"Contributing the Preventive Archaeology: Innovativeness, Development and Presentation"

Reporting

Project Information

CONPRA

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Final Report Summary - CONPRA (Contributing the Preventive Archaeology: Innovativeness, Development and Presentation)
Contributing the Preventive Archaeology: Innovativeness, Development and Presentation

The basic point of the project is transfer of knowledge from one partner to another. This transfer is implemented by system of mutual secondments between academic and private sector. All 4 partners could be considered leading institutions in their fields of expertise in their respective countries. All partners employed secondees on their regular projects providing so the major field for gaining new knowledge and skills, as well as exchange of experienced researchers aiding the partner institutions on the spot.

The outcomes of the works of individual partners are the manuals that contain knowledge, experience, proved methodologies and techniques in the fields of archaeology mastered by project partners. The project and its outputs will positively influence the quality of research of all participating partners, especially their potential and capacities for applicative research tasks and projects.

The project CONPRA started in January 2013 and ended in December 2016. During this time, there were four scientific work packages dealing with research - WP 2 dealt with Aerial photography, WP 3 dealt with 3D photogrammetry, WP 4 dealt with Virtual reconstruction and the main aim of WP 5 was Management of large data sets. There were two additional work packages - No. 1 was Management and No. 6 Dissemination.

During the first 2 years there were active only 3 of 4 partners - VIA MAGNA s.r.o. from Slovakia, TerraVerita s.r.o. from Czech Republic and University of Ljubljana, Slovenia. The 4th partner - University of Belgrade, Serbia, hosted first secondees in years 2015.

In February 2013 all four partners met in Vrútky, Slovakia to attend a Kick-off meeting, where the Executive Committee discussed the course of CONPRA for following year. Another Executive Committee meetings took place in every year, and the head researchers had a chance to discuss current problems and plan future progress. Apart from planned meetings of EC, there were also ad-hoc meetings, where current problems that could not wait were solved. Minutes from these meetings are published on the project website [www.conpra.eu](http://www.conpra.eu).

By the end of the year 2016 there were 31 secondments, in total 62 project months, during which 21 Early Stage and Experiences researchers studied technologies and processes within individual work packages. Because of administrative and organizational reasons the dates of some secondments were shifted, but all the changes were consulted with REA.

The scientific objectives and results of CONPRA work packages were presented on various conferences around Europe either in the form of poster or lecture, or both. (Full list can be found here: [http://www.conpra.eu/conferences/](http://www.conpra.eu/conferences/) posters from conferences here: [http://www.conpra.eu/posters/](http://www.conpra.eu/posters/))

Main objectives of CONPRA for the years 2013 and 2016 are transfer of knowledge between academic and private sector, definition of the most cost and time effective way of documentation of archaeological situations and finds, improvement in location of new archaeological sites (comparison of traditional methods and aerial archaeology), published manuals covering the fields of archaeology on which is CONPRA focused on (manuals are fully available to all researchers on project website [www.conpra.eu](http://www.conpra.eu)) MapServer, Archeopax – new open-source software developed for researchers in all areas of archaeology.

**Work Package No. 2 (partner: University of Ljubljana, Slovenia)**

WP started in May 2013 and focused on Aerial Archaeology and remote sensing. The main goal of secondments was to get theoretical background knowledge of principles of aerial archaeology and remote sensing on one hand and to test exploitation possibilities of aerial data for further processing. Through the study of literature gained the secondees the basic knowledge of theoretical aspects of remote sensing as
well as aerial photo documentation for archaeological purposes. Second step were practical exercises - evaluation and processing of archive analogue aerial imaginary. Third step was again practical exercise - evaluation and processing of the current digital aerial imaginary. The goal of the exercise was also contribution to better understanding of rules of taking pictures on the spot for proper and accurate processing. This work package shows increasing importance and exploitation possibilities of digital aerial photodocumentation for digital terrain modelling as one of the new processing methods. The following secondments were dedicated to practical exercises of evaluation and archaeological interpretation of archive aerial imagery. In summer 2013 were secondees able to bring into practice theoretical background concerning aerial archaeology during training flight in Medulin, Croatia and Duvansko Polje in Bosnia/Herzegovina. Secondment stays in 2015 were focused upon particular archaeological evaluation of raw aerial data. The evaluation itself represents basically macroscopic visual observation of particular photos and subsequent recognition of historical anthropological features and its further spatial definition. The secondment stay in 2016 was aimed at the evaluation of LiDAR data. LiDAR evaluation is about to demonstrate its possibilities as a complementary addition to aerial photography interpretation especially in forested areas. Special attention was dedicated to LiDAR raw data processing (classification algorithms) as well as visualisation techniques of the processed data. The sites scanned by LiDAR were Podhradie – Vrchní Hárad, Katova skala, hillfort „Vyšehrad“, all of them in Slovakia. We can establish on the grounds of presented case studies that LiDAR represents an effective analytical tool with a wider scope of application in both the sphere of archaeological research and sphere of monuments protection agenda.

Work Package No. 3 (partner: VIA MAGNA s.r.o. Slovakia)
Its main objective was to obtain knowledge of image-based 3D modelling used for archaeological documentation. The learning process was divided into two parts: a theoretical and practical one. Secondments were focused firstly on the post-processing of previously acquired 3D data and integration of new methods into the standard workflow of archaeological excavations on Bratislava and Čachtice castles and in village Jazernica, where medieval church was documented. Later it was decided to 3D digitize an ancient tomb in Brazda, near Skopje, Macedonia. To create 3D models digital photographs were used. Besides handheld photographing, photos were also acquired using a pole (pole aerial photography, PAP) and unmanned aerial vehicle (UAV). During last secondment in summer 2014 was also used handheld scanner Artec Eva 3D. Another issue this WP dealt with in 2015 and 2016 were the problems of the use of 3D models in real life and their comparison with traditional ways of archaeological documentation. The most obvious advantage of a digital 3D model compared to the traditional archaeological documentation methods lies in the fact that a 3D model is not static, but it can be manipulated in various ways. It can be viewed from all directions, zoomed in or out, the lighting conditions as well as texturing can be changed over and over again. These features enable archaeologists to handle very small, very large or very heavy objects, buildings or areas. Main goal of other secondments was to learn new approaches and techniques in preparing archaeological documentation. The major part of the secondment was dedicated to gaining knowledge of 3D photogrammetry and exchanging experience of working with 3D structured light scanner.

Work Package No. 4 (partner: University of Belgrade)
WP 4 finally started in year 2015. Four secondees came to Belgrade to learn as much as possible about virtual reconstruction. They used data gathered within other Work packages but collected their own, new data, as well. During the first secondment spent secondees two months working partly in the field (the
archaeological site of Vinča) and partly in the Department of Archaeology offices where they worked on processing of acquired graphic data and studied the basics of 3D modelling and reconstructing of sites, places, artefacts etc. During the stay they used to work with these techniques on the site Vinča – Belo Brdo. The stay was mainly based on studying and training of 3D modelling. From the several softwares which were introduced to the secondees, they used mainly Autodesk Maya, which represents user-friendly software that is able to import 3D models, simply modelling, rendering and making animation. This WP continued in 2016. Next stay was dedicated to the theoretical study of the 3D reconstructions, especially their scientific principles, on basis of which it was possible to create 3D reconstructions in archaeology. The next step was mainly a work in the office, during which ER made 3D reconstructions based on 3D models created within secondments in company VIA MAGNA (WP 3). Those were the models of Celto-Roman building II found on Bratislava castle, monastery Skalka nad Váhom and settlement micro area from the Late Bronze Age in Rajec, all in Slovakia. The stay also focused on the ways of presentation of 3D reconstructions for the needs of preventive archaeology.

Work Package No. 5 (partner: TerraVerita spol. s.r.o.)
Work Package 5 dealt with manipulating with large data sets with use of GIS based server technologies in order to provide integrated systems of data storing, retrieving and presenting. During the secondments in autumn 2013 and spring 2014 were the secondees included into the TerraVerita project that focused on protection and/or conservation of archaeological sites, in this particular case in the area of planned motorway bypass around Chrudim, Pardubice region, eastern Bohemia. Aside from field walking and collection of surface finds it was decided to perform an analysis of thermal imaging, LIDAR data, historic cadastre data and the information on the location of known sites. The processed data was then uploaded to GIS software. The data with the known locations of archaeological sites in the area of Chrudim were digitized into a separate point data layer within the same GIS program used for spatial analysis. When overlaid using the same projection, the data showed clear overlapping of older information in regard to field-walking results. The second task for secondees in Prague in years 2015 and 2016 was developing of ArchaeoPax, which is a modular software designed to assist archaeological fieldwork. 3D capabilities make it possible to virtually reconstruct the excavations in full detail parallel to ongoing fieldwork. The storage of data occurs in specially constructed databases which enable different types of spatial analysis. Finishing of works on ArchaeoPax and launching the application is one of the greatest achievements of whole project. It will simplify various kinds of works in the field of preventive archaeology.

Work package No. 6 (partner: University of Belgrade)
On 4th and 5th of November, at the Faculty of Philosophy of the University of Belgrade were organized CONPRA conference and workshop. It was an opportunity to disseminate results of the project to the Belgrade audiences. The conference was opened by the Attaché of the Slovak Embassy in Belgrade. There were 7 papers presented and they were dedicated to the results of Belgrade secondees to VIA MAGNA, Vrútky, Slovakia. In the afternoon session two keynote speeches brought new results on the development of preventive archaeology in Slovenia and Slovakia. After presentations there was lively discussion which involved numerous participants from the audience and CONPRA speakers. The following day was dedicated to presentation of CONPRA results from Belgrade and Vrútky and during the workshop the colleagues from VIA MAGNA presented details on photogrammetric 3D scanning and scanning using handheld 3D scanners. An exhibition on Aerial photography was opened on Saturday 5th November by D. Grossman from the Department of Archaeology, University of Ljubljana, Slovenia.
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