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1. 先方政府の要請書 (Terms of Reference)



BOSNIA AND HERZEGOVINA

Ministry of Foreign Affairs  
Department for Multilateral Relations  
-Unit for Reconstruction-

Ref: 1073-03-18875/01

NOTE VERBALE

The Ministry of Foreign Affairs of Bosnia and Herzegovina presents its compliments to the Embassy of Japan in Vienna and, referring to the Ministry's Note Verbale 1073-03-16167/01 dated September 10, 2001, has the honour to forward herewith attached the application form for the Project – Establishing Digital Topographic Maps for Bosnia and Herzegovina - for the Japan's Development Studies/Program in JFY 2002.

That Project is the replacement for the same project which was submitted for the Japanese Grant Aid in JFY 2003.

Ministry of Foreign Affairs of Bosnia and Herzegovina avails itself of this opportunity to renew to the Embassy of Japan in Vienna the assurances of its highest consideration. 27

Sarajevo, 22 October 2001



EMBASSY OF JAPAN  
VIENNA

## APPLICATION FORM FOR JAPAN'S DEVELOPMENT STUDIES PROGRAM

Date of entry: October 8, 2001.

Applicant: the Government of Bosnia and Herzegovina – Council of Ministers

### 1. Project digest

#### (1) Project Title:

*Establishing digital topographic maps for Bosnia and Hercegovina*

#### (2) Summary and Location of the Project:

- Digitizing of all existent 1:25.000 scale topographic maps of Bosnia and Herzegovina (The whole territory, 430 map sheets) with topology construction to be utilized for GIS in the future.

- Take new aerial photos of the whole country (51.197 sq. kilometers) using DGPS-Differential GPS

- Principal 21 cities shall be mapped newly by the scale of 1:25.000 with digital method and topology construction with totally new data by above aerial photos which can be used immediately for the government administration as a base data. (Approx. 47 sheets)

- Technology transfer of digital maps (Topology construction) for further 383 sheets, including hardware and software operations, which can be carried out within the state and in Japan.

- Project Location map - Annex 1

### 3. Implementing Agency

- Names of the Agencies:

a) Administration for Geodetic and Real Property Affairs of the Federation of Bosnia and Herzegovina

Number of Staff: 17

Annual budget: 1 500 000 KM

b) Administration for Geodetic and Real Property Affairs of the Republic of Srpska

Number of Staff: 83

Annual budget: 5 000 000 KM

- Organization Chart of implementing agencies - Annex 2

### 4. Justification of the Project

- Present conditions of the sector

Administration for Geodetic and Real Property Affairs of the Federation of Bosnia and Herzegovina is in charge of the Mapping matters in Federation of Bosnia

and Herzegovina, employs 17 people – other surveyors work in cantonal administration and municipal offices.

Administration for Geodetic and Real Property Affairs of the Republic of Srpska is the responsible organization in RS, employs 83 staff, other surveyors work in regional or municipal fields.

J. P. "Geodetski zavod BiH" ,which existed before the war, employs today 115 employees, and is one of potential contractors of work for the Federation of Bosnia and Herzegovina.

After the Dayton (Ohio) Peace Agreement in 1995, rehabilitation and reconstruction of the country has started. However, the effort was concentrated only for the BHN-Basic Human Needs projects. Now the country is going into the real reconstruction stage in which the medium and long-term plans are starting. In such a situation, the needs and demands for new and reliable map information are becoming more important every day. Though, unfortunately, in the country there are no physical conditions to satisfy such needs, especially the needs for information about cities and municipalities, in relation with the reestablishment of the displaced persons.

**- Sector development policy/plan of the national / local government**

Council of Ministers of Bosnia and Herzegovina has always had a very delicate function. First, it should concentrate to recover the standard quality of life urgently, especially in areas of reconstitution. On the other hand, it should pay great attention to establish politically well-balanced administration for both FBiH and RS. In such situation new and reliable digital map information are indispensable for later development of reconstruction projects and improvement of living conditions.

**- Problems to be solved in the sector**

Until the dissolution of Yugoslavia and Bosnia Herzegovina's independence geodesy service in BiH region was in a rather good technical condition regarding the analogue generation until 1980's. However, after the country had entered the period of total instability and confusion, many institutions, buildings and equipment were destroyed and many human lives were lost. Coincidentally, 1980's were the era in which the digital technology in geodesy and cartography developed drastically. The geodesy services could not have a chance to take part in such technology innovation and were forced to stay in the antique analogue world.

**- Outline of the Project:**

- Digitizing of all existent 1:25.000 scale topographic maps of Bosnia and Herzegovina (The whole territory, 430 map sheets) with topology construction to be utilized for GIS in the future.

- Take new aerial photos of the whole country (51.197 sq. kilometers) using DGPS-Differential GPS

- Principal 21 cities shall be mapped newly by the scale of 1:25.000 with digital method and topology construction with totally new data by above aerial photos which can be used immediately for the government administration as a base data. (Approx. 47 sheets)

- *Technology transfer of digital maps (Topology construction) for further 383 sheets, including hardware and software operations, which can be carried out within the country and in Japan.*

- *Purpose (Short Term objective) of the project*

*To have new aerial photos of 51.197 square kilometers with the scale of 1:40.000*

*To have 430 existent maps digitized in a way of topology construction*

*To have 47 map sheets (1:25.000), produced from above photos in digital form*

*To carry out the necessary technology transfer for the digital world*

- *Goal (Long Term objective) of the project*

*To acquire the perfect technical condition to supply the necessary digital Information to the relevant sectors to the benefit of medium and long term Reconstruction Projects.*

- *Prospective beneficiaries*

- *The Project's priority in the National Development Plan/Public Investment Program*

*(5) Desirable or Scheduled time of the commencement of the Project:*

*Survey: 2002*

*Implementation: 2004*

*(6) Expected funding source and/or assistance (including external origin) of the Project*

*(7) Other relevant project, if any*

*This Project is requested only from Japan and there is no duplication of aid Request.*

*There is another small project being done by Northern European AID program, but these are totally different maps – small-scale plans for land titling.*

## *2. Terms of Reference of the Proposed Study*

### *(1) Necessity/Justification of the Study*

*As mentioned above, for the country, which suffered a long period of war and destruction, the top priority of the reconstruction shall be (Resettlement of the citizens, Rehabilitation of Infrastructure and Life Line). As mentioned above, this country had been changed totally. In some towns, where we had a large population, nobody lives today. On the other hand, we can find some new villages in places where the old maps were mentioning only agricultural fields. Sometimes we can not find the bridges at places where they were. Surely Bosnia and Herzegovina started to recover in many fields and the BNH-Basic Human Needs Step was almost cleared. Now we are encountering the difficulty to follow up the medium and long-term rehabilitation program because of the shortage of new and reliable information about the proper land. And such new information can not be obtained alone because of technical and financial constraints. This is just a reason why the project is being requested from Japan because Japan is one of the high-tech countries in this area and has an assistance program to help many countries of the world.*

*(2) Necessity/Justification of the Japanese Technical Cooperation*

*In order to be able to answer the great demand and needs for map information, Administration for Geodetic and Real Property Affairs of the Federation of Bosnia and Herzegovina and Administration for Geodetic and Real Property Affairs of the Republic of Srpska decided to request the assistance from Japan through JICA's Development Study.*

*Reportedly we know that JICA's Development Study has already carried out similar kind of digital mapping projects in many countries worldwide where the people and the government had suffered a total destruction of infrastructure and lifeline. The digital topographic information, which can go easily into GIS-Geographical Information System, was very useful and helpful in these countries. Considering the urgency of the needs of map information in above mentioned urban areas, new aerial photos of all over the country and 46 map sheets of scale 1:25.000 should be carried out by JICA.*

*(3) Objectives of the Study*

*The project is targeting both, to satisfy the urgent needs of topographic map information and to upgrade technology of Administration for Geodetic and Real Property Affairs of the Federation of Bosnia and Herzegovina and Administration for Geodetic and Real Property Affairs of the Republic of Srpska and J. P. "Geodetski zavod BiH" and other contractors of work in Federation of Bosnia and Herzegovina and RS.*

*(4) Area to be covered by the Study (Ref. Map Annexed):*

*The new aerial photos shall cover whole territory of 51.197 sq.kilometers  
Digitizing of existent analogue maps shall cover almost 90% of the territory. (383d map sheets)*

*21 principal cities shall be newly mapped and digitized, which are;*

*FBiH: Sarajevo, Mostar, Tuzla, Zenica, Bihac, Travnik, Citluk, Livno, Jajce, Siroki Brijeg, Gorazde*

*RS: Banjaluka, Bijeljina, Prijedor, Dobo, Trebinje, Zvornik, Derventa, Gradiska, Visegrad*

*District: Brcko*

*(5) Scope of the Study*

*(6) Study Schedule*

*The study is expected to be implemented within 3 years.*

*(7) Expected Major Outputs of the Study*

*Various reports in a necessary stages:*

*New aerial stereo photographs of whole country, using DGPS:*

*430 existent analog map sheets to be digitized :*

*47 digital map sheets of scale 1:25.000, newly produced:*

*Suitable technology transfer for the digital mapping system*

*Technological upgrading of Administration for Geodetic and Real Property Affairs of the Federation of Bosnia and Herzegovina and Administration for Geodetic and Real*

*Property Affairs of the Republic of Srpska and J. P. "Geodetski zavod BiH" and other contractors of work in Federation of Bosnia and Herzegovina and RS.*

*(8) Possibility to be implemented/ Expected funding resources*

*(9) Request of the Study to other donor agencies, if any  
None at this moment.*

*(10) Other relevant information*

### *3. Facilities and information for the Study*

*1) Assignment of counterpart personnel of the implementing agency for the Study*

*2) Available data, information, documents, maps, etc. related to the Study  
All the necessary existent data such as maps, aerial photos, geodetic control data shall be available for the JICA study team.*

*3) Information on the security conditions in the Study Area  
The security condition of the study area is totally safe and the study team will receive adequate and safe space for the implementation of the project.*

### *4. Global issues (Environment, Gender, Poverty, etc.)*

#### *Environmental issue*

*This project shall not have any negative effect on the environmental and ecological issue, on the contrary, it can help a lot to recover or conserve these fields (both natural and social).*

#### *Women development*

*In this project, both men and women shall be the beneficiaries because the project aims to have a new and reliable nation-wide information for the reconstruction and rehabilitation.*

#### *Poverty alleviation components*

*This project should be considered as great means in the combat against poverty induced by the war.*

### *5. Undertakings of the Government of Bosnia and Herzegovina - Council of Ministers*

*In order to facilitate the smooth and efficient conduct of the Study, the Government of Bosnia and Herzegovina - Council of Ministers shall take 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 Bosnia and Herzegovina in connection with their assignment therein, and exempt them from foreign registration requirements and consular fees,*



- 3) to exempt the Study Team from taxes, duties and any other charges on equipment, machinery and other materials brought into and out of Bosnia and Herzegovina for the conduct of the Study
- 4) to exempt the Study Team from income tax and charges of any kind imposed on or in connection with the implementation of the Study
- 5) to provide necessary facilities to the Study Team for remittance as well as utilization of the funds introduced in Bosnia and Herzegovina from Japan in connection with the implementation of the Study
- 6) to secure permission for entry into private properties or restricted areas for the conduct of the Study
- 7) to secure permission for the Study Team to take all data, documents and necessary materials related to the Study out of Bosnia and Herzegovina to Japan, and,
- 8) to provide medical services as needed. Its expenses will be chargeable to members of the Study Team

(6) The Government of Bosnia and Herzegovina-Council of Ministers shall bear claims, if any arise against member of the Japanese 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 willful misconduct on the part of the member of the Study Team.

(7) Administration for Geodetic and Real Property Affairs of the Federation of Bosnia and Herzegovina and Administration for Geodetic and Real Property Affairs of the Republic of Srpska shall act as counterpart agencies to the Japanese Study Team and also as coordinating bodies in relation with other government and non-government organizations responsible for the smooth implementation of the Study.

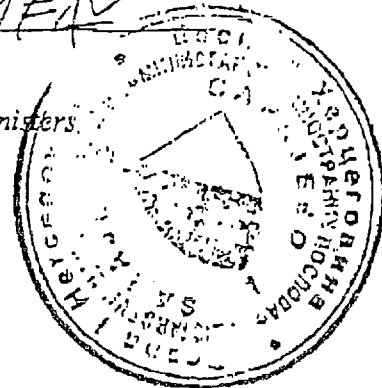
(8) Administration for Geodetic and Real Property Affairs of the Federation of Bosnia and Herzegovina and Administration for Geodetic and Real Property Affairs of the Republic of Srpska will, as the executing agency of the Project, take responsibilities that may arise from the products of the Study.

The Government of Bosnia and Herzegovina-Council of Ministers assures that the matters referred to in this form will be ensured for the smooth conduct of the Development Study by the Japanese Study Team.

Signed: E. Jeyaraj  
 Title: Ag. for MFA

On behalf of the Government of  
 Bosnia and Herzegovina - Council of Ministers.

Date: \_\_\_\_\_





2. Scope of Work

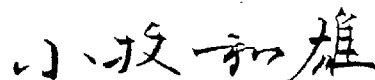
SCOPE OF WORK  
FOR  
THE STUDY  
ON  
ESTABLISHING DIGITAL TOPOGRAPHIC MAPS  
FOR  
BOSNIA AND HERZEGOVINA

AGREED UPON BETWEEN  
MINISTRY OF CIVIL AFFAIRS AND COMMUNICATIONS,  
BOSNIA AND HERZEGOVINA  
AND  
JAPAN INTERNATIONAL COOPERATION AGENCY

SARAJEVO  
23 OCTOBER, 2002



Milan Lovric, Deputy Minister  
Ministry of Civil Affairs and Communications  
Bosnia and Herzegovina



Kazuo Komaki, Leader  
Preparatory Study Team  
Japan International Cooperation Agency



Milovan Blagojevic, Deputy Minister  
Ministry of Foreign Affairs  
Bosnia and Herzegovina

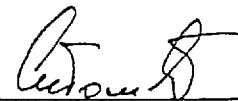
WITNESS



Marko Lozic, Director  
Administration for Geodetic and  
Real Property Affairs  
the Federation of Bosnia and  
Herzegovina



Bojat Vladimir,  
Assistant Director  
Administration for Geodetic and  
Real Property Affairs  
the Republic of Srpska



Stanko Tomić, Chief of Division  
Public Register  
the Government of  
Brcko District

## I. INTRODUCTION

In response to a request of the Government of Bosnia and Herzegovina (hereinafter referred to as "the GOBH"), the Government of Japan decided to conduct "The Study on Establishing Digital Topographic Maps for Bosnia and Herzegovina" (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 GOBH.

The present document sets forth the scope of work with regard to the Study.

## II. OBJECTIVES OF THE STUDY

The objectives of the Study are :

- 1) to take new aerial photographs of the whole country of Bosnia and Herzegovina (Approx. 51,000 square kilometers) ;
- 2) to prepare new digital topographic maps covering the forty-seven (47) map sheets for the cities which are ; Sarajevo, Mostar, Tuzla, Zenica, Bihac, Travnik, Citluk, Livno, Jajce, Siroki Brijeg, Gorazde, Banja Luka, Bijeljina, Prijedor, Dobo, Trebinje, Zvornik, Derventa, Gradiska, Visegrad and Brcko (hereinafter referred to as "the Principal 21 Cities") as shown in Appendix I at the scale of 1:25,000 ;
- 3) to prepare digital topographic maps (using existent maps) covering the whole country of Bosnia and Herzegovina except the forty-seven (47) map sheets for the Principal 21 Cities at the scale of 1:25,000 ; and
- 4) 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.

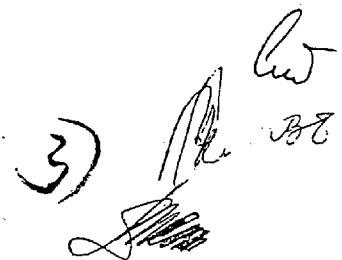
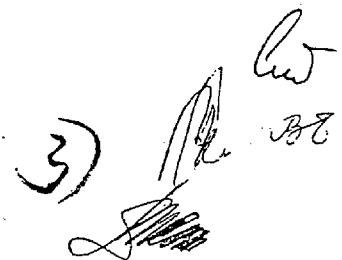
### 1. Review of Existing Conditions

Existing conditions relevant to the Study including organization set-up, mapping system, facilities management and control points shall be reviewed.

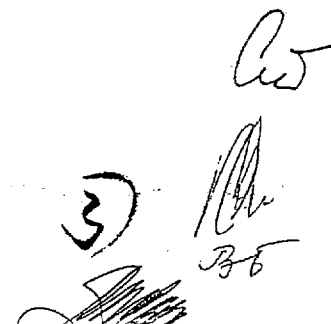
### 2. Aerial Photography

Black and white aerial photographs at the scale of 1:40,000 covering the whole country shall be taken.



3)    
 

3. Map Production for the Principal 21 Cities
  - 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 identified mainly 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 line 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.
  - 8) Printing of Maps  
The digital topographic data shall be printed at the scale of 1:25,000.
4. Digitizing Existing Maps
  - 1) Scanning  
Existing topographic maps at the scale of 1:25,000 covering the whole country except the Principal 21 Cities shall be scanned.
  - 2) Vectorizing  
Digital data acquired by scanning shall be vectorized.
  - 3) CD-ROM production  
The digital topographic data shall be compiled into CD-ROM.
5. Others
  - 1) 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.
  - 2) Dissemination of the Final Products  
Recommendations for the wide and effective use of the topographic data produced under the Study shall be prepared.



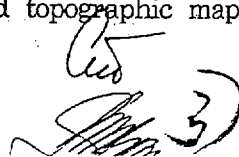
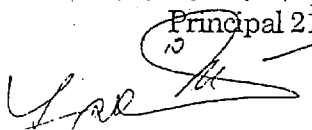
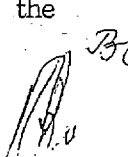
#### IV. STUDY SCHEDULE

The Study shall be implemented in accordance with the tentative schedule as shown in Appendix II. 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

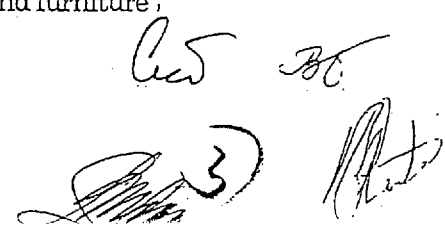
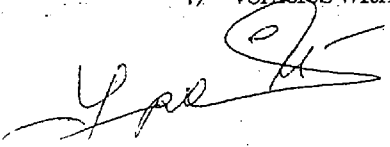
JICA shall prepare and submit the following reports in English and the final products of topographic mapping works to the GOBH.

1. Inception Report  
Twenty (20) copies      At the beginning of the Study
2. Interim Report  
Twenty (20) copies      Within fourteen (14) months after the beginning of the Study
3. Progress Report  
Twenty (20) copies      Within twenty-five (25) months after the beginning of the Study
4. Draft Final Report  
Twenty (20) copies      Within thirty (30) months after the beginning of the Study  
The written comments on the Draft Final Report from the Ministry of Civil Affairs and Communications of Bosnia and Herzegovina shall be submitted to JICA within one (1) month after submission of the 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
  - 1) One (1) set of negative films of aerial photographs for the whole country
  - 2) Two (2) sets of contact prints of aerial photographs for the whole country
  - 3) Two (2) sets of digital data of aerial photographs for the whole country
  - 4) Two (2) copies of result of ground control point survey for map production of the Principal 21 Cities
  - 5) Two (2) copies of result of aerial triangulation for map production of the Principal 21 Cities
  - 6) Two (2) sets of DTM for the Principal 21 Cities
  - 7) Ten (10) sets of 1:25,000 scale digital topographic data for the whole country
  - 8) One hundred (100) copies of 1:25,000 scale printed topographic maps for the Principal 21 Cities

## VI. UNDERTAKING OF THE GOBH

1. To facilitate the smooth conduct of the Study, the GOBH 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 Bosnia and Herzegovina 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 any other charges on equipment, machinery and other material brought into Bosnia Herzegovina 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 necessary facilities to the Study Team for the remittance as well as utilization of the funds introduced into Bosnia and Herzegovina 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 Bosnia and Herzegovina.
  
2. The GOBH 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 Ministry of Civil Affairs and Communications of Bosnia and Herzegovina shall, at its own expense, provide the Study Team with the following in cooperation with other organizations concerned :
  - 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) vehicles with drivers.



4. The Ministry of Civil Affairs and Communications of Bosnia and Herzegovina shall establish the Coordinating Committee for the smooth implementation of the Study and technology transfer.

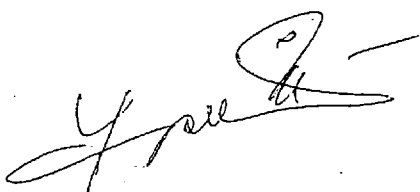
#### VII. UNDERTAKING OF JICA

For the implementation of the Study, JICA shall take the following measures :

- 1) to dispatch, at its own expense, the Study Team to Bosnia and Herzegovina ; and
- 2) to pursue technology transfer to the Bosnia and Herzegovina counterpart personnel in the course of the Study.

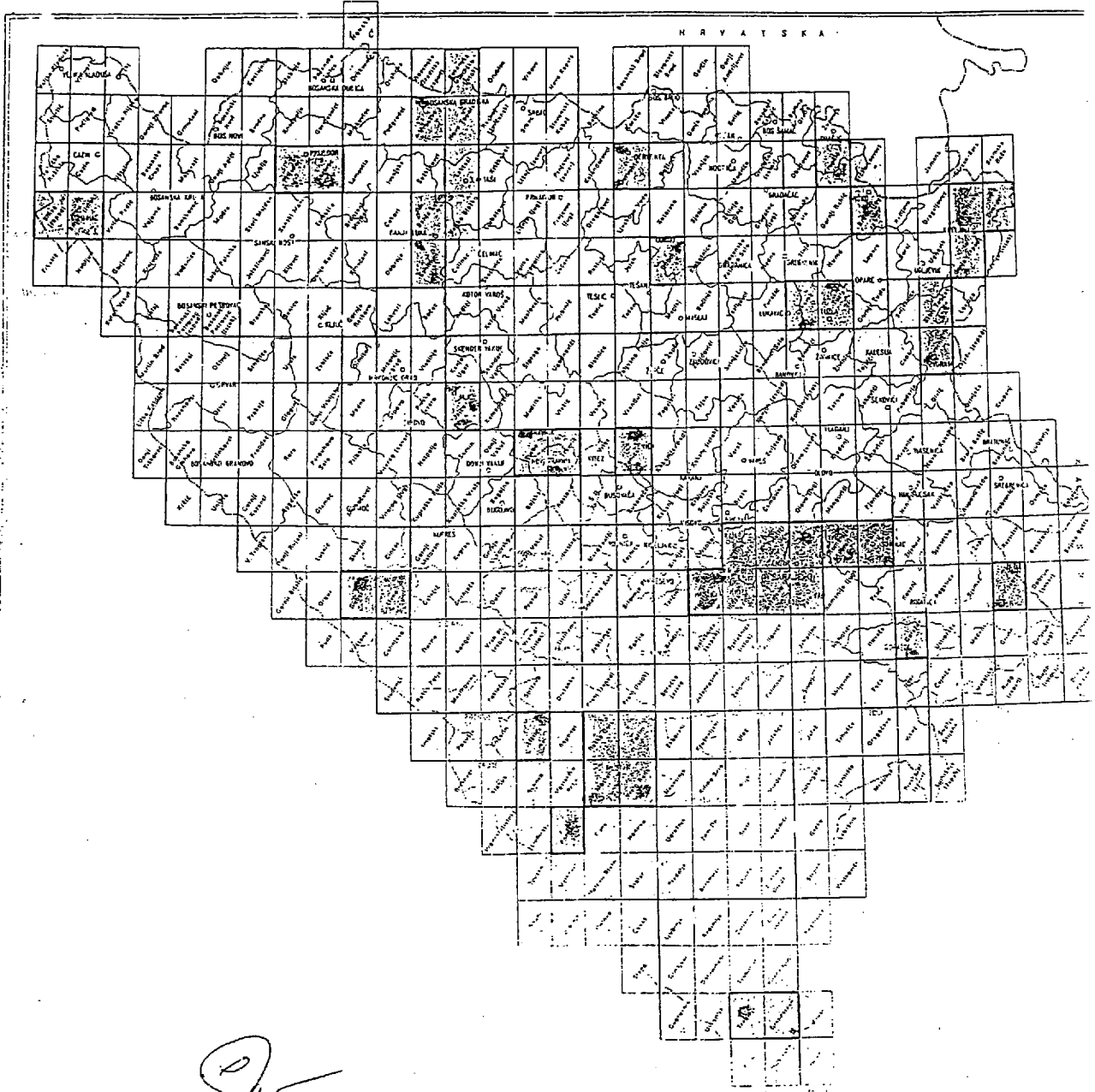
#### VIII. OTHERS

1. The Study shall be implemented at the state level.
2. JICA and the Ministry of Civil Affairs and Communications of Bosnia and Herzegovina shall consult with each other in respect of any matter that may arise from or in connection with the Study.





PRĚGLAD LISTOVA TOPOGRAFSKE KARTĚ 1:25000



*Yarek*



Location of the forty-seven (47) map sheets for the Principal 21 Cities

*aw BF*

*31*

TENTATIVE SCHEDULE

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Work in Bosnia and Herzegovina		■		■	■	■			■	■			■			
Work in Japan	□		□	□										□		
Report	△ IC/R													△ IT/R		

Month	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
Work in Bosnia and Herzegovina				■	■	■		■	■					■		
Work in Japan	□						□					□				
Report								△ P/R						△ DF/R		△ F/R

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

*Y. Sakai*

*C. S.*  
*3*

3. Minutes of Meeting

MINUTES OF MEETING  
ON  
SCOPE OF WORK  
FOR  
THE STUDY  
ON  
ESTABLISHING DIGITAL TOPOGRAPHIC MAPS  
FOR  
BOSNIA AND HERZEGOVINA

AGREED UPON BETWEEN  
MINISTRY OF CIVIL AFFAIRS AND COMMUNICATIONS,  
BOSNIA AND HERZEGOVINA  
AND  
JAPAN INTERNATIONAL COOPERATION AGENCY

SARAJEVO  
23 OCTOBER, 2002



Milan Lovric, Deputy Minister  
Ministry of Civil Affairs and Communications  
Bosnia and Herzegovina



Kazuo Komaki, Leader  
Preparatory Study Team  
Japan International Cooperation Agency



Milovan Blagojevic, Deputy Minister  
Ministry of Foreign Affairs  
Bosnia and Herzegovina

WITNESS



Marko Lozic, Director  
Administration for Geodetic and  
Real Property Affairs  
the Federation of Bosnia and  
Herzegovina



Bojat Vladimir,  
Assistant Director  
Administration for Geodetic and  
Real Property Affairs  
the Republic of Srpska



Stanko Tomic, Chief of Division  
Public Register  
the Government of  
Brcko District

The Japanese Preparatory Study Team (hereinafter referred to as "the Team") organized by Japan International Cooperation Agency (hereinafter referred to as "JICA") and headed by Dr. Kazuo Komaki visited Bosnia and Herzegovina from 15 to 24 October 2002 to discuss the Scope of Work for "The Study on Establishing Digital Topographic Maps for Bosnia and Herzegovina" (hereinafter referred to as "the Study").

During their stay in Bosnia and Herzegovina, the Team held a series of meetings with the officials of the Ministry of Civil Affairs and Communications of Bosnia and Herzegovina and the authorities concerned. A list of participants is given in Appendix.

Through these meetings, both sides have completed the Scope of Work and confirmed the following points:

1. Coordinating Committee

Both sides agreed that the Coordinating Committee shall consist of the following relevant organizations under the chairmanship of the Ministry of Civil Affairs and Communications of Bosnia and Herzegovina.

- 1) Ministry of Civil Affairs and Communications of Bosnia and Herzegovina
- 2) Ministry of Foreign Affairs of Bosnia and Herzegovina
- 3) Administration for Geodetic and Real Property Affairs, the Federation of Bosnia and Herzegovina
- 4) Administration for Geodetic and Real Property Affairs, the Republic of Srpska
- 5) Public Register, the Government of Brcko District

2. Counterpart Personnel

Both sides recognized the necessity of technology transfer to the staff of the relevant organizations of Bosnia and Herzegovina so that Bosnia and Herzegovina builds up the capability to produce and revise digital topographic maps by themselves. Based on the recognition, the Bosnia and Herzegovina side shall provide sufficient counterpart personnel at its own expense in the course of the Study under coordination of the above-mentioned Coordinating Committee.

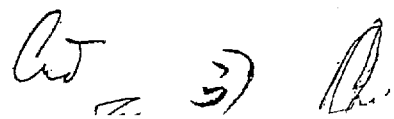
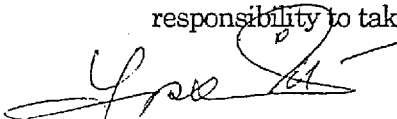
3. Securing the Safety

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

The Ministry of Civil Affairs and Communications of Bosnia and Herzegovina agreed to arrange required measures for the Study Team in cooperation with relevant organizations.

4. 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 Ministry of Civil Affairs and Communications of Bosnia and Herzegovina should take the responsibility to take necessary 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.

5. Printing Maps for the Principal 21 Cities

Both sides agreed, in case of changing the framework for printing maps of the Principal 21 Cities upon the request of Bosnia and Herzegovina, that the size of the forty-seven (47) new map sheets should be the same with the existing one.

6. Office Space and Equipment

The Ministry of Civil Affairs and Communications of Bosnia and Herzegovina agreed to provide the furnished office space in Sarajevo and Banja Luka with necessary equipment such as furniture (desks, chairs, photocopy machines, etc.) and telephone lines.

7. Vehicles

The Ministry of Civil Affairs and Communications of Bosnia and Herzegovina expressed their wish that the vehicles required for the Study Team would be arranged by JICA.

The Team promised to convey the request to JICA Headquarters.

8. Duty-Free Clearance

Both sides agreed that Ministry of Civil Affairs and Communications of Bosnia and Herzegovina shall act as consignee of the equipment, and shall carry out all the necessary procedure, such as duty-free clearance, etc., and otherwise Ministry of Civil Affairs and Communications of Bosnia and Herzegovina shall pay all other necessary expenses for import procedure for the equipment.

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

9. Training of Counterpart Personnel in Japan

The Ministry of Civil Affairs and Communications of Bosnia and Herzegovina requested that counterpart personnel take advantage of training in Japan related to the Study to promote effective technology transfer.

The Team promised to convey this request to JICA Headquarters.

10. Publicity of the Final Report and Products

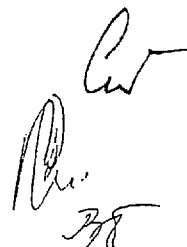
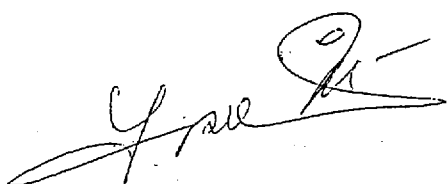
The Team requested the Ministry of Civil Affairs and Communications of Bosnia and Herzegovina that the final report and products to be prepared by the Study shall be open to the public immediately after completion upon request of users.

The Ministry of Civil Affairs and Communications of Bosnia and Herzegovina understood the request and agreed to take full responsibility for necessary procedure.

11. Production and Revision of Digital Topographic Maps of Bosnia and Herzegovina after the Study

The Bosnia and Herzegovina side explained their plan that they will hold the Coordinating Committee for production and revision of digital topographic maps of Bosnia and Herzegovina after the Study.

The Japan side welcomed the plan.

Handwritten signature and initials, possibly 'CW' and '38'.Handwritten signature, possibly 'Y. su'.Handwritten signature and a circled number '3'.

## LIST OF ATTENDANTS

Bosnia and Herzegovina Side

Project Implementation Directorate, Ministry of Civil Affairs and Communication of  
Bosnia and Herzegovina

Mr. Kemal Karkin	Director
Mr. Nemanja Djurovic	Deputy of Director
Mr. Zoran Jelic	Deputy of Director

Reconstruction Unit, Department for Multilateral Relations, Ministry of Foreign  
Affairs of Bosnia and Herzegovina

Mr. Mirza Pinjo	Head of the Unit, Minister-Counselor
Ms. Biljana Grujic	Associate Expert

Administration for Geodetic and Real Property Affairs, the Federation of Bosnia  
and Herzegovina

Mr. Marko Lozic	Director
Mr. Cengic Haris	Deputy Director
Mr. Djonlagic Eldin	Assistant Director

Administration for Geodetic and Real Property Affairs, the Republic of Srpska

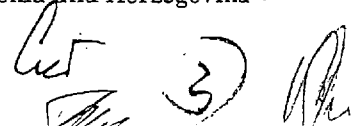
Mr. Todor Panic	Assistant Director
Mr. Bojat Vladimir	Assistant Director

Public Records Department, the Government of Brcko District

Mr. Nikola Ristic	Head of Public Records Department
Mr. Stanko Tomic	Chief of Division of Cadastre Books and Archive

Japan Side

Dr. Kazuo Komaki	Leader of the Team
Mr. Hidehisa Takahashi	Member of the Team
Mr. Takanori Zemmoto	Member of the Team
Mr. Yoshimitsu Yoshimura	Member of the Team
Mr. Kosei Otoi	Member of the Team
Mr. Masamitsu Jojiki	Member of the Team
Mr. Hiroyuki Kawamoto	Embassy of Japan in Bosnia and Herzegovina
Mr. Yasuaki Aihara	JICA Austria Office

*Ministry of Civil Affairs and Communications*

**ANSWERS TO QUESTIONNAIRE**  
**JICA PREPARATORY STUDY TEAM**  
**FOR**  
**THE STUDY**  
**ON**  
**ESTABLISHING DIGITAL TOPOGRAPHIC MAPS**  
**FOR**  
**BOSNIA AND HERZEGOVINA**



## Ministry of Civil Affairs and Communications

### 1. Government organizations

Item	Description	Availability	Note (response)
1. Central Government	1) Organization chart	O	Law on Council of Ministers
	2) Annual budget with breakdown	O	161.318.628
	3) Number of staff	O	
	4) Function of Ministry of Civil Affairs and Communications	O	Law on Council of Ministers and Internal Organization Regulations of Ministry
2. Government policy	1) National development plan	O	Macroeconomic development plan
	2) Major regional development plan and policy	X	Ministry of Foreign Trade and Economic Relations
	3) Report concerning development plans	X	Ministry of Foreign Trade and Economic Relations

## Ministry of Civil Affairs and Communications

### 2. Basic information

Item	Description	Availability	Note (response)					
1. Economic information	1) GDP for each sector for five years		GDP (KM millions)					
			Prelimin. 2001	2000	1999	1998	1997	1996
			10.493	9.629	8.603	7.244	6.367	3.049
	2) Population and its growth rate	O	3,9 millions					
	3) Return of Refugee	O	Ministry for Refugees					
2. Infrastructure	1) Major transport (roads, railway, air, port)	O	Roads and railway					
	2) Road master plan	O	Within Transport master plan					
	3) Embankment and dam	X	Description is not clear					
3. Meteorological data	1) Temperature and precipitation	O	Meteorological Institute					
	2) Cloudiness statistics in dry season	O	Meteorological Institute					

## Ministry of Civil Affairs and Communications

### 3. Execution of the projects

Item	Description	Availability	Note (response)
1. Permission of aerial photography (Security clearance for flight)	1) Name of Agencies and Department	O	Department of Civil Aviation Bosnia and Herzegovina and SFOR
	2) Name and position of the responsible persons in charge of the Study Team to contact	O	Mr. Drago Radić, Deputy Director
	3) Period for permission	O	Min. 5 days
2. Permission of printing for aerial photos	1) Name of Agencies and Department	O	Ministry of Defense (or Permanent Military Committee) and Geodetic Administration of the Entities
	2) Name and position of the responsible persons in charge of the Study Team to contact		
	3) Period for permission		
3. Permission of ground survey works	1) Name of Agencies and Department	O	Ministry of Defense (or Permanent Military Committee) and Geodetic Administration of the Entities
	2) Name and position of the responsible persons in charge of the Study Team to contact		
	3) Period for permission		

## Ministry of Civil Affairs and Communications

### 3. Execution of the projects

Item	Description	Availability	Note (response)
7. Permission of using radio call equipment	1) Name of Agencies and Department	O	Communications Regulatory Agency
	2) Name and position of the responsible persons in charge of the Study Team to contact	O	Mr. Fikret Kasumagić
	3) Period for permission	X	
4. Permission of taking out survey data including aerial photos fair draft out from Bosnia and Herzegovina to Japan	1) Name of Agencies and Department	O	Ministry of Defense or Permanent Military Committee and Geodetic Administration of the Entities
	2) Name and position of the responsible persons in charge of the Study Team to contact		
	3) Period for permission		
5. Custody of topographic maps, aerial photographs, geodetic data, a administrative boundary and name list	1) Name of Agencies and Department	O	Ministry of Defense or Permanent Military Committee and Geodetic Administration of the Entities
	2) Name and position of the responsible persons in charge of the Study Team to contact		
	3) Period for permission		

## Ministry of Civil Affairs and Communications

### 3. Execution of the projects

Item	Description	Availability	Note (response)
6. Law on survey, mapping and GIS	1) Survey law	O	Entity law
	2) Regulation of aerial photography by foreign registered aircraft	O	Department of Civil Aviation Bosnia and Herzegovina
7. Availability of laborer	1) Driver (wages/day)	O	70 – 90 KM/day
	2) Workers (wages/day)	O	50 – 70 KM/day
	3) Regulation for employment	O	Entity law
8. Safety information	1) Present safety conditions	O	OK
	2) Dangerous areas	X	SFOR
	3) Mine field	O	MAC
	4) Harmful animals, insects and diseases	N/A	
9. Availability of transport	1) Government vehicles or rental cars	O	For temporary usage
	2) 4WD cars or others		





1.	The Federation of Bosnia and Herzegovina	1. Organization Scheme	Attachment No. 1
		2. Annual budget	1.559.375.930 KM or 797.308.460 Euro
		3. Number of employed	22.925
2.	The Administration for Geodetic and Real Property Affairs	1. Organization Scheme	Attachment No. 2
		1.a) Organizational Scheme of the Federal Administration with Canton Administration and Municipal Services	Attachment No. 3
		2. Annual budget with each item analysis	1.376.724 KM or 703.918 EURO
		- Total budget is	
		- Salaries, contributions and employees expenses	336.800 KM or 172.200 EURO
		- Material expenses	57.730 KM or 29.517 EURO
		- Real Property Cadastre Services	982.194 KM or 502.195 EURO
		- Number of employees	18
		-Number of employees in the Canton Administrations for Geodesy and Municipal Services	460
		Function	Gazette of the Federation of Bosnia and Herzegovina No.9/96
		Relations with the central Government	Administration for Geodetic and Real Property Affairs of the Federation of Bosnia and Herzegovina is an independent institution responsible to the Government of the Federation of Bosnia and Herzegovina.
		Relations with the Administration for Geodetic and Real Property Affairs of Republika Srpska	Relations at professional and expert level. There exists mutual understanding and relatively good cooperation.
		Relations with the military sector	Good cooperation established with the Federal Ministry of Defense when it comes to the issues of mutual interest.
1.	Meteorological data of the region	Temperature and precipitation	All the data can be obtained at the Federal Meteorological Institute
		Statistical data on cloudiness in dry period	- II -
	Data on more important	Number of inhabitants in the city	List of cities

	cities for which new maps are developed		
		Town development plan	Extensive regulation plans on population movements are being developed with general tendency of city area expansion during the next 10 year period.
5	Specification and standard	Air photographing and photo development	Should be done early March 2003, and the photos should be developed 15 days after photographing
		Land control point survey	Orientation points should be chosen before plane photographing and before plane photographing the points should be marked, then after plane photographing their coordinates should be determined by GPS technology. In order to execute all that, certain number of GPS points should be determined in the area where there are no points, as necessary.
		Plane triangulation	Aerofriagulac method should be used
		Photogramentic map establishing	Digital map establishing by using new technologies with respect for existing standards from the aspect of accuracy and map content
		GIS	There is no GIS in Bosnia and Herzegovina but this 1:25000 map would represent one of important contributions to the beginning of establishing GIS
		Legend and symbols	There exists cartographic key with symbols for topographic map 1:25000
		Projection	1:25000 map should be established in Gaus-Kriger projection of three-level zone but the map should also include UTM six-level zone network
		Spheroid	For G.K. projection Bessel's ellipsoid and for UTM WGS 84
		Printing four-color printer	Four-color printing
6	Existing air photographs	Transparency policy /exposure/	For large portion of the territory of Bosnia and Herzegovina, there exist air photographs taken for

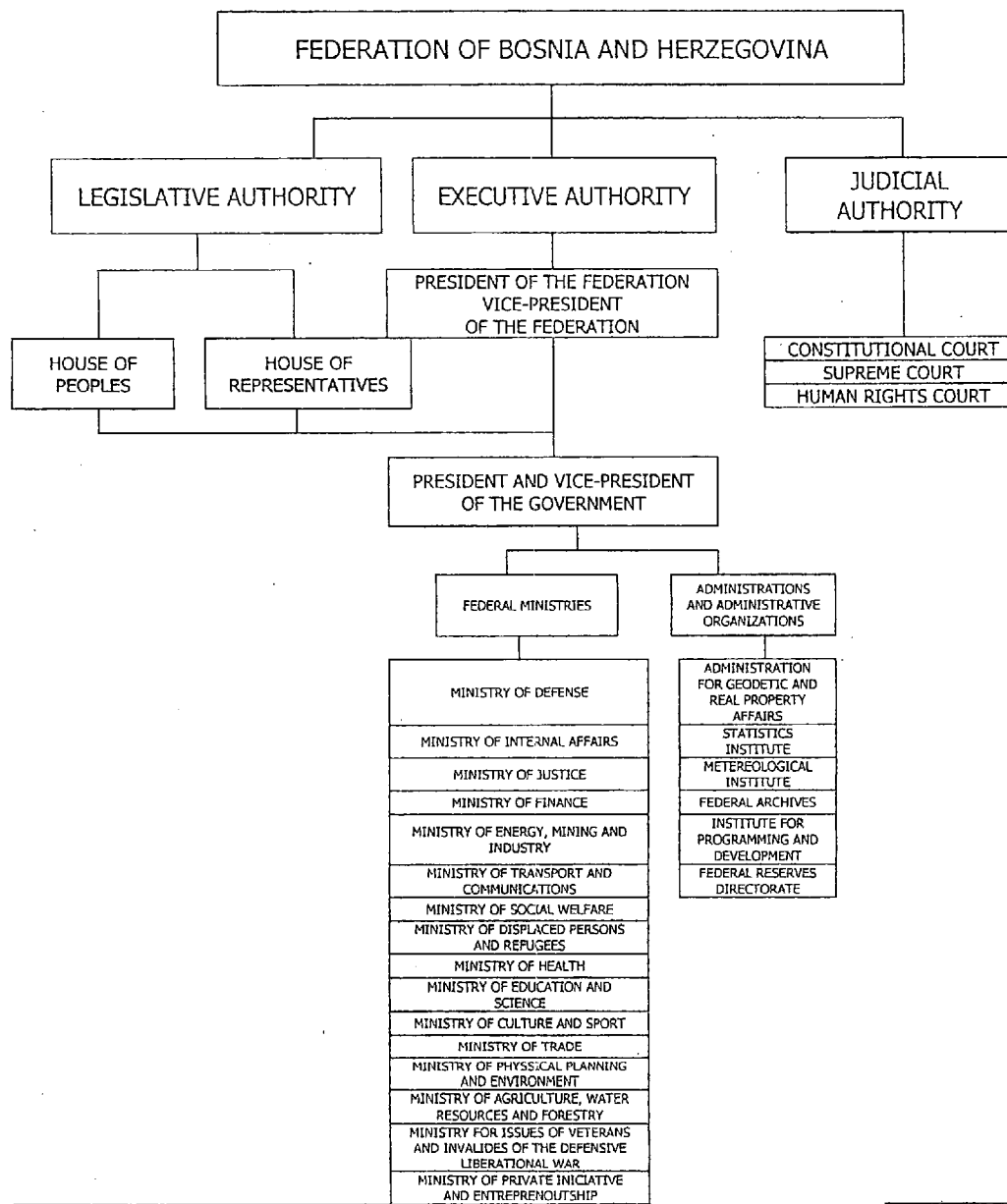


			development of geodesy plans up to R=1:5000. A number of those photos is no longer in Bosnia and Herzegovina. Under the existing laws they are considered to be official secret, but a procedure could be initiated to annul that clause
		Covered surface area	93% of the territory of the Federation of Bosnia and Herzegovina
		Air photo specifications	They are different depending on scale /measure/ of plans they were intended for
		Index map of flight	Before photographing, a flight plan of the plane was made (there is flight plan)
		Air photographing data	This data has been noted
		Executive Organization	Those were VGI (Military Geographical Institute) - Belgrade of the former SFRY and Geodetic Administration of Slovenia
		Storing conditions	There are prescribed conditions for storing photographs
		Reproduction /multiplying/	Reproduction has been done for specific purposes
		Photo accessibility	Photo-material is accessible only for official usage
		Distribution system and users	Photo-material is accessible only for official usage, with the approval of the Republic Geodetic Administration of Bosnia and Herzegovina
7	Existing GIS		No GIS in existence
8.	Training for surveying and map establishing	Formal education and surveying training system	For surveying works, experts are trained in the geodetic technical schools of the Federation and at the Geodetic Department of the Civil Engineering School, University of Sarajevo
		Training at work for an average technician	Technicians training courses are arranged on occasional basis
9.	Activities of other donor countries in the field of surveying, map establishing and GIS	Past and present activities by other donor countries	Up to date, SIDA and GTZ have taken part in similar activities

		Project Reports	SIDA activities – expert education and equipment donation to J.P.G.Z (Public Enterprise Geodetic Institute - Sarajevo), as well as to the local Cadastre Offices. GTZ activities – Pilot Project of Real Property Cadastre of Grude, Br. ko, and Trebinje Municipality
		New proposals submitted by other donor countries	/
		Process initiated for single project by our Government	Continuation of activities on establishing survey and real property cadastre based on annual plan and annual budget resources
1	Existing topographic maps	Transparency policy /exposure/	Accessibility of existing maps will be ensured R= 1:25000
		Covered surface area covered area including index	100% covered
		Data on preparation	Partly at V.G.I.- Belgrade (Military-Geographical Institute) and partly at the State Geodetic Administration of Bosnia and Herzegovina
		Executive organization	That is V.G.I. Belgrade (Military-Geographical Institute Belgrade) and J.P.G.Z –Sarajevo (the Public Enterprise Geodetic Institute – Sarajevo)
		Map specification (marginal information and legend)	/
		Map accuracy including cartographic method	02, x M (measure-scale of the map)
		Reproduction (multiplication)	V.G.I. Belgrade (Military-Geographical Institute Belgrade) before the war and J.P.G.Z. (the Public Enterprise Geodetic Institute – Sarajevo) after the war onward
		Storing conditions and accessibility	A certain number of maps established at V.G.I- (Military-Geographical Institute) were distributed to the Republic Geodetic Administration of Bosnia and Herzegovina with official secret inscription and were intended only for internal usage. Maps made at

			the J.P.G.Z. (the Public Enterprise Geodetic Institute) of which working originals were made on the basis of the printed versions of V.G.I. maps, for the needs of the Ministry of Defense of Bosnia and Herzegovina are owned by this Ministry and they are also at the same level of confidentiality. For the needs of this Project, the Government of the Federation of Bosnia and Herzegovina will make sure to remove that level of confidentiality.
		Distribution System and Users	Federal Ministry of Defense (FMO) is the owner of the topographic map 1:25000 and the J.P.G.Z (the Public Enterprise Geodetic Institute) can distribute it with the approval of the Federal Ministry of Defense.
2	Existing land control points	Horizontal-land control points network plan	Data on triangulation from I do IV level, connecting and polygon points for all the territory are available
		Data on establishment	Available
		Executive organization and assistance	J.P.G.Z. (the Public Enterprise Geodetic Institute) and Krajina Survey Geodetic Technical School in Sarajevo and Geodetic Department of the Civil Engineering Faculty in Sarajevo
		Report that verifies the accuracy of existing points	The State Survey Statute I,II,III part and network elaborates
		Point description	Position description in standard form is available for every point
		Data on damages and/or point loss	Partially available – not complete
		Survey method for horizontal control points, including astronomic survey for points of horizontal nature /origin/ with the neighboring countries	Astro-geodetic methods and triangulation
		Survey method for vertical control points, including monitoring for points of vertical nature /origin/ with the neighboring countries	High accuracy Nivelman.

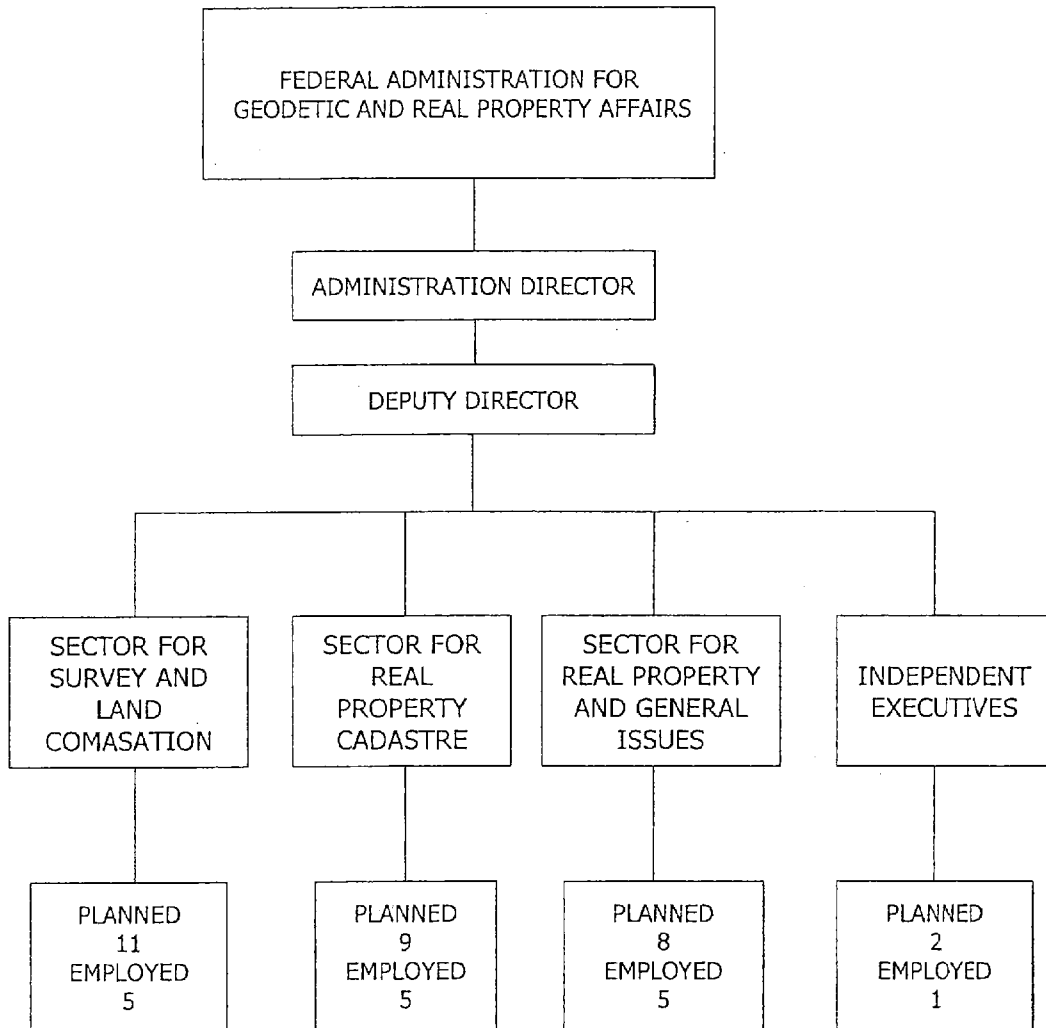
3	Existing survey equipment	Equipment List	G.P.S. samples Trimble 4000 SS for static method without software, total stations, electronic theodolite, analog theodolite, analog levels, digital levels, analog instruments for aero-photogrametric photographs, a number of computers and software
		Equipment status	Qualitatively unsatisfactory, inadequate quantity
4	Map establishing policy	Future map plan	Preparations for photographing, aero-photogrametric photographing, connecting points determination by GPS-, digital map establishing, printing and distribution



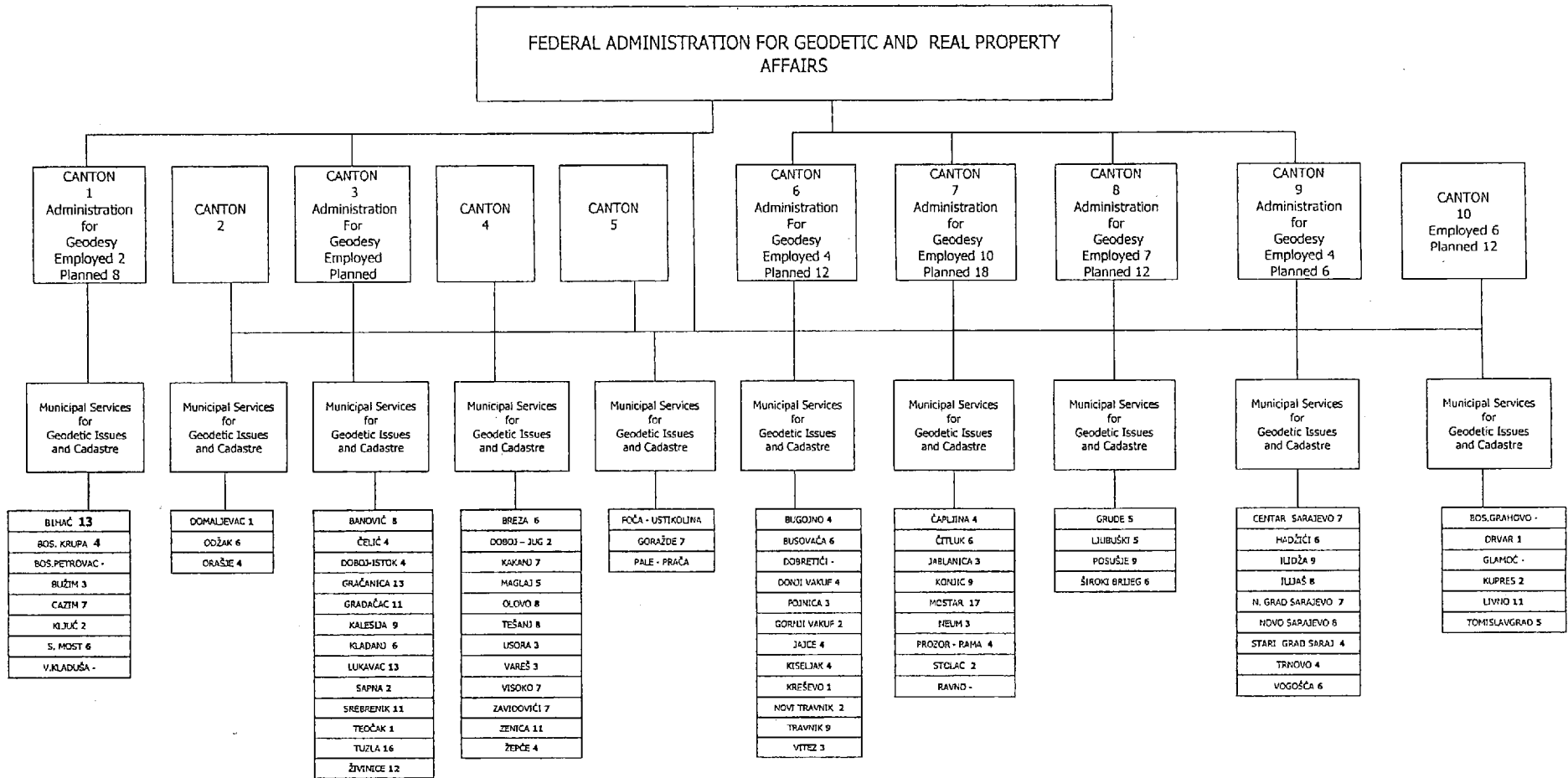
1) ORGANIZATION SCHEME

Attachment No. 1

**FEDERATION OF BOSNIA AND HERZEGOVINA**



1) ORGANIZATION SCHEME



59

1. TOTAL NUMBER OF EMPLOYEES IN CANTONAL ADMINISTRATIONS FOR GEODESY IS 33 , PLANNED 68
2. TOTOAL NUMBER OF EMPLOYEEERS IN MUNICIPAL ADMINISTRATIOIS FOR GEODESY IS 427

## Administration for Geodetic and Real Property Affairs, the Republic of Srpska

### 1. Government organizations

Item	Description	Note (response)
1.The Republic of Srpska	1)Organization chart	- The President of the Republic of Srpska
		- Assembly of the Republic of Srpska
		- Government of the Republic of Srpska
		- Ministries (16)
		- Administrations
		- Administrative organizations
	2)Annual budget with breakdown	- approximately 850 million KM
	3)Number of personnel	
2.Administration for Geodetic and Real Property Affairs of the Republic of Srpska	1)Organization chart	- Administration for Geodetic and Real Property Affairs is an independent administration responsible directly to the Government. Supplement 2.1
	2)Annual budget with breakdown	- The estimated value or planned work in the year 2002, is 3,719,878,000KM
		Item:
		1. Statimation and designation of points of basic and supplementary GPS networks,
		2. Polygon network restoration in city area with planned completion of surveying, supplement and new survey, with city network;
		3. The state survey and planning in communities
		4. Realization fo the Project "Dynamic Cadastro of the RS 2002";
		5. Maintenance of survey, cadastre and real estate registry.
6. Auticipation of establishment of real estate registry in each community in the year 2002.;		



Administration for Geodetic and Real Property Affairs, the Republic of Srpska

		7. Solutions of real estate subjects establishing survey and real estate registry
	3)Number of personnel	i65
	4)Function	- The main function of the Administration for Geodetic and real Property Affairs is an follows
		- ground and real estate survey ;
		- real estate registry ;
		- solution of real property rciations;
		- designation of the rights of real estate;
		- registration of the rights of real estate;
	5)Relation to Council of Ministries of BiH	- Throught the Government of the Republic of Srpska
	6)Relation to Administration for Geodetic and Real Property Affairs of the Republic of Srpska	- Cooperation on all issues concerning the matters of common interest
	7)Relation to military sector	- Republic Administration for Geodetic and Real Property Affairs is an independent civil service apart from military sector only providing some data e.i., topographic maps, to the Ministry of Defense.

2. Basic information

Item	Description	Note(response)
1. Meteorological data of region	1)Temperature and precipitation	- Mostly with moderate continental climates and temperature interval between -15°C and +36°C
	2)Cloudiness statistics in dry season	

## Administration for Geodetic and Real Property Affairs, the Republic of Srpska

2. Information on	1) City population	- Bonja Luka 195,139;
the principal cities		- Eijeljina 96,755;
making new maps		- Prijedor 112,470;
		- Doboj 142,546;
		- Gradiska 58,212;
		- Trebinje 30,878;
		- Zvoraik 81,111;
		- Visegrad 21,202;
		- Derventa 56,300;
	2) City area	- Bonja Luka 1,239 hectares;
		- Eijeljina 734 hectares;
		- Prijedor 834 hectares;
		- Doboj 697 hectares;
		- Gradiska 762 hectares;
		- Trebinje 1,205 hectares;
		- Zvoraik 499 hectares;
		- Visegrad 449 hectares;
		- Derventa 517 hectares;
	3) City development plan	- The community local administration is periodically performing and making corrections of development plans.

### 3. Execution of the projects

Item	Description	Note(response)
1. Existing topographic maps	1) Disclosure policy	- Availability of date including compensation.
	2) Coverage area including index	- There are topographic maps in scale of 1:25000 covering the entire Republic of Srpska, but imprecise.
	3) Date of preparation	

Administration for Geodetic and Real Property Affairs, the Republic of Srpska

	4)Executing organization	- Cartography work done under the jurisdiction of this Administration
	5)Specifications of maps (marginal information and legend)	- A copy of topographic map has been held over to Your delegation
	6)Accuracy of maps including mapping method	- 66 meters
	7)Reproduction	- For the times being there is no adequate equipment for reproduction in the Republic of Srpska - the offset printing
	8)Storage conditions and availability of maps	- Held in a steel lockers and available in the presence and supervision of an official employee.
	9)Distribution system and users	- Distribution is carried out by means of copies at user's demand
2.Existing ground control points	1)Location map of horizontal ground control points	- On the territory of the Republic of Srpska there is trigonometric, polygon and linear network.
	2)Location map of vertical ground control points including leveling network map	- Nivelman of high accuracy has been developed an polygon diameter at over 250 kilometers, that a precise nivelman, technical nivelman of high accuracy and technical nivelman
	3)Date of establishment	- Horizontal points were finished 40 years ago. - Vertical points were finished 25 years ago.
	4)Executing organizations and assistance	- Work on basic and supplementary network is performed by private companies enabled in performing of such tasks, wheres the supervision and planning is governed by the

Administration for Geodetic and Real Property Affairs, the Republic of Srpska

		Republic Administration for Geodetic and Real Property Affairs
	5) Report indicating accuracy of existing point	- There are partial reports for minor locations (cities)
	6) Description of points	- There is a description of trigonometric, polygon and linear points
	7) Information on damage and / or loss of points	- Some 30 to 40% of a actual points has been neutralized
	8) Survey method for horizontal control points including astronomy survey for horizontal origin with neighboring countries	- Used method is Intersection (angle and base measurement), and recently the GPS method
	9) Survey method for vertical control points including observation for vertical origin with neighbouring countries	- Geodetic rivelman based upon the point of orientation, at First.
3. Existing survey equipment	1) List of equipment	- Standard equipment for network survey, and tachometric photography, total stations
	2) Condition of equipment	- Unadequate although constantly upgraded.
4. Map establishment policy	1) Futuer plan of maps	
5. Specifications and standard	1) Aerial photography and photo processing	- Hasn't been done yet. For the Government of BiH performed by Slovenin and Selbia (in cooperation with)
	2) Ground control point survey	- Preparation for survey area, goodetic ground and altitude points, conjanction points, supplements for the points of orientation and lower parts (supplements)
	3) Aerial triangulation	- Applied in pactice for name communities (Khjuc, Drvar, etc.)

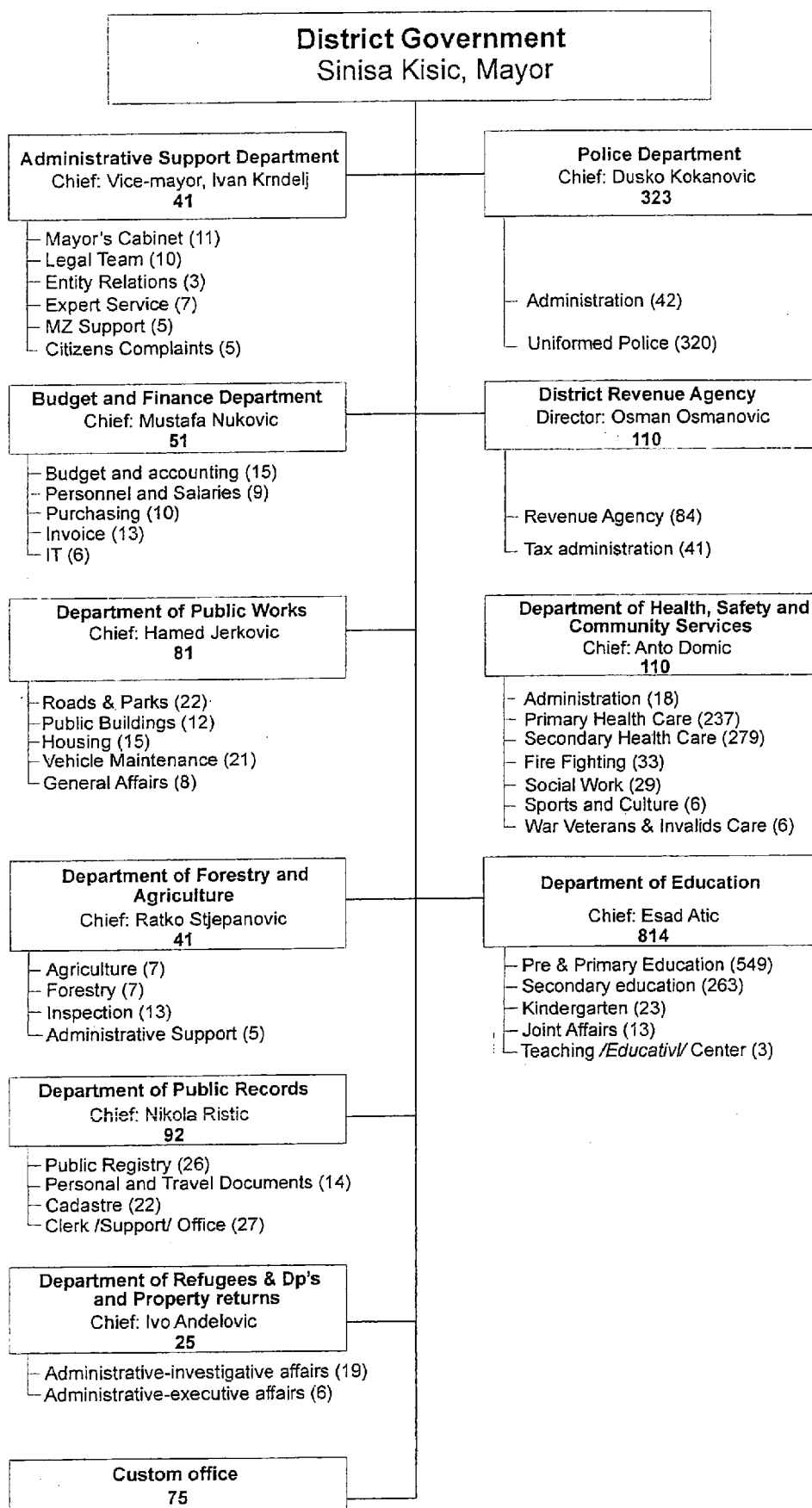
Administration for Geodetic and Real Property Affairs, the Republic of Srpska

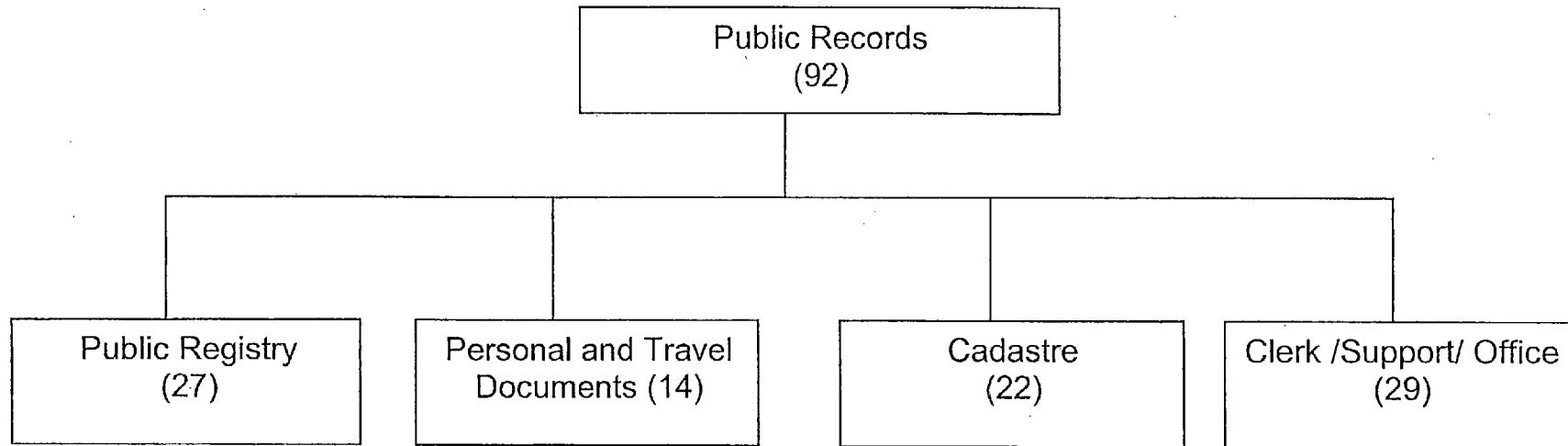
		prior to 1991
	4)Photogrammetric mapping	- Carried out photogramatric mapping in Sarajevo and Barya Luka
	5)GIS	- Preparanos for GIS - supplement of the points of orientation has been carried out but hasn't been gramed by rules.
	6)Annotation and symbols	- There is map's key/annotation with symbols for topographic map
	7)Projection	- Gaus Kainger projection.
	8)Spheroid	- Best ellipsoid
	9)Printing	- There is no equipment for printing but plotting of digital plans
6.Existing aerial photos	1)Disclosure policy	-
	2)Coverage area	-
	3)Specifications of aerial photos (scale, etc.)	-
	4)Flight index map	-
	5)Date of aerial photography	- Placeri in SR Yugoslavia, Belgrade.
	6)Executing organization	- VG Institute, Belgrade
	7)Storage condifions	-
	8)Reproduction	- Reproduction worked cut by photographer

Administration for Geodetic and Real Property Affairs, the Republic of Srpska

	9)Availability of photos	-
	10)Distribution system and users	- Distribution for special purpose
7.Existing GIS	1)Coverage area	-
	2)Scale of contents	-
	3)Date of establishment	-
	4)Executing organization	-
	5)Purpose of use	-
8.Training for survey and mapping	1)Formal education and training system for survey	- Secondary school education and academic degree
	2)On the job training on an average technician	- Training carried out for particular kind of jobs using the existing methods (Books of Regulations)
9. Activity by other donor countries for surveying, mapping and GIS	1)Past and present activities by other donor countries	-
	2)Project report	- All activities decreased if compared to those at the beginning
	3)New proposal submitted by other donor countries	-
	4)Committed process for the Individual project by your government	- Government makes annual plans on survey, establishing of survey and of real estate registry

**ORGANIZATION CHART**  
**THE GOVERNMENT OF BRCKO DISTRICT**







## Public Register, the Government of Brcko District

### 1. Government organizations

ITEM	DESCRIPTION	AVAIL-ABILITY	NOTE (RESPONSE)
1. The Government of Brcko District	1) Organization chart 2) Annual budget with breakdown 3) Number of staff	"0" "0" "0"	Annex no. 1 136,382,000 KM or 69,939,487 € 2,707
2. Public Register the Government of Brcko District	1) Organization chart 2) Annual budget with breakdown 3) Number of staff 4) Function  5) Relation to Central Government  6) Relation to military sector	"0" "0" "0" "0"  "0"  "X"	Annex no. 2 3,009,370 KM or 1,343,267 € 92 Registration office, Personal Documents, Cadastre and Archive and Office Support. Department of the Brcko District Government -----

## Public Register, the Government of Brcko District

### 2. Basic information

ITEM	DESCRIPTION	AVAIL-ABILITY	NOTE (RESPONSE)
<b>1. Meteorological data of region</b>	1) Temperature and precipitation 2) Cloudiness statistics in dry season	"0" "0"	} All data are available in Meteorological Institute in Banja Luka
<b>2. Information on the principal cities making new maps</b>	1) City population 2) City area 3) City development plan	"0" "0" "0"	Approximately 40,000 2,172 hectare Urban and regulation plan of the town are being worked out.

## Public Register, the Government of Brcko District

### 3. Execution of the project

ITEM	DESCRIPTION	AVAIL- ABILITY	NOTE (RESPONSE)
1. Existing topographic maps	1) Disclosure policy	"0"	Availability of existing maps would be provided. Scale of 1:25 000 Coverage area is 100%.
	2) Coverage area including index	"0"	
	3) Date of preparation	"0"	----- Execution organizations are Military Geographical Institute in Belgrade and J.P. "Geodetski zavod" in Sarajevo -----
	4) Executing organization	"0"	
	5) Specifications of maps (marginal information and legend)	"0"	
	6) Accuracy of maps including mapping method	"0"	0.2 x m (map measure) Military Geographical Institute in Belgrade before war; Administration for geodetic and real estate affairs of RS in Banja Luk Maps, which have been made in Military Geographical Institute, were distributed in certain number of copies with designation "official secret" (only for internal use). -----
	7) Reproduction	"0"	
	8) Storage conditions and availability of maps	"0"	
	2. Existing ground control points	9) Distribution system and users	"0"
1) Location map of horizontal ground control points		"0"	Data about points exist.
2) Location map of vertical ground control points including leveling network map		"0"	Data about points exist.
3) Date of establishment		"0"	-----

**Public Register, the Government of Brcko District**

**3. Execution of the project**

ITEM	DESCRIPTION	AVAIL-ABILITY	NOTE (RESPONSE)
3. Existing survey equipment	4) Execution organization and assistance	"0"	"Krajina Premjer" Banja Luka Study on net. Positional descriptions of points exist. Data exist. Astrologic and geodetic method and triangulation "NIVELMAN"- high accurate surveying operation GPS and three total stations Good
	5) Report indicating accuracy of existing point	"0"	
	6) Description of points	"0"	
	7) Information on damage and / or loss of points	"0"	
	8) Survey method for horizontal control points including astronomy survey for horizontal origin with neighbor countries	"0"	
	9) Survey method for vertical control points including astronomy survey for vertical origin with neighbor countries	"0"	
	1) List of equipment	"0"	
	2) Condition of equipment	"0"	
	4. Map establishment policy	1) Future plan of maps	

**Public Register, the Government of Brcko District**

**3. Execution of the project**

ITEM	DESCRIPTION	AVAIL-ABILITY	NOTE (RESPONSE)
5. Specification and standard	1) Aerial photography and photo processing	"0"	In the beginning of March 2003 aerial photography should be carried out and 15 days after finishing it, photo processing should be made.
	2) Ground control point survey	"0"	Designation and marking of orientation points should be chosen before aerial photography.
	3) Aerial triangulation	"0"	It is needed to use method of aerial triangulation.
	4) Photogrammetric mapping	"0"	Establishing of topographic maps using new technology.
	5) GIS	"0"	GIS doesn't exist.
6. Existing aerial photos	6) Annotation and symbols	"0"	There is map's key /annotation/ with symbols for topographic map in scale of 1:25000.
	7) Projection	"0"	Gaus-Kriger projection.
	8) Spheroid	"0"	Besel ellipsoid for Gaus-Kriger projection.
	9) Printing	"0"	Printing in four colors.
	1) Disclosure policy	"0"	Aerial photos for establishing geodetic plans in 1:25 000 and 1:5 000 scale exist.
	2) Coverage area	"0"	100%
	3) Specification of aerial photos (scale, etc.)	"0"	Aerial photos have different plans' scales in dependence of purpose.
	4) Flight index map	"0"	Flight chart exist.

**Public Register, the Government of Brcko District**

**3. Execution of the project**

ITEM	DESCRIPTION	AVAIL-ABILITY	NOTE (RESPONSE)
7. Existing GIS	5) Date of aerial photography	"0"	2000
	6) Existing organization	"0"	Executing organizations were:
	7) Storage conditions	"0"	Military Geographical Institute Belgrade in former Yugoslavia and Geodetic Institute of Slovenia.
	8) Reproduction	"0"	Storage conditions for photo material are as required.
	9) Availability of photos	"0"	Reproduction has been made for certain needs.
	10) Distribution system and users	"0"	Photo material has been available only for official use.
		"0"	Photo material has been available only for official use with permission of Republic Geodetic Administration of B&H.
	1) Coverage area	"0"	} GIS doesn't exist.
	2) Scale of contents	"0"	
	3) Date of establishment	"0"	
4) Executing organization	"0"		
5) Purpose of use	"0"		

## Public Register, the Government of Brcko District

### 3. Execution of the project

ITEM	DESCRIPTION	AVAIL-ABILITY	NOTE (RESPONSE)
8. Training for survey and mapping	<ol style="list-style-type: none"> <li>1) Formal education and training system for survey</li> <li>2) On the job training on a average technician</li> </ol>	<p>"0"</p> <p>"0"</p>	<p>Personnel has been educated at Secondary Geodetic Schools and at Civil Faculty in Sarajevo /geodetic section/.</p> <p>Job training for technicians.</p>
9. Activity by other donor countries for surveying, mapping and GIS	<ol style="list-style-type: none"> <li>1) Past and present activities by other donor countries</li> <li>2) Project report</li> <li>3) New proposal submitted by other donor countries</li> <li>4) Committed process for the Individual project by your government</li> </ol>	<p>"0"</p> <p>"0"</p> <p>"0"</p> <p>"0"</p>	<p>GTZ have taken participation in the some projects.</p> <p>Cadastre Pilot Project for Brcko.</p> <p>Activity on establishing the cadastre of real estate is carried out.</p>

## 5 . ボスニア・ヘルツェゴヴィナ国の概要

### 1 . 国土・気候概要

ボスニア・ヘルツェゴヴィナ国はバルカン半島基部に位置する。その領土は約 5 万 1,000km<sup>2</sup> で、我が国の四国と中国地方を合わせた程度の面積である。アドリア海をはさんでイタリアの反対側に位置するが、海岸線は約 10km と短い。南西を欧州アルプスの東端を成すディナル・アルプス、北をクロアチアとの国境を流れるサワ川、東をドリナ川により囲まれる三角形の国土である。国土の大半は急峻な山岳地により占められる事実上の内陸国である。

気候は、アドリア海に近い地域は地中海性気候の影響下にあるが、それ以外の大部分は内陸性の気候である。

以下に南部のサラエボ市と北部のバニャルカ市の月平均気温、月別降水日数、月別降雪日数を示す。両都市とも内陸に位置しており、山岳性の気候を反映している。

年間を通じて降水日数に大きな変化はなく、降雪は 11 月から翌年の 3 月までである。

月平均気温

月	1	2	3	4	5	6	7	8	9	10	11	12
サラエボ	0	NA	6	10	15	19	20	20	15	10	NA	NA
バニャルカ	NA	3	8	13	18	21	23	23	19	12	5	NA

月別降水日数

月	1	2	3	4	5	6	7	8	9	10	11	12
サラエボ	5	4	6	9	7	6	4	5	6	6	7	4
バニャルカ	4	4	7	7	7	4	5	4	3	2	3	2

月別降雪日数

月	1	2	3	4	5	6	7	8	9	10	11	12
サラエボ	3	6	2	0	0	0	0	0	0	0	1	3
バニャルカ	3	2	1	0	0	0	0	0	0	0	0	3

### 2 . 歴 史

14 世紀に成立したボスニア王国は、約 100 年の繁栄をみたが、15 世紀に入ってオスマン・トルコに征服され、のち約 500 年間その支配下にあった。以降イスラム化が進んだ。19 世紀末にはボスニア・ヘルツェゴヴィナの行政権はオーストリア・ハンガリー帝国に移り、1878 年から 1918 年までの 40 年間その支配を受けた。その後、王政ユーゴスラヴィア期、第 2 次世界大戦を経



て、1945年から社会主義ユーゴスラヴィアの一員となった。1991年旧ユーゴスラヴィアの崩壊とともにボスニア・ヘルツェゴヴィナ国として独立したが、間もなくセルビア人非正規軍とボスニア政府の軍・警察部隊が激突し、内戦が本格化した。1995年11月、オハイオ州デイトン市で紛争3当事者（ムスリム人、クロアチア人、セルビア人）が停戦合意に署名した（デイトン合意）。デイトン合意に基づき、平和安定化部隊（SFOR）による治安維持、上級代表事務所（OHR）等国際社会の影響により、統一国家の形成が進められようとしている。

### 3．政治

ボスニア・ヘルツェゴヴィナ国の政体は議会共和制を基本とするが、主要3民族に配慮した特殊な政治形態になっている。中央政府は主要3民族の代表で構成される大統領評議会が最高組織である。3人が8か月ごとの輪番制で議長を務める。議長が国家元首に相当する。大統領評議会の下に内閣に相当する閣僚評議会が設けられている。閣僚評議会は6大臣で構成されている。6人の大臣は各々外務省、通商経済省、大蔵省、民生通信省、人権省、ヨーロッパ統合省を担当する。議会は2院制で、上院としての民族院、下院としての代議院で構成される。

中央政府の下にエンティティ（構成部分）と呼ばれる自治行政体がある。国土をほぼ2分するボスニア・ヘルツェゴヴィナ連邦とスルブスカ共和国であり、各々大統領、首相、各大臣をもつ。行政区域としては、連邦は10のカントン及び84のオプシナ（市町村）があり、共和国は64のオプシナがある。2000年から両エンティティの係争地となっていたブルチコ市が自治区として認められた。

## 6 . 地形図整備状況

ボスニア・ヘルツェゴヴィナ国における地図の整備状況、それらを修正するための手法、各種地図の保管状況等について、中縮尺地形図を中心に以下のとおり報告する。

### 1 . 測量・地図作成機関の概要

ボスニア・ヘルツェゴヴィナ国の中央政府には測量・地図作成のための特別な機関はなく、ボスニア・ヘルツェゴヴィナ連邦測地・不動産問題管理部、スルプスカ共和国測地・不動産問題管理部、ブルチコ自治区公共記録部地籍課がそれぞれのエンティティ（構成部分）における測量・地図作成のための機関となっている。ボスニア・ヘルツェゴヴィナ連邦測地・不動産問題管理部は、法令、規則の策定と管理を行っているのみで、現業は行っていない。実際には、地図整備公社が、連邦政府の委託を受け測量・地図の作成を行っている。

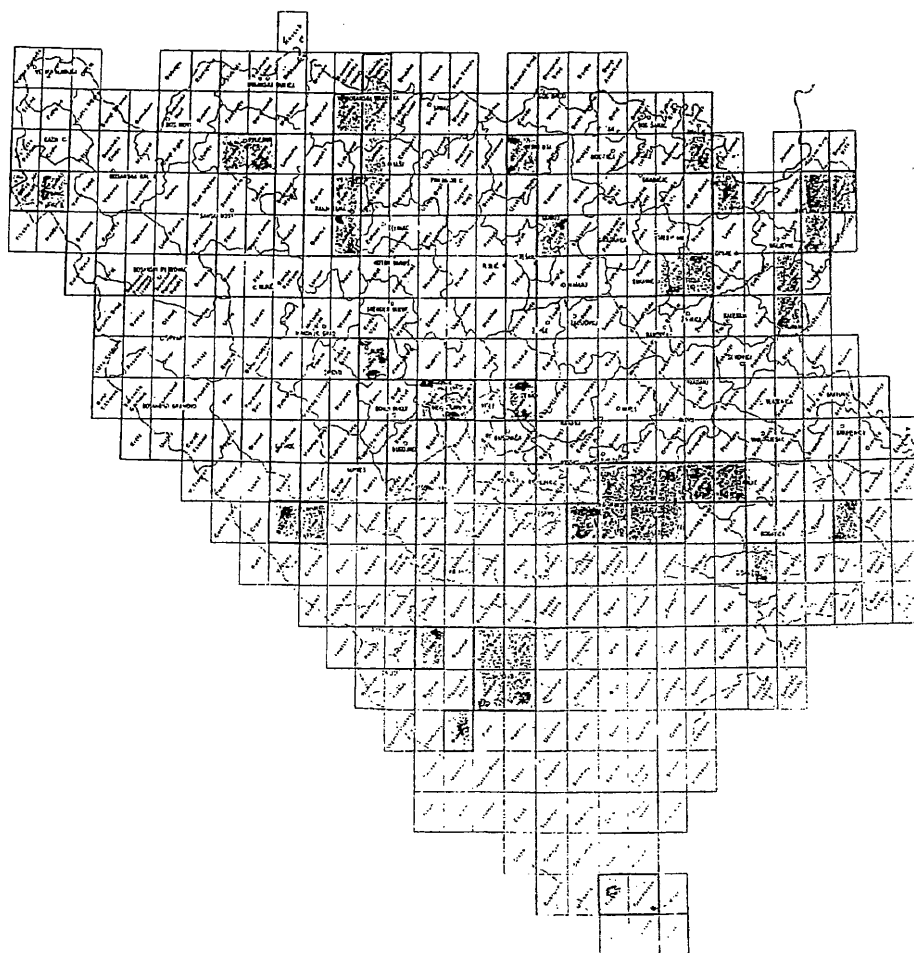


図1 1 : 25,000 地形図のインデックスマップ ( 図隔割 )

## 2 . 1 : 25,000 地形図の整備状況

ボスニア・ヘルツェゴヴィナ国全土の面積は約 5 万 1,000km<sup>2</sup> (日本の中国・四国地方 9 県の面積に相当) で、これを 1 : 25,000 地形図、約 430 面が国土全体を覆っている (日本は、約 37 万 km<sup>2</sup> を約 4,300 面でカバー)。この地形図は、旧ユーゴスラヴィア社会主義連邦共和国時代に整備されたもので、地形図の原版は、現在のユーゴスラヴィア連邦共和国 (首都ベオグラード) 政府が所有しており、ボスニア・ヘルツェゴヴィナ国には、印刷された図面が残されているのみである。このため、各測量・地図作成機関とも地形図の修正には苦慮しており、ボスニア・ヘルツェゴヴィナ連邦においては印刷図をトレースしたもから印刷フィルムを作成することによって地形図の修正を行っている。また、スルプスカ共和国においては、印刷図をスキャンし、画像として整備している。このような状況下においては、地形図の迅速な修正が非常に困難であり、1970 年代に刊行されたまま修正が行われていない地形図が多数存在する。

## 3 . 1 : 25,000 地形図の精度

地形図の作成において必要な測量精度を確保するためには、作業規程等、測量及び地図作成の手続きや精度を規定した基準が必要不可欠であるが、今回これらを手に入れることはできなかった。これは、地形図が旧ユーゴスラヴィア政府の軍により作成されたため、地形図の原版と同様、作業規程の引き継ぎがなされなかったためである。また、原版ではなく、紙地図のトレースによる修正を行っているため、修正における必要な精度の確保が困難である。

ボスニア・ヘルツェゴヴィナ国においては、内戦終了後、国土の復興が進み、大規模な造成や新規道路の建設等、土地の現況が著しく変化している。しかしながら、経年変化に対する迅速な対応が困難なため、地形図の情報と実際の状況との不一致が数多く見られる。

## 4 . 地図の管理方法

地図の保管状況については、ボスニア・ヘルツェゴヴィナ連邦測地・不動産問題管理部についてのみ報告する。庁舎内に合わせて 5 つの地図保管室があり、連邦内の中縮尺地形図、大縮尺地籍図のすべてを保管している。各保管室には、地図を保管するための地図整理箱が設置してあり、その中に印刷された図面を保管しているが、地図整理箱の傷みが激しく、適切な条件で保管されているとはいえない。今後デジタル化が進んでくると、地図を管理する条件が大きく異なってくるが、紙地図やその原版の保管に際しては、こうした地図や原版の劣化を防ぐための対策が必要である。

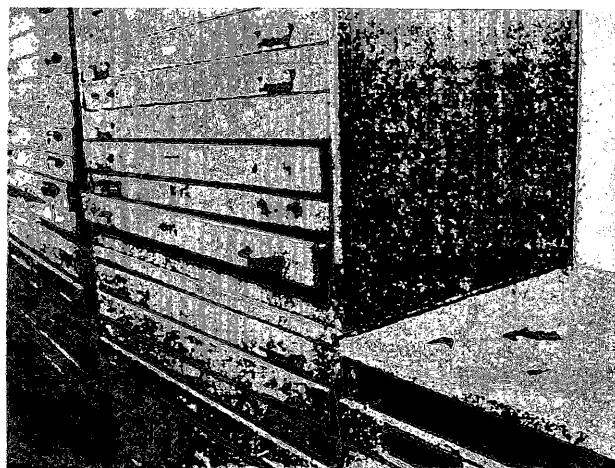


写真 - 1 地図保管室内の地図整理箱







### 5 . 1 : 25,000 地形図の仕様

地形図の図隔の大きさは、縦が約 55 cm、横が約 39 cm と縦長の図隔で切っており、日本の地形図が横長の図隔で切っているとは異なる。色数は、墨、藍、褐、緑の 4 色刷りで、それぞれの色のマスク版や注記版を加えると日本の 3 色 8 版より版数は多くなる。図式記号の区分は、非常に細かく、例えば、宗教関連施設の記号についていうと、日本の場合、お寺と神社の 2 種類だけであるが、本地形図では、キリスト教、イスラム教、ユダヤ教の寺院の区別があるほか、尖塔の数や建物の大きさ等での区別があり、墓地についても教派によって記号が違う（なお、キリスト教における正教とカトリックの図式上の区別はない）。また、湿地については、アシの生息状況と歩行が可能か不可能かによって 6 分類されており、非常に細かい図式記号となっている。これは、この地形図が本来軍事目的の利用を前提として作成されているためで、今後、国土の基盤としての利用を目的としたデジタル地形データ整備を行うためには、図式区分の集約、整理を検討する必要がある。なお、今回、図式に関する資料を入手することはできたが、記号の大きさや表示方法、取捨選択の基準を定める図式規程ではなく、図式記号の意味を解説した凡例集である。

表 - 1 ポスニア・ヘルツェゴヴィナ国における 1 : 25,000 地形図の基本的な仕様

使用している楕円体及び投影法	楕円体はベッセル楕円体。投影方法は、ガウスクリューゲルによる平面直角座標による投影を利用している。
図隔の大きさ	縦：約 55cm × 横：約 39cm
色 数	墨、藍、褐、緑の 4 色

表 - 2 図式記号の例

	キリスト教会 (双塔)		キリスト教修道院		変圧器
	キリスト教会 (単塔)		城、城跡		分電器
	モスク (イスラム教寺院)		錨降下禁止域		三角点となっている教会
	シナゴーク (ユダヤ教会堂)		湿地 (歩行可能)		強い泉 (湧水地)
	キリスト教会 (小規模なもの)		湿地 (歩行困難)		弱い泉 (湧水地)
	モスク (小規模なもの)		湿地 (歩行不可能)		飲料水タンク (常設)

## 6. 他の地図の整備状況、その他

1 : 25,000 地形図以外の地図の整備としては、1 : 500 ~ 1 : 1,000 (都市部)、1 : 2,500 (郊外)、1 : 5,000 (農山村部) の地籍図の整備がある。ボスニア・ヘルツェゴヴィナ連邦の地図整備公社では、旧ユーゴスラヴィア連邦時代に撮影された古い航空写真を使い、現地測量及び現地調査により、地籍図の修正を行っている。これら大縮尺地図については、海外の援助もあり、技術の移転や機材の導入等、デジタル化が進められている。ただし、資金的な問題から、これら機材のメンテナンスが十分に行われておらず、故障のため稼働していない機器が存在する。

## 7. 所感

ボスニア・ヘルツェゴヴィナ国においては、国土の最新の現況を撮影した空中写真がなく、1 : 25,000 地形図の原版もないため、最新の地形図作成が困難な状況下にある。デジタル地形データの全国的な整備は、国土の復興や開発において必要不可欠であり、早急な整備が求められている。しかしながら、デジタル地形データを有効活用するためには、デジタルなデータを単なる迅速な紙地図修正のための素材として利用するだけでなく、デジタルデータ本来の性格を生かした利用、例えば、地理情報システムの基盤データとしての利用等、多様な利活用を積極的に進めていく必要がある。このためには、整備されたデジタル地形データを広く一般に公開し、地理情報システムの基盤データとしての普及と利用を促進していかなければならない。

地籍図等の大縮尺地図のデジタル化は、海外の技術援助によりある程度進められており、デジタル化に関する技術の素養はあるが、中縮尺地図の作成に関しては、作成技術、工程等について熟知している職員が少ない。中縮尺地形図の作成技術には、大縮尺のそれとはまた違った面もあるため、デジタル化に関する技術の移転のみならず、中縮尺地図作成のために必要な技術を総合的に移転する必要がある。

## 7. 地図に関する政府機関

### 1. 国レベル

現在国レベルで統一してボスニア・ヘルツェゴヴィナ国の地理情報整備を担当する機関はない。上級代表事務所(OHR)の強い要請があり、閣僚評議会として測量担当機関の設置が議論されているが、内部の意見対立のため成立に至っていない。今回の事前調査においてはボスニア・ヘルツェゴヴィナ国側に民生通信省、外務省、各エンティティ等から成るコーディネーティング・コミッティが編成されることになっているが、カウンターパートの民生通信省は成果である地理情報の管理・利用等の観点から本コミッティを調査終了後も存続させたいとしている。

国としての基本的な地理情報整備計画はない。

### 2. ボスニア・ヘルツェゴヴィナ連邦

連邦における測量・地図作成機能は連邦測地・不動産問題管理部門、地図整備公社、各カントン及びオブシナ(地方自治組織で、それぞれ県、市町村に相当)の地籍部門の3者に分散している。

連邦としての基本図整備計画は有していない。

#### (1) 測地・不動産問題管理部門

測地・不動産問題管理部門は行政機関として法的整備を担当するとともに、地図整備公社・各カントン及びオブシナの地籍部門を管理する。全国の地形図、地籍図の管理も行っている。測地・不動産問題管理部門本体は職員数18名であり、地図作製に関する現業は行っていない。

##### 1) 地図・航空写真の整備状況

連邦測地・不動産問題管理部門が保有する地図は中縮尺の地形図と彼らがPLANと呼ぶ大縮尺の地籍図との2種類である。

地形図は、1:10,000、1:25,000及び1:50,000の3種類であり、このうち全国をカバーする基本図は1:25,000である。作製時期は1970年代と古いもので、その後修正はなされていない。旧ユーゴスラヴィア時代に軍により作製された。地図の原版は今でもベオグラードにあり、このため、地形図は必要に応じて印刷を依頼してこれを購入している。この事情は連邦に限らず、スルプスカ共和国でも同様である。

地籍図は、1:500、1:1,000、1:2,500及び1:5,000の4種類があり、各々都市中心部、都市郊外、農村地区及び山間地により縮尺を区別している。内戦後の再定住政策がボスニア・ヘルツェゴヴィナ国としての最優先課題の1つであることから、地籍図の維持・管理・更新は精力的になされており、連邦としてもこのための測量、調査がカ

ントンの業務として精力的になされている。

航空写真は旧ユーゴスラヴィア時代(1980年)に撮影された航空写真を保有している。全国の90%あまりをカバーしているが、その後の国土の変貌が激しく、地図作製の観点からは価値の薄いものである。

## 2) 保有機材

測地・不動産問題管理部門自体は地図作製の現業を行っていないことから、このための機材はほとんど保有していない。

独自予算で購入したArcViewを用いて、他の機関でスキャンした地形図のデータをトレースすることによるベクトル化を試行している。

このほか、GPS(汎地球測位システム)受信機を国連から5台貸与され、また、ドイツ技術協力公社(GTZ)の援助により1台が導入されているが、これらは各カントンでの測量作業等で使用されている模様である。

## (2) 地図整備公社

地図整備公社はかつてはバニャルカ、ベレネ及びモスタルに支所があり、ボスニア・ヘルツェゴヴィナ国全体を対象とする公社であったが、内戦後は連邦の公社として機能している。政府予算により連邦としての地図作製業務を実施している。地図作製機器としては旧来のアナログによる技術がほとんどでデジタル技術は有していない。連邦予算による地図作製は、ベオグラードから購入した旧版の紙地図を人力により色分解して印刷用原版を作成し、所有するオフセット印刷機で印刷する業務がすべてである。自力で航空写真から地形図を作成した経験はない。

### 1) 業務概要

連邦予算により、紙地図から人力による色分解を行って地形図の原版を作成する作業が地形図関連の主たる業務である。製版カメラにより白黒フィルムを作成し、黒以外の3色を手作業で削除するとともに水系(青)、植生(緑)、道路(褐色)をトレースして4色の原版を作成している。国内に地形図の原版がないため、独自に印刷を行うこと、修正を行うことを目的として実施しているものである。当初この事業では1:25,000地形図の原版を作成していたが、予算の問題から、190面を終了した時点で1:50,000地形図に切り替えた。

### 2) 保有機材

地図作製に係る地図整備公社の主たる保有機材は以下のとおりである。

- ・製版カメラ
- ・印刷機：PERLE Color Metal(スイス製)

- ・ アナログ図化機：  
    ウイルド A7  
    カールツァイス Stereometrograph G

### (3) 自治体の地籍部門

現地の測量技術者は各カントン及びオプシナの地籍調査部門に分散しており、広域な測量の経験はない。連邦には10のカントンがあり、79のオプシナがある。このうち5つのカントンには測量不動産部局があり、それぞれ5～10名の職員がいる。残りの5つには測量不動産部局はない。各オプシナには測量地籍係があり、合計すると担当者は約400名になる。スウェーデンの援助による地籍図デジタル化の技術移転以降独自の予算により数か所のオプシナでデジタル手法による地籍管理が行われている。使用しているシステムがCADであるため地形図作成を行うことはできない。

### (4) サラエボ大学建設学部測量学科

サラエボ大学では建設学部測量学科において測量教育を行っている。機材としては地図作製関係のものは全く保有していないが、5台の2波干渉測位用のGPS受信機があり、主にこれを用いて地上測量の実習等を行っている。5台の受信機のうち1台を用いて大学構内で連続観測を行っている。これはヨーロッパブロックでのCERGOP project という国際測地観測事業の一環として行われているものであるが、連日24時間の観測を行っていることから、標定測量及び航空写真撮影時の基準点として利用できる可能性がある。

このように、連邦としてはアナログによる地図作製の一部工程の技術は有しているが、全体を通して一から地形図を作成した経験はなく、また、デジタル技術は全く有していない。

## 3. スルブスカ共和国

スルブスカ共和国においては連邦と異なり、共和国測地・不動産問題管理部門において中央集権的に測量・地図作製の業務が実施されている。

### (1) 組織

共和国測地・不動産問題管理部門は局長以下850名の職員を有する。共和国首都のバニャルカにある本部のほか、4つの地方支所(Regional Center)があり、各支所は傘下の市町村を担当する。各市町村には測地・不動産問題管理部門の出先である地方事務所(Cadastral Office)が設置されている。地方事務所は各10名程度の職員を擁しており、合計60か所である。



本部には以下の5つの部が設置されている

総務部

測量部

国境測量部

不動産登記部

地籍部

測量部の1部門としてGIS(地理情報システム)課があり、ここが共和国測地・不動産問題管理部門の地図作成、管理を担当している。GIS課の事務所のみ下記ビエリナの地方支所にある。

4つの地方支所は以下の都市にある。

バニャルカ(Banja Luka)

ビエリナ(Bijeljina)

トレビニェ(Trebinje)

スルプスカ・サラエボ(S. Sarajevo)

## (2) 保有地形図・航空写真

共和国測地・不動産問題管理部門が保有する旧版地形図は、1:25,000、1:50,000、1:100,000及び1:200,000である。スルプスカ共和国全土分を保有している。ただし、連邦と同様地形図の原版は保有していない。

航空写真は保有していない。

## (3) 地形図作成関連業務(GIS課)

ビエリナのGIS課はスルプスカ共和国における地形図に関する業務及び地籍図のデジタル化業務の中心である。

地形図関連の主たる業務は、保有する地形図のデジタル画像作成である。この業務は、地形図をスキャナで読みとることによりラスタ化し、MicroStationを用いてgeo-referenceを行うものである。目的は原版のない地形図を複製するための原図を作成することである。ベクトル化、構造化はなされていない。1:25,000地形図については、共和国に関連する287面すべてを完了している。デジタル化したデータを軽くするため、スキャンの密度は200dpiと粗い。他の縮尺の地形図については未実施である。

地籍図関連の業務は、連邦の地籍図のデジタル化である。CADソフトを用いて紙の地籍図をなぞることによりベクトル化を行っている。連邦全体の25%について終了している。

#### (4) 保有機材

測地・不動産問題管理部門本部（地籍図関連業務に使用）

- ・ 図化機：カールツァイス Stereometrograph G
- ・ スキャナ：TRUSCAN Select (400dpi)
- ・ プロッタ：HP
- ・ CAD ソフトウェア：Mapsoft（ベオグラード大学製）
- ・ コンピューター：8 台（うち 1 台はサーバ）

GIS 課（地形図データ取得及び地籍図デジタル化）

- ・ スキャナ：2 台（白黒及びカラー、600dpi）
- ・ プロッタ：HP
- ・ ソフトウェア：
  - MicroStation 2 ライセンス（geo-reference 用）
  - Mapsoft 2 ライセンス（地籍図用 CAD）
  - GIGIT 10 ライセンス（地籍図用 CAD）
- ・ GPS 受信機 6 台（うち 5 台は国連からの貸与）

#### (5) 長期計画

「国土基本図整備計画」というべき独立した連邦の地理情報整備計画はないが、地籍調査事業の一部に基準点測量、地形図のデジタル化が位置づけられている。連邦では 1997 年から 2006 年の 10 か年計画で連邦内の地籍調査及び不動産権確認調査を実施することになっている。このため、年間 870 万 KM（約 5 億 2,000 万円）の予算を計上している。

予算のうち 86% は連邦予算、残りの 14% はオブシナからの支出となっている。

#### 4. ブルチコ自治区

ブルチコ自治区には地形図作製部門はない。公共記録部の地籍課が地籍図の作製、地籍図のデジタル化を試みているが、地形図の管理、複製は行っていない。国土基本図整備計画は策定されていない。

公共記録部は地籍課のほか、出生・婚姻の登録を担当する公共登録課、パスポートの発行等を行う個人文書課及び総務課の 4 課から成る。

地籍課が担当する業務は地籍図の整備であり、扱っている図は 1 : 500、1 : 1,000 及び 1 : 2,500 地籍図である。

職員がトータルステーションを用いて測量を行い、この結果等に基づいて手作業で地籍図の修

正を行っている。

GTZにより地籍図のデジタル化の援助が行われている。概要は以下のとおりである。

本援助は2000年に開始され、2002年に第1段階が終了した。導入機器はRTK-GPS観測用の基地局(1台)と移動局(2台)、トータルステーション(1台)、コンピューター(3台)、A0プロッタ(1台)及びベクトル化ソフト(Map sys:ルーマニア作成)である。GTZは2000年にブルチコ自治区全域の航空写真撮影を行い(写真縮尺は市街部1:1,000、郊外1:2,500)、空中三角測量をドイツ国内で行って結果のオルソフォトをCD-ROMの形でブルチコ自治区に供与した。ブルチコ自治区ではオルソフォトを画面上でなぞることにより図化する技術が移転された。GTZによる訓練は、10名の職員に対してなされた。

この援助はブルチコ自治区のみならず、ボスニア・ヘルツェゴヴィナ連邦及びスルブスカ共和国に対してもなされている。

## 8 . 地図に関する民間会社

### 1 . GEODIS

#### 1) 本社はウィーン

総勢 250 名ほど、サラエボ支社は 10 名

#### 2) 測量機器販売、測量業務、測量技術研修を行う。

- ・オーストリアにあるグループ企業 ( Geodis Brunn ) により、航空写真撮影も行うことができる。

#### 3) 取扱製品は、

- ・ TOPCON 社製品すべて
- ・ RMDATA 社製品
- ・ BENTLEY 社製品 ( MicroStation、CAD ソフトウェア等 )
- ・ MUTOH 社製品
- ・ BMI 社製品
- ・ GOECKE SCHWELM 社製品
- ・ その他

Intergraph 社製品も取り扱っている。

コンピューター ( ハードウェア ) は取り扱っていないが ( 必要なハードウェアのスペックは情報提供している ) システムとしてハードウェア込みの見積りを提出することはできる。

#### 4) 連絡先

A. Andrejevica 94, 71000 Sarajevo

Tel. +387-66-156-568

Tel/Fax. +387-33-470-793

E-mail : geodis@bih.net.ba

Web page : <http://www.geodis-sarajevo.com>

### 2 . GISDATA

#### 1) 本社はザグレブ

全社で社員 50 名以上 ( フルタイム社員以外を含む )

#### 2) 業務内容

- ・ ERDAS、ESRI、TRIMBLE の代理店
- ERDAS 以外の Leica 製品 ( 数値図化機、GPS 等 ) は扱っていない。
- ・ 販売、トレーニング、コンサルタント、GIS データ作成を行っている。

### 3) 連絡先

Fra Andela Zvizdovica 1, UNITIC Poslovni center, toranj B/16 71000 Sarajevo

Tel. 033-295-154, 033-295-155

Fax. 033-295-154

E-mail : azer.kurtovic@gisdata.com

Web page : <http://www.gisdata.com>

## 3 . GEO-GIS d.o.o.

### 1) ボスニア・ヘルツェゴヴィナの民間測量会社

### 2) 業務内容

- ・ 土木測量、地籍測量を実施
- ・ 試行的に地籍図のデジタル化も実施
- ・ クロアチアの測量会社の下請けでデジタル技術によるクロアチアの1:25,000地形図の編集作業を行っている。

### 3) 連絡先

88240 Citluk, Rudarska b.b.

Tel./Fax. +387-36-643-525

E-mail : [geo\\_gis@tel.net.ba](mailto:geo_gis@tel.net.ba)

## 9 . 地図に関する他ドナーの援助状況

### 1 . 概 要

ボスニア・ヘルツェゴヴィナ国は、地形図を作製した経験がなく、地形図整備に関する他国からの援助はこれまでない。一方、難民帰還・再定住に伴い発生する不動産の所有権問題に対応するため、スウェーデン、ドイツ等の援助により、地籍調査、地籍図整備に関する技術移転、機材供与が行われている。

### 2 . スウェーデン

スウェーデン国際開発協力庁（SIDA）により、地籍図のベクトル化を進めることを目的として、1996～1998年に行われた。スルプスカ共和国及びボスニア・ヘルツェゴヴィナ連邦からモデル地域を選び、GPS（汎地球測位システム）を用いた地籍測量、地籍図のベクトル化に関する技術移転がなされた。GPS 2台、トータルステーション4台、コンピューター10台、デジタイザー2台、プロッター、車両、CADソフトウェア等が導入された。なお、コンピューター及びCADソフトウェアは古くなったため、現在では使用されていない。

### 3 . ドイツ

ドイツ技術協力公社（GTZ）により、地籍図のデジタル修正を目的として、2000年度から実施されている。ボスニア・ヘルツェゴヴィナ連邦、スルプスカ共和国及びブルチコ自治区からモデル地域を選び、オルソフォトデータからコンピューターで図化を行う技術の移転を行っている。RTK-GPS 3セット、トータルステーション3台、コンピューター9台、プロッター3台、CADソフトウェア等が導入されたほか、1：1,000、1：2,500の航空写真撮影が行われている。

### 4 . 米 国

2001年度、上級代表事務所（OHR）より、デジタル地籍図を出力するためのプロッター、コンピューター、プリンター、スキャナがブルチコ自治区に供与されている。

### 5 . 日 本

国連開発計画（UNDP）を通じて、ブルチコ自治区に地籍測量のためのトータルステーション2台及びコンピューターを供与している。

## 10. 収集資料リスト

番号	資料/書籍名	発行/受領機関名	内容	員数	備考
1	INVENTORY OF POST - WAR SITUATION OF LAND RESOURCES IN BOSNIA AND HERZEGOVINA GCP/BIH/002/ITA	FAO	地形、地質、土壌、地雷分布図等	1枚	CD-R、シェイプファイル及び画像データ
2	PLAN GRADA SARAJEVA	JP GEODETSKI ZAVOD BIH	1:20,000サラエボ ガイドマップ	1枚	
3	GEOGRAFSKI ATLAS BOSNE I HERCEGOVINE	JP GEODETSKI ZAVOD BIH	ボスニア・ヘルツェゴヴィナ アトラス	1部	
4	GEODETSKI ZAVOD U SARAJEVU MOUNTAIN MAP	JP GEODETSKI ZAVOD BIH	1:50,000サラエボ オリンピック ガイドマップ	1枚	
5	ZEMLJISNA KARTA SA NACIONALNOM STRUKTUROM REPUBLIKE BOSNE I HERCEGOVINE	JP GEODETSKI ZAVOD BIH	1:700,000ボスニア・ヘルツェゴヴィナ民族分布図	1枚	
6	ПЛАН ГРАДА БАНЬА ЛУКА	КРАЈИНА ОСИГУРАЊЕ	1:16,000バニャルカ市ガイドマップ	1枚	書店にて2.5KMで購入
7	Topografska Karta 1:25,000 Banja Luka	Vojnogeografski institut/ Republicka geodetska uprava Sarajevo	1:25,000地形図(旧版図)	1枚	白黒コピー
8	三角点の記	スルブスカ共和国測地不動産問題管理部		4枚	
9	2003年-2006年事業計画(案)	スルブスカ共和国測地不動産問題管理部		1部	セルビア語
10	一、二等三角点網図	スルブスカ共和国測地不動産問題管理部SECTION FOR GIS		1枚	非公式資料(試作図)
11	水準点路線網図	スルブスカ共和国測地不動産問題管理部SECTION FOR GIS		1枚	非公式資料(試作図)
12	GPS基準点配点図	スルブスカ共和国測地不動産問題管理部SECTION FOR GIS		1枚	非公式資料(試作図)
13	地籍調査進捗状況図	スルブスカ共和国測地不動産問題管理部SECTION FOR GIS		1枚	非公式資料(試作図)
14	行政区分図	スルブスカ共和国測地不動産問題管理部SECTION FOR GIS		1枚	非公式資料(試作図)
15	数値地籍図整備状況図	スルブスカ共和国測地不動産問題管理部SECTION FOR GIS		1枚	非公式資料(試作図)
16	1:10,000地形図整備状況図	スルブスカ共和国測地不動産問題管理部SECTION FOR GIS		1枚	非公式資料(試作図)
17	スルブスカ共和国土地台帳整備状況図	スルブスカ共和国測地不動産問題管理部SECTION FOR GIS		1枚	非公式資料(試作図)

番号	資料/書籍名	発行/受領機関名	内容	員数	備考
18	1:4,500 City Map Brcko	ЗАВОД ЗА ИЗГРАДЊУ		1枚	絶版
19	City Map Brcko			1枚	文房具点にて1KMで購入(18の縮刷版)
20	BRCKO DISTRICT OF PUBLIC RECORDS	Brcko自治区公共記録部地籍課	Brcko自治区公共記録部地籍課概要	1部	小冊子(英語版)
21	META_BAZA PODATAKA ZA BRCKO DISTRIKT BOSNE I HERCEGOVINE	Brcko自治区公共記録部地籍課	Brcko自治区数値地籍図整備状況図	1枚	非公式資料
22	Brcko及びその周辺の1:50,000地形図	Brcko自治区公共記録部地籍課		1枚	原本(張り合わせてあるもの)
23	Brcko及びその周辺の1:25,000地形図	Brcko自治区公共記録部地籍課		2枚組	ラスター画像出力図
24	サラエボ中心部案内図	Hotel EUROPA GARNI		1枚	
25	飛行許可申請記載項目に関する文書	民生通信省		1枚	問い合わせに関する回答文の英訳
26	GESTOVNA KARTA HRVATSKE I BOSNE I HERCEGOVINE	DRUSTVO ZA OSIGURANJE SARAJEVO - OSIGURANJE d.d.	1:500,000クロアチア及びボスニア・ヘルツェゴヴィナ道路地図	1枚	
27	ORGANIZACIJA GEODETSKE DJELATNOSTI U FEDERACIJI BOSNE I HERCEGOVINE	ボスニア連邦測地不動産管理部	ボスニア連邦測地不動産管理部体制図	1枚	
28	1:1,000,000ボスニアヘルツェゴヴィナ地形図	JP GEODETSKI ZAVOD BIH		1枚	
29	TJEMENA LISTOVA TOPOGRAFSKIH KARATA	JP GEODETSKI ZAVOD BIH	楕円体及び投影法変換座標等対応表	1部	
30	ENCIKLOPEDIJSKI GEOGRAFSKI LEKSIKON JUGOSLAVIJE	SVJETLOST	ユーゴスラビアの地理百科	1部	古書店にて28KMで購入
31	1:5,000地籍図VISOKO	VISOKO OPCINA地籍課	デジタル地籍図出力図(部分)	1枚	
32	Uprava za geodetske i imovinsko-pravne poslove Hercegovacko-neretvanske zupanije	Mostar zupanije(Kanton)測地不動産管理部	Mostar Kanton測地不動産部概要	1部 (2枚)	
33	PRODUCTION OF DIGITAL TOPOGRAPHIC MAPS IN SCALE 1:25,000	GEO-GIS d.o.o	1:25,000デジタル地形図(クロアチア国)	4枚	
34	Podaci o trigonometrijskoj tacki	ボスニア連邦測地不動産管理部	三角点の記	1枚	



番号	資料/書籍名	発行/受領機関名	内 容	員数	備 考
35	ボスニア連邦カントン境界図	ボスニア連邦測地不動産管理部		1枚	
36	ボスニア連邦土地台帳・地籍図整備状況図	ボスニア連邦測地不動産管理部		1枚	
37	Topografska Karta 1:25,000 "Visoko, Ilidza and Sarajevo"	ボスニア連邦測地不動産管理部	旧版図	各1枚	原本
38	1:25,000旧版地形図スキャン画像	ボスニア連邦測地不動産管理部		3枚	CD-R、Tiff画像、新規作成要望図幅分
39	TOPOGRAFSKI KLJUC ZA TOPOGRAFSKU KARTU 1:25,000	ボスニア連邦測地不動産管理部	1:25,000地形図図式	1部	
40	1:600,000 Hrvatska Slovenija Bosna I Hercegovina	freytag & Berndt	1:600,000クロアチア・スロベニア・ボスニアヘルツェゴヴィナ道路地図	1部	書店にて12KMで購入
41	レンタカー価格表	HERTZ cjenovnik Sarajevo Airport		1枚	
42	SARAJEVO mini guide & city map	TOURIST INFORMATION CENTRE		1部	TOURIST INFORMATION CENTREで入手
43	コンピュータ部品価格表	WHITEFIELD COMPUTERS doo		1部	
44	BOSNIA AND HERZEGOVINA MINE SITUATION AS AT OCT 2002	BOSNIA AND HERZEGOVINA MINE ACTION CENTRE	1:400,000ボスニア・ヘルツェゴビナ地雷分布図	1枚	出力図
45	MINE CONTAMINATION MAP SARAJEVO, TRAVNIK, TUZLA, PRIJEDOR, BIHAC and TREBINJE AREA	BOSNIA AND HERZEGOVINA MINE ACTION CENTRE	1:25,000サラエボ、トラブニク、ツツラ、プリエドール、ビハッチ、トレビニェ地域地雷分布図	6枚	出力図
46	SEMA BROJA STANOVNIKA I POVRŠINE U KM2	ボスニア連邦測地不動産管理部	ボスニア連邦新規整備11都市、都市及び郡部人口並びに面積	1枚	
47	レンタカー価格表	Crown Agents Autoservis		1枚	
48	大縮尺地籍図整備地域図	スルブスカ共和国測地不動産問題管理部SECTION FOR GIS		1枚	非公式資料(試作図)
49	土地登録進捗状況図	スルブスカ共和国測地不動産問題管理部SECTION FOR GIS		1枚	非公式資料(試作図)
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