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Digital Map (GIS based) for Archeological Heritage

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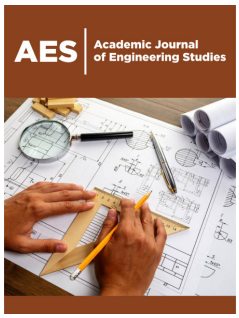

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Submission: October 26, 2021

Published: November 22, 2021

Volume 2 - Issue 4

How to cite this article: Constantin Viorel MARIAN, Mihaela IACOB. Digital Map (GIS based) for Archeological Heritage. Academic J Eng Stud. 2(4). AES.000542. 2021.

Abstract

The paper briefly presents the main product of Arch Terr project "Integrated management of archaeological heritage: archaeological map and administrative procedures for heritage research and protection"; project funded by UEFISCDI following the research collaboration of two scientific centers, "Dunărea de Jos" University of Galați and "Politehnica" University of Bucharest. The scientific research project presents the archaeological heritage digital map with geospatial information (Geographic Information Systems GIS) for Romania. The project was started in 2020 as a winner of multiple (76) research projects competition for cultural national heritage. We present, in the following, one of the deliverables of the project, the archaeological heritage digital map with geospatial information (Geographic Information Systems GIS) for Romania. The digital map was conceived as an essential tool in the activity of protecting the archaeological heritage at the level of each deconcentrated administrative structure (county directorates for culture, county cadaster offices) from the 42 territorial administrative units in Romania; the map is also a means of information for the public. The archaeological map is considered a necessity at European level, in the context of an aggressive investment policy; it comes as a support of heritage protection, cultural (archaeological) but also a land use policy, from the perspective of sustainable development. You can find the fully functional digital map at www.archterr.ro with full open public access.

Keywords: Digital map; Archaeological heritage; GIS

Introduction

The digital map of the archaeological heritage in Romania responds to an urgent need determined by the large infrastructure and real estate projects that are increasingly aggressing the archaeological heritage. International and national awareness of the vulnerability of this category of cultural heritage, which is a non-renewable resource of national identity, has led to the creation of legislative instruments, in parallel with a sustained effort to know this category through complex GIS applications. In order to know, inventory and protect the archaeological heritage, tools for integrated archaeological heritage management have been created in many European countries in the form of an interactive map [1] such as: France [2] (the archaeological map), Italy [3] (the archaeological risk map), Greece [4] (the archaeological cadaster), England [5] (the map of historical heritage), etc. For Romania, the analysis of previous efforts in the field of repertoire of archaeological discoveries RAN (National Archaeological Repertory), eGISPAT (the National Program for Implementing a Geographic Information System for the protection of cultural heritage - archeology and historical monuments) [6] reveled the need for a modern, integrated inventory system of archeological sites and monuments in Romania [7]. For the implementation of the archaeological management, we considered the transfer of technology from informatics, communications, topography, photogrammetry to archaeological heritage. At the same time, three counties were chosen, with different situations depending on the level of knowledge of the archaeological heritage: Constanța, Covasna and Galați.

Discussion

A key feature of the digital map is the simultaneous representation of two different coordinate systems information on the same map. The system permits the conversion between World Geodetic System WGS84 [8] system and Stereo70 [9] system. The data provided in, or the other coordinates are automatically reconverted before representing the polygonal surfaces on the map. The benefit of an automated conversion is avoiding human intervention and this human error when converting Stereo70 to WGS84 and vice versa. Each archeological site is graphically represented and linked to the database using unique identification (Figure 1). If a private investor desires to verify his land position relative to an archeological site, our system is designed to generate the polygonal shape based on the terrain coordinates. This allows immediate checking if the terrain is partially or totally overlapping an archeological site or its archeological protection area. The following figure shows the hardware server implementation. A structure using virtual machines is used for easy future expansion (Figure 2). The server contains in addition to a host operating system and a type 2 hypervisor, all the necessary modules for the management of the entire structure and backup (Figure 3).

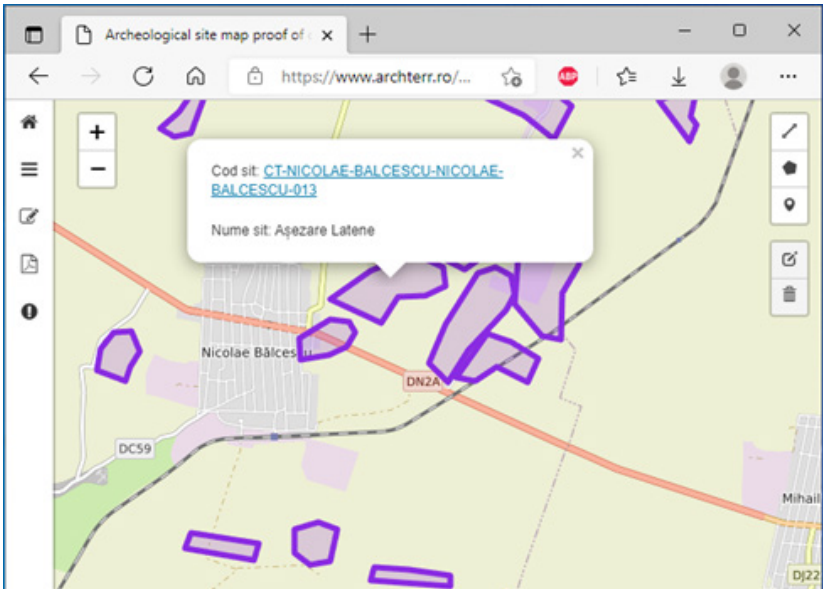

Figure 1: Archeological site graphical representation

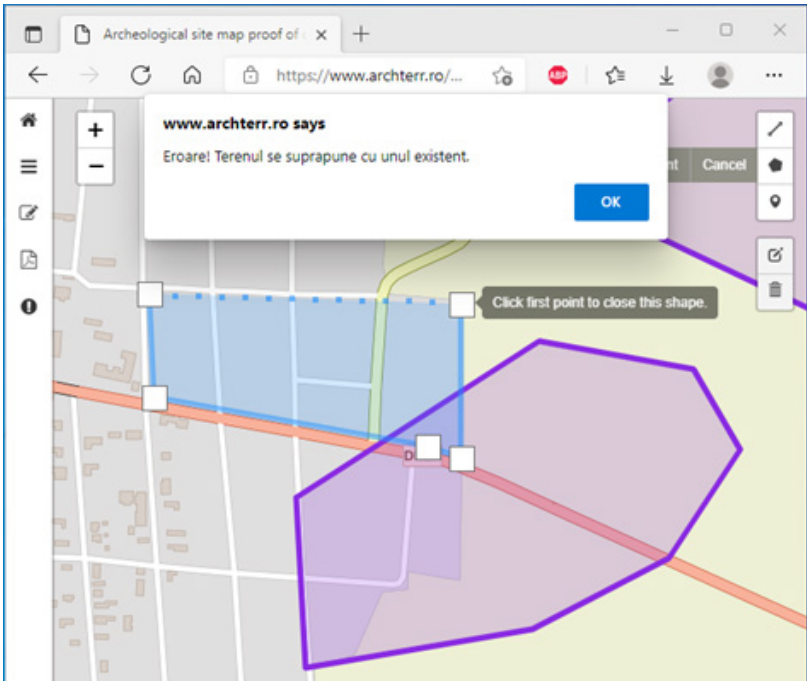

Figure 2: Error message in case.

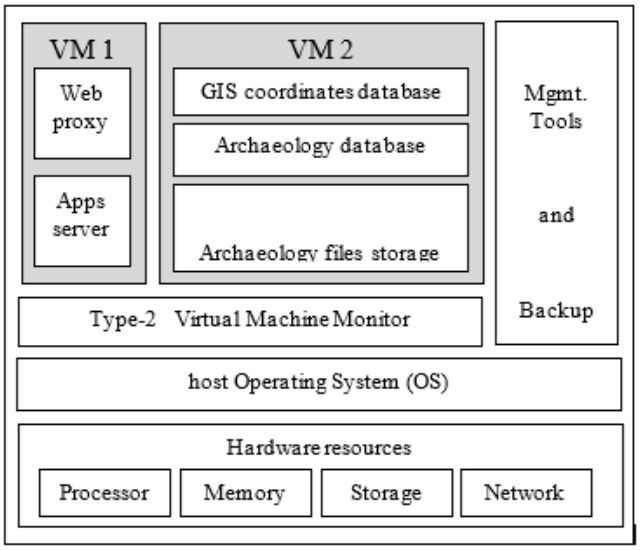

Figure 3: Hardware system architecture.

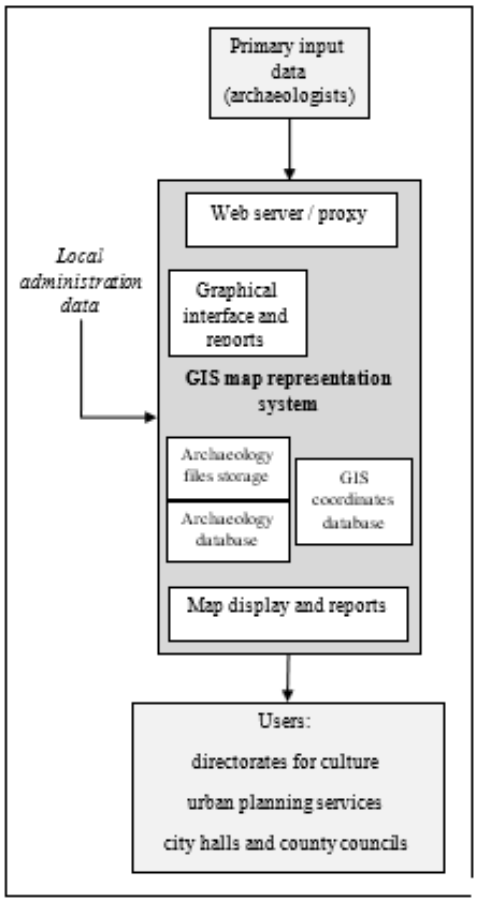

Figure 4: Functional system architecture.

The first virtual machine contains the web proxy server that provides a user friendly interface both for providing archaeological and GIS data and for displaying polygons that represent archaeological sites. It also contains the computer application that analyzes the archeological sites coordinates and displays their positioning on the map as well as the overlap with other terrain surfaces. The second virtual machine is mainly used for storing information. Here we refer with priority to the GIS coordinate information in a database. Archaeological information of any other type is stored in a database and the associated files are saved in the operating system files hierarchy. The typical user are: national directorates for culture; local urban planning services; city halls; county councils administrative services. The following figure presents the functional server architecture (Figure 4).

Conclusion

The paper presented the scientific research project outcome, the archaeological heritage digital map with geospatial information (Geographic Information Systems GIS) for Romania. The fully functional digital map could be found at www.archterr.ro with full open public access.

Acknowledgements

The research project was carried out by "Dunărea de Jos" University Galați (Department of History) and "POLITEHNICA" University Bucharest (Computer Science Department, Faculty of Engineering in Foreign Languages). This work was supported by a grant of the Romanian Ministry of Research and Innovation, CCCDI-UEFISCDI, project number PED 571/2020 within PNCDI III.

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