2
14	LEICA	734181	TPS1200 Application "Reference Plane".	2
15	LEICA	733270	GEB221, Lithium-Ion battery, 4Ah, rechargeable. To be used with TPS1200 and GPS1200 series.	4
16	LEICA	733271	GKL221, Charger PRO. To be used with up to two charging adapters GDI221 or GDI222, Charger cable and net adapter included.	2
17	LEICA	733323	GDI221, Adapter for GKL221 for charging 2 Li-Ion batteries GEB221, GEB211.	4
18	LEICA	394752	GST20-9, Wooden heavy duty tripod	2
19	LEICA	385500	GLS11 Reflector pole, telescopic, with circular bubble, cm and ft graduation, extends to 2.15m.	2
20	LEICA	403428	GZW12 Extension 1m long, for reflector pole GLS11 and carriers	4
21	LEICA	641617	GPR121 Circular prism, with holder and target plate.	2
22	LEICA	667451	GVP609, Container for 2 Circular prism, 2 Carriers/Laser plummets and 2 tribrachs.	1
23	LEICA	734165	GVP627, Hard container for System1200 SmartRover, SmartPole, RX1250 and SmartStation.	2
24	LEICA	734711	Leica Geo Office Software, not protected.	1
25	LEICA	734713	Software protection key(USB) for single user licence.	1
26	LEICA	734719	L1/L2 data-processing for GPS, for code and phase, protected option.	1

Administration list of equipments for the Study

Project Name : The Study for Establishment of Geographic Information for Implementation of National Physical Plan in the Republic of Montenegro

Cooperation Period : 02/2007 - 03/2009

Counterpart Organizations (User) : **Department of Real Estate (DRE), Ministry of Finance**

Equipment Provider : VEKOM d.o.o.

Procurement : Special Lot by JICA

No.	Brand	Code	Description	Quantity
1	LEICA		LPS Core Photogrammetry Suite Core includes IMAGINE Advantage and "imblock" (prior IMAGINE OrthoBASE functionality, plus new feature). Licenses	2
2	LEICA		LPS Stereo (License only)	2
3	LEICA		LPS ATE (License only)	1
4	LEICA		LPS Terrein Editor (License only)	1
5	LEICA		LPS Mossaic PRO (License only)	1
6	LEICA		ORIMA TE GPS for LPS (License only)	1
7	LEICA		PRO 600 for LPS/DPW	2
8	LEICA		Topompuse	2
9	LEICA		Stereo Analyst for ArcGIS	1

Equipment Provider : VEKOM d.o.o.

Procurement : Lot-1 by JICA

No.	Brand	Code	Description	Quantity
1	BENTLAY		MicroStation V8 XM Edition (CAD Platform)	3
2	ESRI		Arcinfo 9-2 (GIS Software)	1
3	ESRI		Spatial Analyst for ArcGIS (Extension software for Arcinfo)	1
4	PLANAR		SD 2020 (Stereoscopic Display)	2

Equipment Provider : INFORMATIKA MONTENEGRO

Procurement : Lot-2 by JICA

No.	Brand	Code	Description	Quantity
1	Microsoft		Mocrosoft Office Professional 2003 (Word Processing Software)	4
2	Adobe		Photoshop CS2 (Digital Imaging Editor)	2
3	Adobe		Illustlator CS2 (Vector Graphic Software)	1
4	Dell		Precision 490 NVIDIA Quadro FX-3500, E197FP (Workstation with display)	2
5	Dell		Precision 490 NVIDIA Quadro FX-3500 (Workstation without display)	2
6	CISCO		WS-C3560G-24TS-S CATALYST356024 10/100/1000T+4SFP Standard Image (switch)	1
7	APC		SUA2200 (UPS)	4

Administration list of equipments for the Study

Project Name : The Study for Establishment of Geographic Information for Implementation of National Physical Plan in the Republic of Montenegro

Cooperation Period : 02/2007 - 03/2009

Counterpart Organizations (User) : **Department of Real Estate (DRE), Ministry of Finance**

Equipment Provider : INFORMATIKA MONTENEGRO

Procurement : Lot-3 by JICA

No.	Brand	Code	Description	Quantity
1	HP	Q7546A	Laserjet Printer LJ 5200dtn	1
2	HP	Q7715A	64MB 100-pin DDR DIMM	1
3	HP	Q7516A	Black Print Cartridge	3
4	HP	C6075B	Plotter Designjet 1055cm plus	1
5	HP	C4871AL	HP 80 Black Ink cartridge	3
6	HP	C4846AL	HP 80 Cyan Ink cartridge	3
7	HP	C4847AL	HP 80 Magenta Ink cartridge	3
8	HP	C4848AL	HP 80 Yellow Ink cartridge	3
9	HP	C4820A-US	HP 80 Black Printhead	3
10	HP	C4821A-US	HP 80 Cyan Printhead	3
11	HP	C4822A-US	HP 80 Magenta Printhead	3
12	HP	C4823A-US	HP 80 Yellow Printhead	3
13	HP	C1861A-US	HP Bright White Inkjet Paper (36in＊150ft)	10
14	HP	51642B-US	HP Matte Film (36in＊125ft)	10

Equipment Provider : BUFFALO in Japan

Procurement : Kokusai Kogyo Co.,Ltd.

1	BUFFALO	HD-Q2.0TSU2	External Hard Disk Drive (2.0 Tera Bites) for Areial Photo Data Storage	1

Administration list of equipments for the Study

Project Name : The Study for Establishment of Geographic Information for Implementation of National Physical Plan in the Republic of Montenegro

Cooperation Period : 02/2007 - 03/2009

Counterpart Organizations (User) : **Department of Spatial Planning (DSP), Ministry of Economic Development**

Equipment Provider : VEKOM d.o.o.

Procurement : Special Lot by JICA

No.	Brand	Code	Description	Quantity
1	LEICA		Stereo Analyst for ArcGIS	1

Equipment Provider : VEKOM d.o.o.

Procurement : Lot-1 by JICA

No.	Brand	Code	Description	Quantity
1	ESRI		Arcinfo 9-2 (GIS Software)	1
2	ESRI		Spatial Analyst for ArcGIS (Extension software for Arcinfo)	1

Equipment Provider : INFORMATIKA MONTENEGRO

Procurement : Lot-2 by JICA

No.	Brand	Code	Description	Quantity
1	Microsoft		Mocrosoft Office Professional 2003 (Word Processing Software)	1
2	Adobe		Photoshop CS2 (Digital Imaging Editor)	1
3	Dell		Precision 490 NVIDIA Quadro FX-3500, E197FP (Workstation with display)	1
4	APC		SUA2200 (UPS)	1