



Manager's Report



Modern society is based on two basic drivers, technological revolution and globalization. While technology, especially digital technology, is developing and progressing faster than it could be foreseen, globalization is dramati-

cally changing social behaviour of people and societies, their interests and way of communication. In this context, Jack Ma, the founder of Alibaba, said in the interview given to CNBC in June 2017: "At the heart of the fast-approaching technological new age, are data and putting the data into the centre of society's interest. We believe the data are going to be so important to human life in the future and tomorrow [with the Internet of things], everything will be connected" he says.

Respecting this and many other clear signs of new relevance of data and information in human society, the scientists and academician are logically extremely interested in the subjects and issues related to them. The platform for the development of a new period of data, including efficient collection, organization, interpretation and usage of data requires the development of infrastructure which will enable such efficient usage based on standards, specifications and technology, and contribute essentially to decision making in every kind of human activity.

Inspired by this cognition, the consortium of 16 universities prepared and proposed a project named "Western Balkans Academic Education Evolution and Professional's Sustainable Training for Spatial Data Infrastructures – BESTSDI" responding to the call of ERASMUS+ KA2 Capacity Building in the Field of Higher Education 2016. The goal of the project is to give incentive to all universities in the partner countries in the region of Western Balkans to introduce Spatial Data Infrastructure (SDI) as a platform for spatial data usage in any applicative concept that

upgrades SDI in their study programs in standardized and well elaborated form.

This incentive has been recognized by the Education, Audiovisual and Culture Executive Agency of European Commission, and in October 2016, we started to work on BESTSDI project. The challenge is great, but we are convinced that we shall achieve the goals set with the strong and competent team that we have gathered.

It is our intention to disseminate project information and communicate results with a broad audience. To achieve this, we are launching this e-Newsletter. It should deliver information about our activities, events, results and activities tied to the project undertaken by project partners. BESTSDI Newsletter will be released quarterly within the frame of Dissemination and Exploitation Work Package, Task Group Communication, prepared by the Editorial board.

We hope that BESTSDI Newsletter will encourage broader discussion about teaching SDI at the institutions of higher education, and therefore, we are also open to reader's opinions and discussion.

*Željko Bačić,
Faculty of Geodesy, University of Zagreb
Project coordinator*

BESTSDI Newsletter is quarterly e-newsletter by Erasmus+ KA2 Capacity Building in field of Higher Education "Western Balkans Academic Education Evolution and Professional's Sustainable Training for Spatial Data Infrastructures" project (N° 574150-EPP-1-2016-1-HR-EPPKA2-CBHE-JP).

More information at: www.beststdi.eu.



Kick-off meeting

November 14–16, 2016,
Zagreb, Croatia

Western Balkans Academic Education Evolution and Professional's Sustainable Training for Spatial Data Infrastructures – BESTSDI project was inaugurated on November 14th, 2016 in the Rectorate Aula of the University of Zagreb within the frame of the first project workshop – kick-off meeting. More than fifty project consortia participants together with the representatives of the University in Zagreb, Croatian Agency for Mobility and European Union Programs (AMPEU) and the State Geodetic Administration attended the project launch and after the welcome speeches of the guests of honour, Ms. Branka Roščić, PhD (Head of the Department of International Relations at the University of Zagreb), Antonija Gladović, M.Sc. (Director of the Agency for Mobility and EU Programmes, AMPEU), and Prof. Damir Medak, PhD (Dean of the Faculty of Geodesy, Zagreb), they received the first information about the project from the project coordinator, Prof. Željko Bačić, PhD, from the Faculty of Geodesy, University in Zagreb. Prof. Joep Crompvoets from the Catholic University Leuven in Belgium gave a motivation lecture about the relevance of spatial data and the importance of the development of well-defined infrastructure of spatial data “SDI – education motivation and beyond”.

The goal of the Erasmus+ Ka2 CBHE programme is to transfer the knowledge and skills of the academic institutions from the EU member countries to partner institutions from non-EU countries. BESTSDI project intends to achieve this in the next 36 months in



the field of georeferenced information, respectively Spatial Data Infrastructure (SDI), and concepts that upgrade SDI, like smart cities, intelligent transportation and sustainable environment. The modern world is based today on georeferenced information, which means that spatial management in any form is presently impossible without good spatial information and knowledge how to use such information. Therefore, this project is focused on a wide spectrum of study programmes, starting with basic ones related to spatial information (geodesy and geoinformatics), then continuing to those related to civil engineering, geology, mining, architecture, till forestry and agriculture studies, as well as philosophy or geography studies.

Apart from the University in Zagreb, respectively the Faculty of Geodesy as the Coordinator of the BESTSDI Project almost one million Euro worth, the other partners from the programme countries (EU) are Catholic University Leuven, Belgium, and the University of Applied Sciences Bochum, Germany, along with the two faculties from Croatia, Faculty of Geotechnical Sciences in Varaždin. and Faculty of Civil Engi-

neering, Architecture and Geodesy of the University in Split. Project consortia members are also project partner teams from 12 universities, respectively 16 faculties from all six countries of the Region 1 (per EU division): Albania, Bosnia and Herzegovina, Kosovo, Macedonia, Montenegro and Serbia.

The remaining two and a half days were filled with a number of sessions and hard work resulting in allocation of leader and deputy leader tasks of Work packages and Task groups. Definition of work schedule plan. Launch of work for the first five Task groups, and skype meeting with our project officer, Ms. Belen Enciso from EACEA organised within the frame of project and financial management sessions. Project web page and Moodle platform were also presented and launched. In spite of the fact that we worked hard all three days, we also found time for short sightseeing of Zagreb and a joint dinner with the entertainment program presenting the baptizing of young vine, a long-standing tradition in Croatia, performed by the actors Vladimir Kuk and Zlatan Katić.

Željko Bačić



Task 1.3 Requirements Analysis — Final report

At the end of April 2017, the final report on Task T1.3 Requirements Analysis was submitted. The aim of Task 1.3 was to determine the key requirements of stakeholders in the Western Balkans regarding curricula development at higher education entities related to Spatial Data Infrastructure. In order to achieve this objective, a survey was undertaken based on an online questionnaire. In total, 186 completed questionnaires out of 919 questionnaires distributed were received. For a web survey such as this one, this response rate of 20% is satisfactory with significant differences among the countries ranging from 5% to 55%. The respondents were rather positive about the questionnaire. Due to the limited group sizes of the different stakeholder's groups in different countries, no significant differences in requirements between the different groups were found. The differences in requirements appear to be significantly larger for various countries with their different contexts, conditions and rules.

The main organizations that responded were public administrations, universities/higher education institutes and private companies that mainly operate in the sectors spatial planning, environment, construction & civil engineering, agriculture, architecture & engineering, real estate, and research. These organizations are mainly end users or producers of geospatial data and do not offer any teaching topics. Among the courses offered, GIS appears to be the most popular topic to be taught.

The needs for numerous competences grouped in Knowledge Areas (KAs) in the domain of geographic information science and technology were analysed. Most of the competences listed appeared to range from moderately to extremely necessary. In general, the competences related to KA conceptual foundations, geospatial data, cartography and visualization, and society appeared to be more needed than the competences

of the other KAs. The least needed competences refer to KAs analytical methods, design aspects, data modelling and data manipulation. The competences of remaining KAs infrastructures & platforms, as well as organizational & institutional aspects are intermediaries. For the further development of the curricula, competences related to conceptual foundations, geospatial data, cartography and visualization, and society need extra attention. As single competences, the following ones appeared to be the most needed: Working with land administration systems, knowledge about legal aspects, being aware of relevant (national) legislations/regulations, understanding basic elements, measuring basic geometric properties, and data quality assessment.

The questionnaire results clearly show that there is a great need to have the courses in native languages. There is also a need to have the courses in English as well – although the need is not as great as the need to have the courses in native languages.

The questionnaire also indicates that there is a need to have the courses conducted remotely via internet providing the access to the teaching material at any time during the course.

In general, the knowledge and understanding of all listed aspects of INSPIRE in respondents' organizations is rather low – in particular in the aspects related to metadata regulation, monitoring and reporting obligation regulation, and relevant EU directives, policies and programs. Some knowledge and understanding exists regarding the objectives and main principles of INSPIRE in the Western Balkans region. Most respondents' organizations appeared to be not very capable to perform the activities related to the implementation of INSPIRE. The need for developing the INSPIRE-compliant components in the respondents'

organizations is not great – although the percentages related to data models and learning material are rather high. The most relevant INSPIRE data themes for the Western Balkans region refer to coordinate systems, geographical grid systems, cadastral parcels, land use and administrative units. For a few countries, the INSPIRE data themes related to transport network, elevation, ortho-imagery, buildings and soil are very relevant as well. The developed curricula need to enhance the competences related to the implementation of INSPIRE by creating learning materials that meet the demands of the stakeholders.

The main hampering factors in preventing innovation and/or limiting SDI-innovation activities refer to knowledge and financial issues. Hampering factors related to market issues appear to be important, but not as important as the ones related to knowledge and financial issues. The importance of the hampering factor related to the lack of qualified personnel appears to be very important confirming the need to have a project such as BESTSDI. It also appears very difficult to find cooperation partners for innovation. The main financial hampering factors refer to the lack of funds within an organization and the lack of funds from the sources outside of the organization.

In general, various countries in the Western Balkans provided similar views in terms of requirements for further curricula development in the region.

Acknowledgement: We would like to thank all the stakeholders who completed the questionnaire. Their input was vital for this task T1.3 and so their efforts are enormously appreciated.

Joep Crompvoets, KU Leuven

Partner presentations

FACULTY OF CIVIL ENGINEERING SUBOTICA UNIVERSITY OF NOVI SAD, SERBIA



Faculty of Civil Engineering Subotica was founded on 22nd April 1974 in Subotica, Serbia, within the framework of the University of Novi Sad. The Faculty grew into a modern educational and scientific institution performing its teaching activities in Serbian and partly in Hungarian language. Study programs at the Faculty are accredited for all three levels of studies: bachelor, master and doctoral academic studies. Bachelor study program covers all topics of Civil Engineering and it is organised in four modules: Constructions, Hydraulic Engineering and Water resources, Traffic Infrastructure and Architectural Engineering. Master studies are similarly organized with the study modules of Constructions and Architectural Engineering being each divided into two professionally specific modules: Concrete Structures / Metal Structures and Architectural Engineering – Design /

Architectural Engineering – Urban Planning respectively.

Educational objectives of the programme of the Faculty of Civil Engineering Subotica are to offer students the engagement in civil engineering and other connected fields that require analytical and professional abilities.

This program is intended to prepare students to be successful professionals competent in critical thinking, problem solving based on a fundamental knowledge in a wide range of civil engineering technical areas, leadership, effective communication, civic engagement, contribution to the society, consideration of global and societal concerns, ethics and sustainability when making engineering decisions.

The Faculty has successful cooperation with other faculties, institutes and construction firms. It is located in a building that was designed in

cooperation of professors and students who were working on their graduation theses.

The building has modern classrooms, amphitheatre, laboratories, computer classrooms and the library with more than 7000 professional titles.

The Faculty publishes biannual Journal of the Faculty of Civil Engineering and has well recognized annual International conference *Contemporary Achievements in Civil Engineering* in April.

With increased interest being also generated by the BESTSDI project, the Faculty started accreditation procedure for the new study programme *Geodesy* in 2017 that was approved by the University Senate in June and submitted to the Commission for Accreditation and Quality Assurance for Higher Education.

Viktorija Aladžić,
Faculty of Civil Engineering, Subotica



Partner presentations

FACULTY OF CIVIL ENGINEERING – SKOPJE UNIVERSITY “Sts. CYRIL AND METHODIUS”

The University “Sts Cyril and Methodius” is the oldest, biggest and most renowned university in the Republic of Macedonia. It was formed in 1949.

Today, the University consists of 23 faculties, 5 scientific institutes and 12 associated institutions. The total number of students at UKIM is about 60000, and there are about 1850 members of the teaching and scientific staff at the University.

The Faculty of Civil Engineering - Skopje was founded in 1949, as a part of Technical Faculty that was formed from two departments - Civil engineering and Architecture.



Figure 1: Faculty of Civil Engineering - Skopje

The study of geodesy as a teaching discipline at the academic level in the Republic of Macedonia began in the distant 1949 - at the beginning of establishing the Technical Faculty. A large qualitative leap in the geodetic education occurred in 1977 when the studies of geodesy were introduced for the first time at the Faculty of Civil Engineering with VI/1 degree (five-semester) studies.

Ever since, the studies of geodesy have been actively promoted and encouraged. It resulted in opening of complete (10-semester) undergraduate studies at the Faculty of Civil Engineering in 2001.

Respecting the tendencies of the European high level education and European Credit Transfer System - ECTS, the academic geodetic education was reformed in the school year 2006/07. A new system of studying covering 6-semester undergraduate and 4-semester postgraduate studies in the field of geodesy was introduced (the system 3+2).

The introduction of ECTS system has also caused changes in financing of studies making it obligatory for the students to co-finance the studies. The amount that should be paid by students in the state quota studies of the first cycle of geodesy is 200 Euro per year.

In the last 10 years, around 350 students have graduated in the first cycle of geodetic studies.

The introduction of Bologna process into the study program of geodesy at the Faculty of Civil Engineering enabled the opening of the second cycle of studies - postgraduate (Master) studies. In that way, another important degree was introduced in the higher geodetic education in the Republic of Macedonia.

Presently, there are two study programmes of the second cycle of geodetic studies:

- Study program of Geodesy, and
- Study program of Land management.

The duration of the studies is 2 years (4 semesters), with teaching activities being performed in 3 semesters, and the fourth semester is planned for the preparation of a master's thesis.

In the past 9 years, around 100 students graduated from the postgraduate studies.

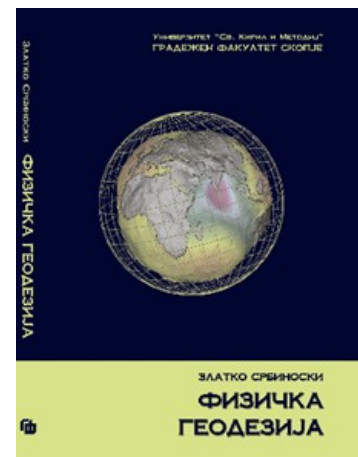


Figure 2: Cover pages of some of the books used at the studies of geodesy

The educational activity is enhanced with the publication of specialized geodetic literature in accordance with the curriculum of individual courses offered within the frame of the study programme of geodesy. In the past 15 years, the members of the geodetic departments published more than 20 books and teaching materials according to the respective subject curricula, which significantly facilitates the preparation of the exams by students.

Zlatko Srbinoski,
Faculty of Civil engineering, Skopje

Project events and conferences

2nd BESTSDI Workshop, March 13-15, 2017, Subotica, Serbia

The main goal of the 2nd BESTSDI Workshop was to gather partner universities, i.e. principal users/participants of BESTSDI project (BESTSDI users) and its results. The specific objective of BESTSDI is to develop appropriate curricula, courses and their content for both target groups (BESTSDI providers and BESTSDI users) of academic institutions. This includes the development of:

- SDI compulsory course for undergraduate study programmes in geodesy
- SDI modules for graduate study programmes in geodesy and geoinformatics
- SDI user course components (not necessarily full courses) for undergraduate study programmes of partner faculties
- SDI elective courses for graduate study programme of partner faculties (BESTSDI users)
- Development of sustainable training courses (life-long education) for a wide range of professionals

Since the project efforts were focused on preparation stage, i.e. on analysing the current curricula status (BESTSDI users) and learning materials (BESTSDI providers), as well the requirements of all subjects (institutions, firms, associations) dealing with SDI, it was important to focus on the group of universities that will later participate in the new BESTSDI curricula implementation and evaluation. At the same time, all partners had to start with the preparation for building educational infrastructure (hardware and software) needed in curricula implementation.

Based on these objectives of the workshop, the agenda was focused on these needs. The sessions were divided thematically into: 1) Opening session, 2) Reporting session, 3) What do we understand under SDI and SDI context within the frame of BESTSDI project, 4) Current learning material status, 5) Requirement Analysis, 6)

Project&Financial management, 7) Equipment procurement, 8) Specification of project curriculum, 9) Support tools for project management and 10) Wrap-up session.

The Opening session provided the opportunity for the host to present itself. Miroslav Bešević, the dean of the Faculty, presented education and research activities at his institution. The session also included the work plan and was chaired by Danijel Kukaras. The Reporting session featured all relevant news and activities presented by Željko Bačić, as well as project communication plan presented by Vesna Poslončec Petrić.

The third session was used to exchange experiences and views on SDI. SDI is a multi-level and multi-disciplinary topic aiming to support a wide range of human activities in environment. Therefore, in this session, there were three views or use cases of the SDI given by Viktorija Đuračić, Edmond Hoxha and Danny Vanderbroucke.

The fourth and fifth sessions were dedicated to reporting on progress in task groups. Dražen Tutić reported on current curricula status, Andreas Wytzisk on learning materials, and Joep Crompvoets on requirement survey and analysis featuring national representatives reflecting on the survey status in their countries.

The sixth session offered instructions on project management actions that have to be performed by participating institutions and were presented by Željko Bačić. The next session delivered by Danijel Šugar concerned the details of equipment procurement that needs to be performed under national regulations on public procurement.

The eighth session was dedicated to available tools (body of knowledge and advanced curriculum design tools) that will be used for new curricula design. Danny Vanderbroucke presented the tools and goals of the new curricula that will be designed under the BESTSDI project. The topic of the ninth session was the development of the project quality plan and its execution and





was presented by Željko Bačić and Andreas Wytzisk, as well as the presentation of Moodle platform that is used as support tool for project management and will be used for curricula implementation. It was given by Dražen Tutić. Final, wrap-up session concluded the work in workshop, emphasized activities that were done and those that have to be done in the near future. Future events were announced by Ivana Racetin who gave a detailed presentation for the BESTSDI Summer School to be held in Split, July 3-7, 2017.

Social events, also very important for strengthening positive relationships and atmosphere among participants were a true success. Viktorija Aladžić from the Faculty of Civil Engineering Subotica, organized a tour in architectural and historical parts of Subotica, the city famous for its Art Nouveau structures. The dinners in the historical part of the city and at the Palić lake were a perfect complement to the workshop.

The University of Novi Sad, Faculty of Civil Engineering Subotica successfully organized this workshop and offered a warm hospitality and support to all participants. BESTSDI team is therefore grateful to Miroslav Bešević, dean of the Faculty of Civil Engineering Subotica for his support, Danijel Kukaras who was in charge of the organization of this workshop in Subotica, and to all staff at the Faculty who helped in the realization of this workshop.

All details and material of the workshop are available to interested parties on the project online platform: <http://science.geof.unizg.hr/moodle>.

Dražen Tutić, Faculty of Geodesy, Zagreb

3rd BESTSDI Workshop, March 27-29, 2017, Skopje, Macedonia

3rd BESTSDI Workshop in Skopje was organized by the Faculty of Civil Engineering of Ss. Cyril and Methodius University whose project team is led by Prof. Zlatko Srbinoski. This workshop was organized only two weeks after the 2nd Workshop in Subotica. This time, the focus group included program countries, i.e. the participants from Belgium, Germany, Croatia and Macedonia, but also the participants from the partner countries Bosnia and Herzegovina, Albania, Serbia, Montenegro and Kosovo.



The main objective of this workshop was to exchange knowledge and foster work in task groups.

Very important addition of this workshop was a visit to the Agency for Real Estate Cadastre (AREC) of the Republic of Macedonia. AREC is BESTSDI associated partner with the role to participate in BESTSDI activities related to the dissemination of knowledge primarily to the public sector. AREC will particularly support curriculum development and knowledge transfer by organising meetings with universities, public sector institutions and private firms on national level. This meeting of BESTSDI team in AREC facilities served exactly this purpose.

The work in three days was divided into 11 sessions: 1) Opening session, 2) Reporting session, 3) What do we understand under SDI and SDI context within the frame of BESTSDI project, 4) Current learning material status, 5) Agency for Real Estate Cadastre, 6) Requirement Analysis, 7) Project & Financial management, 8) Equipment procurement, 9) Specification of project curriculum, 9) Quality plan and 10) Wrap-up session.

The workshop started with the welcome speech given by Prof. Darko Moslavac, the dean of the Faculty of Civil Engineering of Ss. Cyril and Methodius University. Ana Mitrovska from the National Agency for European Educational Programmes and Mobility (NAEPM) presented ERASMUS+ programmes in Macedonia. In this opening session, the host was presented, and the work plan accepted.

Željko Bačić reported on project activities and progress, while Vesna Poslončec-Petrić presented project communication plan and its realization.

The discussion on understanding SDI followed in the afternoon of the first day featuring the presentations of examples from Macedonia (Gjorgi Gjorgiev), Bosnia and Herzegovina (Mladen Amović) and Belgium (Danny Vanderbroucke).

At the end of the first day, task group leaders Dražen Tutić, Ulrike Klein reported on the progress in their task groups that belong to Work Package 1: Preparation.

The second day started with the visit to AREC. AREC director, Slavche Trpeski gave a warm welcome and emphasized AREC mission and dedication to support SDI development. Lidija Krstevska presented the implemented and ongoing NSDI projects in AREC, Sonja Dimova



presented the development of the National spatial data infrastructure in Macedonia, and Tatjana Arangelova presented National Geoportal of the Republic of Macedonia. Igorche Karafilovski from Crisis Management Centre demonstrated application of SDI for Macedonian Forest Fire Information System- MKFFIS. At the end of this session, Danny Vanderbroucke presented the findings of the survey conducted within the frame of requirement analysis.

The second day ended with two sessions, the first one on financial management given by Željko Bačić, and equipment procurement given by Danijel Šugar.

The third day of the workshop had three morning sessions. Specification of the project curriculum was presented by Danny Vanderbroucke. Ulrike Klein and Željko Bačić reported on the progress of specification and activating project quality control. The workshop ended with wrap-up session and plan for future activities.

The success of this workshop was provided mainly by the team from Faculty of Civil Engineering of Ss. Cyril and Methodius University, Prof. Zlatko Srbinoski, Prof. Zlatko Bogdanovski, Gjorgi Gjorgiev, Filip Kasapovski and Tome Gegovski.

Dražen Tutić, Faculty of Geodesy, Zagreb



Related events and conferences

Faculty of Technical Sciences University of Novi Sad

The Faculty of Technical Sciences opened a new computer laboratory with 16 high performance computers. The equipment was financed by the GEOWEB project. GEOWEB is an EU project intended for the modernisation of geodesy education in the Western Balkans and focused on competences and learning outcomes. The Workshop related to the area of Ground Penetrating Radar was held on 10.3.2017.

The purpose of this event was to make the students familiar with the concepts of Ground Penetrating Radar, how to collect spatial data and how to use data. The lecturers were Simona Fontul (Laboratorio Nacional de Engenharia Civil, Portugal), Damir Varevac (Faculty of Civil Engineering of Osijek, Croatia), Lara Pajewski (Sapienza University, Italy) and Aleksandar Ristić (Faculty of Technical Sciences, Serbia).



More information is available on: <http://geo.ftn.uns.ac.rs/mod/resource/view.php?id=4048> and <http://www.ftn.uns.ac.rs/n978966826/otvorena-laboratorija-za-geoinformatiku-na-ftn-u>.

Dragana Popovic and Dubravka Sladić, Faculty of Faculty of Technical Sciences, Novi Sad

SDI in Mostar

As a part of the **Day of Geography Studies** held on March 17th, a cartography workshop was also held along with other workshops. The workshop was led by Dario Šakić. The aim of the workshop was to demonstrate the importance of cartography today, orientation techniques, spatial data infrastructure and GIS basics. Current project named BESTSDI was presented to students, and the objective of the project, as well as how the Faculty participates in its implementation, was explained. The importance of spatial data standardization was emphasized. The students were able to do measurements on topographic maps, to see what data should be collected in the field to make such a map. They also learned something new about cartographic projections, what they are, why they are important and what kind of projections are available.



Snježana Musa, Faculty of Science and Education, Mostar

Coordination meeting of Erasmus + projects

Coordination meeting of Erasmus + projects was held in Metropol Palace Hotel on 5. May 2017 organised by Tempus - Erasmus Foundation + in Serbia with the support of the Ministry of Education, Science and Technological Development in order to provide guidelines for successful implementation of Erasmus + projects in the field of capacity building in higher education, as well as the recommendation for successful financial management and preparation of reports.

Milorad Janić and Dragomir Grujović, Faculty of Forestry, Belgrade

BESTSDI at the Festival of Science 2017

The **Festival of Science**, was held in 22 towns in Croatia and traditionally in the Technical Museum "Nikola Tesla" in Zagreb, from April 24 until 29, 2017. This year's manifestation was the 15th Festival of Science gathering many Faculties, scientific institutes, scientific and non-governmental organizations for science popularization, schools and individuals, including traditionally also the Faculty of Geodesy from the University of Zagreb.

The BESTSDI project team from Zagreb presented SDI concept in general and tried to explain to the visitors why "ordinary" people need SDI and why we run BESTSDI project. Besides SDI & BESTSDI presentation, the team also presented EU Copernicus program and the role of the Faculty as Copernicus Relay for Croatia and Copernicus Academy member from Croatia. What was it like? ...visit our [Facebook](#).



Vesna Poslončec-Petrić, Faculty of Geodesy, Zagreb

IMPULS project "Infrastructure of Geospatial Data in the Service of the Development of the Republic of Srpska"

In the period from 27-28. April 2017, the workshop within the frame of the IMPULS project "Infrastructure of Geospatial Data in the Service of the Development of the Republic of Srpska" was held. The workshop offered the possibility to share experiences from Sweden and Croatia in the field of legislative system in terms of spatial data infrastructure and examples of good solutions in practice that the representatives of the Faculty of Technical Sciences in Novi Sad shared with other participants. They gave suggestions about what the authorities in Republic of Srpska need to do in the future period.



On the second workshop day, the representatives from the Faculty of Architecture-Civil Engineering and Geodesy at the University of Banja Luka presented BESTSDI project, its importance and benefits for the University of Banja Luka and the Republic of Srpska in the presentation titled "Development of New Educational Programmes in the Field of Infrastructure of Geospatial Data".

Mladen Amović, Faculty of Architecture-Civil Engineering and Geodesy, Banja Luka

Erasmus + Office in Serbia - Visit to the Faculty of Forestry, Belgrade

The Preventive Monitoring Visit to the project Western Balkans Academic Education Evolution and Professional's Sustainable Training for Spatial Data Infrastructures / BESTSDI was held at the Faculty of Forestry, University of Belgrade, on May 22, 2017.

The meeting was attended by the representatives of the Tempus Foundation - Erasmus + Office in Serbia, all members of the project team of the University of Belgrade, as well as by two participants of the project team from the Faculty of Technical Sciences at the University of Novi Sad.

Milorad Janić and Dragomir Grujović, Faculty of Forestry, Belgrade

“Land Capability Study Project for the Area of Tuzla City” – presentation of the project outcomes and training course for municipality administration

The main act to consider the value of land from the perspective of various sectors and their needs (urban planning, agriculture etc.) in the Federation of Bosnia and Herzegovina is the Decree on unique methodology for preparation of the spatial planning documents that prescribes the obligation to make the Land capability study a segment of spatial basis.

Land capability study projects are being implemented by the Institute of Soil, Agro chemistry and Melioration (PAM) of the Faculty of Agricultural and Food Sciences, University of Sarajevo.

The main objectives of this study are to prepare thematic databases and maps (scale of 1:10,000 as prescribed by the Law on Spatial Planning) and to explore and analyse land resources of certain municipality by using Geographic Information System (GIS) and remote sensing source of information. Based on this database, the further objective is to determine the distribution of different land use types, as well as to perform evaluation of soil based on its quality (bonity) categories, and the analysis of pedological characteristics of the present soil types. By using defined soil bonity categories, land capability study defines the natural potential of soils in terms of agricultural production and food production, and defines the zones for various land use types. From the rational land use point of view, it means adequate spatial planning, rural planning, development of agriculture and environmental protection.

Land capability study project has been implemented in Tuzla City. The presentation of the project outcomes was held on May 26, 2017. Prof. Hamid Čustović, PhD, pointed out the importance of having digital databases for planning at local level, while Doc. Melisa Ljuša, PhD, presented GIS database and maps prepared within the frame of the project.

The workshop was attended by the Mayor of Tuzla City, the representatives of city administration, Cantonal Ministry for Spatial Planning and Environmental Protection, Cantonal Ministry for Agriculture, Forestry and Water Management, and others.



In addition to this, the Institute of Soil, Agro chemistry and Melioration of the Faculty of Agricultural and Food Sciences, University of Sarajevo organized training course on SDI and practical use of the land capability study project. The trainers were Doc. Melisa Ljuša, PhD, and Doc. Jasmin Taletović, PhD. Two-day training course was held in May, attended by the representatives of seven municipalities of the Tuzla Canton.

This training course improved the level of competences and skills of municipalities' representatives, but also contributed to the objectives of the BESTSDI project.

Melisa Ljuša, Faculty of Agricultural and Food Sciences, Sarajevo

BESTSDI in Montenegro

In the context of continuous monitoring of the Erasmus+ programme, the Education, Audiovisual and Culture Executive Agency (EACEA) is developing a comprehensive field monitoring policy. National Erasmus+ Office in Montenegro (NEO) is eager to have a better overview of the funded projects, their objectives and results and to become better acquainted with the institutions and stakeholders involved.

The purpose of the visit is to provide the rules, procedures and advice to prevent potential future difficulties and obstacles, to review the objectives, priorities, methodology and planned activities, to discuss and check the applied procedures, their relevance and adequacy for financial management in particular. It gathered all relevant staff members involved in the project, both academic and administrative.

On Thursday, May 30th, 2017, the monitoring visit was held and organized by the National Erasmus+ Office in Montenegro (NEO) in Podgorica.

The following members attended the meeting: Goran Barović (Faculty of Philosophy), Duško Vujačić (Faculty of Philosophy), Nikola Pavlović (Rectorate of the University of Montenegro), Vanja Drljević (National Erasmus+ Office in Montenegro), Ranko Lazović (National Erasmus+ Office in Montenegro), Aleksandra Despotović (Biotechnical Faculty), Jelena Latinović (Biotechnical Faculty), Mirko Knežević (Biotechnical Faculty), Ana Topalović (Biotechnical Faculty), Milić Čurović (Biotechnical Faculty), Katarina Pavićević (master student of the Biotechnical Faculty).

Agenda was planned according to daily activities:

- Rules, procedures and advices to prevent potential future difficulties and obstacles
- Review of the objectives, priorities, methodology and planned activities
- Introduction of the project
- The following activities
- Discussion and consideration of applied procedures, their relevance and adequacy

In the opening speech of the meeting, Vanja Drljević - National Erasmus+ Office in Montenegro, said that in the context of continuous monitoring of the Erasmus+ programme, the Education, Audiovisual and Culture Executive Agency (EACEA) was developing a comprehensive field monitoring policy. NEO are eager to have a better overview of the funded projects, their objectives and results and to become better acquainted with the institutions and stakeholders involved.

At the end, NEO noted that this meeting was successful, and it was highlighted that the implementation of the BESTSDI program was developing as planned with the project participants performing the activities within above mentioned deadlines.

Katarina Pavićević
Biotechnical Faculty Podgorica, University of Montenegro



1st International Doctoral Seminar in the field of Geodesy, Geoinformatics and Geospace

The Faculty of Geodesy, University in Zagreb organized the 1st International Doctoral Seminar in the field of Geodesy, Geoinformatics and Geospace in cooperation with Technical University Munich from Germany and Catholic University Leuven from Belgium that was held in the period from May 22nd – 25th 2017 in Dubrovnik at the Centre for Advanced Academic Studies (CAAS) of the University in Zagreb. The goal of the seminar was to foster cooperation and networking among PhD students of the doctoral studies in the region and across Europe, and enhance educational and research potentials of the postgraduate doctoral study programme of geodesy and geoinformatics at the Faculty of Geodesy, University in Zagreb.

The development of information - communication and satellite-technologies, micro- and nano- electromechanical systems and robotics has caused mayor and deep changes in geo-sciences, which is especially visible in the field of Geodesy and Geoinformatics. Additionally, globalization and interdisciplinarity have fostered the development of completely new concepts of data collection, analysis and usage of spatial information, where Global Navigation Satellite Systems and Unmanned Aerial Vehicles have changed the paradigm of classical geodesy, and Spatial Data Infrastructure is just beginning a process materialized today through the concepts of intelligent transportation, smart cities and smart environment.



Technological revolution and fast growth of all branches of geo-sciences present a great challenge for academic society highlighting the issue of how to cope with changes and how to keep the highest level of education and research, especially emphasized in the execution of postgraduate doctoral studies. At the Faculty of Geodesy, as elsewhere in the world, we see the solution in networking at all levels, enabling the students of PhD studies, their mentors and teachers to exchange the information about scientific cognition and executed projects, and research results. This should enable better mobility, joint launching and participation in projects, dual mentorships and doctoral thesis.

In the above mentioned context, PhD schools and seminars are becoming frequent, almost regular form of activity in advanced countries worldwide. Due to the lack of such content in South-East Europe in the field of our interest, we have decided to organize International Doctoral Seminar which should enable all PhD students, both from the Faculty of Geodesy and other academic institutions, to participate in this seminar under favourable conditions in fascinating surrounding of Dubrovnik, the pearl of Croatian coast.

The seminar attended by 40 participants, PhD students and professors-lecturers from eight countries, including also four partner universities at the BESTSDI project, was held in the exquisite surrounding of CAAS centre in Dubrovnik, just few hundred meters from the old town of Dubrovnik.

More information about this event is available at the Seminar web-page <http://www.geof.unizg.hr/ids2017/>.

Željko Bačić, Faculty of Geodesy, Zagreb



Digitale Geodaten NRW

Since January 2017, all official spatial information of the German state North Rhine Westphalia is available as Open Data. Digital Terrain Models, Digital Landscape Models, Orthophotos and topographic maps, as well as the data concerning the population or the environment are ready to be downloaded in different formats and free to use for all academic, economic, governmental or other commercial or non-commercial purposes under the link <http://opengeodata.nrw.de>.



Figure 1: Average slope per street segment. Data: Digital Terrain Model, Digital Landscape Model, Digital Orthophotos. Data source: Land NRW (2017). Data licence Germany – attribution – Version 2.0

The Department of Geodesy from Bochum University of Applied Science already uses the data to build different applications. The latest one is a tool to create a map with upward and downward slopes. It uses the street data from the Digital Landscape Model and the Digital Terrain Model to automatically calculate the angle and the direction of the gradient for each street segment. The average slope data is displayed on a map in classes of difficulty (see Figure 1). The results can be used, for example, for the planning of bicycle routes or the analysis of accessibility of points of interest for wheelchair drivers.

Ulrike Klein, Bochum University of Applied Sciences, Bochum

Future project events

4th BESTSDI Workshop, Nikšić, Montenegro will be held at the Faculty of Philosophy Nikšić; Montenegro in Nikšić, Montenegro in September 14-15, 2017. More info on <http://science.geof.unizg.hr/moodle/>.

5th BESTSDI Workshop, Mostar, Bosnia and Herzegovina will be held at the Faculty of Science and Education, University of Mostar; Bosnia and Herzegovina, in November 06-08, 2017. More info on <http://science.geof.unizg.hr/moodle/>.

Future related events and conferences

Split Summer School 2017 at the Faculty of Civil Engineering, Architecture and Geodesy Summer School will be held at the Faculty of Civil Engineering, Architecture and Geodesy in Split, Croatia, September 4-8, 2017. The first announcement and call for applications are available on: <http://split-summerschool.com/>.

13th International Conference "Geoheritage, Geoinformation and Cartography" organized by Croatian Cartographic Society and the Faculty of Geodesy, University in Zagreb in Selce, Croatia, September 7-9, 2017. More info on www.kartografija.hr.

Publications and presentations related to BESTSDI

[SDI and Changes on the Earth](#), Festival of Science 2017, Zagreb, Croatia, April 24-29, 2017. (*Poslončec-Petrić, V.; Bačić, Ž.; Tutić, D.; Nevistić, Z.*)

[ERASMUS+ Capacity Building in Higher Education – project BESTSDI](#), News of the Agency for Real Estate Cadastre of the Republic of Macedonia.

[BESTSDI – regionalni projekt ERASMUS+ za unaprjeđenje akademske nastave iz područja infrastrukture prostornih podataka](#), Short article on BESTSDI project, Geodetski glasnik, Vol. 50, No. 47. (*Ključanin, S.; Poslončec-Petrić, V.; Bačić, Ž.*)

[BESTSDI Project – Modernization and Standardization of SDI Education in Region](#), 12th International Scientific and Professional Conference on Contemporary Theory and Practice in Construction, 6-8. December 2016, Banja Luka, Bosnia and Herzegovina (*Bačić, Ž; Poslončec-Petrić, V.*)

[First ERASMUS+ project coordinated in Croatia](#), Universitas – Croatian university newspaper, December 5, 2016.

[BESTSDI – regional ERASMUS+ SDI project](#), 8th NSDI & INSPIRE Day, Zagreb, November 25, 2016. (*Poslončec-Petrić, V.*)

[BESTSDI – Regional ERASMUS + Project for the Improvement of the Academic Education in Spatial Data Infrastructure](#), 12th conference Cartography and Geoinformation (Zagreb, November 16–18, 2016) (*Bačić, Ž; Poslončec-Petrić, V.*)

Aleksić, I.R., Kuburić, M., Aleksić, Lj. (2017). [Technical Implementation of the National Spatial Data Infrastructure in Serbia](#), Tehnički vjesnik, 24(1). doi:10.17559/TV-20140819095348.

... more at: www.beststdi.eu

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