NEED TO IMPLEMENT A GIS
FOR ARCHEOLOGICAL SITES

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Abstract. *Given the large amount of data arising from a multidisciplinary archaeological research, the destructive nature of archaeological research and present possibilities for modeling and managing digital data, appear the need to manage and digital modeling of their to obtain digital database, maps, analysis and reports. All these requirements can respond, by his complexity, the Geographical Information Systems.*

Keywords: archaeological site, preventive archeology, proximity analysis, spatial distribution

INTRODUCTION

A key to the approach that we adopted in this paper is the archaeologic cadastre who, in accordance with the latest field regulations, is considered as specific information system for archaeological sites. Thus, within or, registration and evidence of archaeological sites is a activity of utmost importance since they are provided the minimum conditions necessary to protect sites.

For archeology, each GIS project is a unique case, according to research methods and techniques used, nature and complexity of the site, archaeologist etc. requirements. Therefore, working and operation mode of a GIS in archeology can not be standardized.

The reasons why for the archaeological sites should be reconstructed in digital form are the following: large quantity of data in graphic form (maps, plans) in the form of sheets; difficult access to information; the damage during time of graphical information, which leads to loss of information. Given the destructive nature of archaeological research, this is seriously in archeology, because we can't recover lost information; the existence need of precise positioning data of archaeological discoverys and of achieving measurements by making precision maps for storage of information from year to year (especially in the rescue excavations); a GIS have facilities in spatial analysis of information, due to its possibility to work on multiple logic levels that is structured the graphical information. Thus, a single project which includes information from one area or a wider area, you can create thematic maps of spatial distribution of a type of discovery or more, and obtaining information on connections and links between these;

➢ handling, storage and information management easier in the digital system than analog (rolls of maps, etc);

➢ ability to listing and viewing maps at different scales, in digital format, as well the advantages afforded by posibility to correct digital maps;

➢ the possibility to generate 3D model;

➢ the possibility of storage and complex query of graphic and non-graphic data;

> ➤ the possibility to associate to graphic elements their image (digital photography or scanned);

> ➤ the possibility to integrate into a GIS project as graphic data such and data in nongraphic, in a uniform format, with well established links between them and access in both directions - from a graphic to a record in the database and from a registration from database to a graphic.

A GIS APPLICATION FOR ARCHAEOLOGICAL SITES

By its very nature, the fields of protecting archaeological sites are characterized by their ability to handle data with varying degrees of detail, the data being used in different scales and resolutions. Given this reality, I propose to achieve a geographical information system on two levels, creating a spatial multi-resolution database with, properly, two different levels of detail, namely: the "area" level and the "site (Monument)" level.

Within the system will be implemented technical, legal and quality cadastral elements for each level. However, in each of the two levels will be used specific spatial data.

"Area" level system

To achieve the GIS applications at this level will be used as a support the digital maps of the study areas. At this level there are elements of technical cadastre (location, neighborhood, area, cadastral number, protection area), cadastre qualitative elements (the overall condition of the building, state of the elements of the monument) and legal elements (owner, legal situation) (Fig. 1).
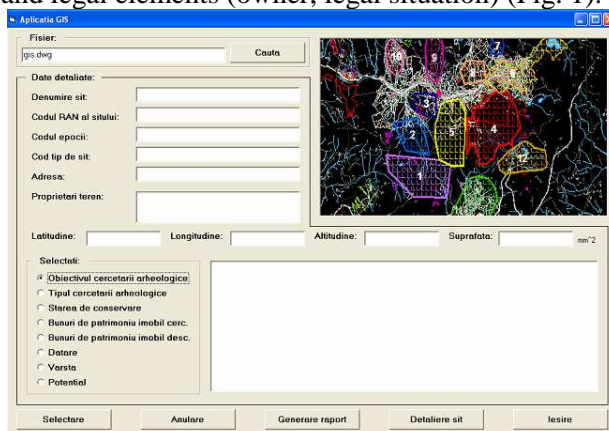

Fig. 1. Application interface

For "Area" level of the application were taken into account all the thirteen archaeological sites from Roşia Montană. It was made a database in Microsoft Access. The database contains data on site location (territorial administrative unit, city, geographical landmarks, hidrograpfical landmarks, latitude, longitude, altitude), the legal situation of the site, area, type of research, code epoch, conservation status, mobile treasures found.

In choosing a certain site from database he will appear marked on the A-Cad plan, his photo, caracteristics of the site, and if we select "RAN" code appears "Fiche archaeological site (Fig. 2).
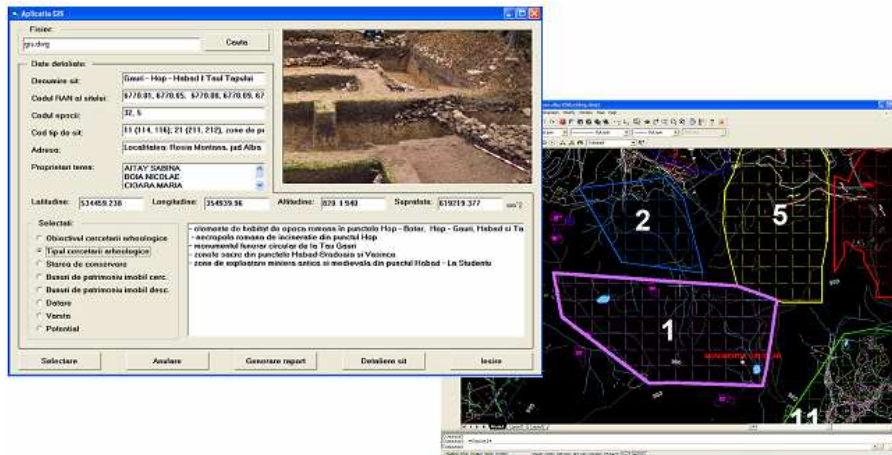
Fig. 2. Database query

"Site (monument)" level

"Site (monument)" level will be made for the particular case of archaeological sites.

At this level there will be elements of technical and qualitative cadastre. Technical elements include the site location in a coordinate system which, depending on the configuration and complexity of the site can be defined as unique on site or unique on single grave.

Qualitative elements describe the state of the site and its components in order to achieve of classifications, such as classifications after causes, types of degradation, types of treatment, emergency, etc.

For "Site (monument)" level of the application was choosed The Circular Monument, which is part of the "Găuri – Hop – Hăbad - Tăul Ţapului" archaeological site.

For this level was created a database which contains general data on the Circular Monument, but also data on the four graves found in this site (dimensions at the upper part of the grave pit, dimensions at the bottom of the grave, depth at the upper part of the grave pit, depth on the bottom of the grave pit, mobile treasures found, dating, age, destination) (Fig.3).

Fig. 3. The database for "Site (monument)" level

When we select the monument will appear his location on the site, the characteristic data and the locate the four graves (Fig. 4).

Fig. 4 The location of Circular Monument within the site "Găuri – Hop – Hăbad - Tăul Ţapului"

When we will select a certain grave it will appear marked on the Circular Monument, and we will show the caractersitics of that grave, mobile treasures found and placing them strengthen a certain period of time, based on dating.
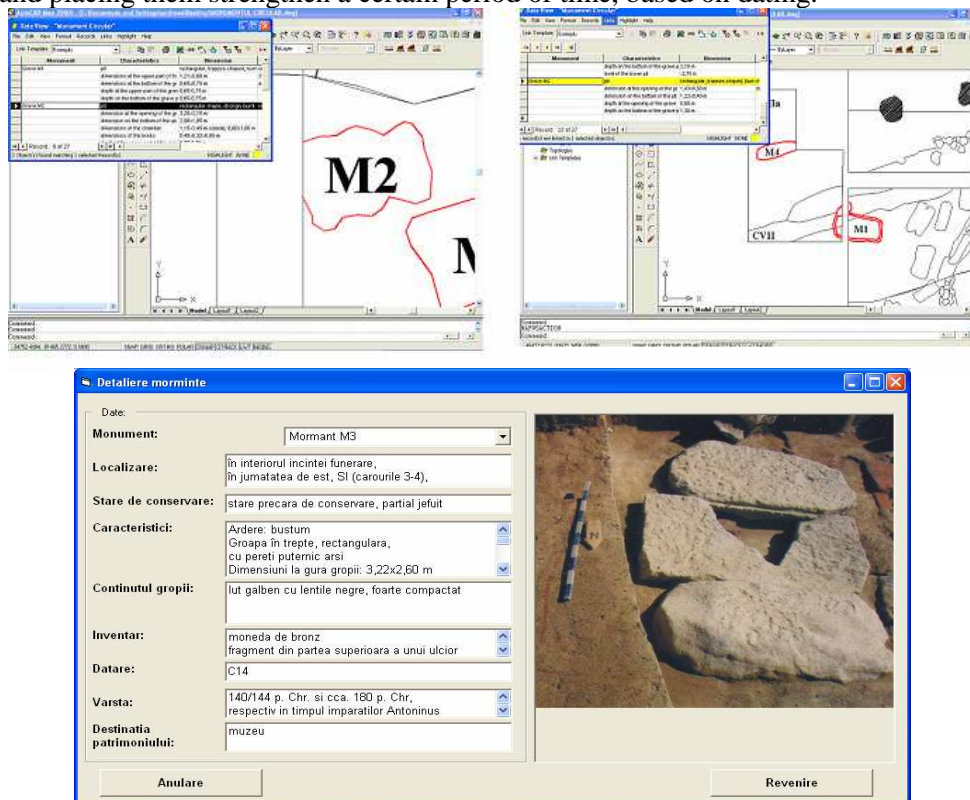

Fig. 5 Database query

As types of analysis that can make in a GIS project can be listed the following:

- o making decisions on preventive archeology;
- o spatial distribution of a type of object found, and correlations between objects found at different levels of ironing;
- o percentage analysis regarding the presence of an object or a certain type of complex on layers, the levels or large areas (in several resorts from the same archaeological period);
- o a proximity analysis showing areas of origin of materials.

Besides storage facilities, management and obtaining of information a GIS application has far superior facilities and on the presentation of data.

PROPOSALS FOR FURTHER RESEARCH

Among the proposals for further research can enumerate:

a) generalization of GIS application for monuments and archaeological sites at nationwide;
b) extension to realize GIS application for other archaeological sites;
c) extension of research in the use of 3D information.

CONCLUSIONS

The requirement of efficient administration of the national cultural heritage leads to the need for operational implementation of geographic information systems based on urban real estate cadastre and historical monuments cadastre.

The system developed in this paper is a geographic information systems for historical monuments thus joining in the trends which manifests national and international on cadastre, urban real estate cadastre, historical monuments cadastre and the management of cultural heritage.

It is necessary that such a informational system to become operational because it is primarily intended for specialists in the field of archeology at all levels: national, zonal level and the monument.

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