Co-funded by the
Erasmus+ Programme
of the European Union

University of Belgrade
Faculty of Civil Engineering

The Project:

Modernizing geodesy education in Western Balkan with focus on competences and learning outcomes - GEOWEB

Activity 5.1

Geodesy stakeholders survey report

Belgrade, July,4th

Under the WP5, University of Belgrade – Faculty of Civil Engineering (UB FCE) with other partners and the project coordinator developed an Internet based survey questionnaire.

The objective and the concept

- the objective has been to collect information from geodesy stakeholders operating in Western Balkan countries;
- the information should provide better insight into activities of geodesy stakeholders and their needs regarding surveying and geodesy professionals' skills and knowledge;
- web site and database should be live and operational during the project lifetime and allows afterwards, so additional input is expected and desired;
- the questionnaire (and database) is designed to be as simple as possible, requiring minimal effort to provide requested information; predefined answers offered whenever possible.

Draft version of the questionnaire was provided to all project participants for the review and comments. Comments were analysed and implemented accordingly. The final version of the questionnaire is provided to all stakeholders at the UBFCE website http://osgl.grf.bg.ac.rs/survey/accounts/login/ (Figure 1).

Project members were asked to invite as many as possible geodesy stakeholders from their countries to take part in the survey. The idea behind internet based questionnaire was to have a live database containing the results of the survey. Each stakeholder is invited to update his questionnaire as needed. Also, it is expected that more and more geodesy stakeholders will participate in the survey in the future, since other events are planned within the project. Therefore, it is realistic to expect significant increase in number of stakeholders participating in the survey. In the meantime, the results of the questionnaire available on July, 4thare analysed and described, as follow.

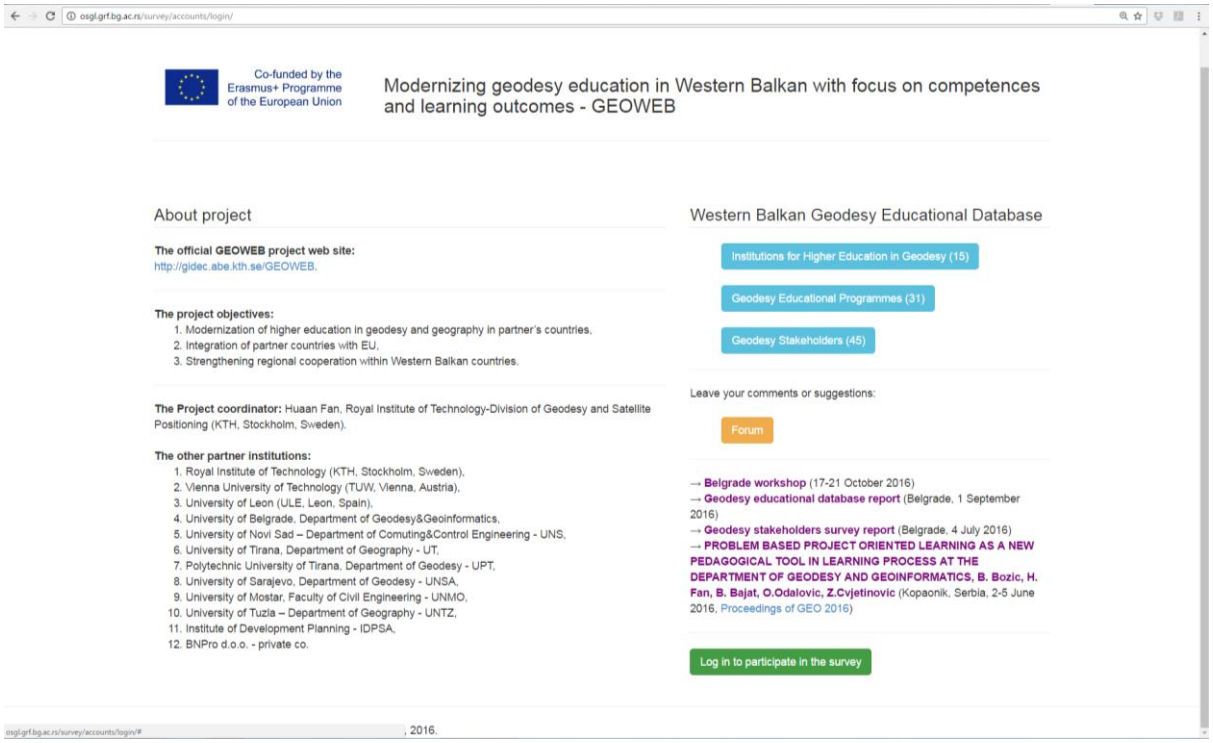

Figure 1. Login page for the questionnaire for the geodesy stakeholders and survey regarding higher education institutions and programmes in geodesy

Questionnaire

As it has been already stated, the questionnaire is designed to be as simple as possible, requiring minimal effort to provide requested information. Basic information on geodesy stakeholders have to be filled in using provided web form such as the following (Figure 2):

- name,
- address data,
- information on contact person,
- the type of organization,
- number of geodetic/GIS employees and
- main activities of organization.

Whenever possible, representative of the stakeholder is offered to select predefined answers. The option for describing main activities of the stakeholder is provided as well. The second part of the questionnaire was designed to provide desired information on geodesy stakeholders' needs regarding surveying and geodesy professionals' skills and knowledge. The stakeholder is offered to select the type of specialists that are most needed in his organisation and also to specify if retraining of his existing staff is required in some field of geodesy. Also, stakeholder is asked about the possibility to receive geodesy students for visits, practice and/or employment. Finally, the stakeholder is offered an opportunity to give his comments on geodesy education. Section of the questionnaire containing the most significant questions is given in the Figure 3.

Type of organisation

- ○ Local/central government agency
- ○ Other public body
- ◉ Private enterprise
- ○ Other type

Number of geodesy/GIS employees

14

Select main activities of organization

- ☑ Cadastral/topographic surveying
- ☑ Engineering surveying
- ☑ Geodesy (geodetic networks and reference systems)
- ☐ Photogrammetry and remote sensing
- ☐ GIS development and geospatial data management
- ☐ Land management (cadastre, land valuation, land consolidation)
- ☑ Geodetic software and equipment supply and maintenance

Short summary of main activities

As the need for geodesy grows and new technologies are implemented, so do our activities change focus. Beside everyday cadastral/topographic survey, and creating topographic/geodetic plans for the needs of regulation plans, we offer surveying works for all kind of engineering activities, mostly civil engineering. Renewing of geodetic networks in different Municipalities is also something worth mentioning. When talking about reference systems, we have done field measurements for transformation parameters calculation.

Figure 2. Web form for entering basic information on geodesy stakeholde

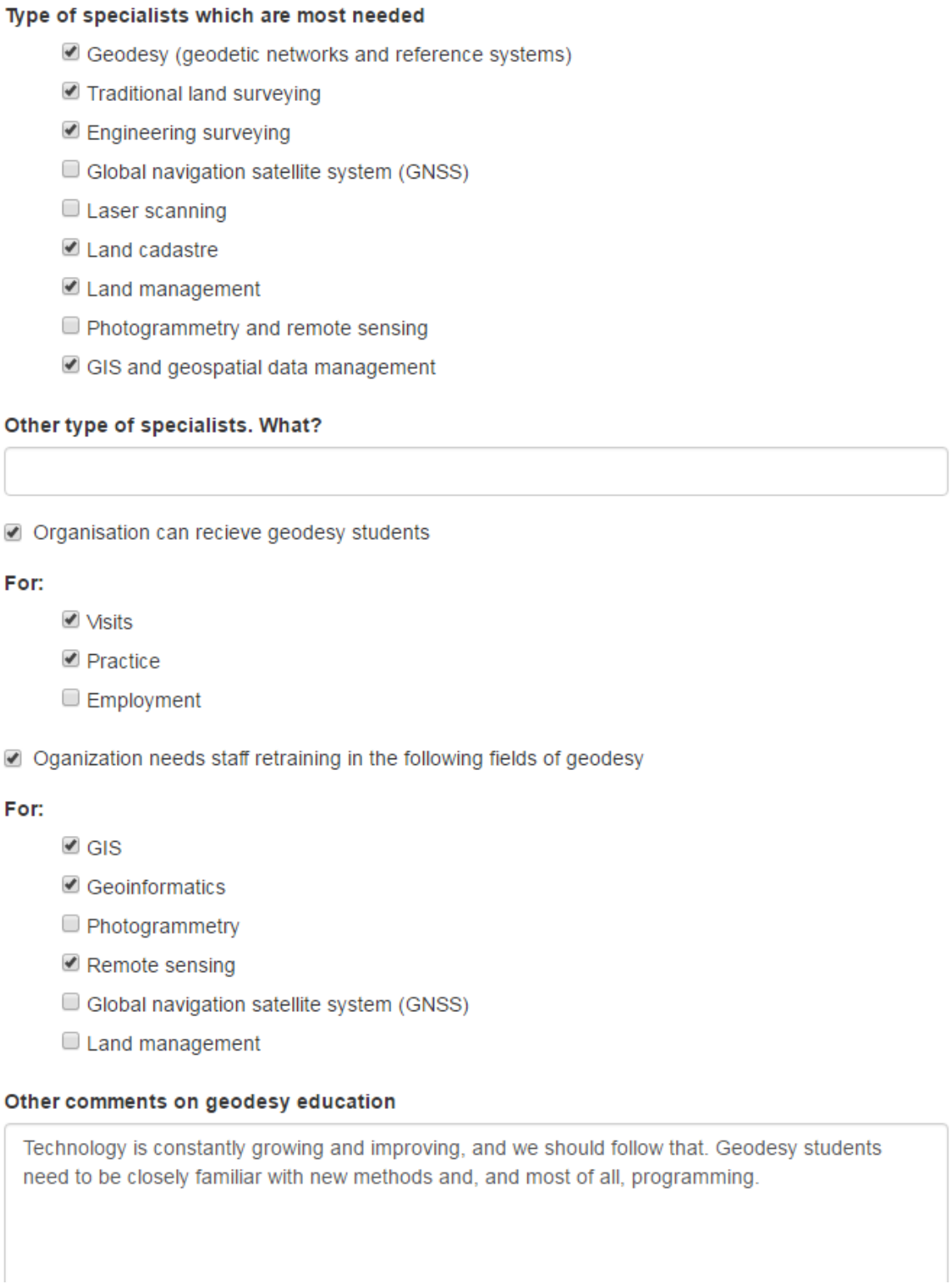

Figure 3. Section of the questionnaire for the geodesy stakeholders survey - Information regarding education and competences of future professionals

The Results

At the time of writing this report the number of stakeholders that participated in the survey was 42 (Table 1).

Country	
Albania	10
Bosnia and Herzegovina	20
Serbia	12
Total	42

Table 1: Number of stakeholders participating in the survey

Having in mind that, according to official site of the Republic Geodetic Authority of Serbia (http://www.rgz.gov.rs/reg-go-public/GeoOrgPublic.aspx), there are more than 500 geodetic organisations having some kind of licence for practising geodesy/surveying just in Serbia, it is clear that the number of survey participants is rather low. Therefore, it would be irresponsible to state that the results of the survey should be statistically significant. Nevertheless, there are some interesting indications regarding stakeholders' needs and their opinions on geodetic education, so these will be given here briefly.

The summary results of the geodesy stakeholders survey are given in Table 5. The stakeholders are sorted according the country they are located in. It can be noticed that all three types of organizations are present: private enterprises, local/central government agencies and other public bodies. However, as expected, the largest number of participants is private enterprises (Table 2).

Stakeholders according to their type	
Private enterprises	31
Local/central government agencies	8
Public bodies	3
Total	42

Table 2: Number of stakeholders participating in the survey

It can be easily concluded from the Table 5 that stakeholders are mostly engaged in standard geodetic activities such as: cadastral/topographic surveying, engineering surveying, geodesy (geodetic networks and reference systems) and GIS development and geospatial data management (Table 3). Organisations dealing with photogrammetry and remote sensing as well as those providing geodetic software and equipment supply and maintenance services are, as expected, in minority.

Activity	No.	%
Cadastral/topographic surveying	27	64
Engineering surveying	27	64
Geodesy (geodetic networks and reference systems)	25	60
GIS development and geospatial data management	23	50
Land management	21	50
Photogrammetry and remote sensing	12	29
Geodetic software and equipment supply and maintenance services	11	26

Table 3: Activities of stakeholders

Regarding the type of specialists that are most needed by the stakeholders, it is quite indicative that GIS and geospatial data management specialisation is the most needed one. About 74% of stakeholders stated that they need this type of specialisation. This is quite understandable, having in mind that geospatial data management and processing is compulsory activity within almost every geodetic project. Also, standard geodetic specialisations such as: geodesy (geodetic networks and reference systems), engineering surveying and knowledge and skills from global navigation satellite system (GNSS) are also highly required (50-64%). Laser scanning, as a new technology, requiring still very expensive equipment is, again, as expected, not so required (17%). The needs for other types of specialisations are in the range of 33-43% (Table 4).

Activity	No.	%
GIS and geospatial data management	31	74
Engineering surveying	27	64
Geodesy (geodetic networks and reference systems)	24	57
GNSS	21	50
Land management	18	43
Land cadastre	17	40
Traditional surveying	15	36
Photogrammetry and remote sensing	14	33
Laser scanning	7	17

Table 4: Competences needed

Most of the stakeholders are ready to accept geodesy students for visits and practice, and some of stakeholders are also open for new employees.

It is quite interesting to analyse the information provided by stakeholders regarding their needs in staff retraining:

- Almost all stakeholders from Albany stated that they need staff retraining in almost all offered fields in geodesy;
- Needs of stakeholders from Bosnia and Herzegovina in this respect were quite limited,
- Stakeholders from Serbia showed no interested at all for staff retraining.

Due to rather limited sample, this may not be the real situation regarding this matter. However, the results are quite interesting and they certainly deserve further attention.

Although there is a rather limited input provided by stakeholders, we are giving here a summary of comments provided by stakeholders:

- more practical knowledge and skills is required,
- better cooperation between geodesy stakeholders and educational institutions is required,
- education should be focused on modern technologies, especially geoinformatics (GIS, programming),
- other knowledge and skills required (standards, economy, legislation, etc.).

A complete list of relevant comments is given in Table 6.

Stakeholder	Cadastral/topographic surveying	Engineering surveying	Geodesy (geodetic networks and reference systems)	Photogrammetry and remote sensing	GIS development and geospatial data management	Land management (cadastre, land valuation, land consoli	Geodetic software and equipment supply and maintenanc	Geodesy	Traditional land surveying	Engineering surveying	Global navigation satellite system (GNSS)	Laser scanning	Land cadastre	Land management	Photogrammetry and remote sensing	GIS and geospatial data management	Visits	Practice	Employment	GIS	Geoinformatics	Photogrammetry	Remote sensing	Global navigation satellite system (GNSS)	Land management	Country	Type of organization	Number of empoyees
1	1	1	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	ALB	PE	12
2	1	1	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	ALB	PE	13
3	1	1	1	1	1			1		1	1		1	1		1	1	1	1	1	1	1	1	1	1	ALB	PE	8
4	1		1	1	1	1		1			1		1	1	1	1	1	1	1	1	1	1	1	1	1	ALB	GA	4
5		1	1		1			1		1	1		1	1		1	1	1	1	1	1	1	1	1	1	ALB	PE	15
6	1	1	1	1	1			1		1	1		1	1		1	1	1	1	1	1			1	1	ALB	PE	3
7	1	1	1	1	1	1	1	1		1	1	1	1	1	1	1		1	1	1	1	1	1	1	1	ALB	PE	2
8			1	1	1	1		1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	ALB	GA	35
9		1	1					1		1	1		1	1	1	1	1		1	1	1	1	1	1	1	ALB	GA	5
10			1	1	1			1			1	1	1		1	1	1	1	1	1	1	1	1	1	1	ALB	GA	22
11	1	1				1		1	1	1	1						1									BiH	PE	3
12		1						1		1	1					1	1	1	1					1	1	BiH	PE	3
13	1	1	1			1		1	1	1				1						1	1	1				BiH	PE	6
14	1	1	1				1	1	1	1			1	1		1	1	1		1	1		1			BiH	PE	14
15							1									1	1	1								BiH	PE	4
16	1	1	1		1	1		1	1	1	1					1	1	1		1	1			1	1	BiH	GA	4
17					1											1		1	1							BiH	PE	5
18	1	1	1			1				1	1					1	1	1								BiH	PE	8
19	1	1	1	1	1	1	1	1								1		1		1						BiH	PE	5
20																										BiH	GA	5
21	1	1	1		1	1	1	1		1				1		1				1	1				1	BiH	PE	16
22		1			1					1						1										BiH	PE	1
23					1	1	1							1	1	1	1	1	1	1	1					BiH	PE	13
24									1							1										BiH	PB	1
25		1	1		1			1		1						1	1									BiH	GA	3
26	1	1	1					1	1	1						1		1		1			1			BiH	PE	3
27					1			1	1	1					1	1	1	1		1	1		1			BiH	PB	8
28	1	1	1		1	1			1	1	1		1													BiH	PE	4
29	1					2							1			1										BiH	GA	3
30	1	1	1			1		1	1	1				1			1	1								BiH	PE	3
31	1	1																								SER	PE	4
32	1	1	1					1	1	1	1		1		1			1	1							SER	PE	10
33		1	1				1				1					1										SER	PE	1
34	1		1	1	1	1	1		1				1	1	1	1	1	1	1							SER	PE	15
35	1				1	1		1	1	1	1		1	1		1		1	1							SER	PE	10
36	1	1	1		1	1	1	1	1	1	1		1	1		1	1	1	1				1			SER	PE	25
37				1	1										1											SER	PE	5
38	1	1										1			1	1		1								SER	PE	3
39	1	1	1			1				1	1			1												SER	PE	2
40	1			1	1				1	1					1	1	1									SER	PB	30
41	1	1				1				1	1	1														SER	PE	2
42	1								1																	SER	PE	1
Total	27	27	25	12	23	21	11	24	15	27	21	7	17	18	14	31	22	25	17	18	16	10	12	13	13			
%	64	64	60	29	55	50	26	57	36	64	50	17	40	43	33	74	52	60	40	43	38	24	29	31	31			

ALB	Albania
BiH	Bosnia and Herzegovina
SER	Serbia

GA	Local/central government agency
PE	Private enterprise
PB	Other public body

Table 5. Summary results of the geodesy stakeholders survey

Country	Comments
ALB	Mostly students need more practice and consolidation of the theoretical concepts in real works
ALB	More efforts should be made on Economic Background, Industry standards and Ethic Code
ALB	In our opinion, the education in geodesy should go in its modernizing towards the good and solid education in modern technologies, modern geodesy theory. Geo-information (GIS-WebGIS), land management and legislation as well as the new methods and technologies in engineering geodesy.
ALB	Particular needs in -depth knowledge of Geodesy concepts, creation and management of geo-information processing in GIS platform. ASIG is an institution responsible for the implementation of the INSPIRE Directive in Albania. ASIG for next year, will receive more responsibility for the production of various maps (as NMCA) for the Republic of Albania. For this purpose, it will be more need for training short and long term for its specialties. (Like In GIS, Remote Sensing, photogrammetry ...)
ALB	Our Organization is always looking for qualified employees, in every department not only survey unit. When something new in technology is required for the progress of the work, company cares that the employee to be well trained. 1. Permanent change of teaching mentality. Combined theory and practice in a more efficient way. 2. Bringing new methods in teaching, as well as combination and attracting engineers with experience in teaching. 3. A fully equipped laboratory is a must.
BiH	More cooperation with faculty of geodesy and support in seminars modern technology in geodesy.
BiH	Technology is constantly growing and improving, and we should follow that. Geodesy students need to be closely familiar with new methods and, and most of all, programming.
BiH	We usually provide training for the new technology in Geoinformatics-geomatics.
BiH	The main problem, in my opinion, with geodesy education is that focus of education is theory and not application. Of course, this is maybe not intentional but the reason could be expensive software and hardware (geodetic instruments) which is needed for quality education of geodesy/GIS students.
SER	Students have great deal of theoretical knowledge but they lack transversal skills and what is more important work-based skills.
SER	Geodetic engineers should have better skills and knowledge in geoinformatics, especially in terms of solving various problems by programming, i.e. using scripting languages in GIS software or standard programming languages and software development tools, such as Visual Basic, C# and Visual Studio.
SER	There is no any communications and consultations between private companies and educational institutions of Geodesy in Serbia. Except sporadic individual cooperation and economic benefits.
SER	The program is not adapted for the market, and up to date technology. It doesn't follow trends in geodesy.

Table 6: Comments on existing education in geodesy

Local coordinator
Branko Bozic, PhD