

“Polemon”, “Daedalus” and the Integration of National Monument Inventories

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ABSTRACT

The need to develop, maintain and operate an Integrated National Monument Inventory (**INMI**) is well recognized among National Authorities. It will certainly serve as a tool for studying, preserving, maintaining and promoting all kinds of archaeological monuments (sites) and artifacts (movables). The emphasis is put on its usefulness to research, to educational and to various production activities, as well as to the design of development projects. We report on the three main research projects recently completed on this subject, involving universities, public authorities and private IT companies, namely "*The Monument Inventory in the Region of Central Macedonia*", "*Polemon*", and "*Daedalus*". The capabilities of the state-of-the-art Information Technology for the retrieval, processing, archiving and displaying of geometric, descriptive and morphological characteristics, in conjunction with current high-speed computer network infrastructure, already permits the development and operation of an INMI, enriched with thematic and geographic databases, which will contribute to the systematic research of all types of monument records among archaeologists, historians, architects, public officials and many others. Smaller scale Inventory Systems may be developed and maintained at local levels (Antiquities Ephorate), linked to the INMI and accessed by a friendly, hopefully multilingual user interface.

1. INTRODUCTION

The creation, maintenance, and operation of a Monument Inventory are recognized as mandatory for the documentation, protection, preservation and promotion of the cultural property and the architectural heritage. Moreover, a National Inventory can contribute greatly to scientific research and should constitute a basic precondition for the spatial allocation of production activities and the designing of development policies.

Modern computer technology offers great capabilities for the storage, processing and retrieval of geometric and morphological characteristics of monuments and movables. Traditional ("analogue") approaches have been proved inadequate, due to the sheer volume of information involved.

Cultural property falls into two main categories:

- **Immovable**: monuments, archaeological sites, etc.
- **Movable**: artifacts, products of archaeological excavations, etc.

There may be another (sub-category) of cultural property which can be primarily defined as movables, but may be subject to the intention to make them immovable. At least one aspect of the arguments concerning the restitution to Greece of the (so called) *Elgin marbles* (from the Parthenon) should be seen in this light (Parrott, 1991).

2. THE MONUMENT INVENTORY IN THE REGION OF CENTRAL MACEDONIAN (MIRCM)

The development of this Inventory was funded (from 1990 through 1993) by the Commission of the European Community and the Ministry of Macedonian and Thrace, as a University of Thessaloniki research project, under the auspices of the Hellenic UNESCO Committee.

The main goal of the project was the organization of a Monument Inventory for the region of Central Macedonian and the creation of a prototype model to serve as a basis of a forthcoming National Monument Archive (or Record). A decentralized organization scheme for this Inventory at local and regional levels, under the supervision of a central administration, was proposed. Architects and archaeologists from all three local Antiquity Ephorate (16th/Prehistoric, 9th/Byzantine and 4th/Contemporary) were participating in the research team. The (immovables-only) cultural property was divided in four categories

- Individual monuments
- Archaeological sites
- Building complexes
- Settlements and/or historic urban centers.

Four *registration forms* were compiled for the initial collection of all sorts of information. These forms were composed of thematic entities, a number of which were common in some of them, while others were simply similar in structure. These entities provide the salient facts concerning the object: name, location, ownership, ethnic and religious identification, date of construction, typological, morphological and constructional development facts across time, basic references, geodetic and land surveying data, name of the official who is responsible for the registration, etc. At least one photograph of the main facade and a plot plan were required. Descriptive data were simply keyed in, photographs and plots were scanned before their registration in the database as bit images, while other kinds of data, like the cartographic background, were entered using conventional digitization techniques.

The entire database is composed of a large number (forty four) of sub-bases, taking full advantage of the similarities in the thematic entities of the four registration forms. Almost 1200 information items (fields) for each monument form the records of these databases. It is a user-friendly *Superbase* (ver. 3.0) application, running on a Windows platform (ver. 3.11 at that time). Although four distinct registration Forms were used for the initial collection of information, the database is uniform, offering the possibility to correlate the content of any information entity, to any other entity on another Form. For the retrieval of combined information (query), keywords were assigned to each thematic entity, forming a thesaurus of terms for an accurate, more or less, description of each monument.

In order to show the geographic location of each monument, a vector cartographic background was compiled. This feature, along with the scanned maps, the topographic plans, the scanned photographs and a short descriptive text, allow for the printing of a single page information sheet for each registered "object".

Almost 700 monuments have been registered in this database, spanning the region of Central Macedonian (except those in the city of Thessaloniki). This database played a very important role, not only in the designing stage of all projects that followed, but as the first attempt to register authoritative cultural information in digital form. Access to this information (stored on CD) requires authorization by the steering Committee of all partners involved in the project.

3. *Polemon*

The *Polemon* project, officially entitled "Coordinated Informatics Services for the Documentation, Management and Promotion of Cultural Heritage", initiated in late 1994, was completed in 1997 and it is in the final stage for being approved by the (Greek) General Secretariat for Research and Technology. It was carried out by a consortium headed by the Institute of Computer Science (Foundation for Research and Technology - FORTH) and members from:

- The Ministry of Culture (Directorate of Monuments Records and Publications),
- The Faculty of Rural and Surveying Engineering, Aristotle University of Thessaloniki,
- Epsilon Software SA,
- The Institute of Computer and Communication Systems,
- Intrasoft SA,
- The Benaki Museum.

The aim of *Polemon* was the creation of a pilot information system for the National Monument Record, together with an integrated Museum Information System, both implemented at national level. The project guarantees full compatibility of information structures, procedures and required technical infrastructure between these two complementary information (sub)systems. The need to develop two distinct systems, arises from the different levels of information detail, each is required to serve: Monument Records (archives or inventories) handle information compiled and held by separate, independent and geographically dispersed local authorities (under the supervision of the Ministry of Culture), while a museum is a more or less autonomus institution, each with its own needs, aims and activities. Both systems

- Manage a formalized data corpus, thus serving the needs of basic documentation,
- Support basic management tasks,
- Handle a variety of documentation material (maps, photos, plans, text),
- Support (fixed and user-appended) thesauruses of terms,
- Can be linked to other national or international cultural information systems through computer networks.

The pilot installation of *Polemon* links servers (nodes) at Heraklion, Athens, Thessaloniki and Komotini. When accepted as a national infrastructure, will link all

Divisions (including more than forty Antiquity Ephorates) of the Ministry of Culture, nationwide. In addition, the Museum Information System running at the Benaki Museum, will serve as a prototype model for any other museum participating in the network.

From the technical point of view, Polemon is based on:

- A client - server architecture, with unix/solaris, HP/UX, or IBM/AIX operating system for the server and Windows for the clients.
- Creation of Local Area Networks (LANs) linked between them and with external networks. Each LAN corresponds to a Division or to a Museum.
- Relational databases and SQL for management and documentation (Sybase / Ingres).

Any client constructs a standard query language question, like

select table1.field1,...,tableN.fieldN

from table1,...,tableN

where tableX.fieldX = tableY.fieldY|constant

order by tableX.fieldX

using operators : AND, OR, NOT

and functions : AVG, SUM, MAX, MIN, COUNT,

which the general processing subsystem transmits to all other servers in the network in an asynchronous mode.

The authors' basic contribution to the *Polemon's* consortium was the compilation of the (digital) cartographic infrastructure for displaying the location of the monuments and the topographic plans of the archaeological sites in a GIS environment. The geographic data were obtained from various sources, or digitized at the University of Thessaloniki. More than 80000 place names (in Greek and in Latin characters) were imported from a Hellenic Army Geographic Service Database. All geographic data were transformed to the National Geodetic Reference System of 1987, forming an adequate cartographic database to be linked with the Hellenic Cadastre Data, when available. This material was initially compiled in ArcInfo 6.0, but later, it has been exported and implemented in a microGDS (pc/gis) platform.

Very few data, concerning both monuments and movable, have been stored in *Polemon's* databases, solely for testing and evaluation purposes. *Polemon's* future depends upon the Ministry of Culture's (political) decision to take advantage of the project's results.

4. *Daedalus*

Daedalus is a research project carried out concurrently with *Polemon*, in the framework of the European Union EPET-II program, under the coordination of the Archaeological Institute of Crete (at Heraklion), and members from:

- The University of Crete
- The Museum of Cretian Ethnology
- Aristotle University of Thessaloniki
- Technological School of Athens
- Geomatics SA
- Dromos SA
- Orion SA,

The main goal of *Daedalus* was the compilation of of the archaeological map of Crete in a Geographic Information System (PC-Arcinfo/Arcview GIS) environment, as well as the registration, documentation and promotion of monuments and movables in Crete, dated from the neolithic to the early industrial era. Modern scientific tools, like the Global Positioning System (GPS), using low-cost single-frequency *Maggellan* receivers, helped the archaeologists (without the presence of any land surveyor) determine the coordinates of almost 2000 sites, and mapped their location and limits with a sub-meter accuracy. Aerial photogrammetry (photos at 1:4000 scale) were also used to construct detailed maps in various places of archaeological interest.

Daedalus, like the Monument Inventory in the Region of Central Macedonia, was mainly a data collection, archiving and processing project, although the registration was limited in Crete and in Macedonia respectively. The cultural property (immovable and movable) being processed in the framework of *Daedalus* falls in one of the following categories:

- Archaeological sites
- Monuments
- Excavations and excavation data
- Objects (movables) found at the above sites.

Daedalus was developed for a Windows 95/98 platform using Microsoft Access and ArcInfo. One client - version runs on an Arcview environment. Its cartographic background was compiled in vector form, from digitized 1:50000 maps, edited with place-names from sources of much greater scale. Topographic maps at 1:5000 to 1:1000 scale were used in defining the limits of archaeological or excavation sites. Keywords were assigned to all objects, to facilitate users in retrieving the information they need using simple query language questions.

The whole application is based on two separate but related systems

- The descriptive and multimedia information management system, with the following management subsystems:
 - Descriptive data registration
 - Data retrieval
 - Multimedia display / play
 - GIS connection and cartographic display module
- The GIS management system

Daedalus final product is an integrated database / GIS user-friendly environment, suitable for managing a large amount data. Its client-server architecture allows its

interoperability with other Inventories (like *Polemon*), and special care has been taken to be as compatible as possible.

Daedalus, too, is at the final stage (2002) for being approved by the (Greek) General Secretariat for Research and Technology. The data are available on CD-ROMs to authorized users of the scientific community.

5. ARCHAEOLOGICAL CADASTRE AND INMI

The Hellenic Cadastre, is a EU supported national project, which has started in 1995, and which has an anticipated 10-15 years duration for completion. When completed, the geometric, descriptive and legal / ownership information in its databases will be very important for the development of a national monument inventory, providing the necessary cartographic background and geodetic reference for mapping the location of any monument and the boundary of any site.

6. CONCLUDING REMARKS

The know-how and the experience gained from the research conducted during the *MIRCM*, *Polemon* and *Daedalus* projects, allows the authors to state that the time has come for all teams (Universities, Private Companies and Public Authorities) to join forces for an initiative to start “building” an **Integrated National Monument Inventory** (INMI), which will cover all “items” (movable or immovable) of our cultural property.

Nevertheless, (greek) government officials have recently announced the incorporation of the project as part of nine high priority projects (120M for the Society of Information) to be funded by the 3rd European Union Framework.

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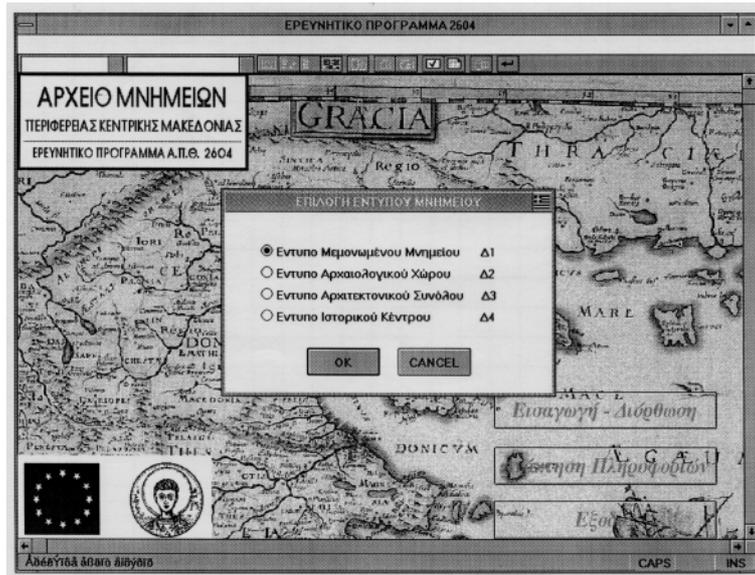


Figure 1: *MIRCM* : One of the initial screens, where the user may select a registration form.

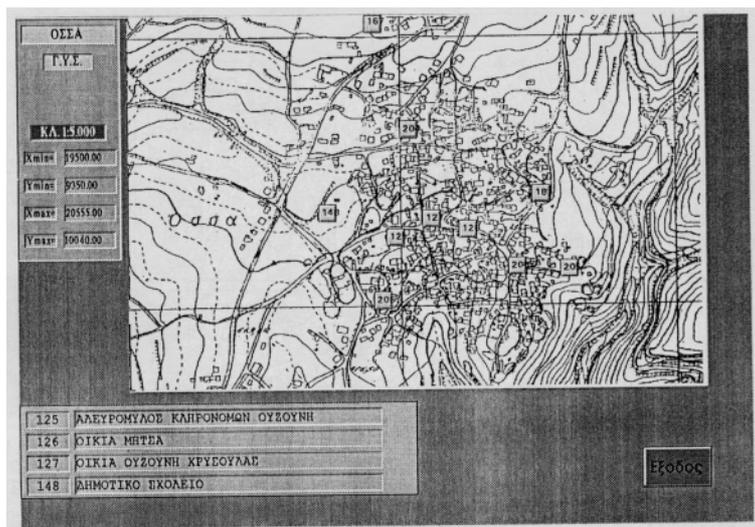


Figure 2: *MIRCM* : Location of Monuments on a digital cartographic background, after a retrieval has been completed. The user may “click” with the mouse on the monument’s location, to obtain more information from the database.

ΝΕΑ ΑΠΟΛΛΩΝΙΑ : "ΑΡΧΑΙΑ ΑΠΟΛΛΩΝΙΑ"

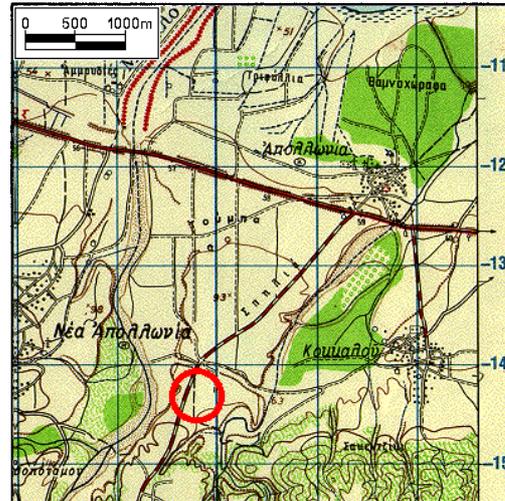
Πόλη και νεκροταφείο της Κλασικής, Ελληνιστικής και Ρωμαϊκής περιόδου, 1.5χλμ. Α της κοινότητας Νέας Απολλωνίας. Ταυτίζεται με την αρχαία Απολλωνία της Μυγδονίας. Η πόλη εντοπίζεται σε τεράστιο τραπεζόσχημο ύψωμα, έκτασης περίπου 300 στρ., στην περιφέρεια του οποίου και σε μεγάλο μήκος ανιχνεύεται ισχυρή οχύρωση. Βόρεια και νότια της πόλης εκτείνονται νεκροταφεία, το βόρειο στη δέση Μπουντρούμια όπου και ο μεγάλος ταφικός τύμβος της Παζαρούδας και το νότιο στη Θέση Καβάκι. Στην επιφάνεια της τράπεζας αφθονούν τα αρχιτεκτονικά μέλη και τα όστρακα αγγείων. Σημαντικό είναι ένα επιστύλιο με αναθηματική επιγραφή στο Διόνυσο. Η βόρεια πλευρά της τράπεζας απέχει 2χλμ. από τον οδικό άξονα Θεσσαλονίκης-Καβάλας, που πιθανότατα ακολουθεί την πορεία της Εγνατίας οδού.

ΓΡΑΠΤΕΣ ΠΗΓΕΣ

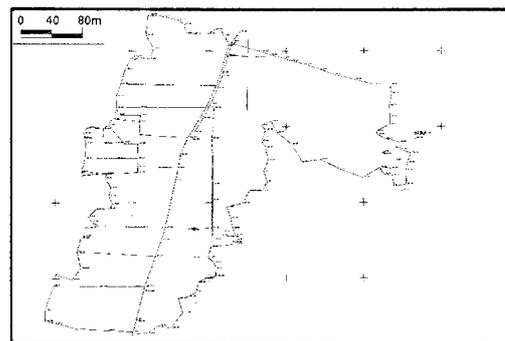
1. Πτολεμαίος III, 12, 33
2. Αθήναιος VIII, 334
3. Titus Livius XLV, 28, 8-9
4. Plinius IV, 38
5. Ψευδο-Σκύλαξ 66

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Απόσπασμα από Φ.Χ. ΖΑΓΚΛΙΒΕΡΙΟΝ κλ. 1:50000 / Γ.Υ.Σ. (σμίκρυνση).



Τοπογραφική αποτύπωση, κλ. 1:1000 / Κ. Τοκμακίδης - Π. Δημητριάδης (σμίκρυνση).



ΙΣΤ' ΕΦΟΡΕΙΑ ΠΡΟΪΣΤ. & ΚΛΑΣΙΚΩΝ ΑΡΧΑΙΟΤΗΤΩΝ

Figure 3: MIRCΜ : Sample (A4) print-out with site description.

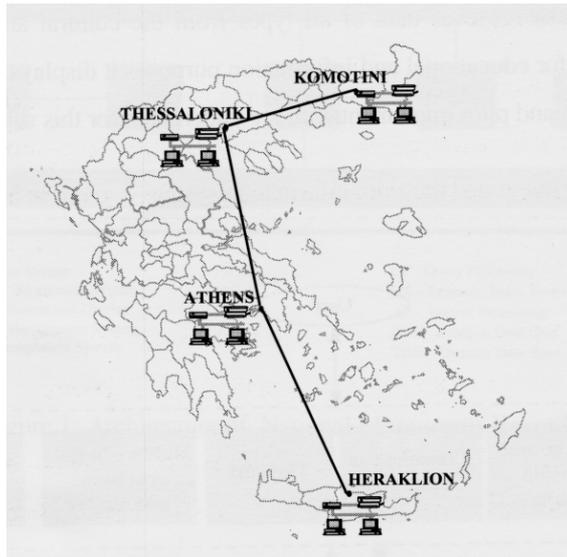


Figure 4: *Polemon* : Pilot operation at four cities in Greece. The sites are the offices of local Antiquity Ephorates.

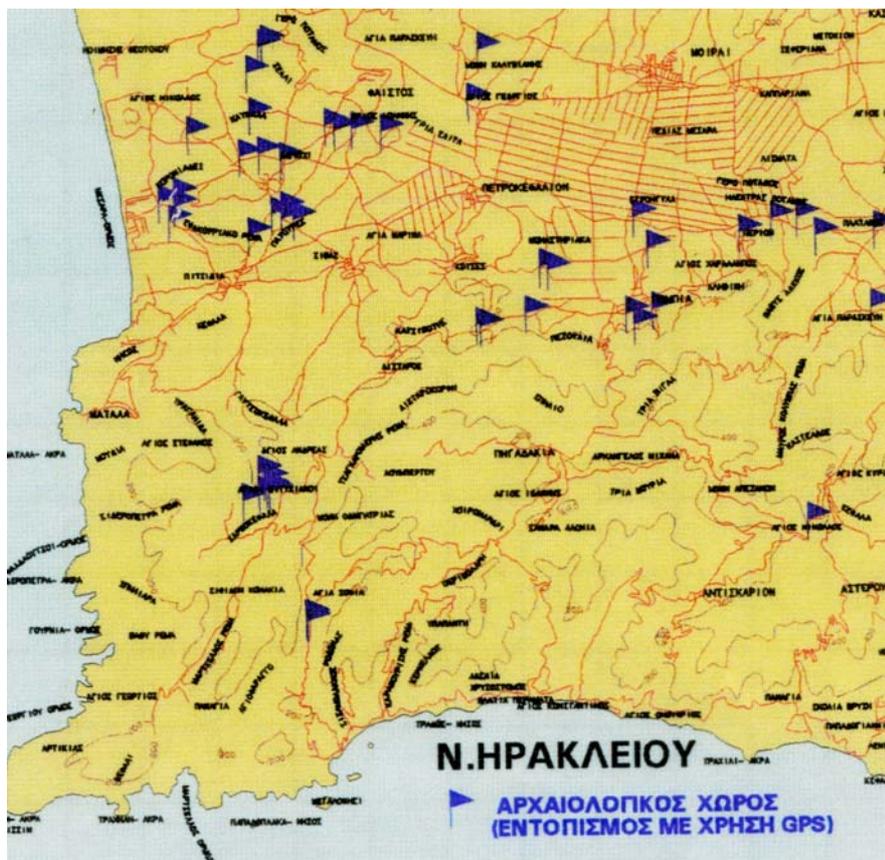


Figure 5: *Daedalus* : Sample GIS PC-screen, showing the location of monuments / sites determined by the Global Positioning System.

This portion of the whole digital map contains by far more information than the Ministry of Culture’s thematic map (<http://www.culture.gr/2/21/iv-maps/index.html>) published on the web (October 2002)