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BESTSDI PROJEKT – MODERNIZACIJA I STANDARDIZACIJA NASTAVE IZ IPP U REGIJI

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Rezime:

Efikasno korištenje prostornih informacija danas je jedan od pokazatelja razvijenosti društva. Znanja i vještine povezane s korištenjem prostornih informacija objedinjenih u konceptu infrastrukture prostornih podataka (IPP) nova je paradigma geodetske, ali drugih struka koje se temelje na prostornim informacijama. U cilju modernizacije, standardizacije i podizanja nivoa akademske nastave IPP-a na univerzitetima u jugoistočnoj Europi, u okviru Erasmus+ programa pokrenut je projekt BESTSDI. Osnovni podaci o projektu i njegovi ciljevi te očekivani rezultati predstavljeni su u ovom radu

Ključne riječi: BESTSDI, IPP, akademska nastava, jugoistočna Europa

BESTSDI PROJECT – MODERNIZATION AND STANDARDIZATION OF SDI EDUCATION IN REGION

Abstract:

Efficient usage of spatial information is today one of the society development indicators. Knowledge and skills tied to usage of spatial information incorporated in the spatial data infrastructure (SDI) concept is new paradigm of geodetic, but also other professions related to spatial informations. Towards modernization, standardization and level raising of SDI academic education on the universities in South-East Europe, in the frame of Erasmus+ programme, the BESTSDI project has been launched. General information about this project, its goal and expected results are presented in this paper.

Keywords: BESTSDI, SDI, academic education, South-East Europe

1. INTRODUCTION

Reacting on Erasmus+ call 2016 (EAC/A04/2015) which was published in the EU's Official Journal on 20 October 2015 group of Universities coordinated by Faculty of Geodesy University of Zagreb submitted in February 2016 application on Key Action 2: Capacity building in higher education call. Among 736 applications received Western Balkans Academic Education Evolution and Professional's Sustainable Training for Spatial Data Infrastructures (BESTSDI) Project was one of 147 projects selected for funding. The amount awarded for funding of BESTSDI project is €978.166,66 which should be used inside 36 months starting in October 2016.

2. MOTIVATION FOR BESTSDI PROJECT

A Spatial Data Infrastructure (SDI) is a framework to share, discover and re-use spatial data among public authorities, the private sector and citizens. SDI's are based on a "coordinated series of agreements on technology standards, institutional agreements, and policies" [1] that unlock geospatial information resources for a wide range of application fields, for instance environmental monitoring and policy making, transportation planning, health care, physical planning, national security, etc. They are an integral part of the e-government movement and open data initiatives.

INSPIRE is an EU Directive [2] aiming to establish an infrastructure for spatial information in Europe to support Community environmental policies and policies or activities which may have an impact on the environment (<http://inspire.ec.europa.eu/>). The Directive addresses problems regarding the availability, quality, organization, accessibility and sharing of spatial information. INSPIRE may be seen as the legal framework of a European SDI.

BESTSDI Project is based on findings of the EU IPA2010 project "INSPIRATION – Spatial Data Infrastructure in the Western Balkans" executed in 2012-2013 and the follow-on project "Cooperation in the Western Balkans region – Infrastructure for Spatial Information in the region of Western Balkan" (IMPULS), financed by Sida (Swedish International Development Cooperation Agency), being under execution.

While INSPIRATION focused on promotion of SDI and coordination of its further development resulting in strong legislative activities among the involved National Mapping and Cadastral Agencies (NMCA's), IMPULS is a project aiming to provide support to the development of the Regional SDI's in accordance with the INSPIRE Directive and SEE 2020 (South East Europe 2020 Strategy) and other relevant documents aiming to the improvement of interoperable spatial information and services in the Western Balkan region for efficient support to e-Government. The IMPULS project primarily addresses the internal needs of the NMCA's in the partner countries and recognizes a severe shortage of qualified staff able to develop spatial data infrastructures, both with respect to data and service provision as well as its usage.

BESTSDI refines and extends the IMPULS approach in three ways:

1) A successful SDI requires an active participation by in principle all national and local governments within a country as well as its private sector and – directly or indirectly – its citizens. This active participation is impossible without appropriate knowledge level about SDI of each stakeholder, especially professionals with academic education. Thus, education on SDI must be properly introduced in higher education study programs for future professionals and life-long learning courses for present professionals!

Promoting and implementing necessity for development of SDI curricula and courses BESTSDI goes beyond the NMCA-centric approach and addresses a wide group of SDI stakeholders, which are representative for the heterogeneous community of spatial data providers and consumers.

2) An SDI comes to life, if published geospatial data is widely being (re-) used, in particular for purposes other than those it was created for. BESTSDI covers both, spatial data provisions as well as its (re-) usage in application domains of regional interest. Regarding data provision, the project covers demands placed on physical science (primarily geodesy, cartography and remote sensing) which is a regional priority for Western Balkans. Data (re-) usage scenarios cover requirements arising in the regional priority domains agriculture, forestry and fisheries. The project also addresses demands related to other national priorities such as Architecture and Building (Bosnia and Herzegovina and Kosovo) and Environmental Protection (Bosnia and Herzegovina and Serbia).

3) All BESTSDI partner countries are either candidate or potential candidate countries of joining the European Union. Thus, the implementation of the INSPIRE Directive as well as compliance with a wide ranging set domain-specific EU regulations which require geospatial capabilities – e.g. EU Common Agriculture Policy (CAP), EU Water Framework Directive (WFD) or Environmental and Noise Directive (END) – is of strategic importance for becoming a full member of the EU. Therefore, the National SDI's of the partner countries have to meet a diverse set of requirements that typically goes far beyond their traditional scope. BESTSDI builds the capacity to supply and maintain up-to-date geospatial data and reliable services in order to sustainably meet the requirements of selected domain-specific EU regulations.

By following such a demand-driven approach and by taking into account the complexity and heterogeneity of a multi-purpose SDI, BESTSDI takes SDI-related education in the partner countries a significant step further, supports a sustainable SDI evolution and contributes to the development of university-enterprise cooperation, entrepreneurship and employability of graduates.

3. BESTSDI AIMS AND OBJECTIVES

The wider objectives of the BESTSDI project is to improve the quality of higher education in Geographical Science and Technology field, SDI and geodesy, enhance its relevance for the labor market and society and to improve the level of competences and skills in HEI's by developing new and innovative education programs within the field of SDI. These wider objectives are fully compliant with the priorities of the Capacity Building projects within the Erasmus+ program.

The specific project objectives are to develop, test and adapt new curricula, courses, learning material and tools within the field of SDI. In doing so, existing undergraduate and graduate geodesy and geoinformatics curricula's in the academic institutions in the WB region will be lifted to higher levels, recognizing the use of spatial data for modern society and its development. By the incorporation of SDI concept and other modern concepts based on spatial data and information, the students of the new courses will have the ability to provide efficiently spatial data and services to SDI users. In parallel, the project also introduces SDI and related concepts in undergraduate and graduate study programs on academic institutions which profiles are well recognized as SDI users, raising awareness among the students and professionals about the relevancy of SDI and advantages of well organized spatial data.

The new curricula and courses address the current knowledge gap of European directives being identified in section E, such as INSPIRE for SDI providers and Water Framework Directive and others for SDI users. In this context, the specific objective of the project is to develop appropriate curricula, courses and their content for both target groups (SDI providers and SDI users) of academic institutions. This includes the development of:

- SDI compulsory course for undergraduate study programs in geodesy,
- SDI modules for graduate study programs in geodesy and geoinformatics,
- SDI user course components (not necessary full courses) for undergraduate study programs of partner faculties,
- SDI elective courses for graduate study program of partner faculties (SDI users),
- Development of sustainable training courses (life-long education) of broad scope of professionals.

An additional project objective is to disseminate the project experiences and results in order to create additional value and multiply the impact of the results. As a consequence, dissemination will be made about best practices in teaching on SDI, the content of the developed courses, experience in introduction of newly developed courses and training courses for professionals to professional society. These dissemination activities are made to targeted audience like professional bodies, public authorities etc.

A third objective is to establish the necessary foundation for the participation of partner universities in the academic SDI arena.

The introduction of modernized curricula will provide new kind of professionals equipped with broader cognition, knowledge and skills about SDI and other modern spatial data related concepts. The new students will be able to foster development at all levels of SDI's in their countries and therefore adopt EU directives faster and more efficient. In practice this should also result in growth of a SDI based spatial data market.

4. BESTSDI PROJECT CONSORTIA

The applicant organization and coordinator of the BESTSDI project is University of Zagreb - Faculty of Geodesy (UNIZg-FoG). The BESTSDI Project team in Zagreb includes by the project coordinator Prof. Željko Bačić, Ass. Prof. Vesna Poslončec-Petrić, Prof. Damir Medak, Ass. Prof. Dražen Tutić and Dr. Danijel Šugar. UNIZg-FoG has a modern study program, recently adopted, involving geoinformatics and SDI module with courses covering also broader areas like smart cities, climate changes, etc. It has also a well-developed cooperation with academic institutions in the Western Balkans and Western Europe respectively, having also lot of managerial experience and wide professional network and close relationship with the other academic institutions and mapping agencies in the region as well as rest of Europe.

Consortia members (partners) from program countries (experts) come from Catholic University of Leuven (Prof. Joep Crompvoets, Prof. Jos Van Orshoven and Dr. Danny Vandenbroucke), the University of Applied Sciences from Bochum (Prof. Andreas Wytzisk, Prof. Ulrike Klein), the University in Split (Prof. Željko Hećimović) are deeply involved in SDI at national and European levels and they are well known in the professional geospatial community, creating a strong consortia team able to manage and conduct this project.

SDI being widely implemented and used requires education in SDI providers study programs (geodesy and geoinformatics) but also in SDI user study programs (civil engineering, mining, geology, forestry, architecture, IT sciences, biotechnology). To achieve success, the project decided to act toward both groups in synergy, strengthening ties and creating common understanding. Therefore, partner countries partners have been composed so to gather all SDI providers and expertise, and representatives from the SDI user community by bringing together five provider faculties and eleven user faculties.

Consortia members from partner countries are:

- Ss. Cyril and Methodius University Skopje (Faculty of Civil Engineering), Macedonia (having program country status in Erasmus+ program)
- Polytechnics University of Tirana (Faculty of Civil Engineering), Albania
- Polytechnics University of Tirana (Faculty of Geology and Mine), Albania
- Agricultural University of Tirana (Faculty of Forestry Science), Albania
- University of Banja Luka (Faculty of Architecture, Civil Engineering and Geodesy), Bosnia and Herzegovina
- University of Mostar (Faculty of Science and Education), Bosnia and Herzegovina
- University of Sarajevo (Faculty of Civil Engineering) Bosnia and Herzegovina
- University of Sarajevo (Faculty of Agricultural and Food Sciences), Bosnia and Herzegovina

- University of Tuzla (Faculty of Mining, Geology and Civil Engineering), Bosnia and Herzegovina
- University for Business and Technology Pristine, Kosovo
- University of Montenegro (Faculty of Philosophy Nikšić), Montenegro
- University of Montenegro (Faculty of Biotechnology Podgorica), Montenegro
- University of Belgrade (Faculty of Forestry), Serbia
- University of Novi Sad (Faculty of Technical Sciences), Serbia
- University of Novi Sad (Faculty of Civil Engineering Subotica), Serbia
- University of Prizren “Ukshin Hoti” (Faculty of Computer Sciences), Kosovo

Additionally, three NMCA’s participate in project as associated partners being especially important, since they should contribute in evaluation of developed curricula’s. Associated partners are:

- Republic Administration for Geodetic and Property Affairs of Republika Srpska, Bosnia and Herzegovina,
- Federal Administration for Geodetic and Real Property Affairs of Federation of Bosnia and Herzegovina, Bosnia and Herzegovina and
- Real Estate Cadastre Agency of the Republic of Macedonia, Macedonia.

All together project consortia consist of 16 partner universities comprehending 22 faculties and 3 associated partners. Finally, two subcontractors from Sweden, Prof. Anders Östman and Swedish NMCA – Lantmäteriet which are involved in the project due to their great experience in execution of reform and modernization projects, presence in the region (presently IMPULS and CILAP project), SDI implementation knowledge but also for external evaluation and project supervision what is extremely important for such projects.

5. EXPECTED IMPACT OF THE PROJECT

Spatial data applications are a constantly growing sector of IT, supporting businesses and growing economies. BESTSDI will contribute to this development by providing support to the market through the development of higher education curricula and programs providing the necessary knowledge and skills necessary for those developments.

The BESTSDI results primarily consist of learning material structured as a project curriculum. In addition, various types of promotion material will be produced. Finally, but not least, the project will develop and implement a consortium agreement, assuring future cooperation among the partners.

The learning material will consist of recorded lectures, reading instructions, exercises, open data sets and instructions on the use of open source software to develop SDI components. All learning material produced by the project and not associated with external property rights will be made available using CC-BY-AY license (Creative Commons by Attribution-ShareAlike). The material will be

uploaded on the project website, assuring easy access to it for all project partners. When the material is quality assured, it will also be released to the general public. During the project lifetime, partners will use the English versions of the learning material when creating localized versions. These localized versions will primarily be shared by the partners within a single country, although sharing across national boundaries are also encouraged. The localized versions of the learning material will also be shared with public authorities and private companies. Professionals at local and national levels will be reached through dissemination activities and the use of promotion material. More specifically, training of professionals will be carried out in each partner country as a part of the project.

Economic impact is reached by developing the market labour capable to solve public sector SDI issues (data models, metadata, and web services etc.) and contribute to broader development of private geoinformation sector development. The BESTSDI will enhance international impact, and contribute to the development of the regional and national SDI's in line with the INSPIRE Directive that is going to be obligatory for the project beneficiary countries when entering EU.

In particular, BESTSDI will contribute to sustainable knowledge transfer and implementation in line with European and other relevant SDI standards. The outcomes of the project will provide support to policy makers from national and local levels in line with the EU level. BESTSDI will advance knowledge and skills that will enhance uptake of innovative technologies in line with the state-of-the-art EU policies and geoinformation market development.

Fast development of collecting spatial data technologies such as Unmanned Aerial Vehicles, Copernicus services and Sentinel satellite data, air and terrestrial LIDARS and photogrammetric scanning techniques, as well as developments such as Linked Data, Sensor Web Enablement and other relevant technologies, are challenging "classical" SDI development at EU, national and sub-national levels. Local communities will extensively benefit from new technologies and spatial and Earth observation programs. Without SDI support and development these developments will be minor. BESTSDI will support these EU programs and development processes providing breakthrough state-of-the-art higher educational curricula and programs.

6. CONCLUSION

Starting the execution of BESTSDI Project for next 36 months we also start an extremely interesting period in development of SDI education in the Western Balkan region and broader which should involve great number of academic and non-academic partners. Continuing chain of projects like mentioned INSPIRATION and IMPULSE the synergetic effect should be achieved among academic partners providing new value to governmental and business sector.

Internal knowledge and expertise of partner institutions as well as firm project organization should guarantee success to this challenging project delivering at the end new curricula's about SDI, usage of spatial information and related geo-fields starting new phase in development of academic education in the field of geodesy, geoinformatics as a primary providers of spatial information, involved technical

faculties and other field faculties as secondary providers or users of spatial information.

LITERATURE:

- [1] Kuhn, Werner: Introduction to Spatial Data Infrastructures. Presentation held on March 14 2005. Available from: <http://www.docstoc.com/docs/2697206/Introduction-to-Spatial--Data-Infrastructures>, 2005.
- [2] European Commission: Directive 2007/2/EC of the European parliament and of the council: Establishing an infrastructure for spatial information in the Community (INSPIRE), Brussels, 2007.