

# The D.E.A.D. Project: An Application for the Digital Recording of Archaeological Data

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## Abstract

This paper presents a prototype application named Digital Excavation Archaeological Diary (D.E.A.D.). D.E.A.D. is an application for the digital collection and recording of archaeological data in the excavation field, with the use of a Personal Digital Assistant (PDA) and the automated registration of the collected data to archaeological and museum digital files. The software relies on real archaeologists' requirements. The main scope of the application is to speed up the processes of the archaeological research digitalisation and registration and thus the acceleration of the publication of archaeological research.

## Keywords

PDA, archaeological excavation, data digitization, data archiving, archaeological databases

## 1. The problem

Everyday archaeological excavations produce huge amounts of information and findings. The excavation data record is traditionally completed with the use of the archaeological excavation diary and registration lists of photographs, drawings and findings. Part of the data produced out of this practice is digitised in a later phase for further processing. The effect of this practice is the accumulation of archaeological data and findings in lists and repositories, the delay of the archaeological research and, as a result, the delay of the publication of the final results and the delay of the exhibition of the artefacts in a museum. (Ευγενίδου, 1995, Κωτσάκης 2002).

## 2. The purpose

One way of addressing this problem is the direct digitalization of the archaeological discoveries on site and the automation of the archiving of archaeological data in compatible databases. The creation of a user friendly PDA application, which assists the archaeologist in collecting the basic archaeological data and does not cause additional problems to his everyday work, will speed up all the archaeological processes from the field to the lab and to the final publication and exhibition of the artefacts. The D.E.A.D. application will be used

in assistance with the traditional archaeological diary, to support the relatively easy and systematic recording and registration of the excavation data by the archaeologist. In several excavations outside Greece archaeological teams are successfully testing similar applications for the recording and registration of excavation data (Reilly and Rahtz 1992; Ziebart *et al.* 2001; Ancona *et al.* 2000; Lock 2003).

## 3. The theory

Archaeological work is a complex process with many different types of information. The excavation data record is traditionally completed with the use of the archaeological excavation diary and the registration lists of photographs, drawings and findings. Several excavation projects have been examined in order to discover and compare the most common practices of an excavation process. In addition, similar applications and articles have been read and taken into consideration. The purpose of the study was to reach a standard model of the archaeological excavation.

The methodology which has been followed for the development of D.E.A.D. is twofold:

- first, it identifies, records and automates the activities that take place during the traditional excavation (Χατζή-Βαλλάνου 1985; Renfrew 1991; Joukowsky 1999) with the aim to model

the excavation and the registration of excavation data (see *Diagram 1*),

- second, it uses this model for analysing existing applications that are currently used for excavation data recording, with the purpose to identify the excavation activities they support (see *Table 1*).

The outcome of this methodology was the specification of a set of requirements for the direct digital recording and registration of archaeological data in the field (see *Diagram 2*).

**The model of an excavation**

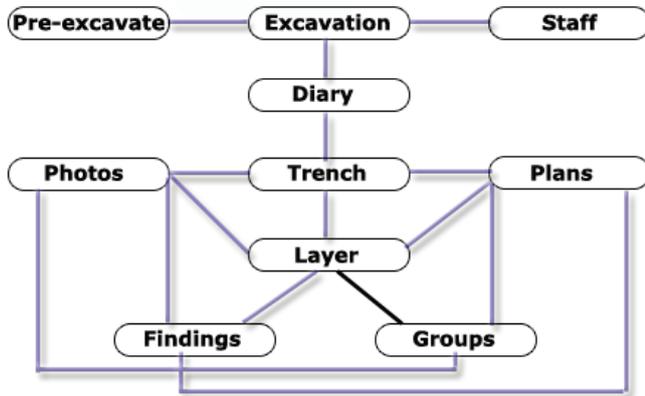


Diagram 1. The model of an excavation.

The basic structure and model of excavation data is the following: excavation, trench, level, findings, group of findings, photographs, sketches and plans. For all these, certain numerical and written information is collected. The basic problem that we encountered is that every excavation collects different data information. This problem is taken into consideration and is resolved with the D.E.A.D. application.

In addition, according to *Diagram 2*, D.E.A.D **should** support the following possibilities:

- data registration, modification, deletion and update in a database and the formation of a query to the database,
- connection and preview of photographs, drawings and their metadata,
- registration of geographic coordinates where needed and co-operation with a Geographical Information System (GIS),
- wireless data uploading in a central information system,
- communication and information exchange between work teams in different parts of the same excavation,
- linear and non-linear data registration and preview.

	Excavation	Staff	Trench	Layer	Finds	Groups	Photos	Plans	Diary
Dig-logic	✓	✓	✓	✓	✓	✓	✓	✓	✓
Archaeo-tool	✓	✓	✓	✓	✓	✓	✓	✓	✓
Singul-arch	✓	✓			✓	✓	✓	✓	✓
iadb	✓	✓	✓	✓	✓	✓	✓	✓	✓
archaeopack-pro		✓		✓	✓		✓	✓	✓
proleg	✓	✓	✓	✓	✓		✓	✓	

Table 1. Analyses of existing applications.

**The First model of D.E.A.D.**

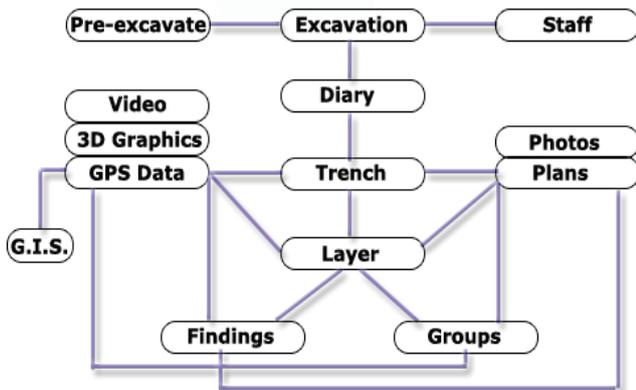


Diagram 2. The First model of D.E.A.D.

However, there are various restrictions that make the implementation of the model presented in *Diagram 2* impossible by Greek archaeological projects:

- the lack of familiarity of Greek archaeologists with modern technologies,
- the limited political will for the use of new technologies in archaeological excavations,
- equipment costs and user training,
- subjects of the usability and functionalism of the user-interface of PDAs,
- the lack of local wireless networks.

The D.E.A.D. application, however, tries to overcome these restrictions and, with the help of new technologies, tries to provide the archaeological community an easy-to-use and technologically advanced solution for collecting archaeological data in the field.

#### 4. The practice

Our system has three main components: a RDBMS, a PDA user interface and a desktop user interface. The system uses common and easy-to-use internet technologies. Both desktop and PDA interfaces are written in PHP middle-tier, which allows the communication with the database through wireless technology.

The D.E.A.D. application follows the structure of the model presented in *diagram 3*. The PDA report

**The Final model of D.E.A.D.**

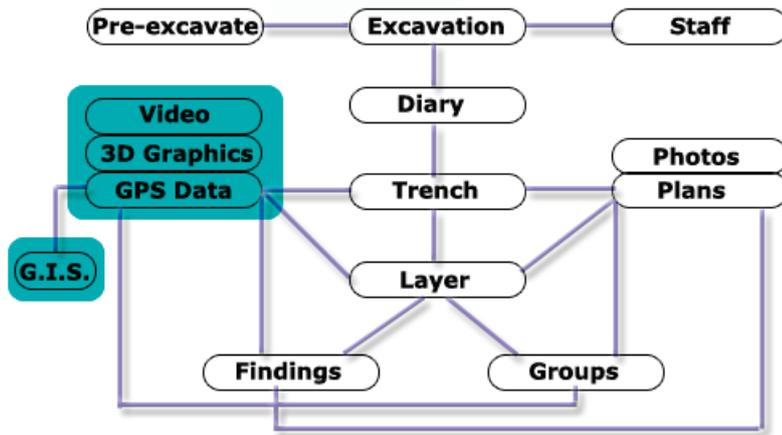


Diagram 3. The Final model of D.E.A.D.

is uploaded directly to a centralized database where the data can be modified, inspected and distributed at any time. The application is designed to be used on different kind of platforms (laptops, desktops, PDAs), and the rough conditions of an excavation were taken into consideration when designing the user-interface of the PDA. The D.E.A.D. application is fully customizable through a very simple configuration file in order to cover the needs of every type of excavation project.

Taking into consideration the aforementioned restrictions, D.E.A.D. provides the following:

- storage, preview, modification and deletion of archaeological data evolving prior to and during the archaeological excavation, which can be: time-based data (excavation date, time and meteorological conditions), topographical data

(coordinates, drawings) related to the excavation site (maps, sketches), archaeological artefacts (photographs, dimensions, drawings, material, description),

- registration of the people participating in and working for the excavation,
- automatic registration of the excavation results in a database for further processing.

Furthermore we have tested and proposed three implementation models, each one of them serving different purposes for data distribution.

The first and the simplest is the one where the collection of data and its analysis are taking place in the field. In this case, the archaeologists collect the data, take photos and register the basic information in their PDAs. Information is transmitted through wireless technology to the laptop of the supervisor, who can edit them and make quick decisions for the excavation in the field. All the data are stored in the excavation database system and the archaeological team can easily access and edit them in situ, just like in the old-fashioned way, with the use of traditional excavation diaries.

The second model gives the supervisor or other colleagues the opportunity to work from a distance. The database is located on a remote server where all the personnel have access through the PDA or PC interface. The link between the field and the remote location uses cell phone technology. In this case, the

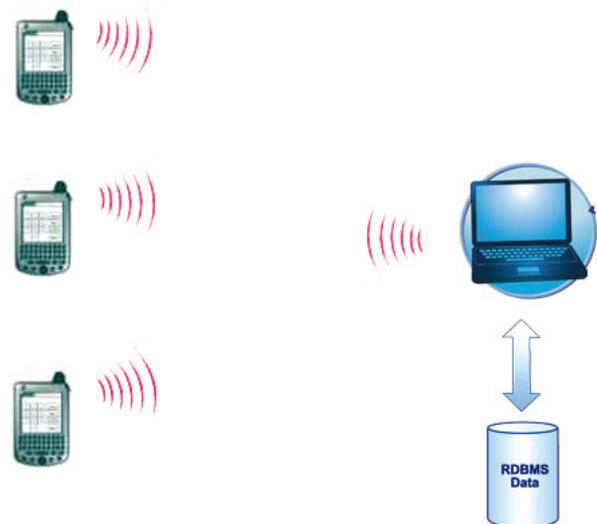


Diagram 4. D.E.A.D. Distribution Model 1.



Diagram 5. D.E.A.D. Distribution Model 2.

registration and editing can be done at the same time, both in the field and in the archaeological lab. This way, the distributed data from the excavation can be examined by the archaeological research team at the lab and give precious feedback to the field team, which can assist them during the process of excavation.

The third one can be used in case there is a need for publishing the excavation data for research reasons worldwide, through the web, in real time. When the data are stored on a remote server, they can be published easily on the internet and can be viewed and commented by authorized users, who can assist the archaeological research with their special scientific archaeological knowledge.

### 5. The use

The PDA application has been evaluated by archaeologists in terms of usability. The users have found the application easy, friendly and simple in navigation. They also pointed out the good interoperability of the D.E.A.D. application, adjusting the archaeological and technological needs of every excavation.

There are still some obstacles which need to be overcome: the lack of proper education in new technologies and the fear that archaeologists have in using them in their everyday work. Also, from a technical aspect, an archaeological project should be very well organised and have the facilities and the funds to properly support new, advanced technologies.

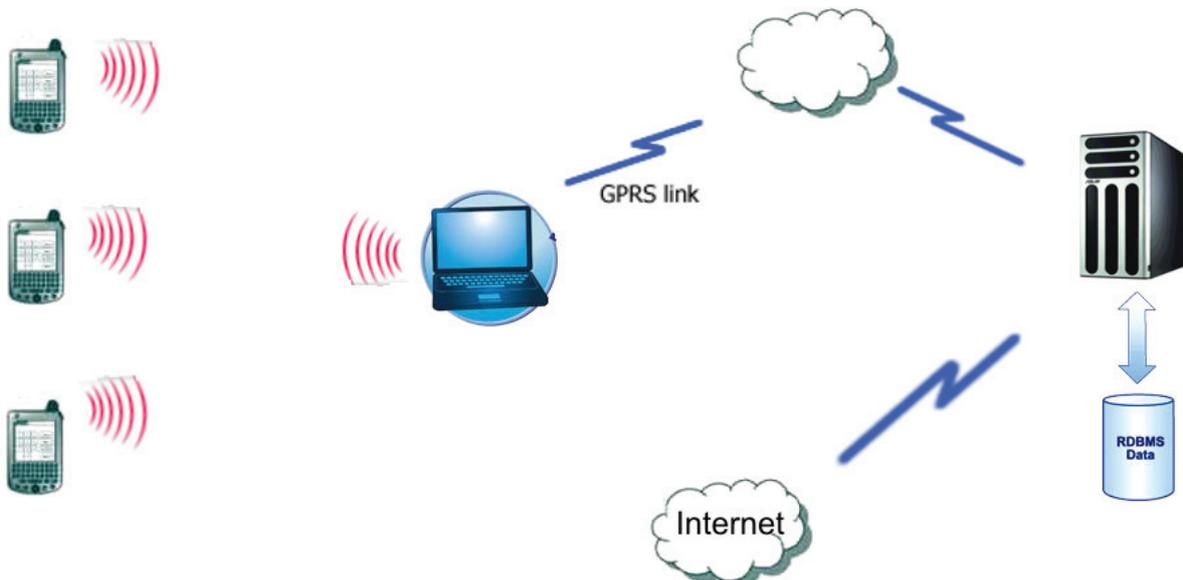


Diagram 6. D.E.A.D. Distribution Model 3.

## 6. The future

The application is in the process of final evaluation and the main objective is to observe in a real excavation, how the use of the D.E.A.D. can accelerate the process of digitization and archiving of archaeological data. Further improvements will be announced on our website [www.archaeotech.gr](http://www.archaeotech.gr).

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