TOWARDS A COMPUTER INFORMATION SYSTEM
FOR THE ARCHAEOLOGICAL SITES
AND FOR THE MONUMENTS IN RHODES

In the Archaeological Institute of the Dodecanese, the need for establishing an information system on the archaeological sites and the monuments has been evident for many years. Collecting basic information is one of the two key requirements in integrated archaeological research and remains always a challenge. Relating and manipulating data from a variety of fields is the second key requirement in a comprehensive approach towards monuments and our cultural heritage. The great expansion and rapid improvements in personal computing systems and particularly the development of Geographic Information Systems during the last ten years have provided the possibility of its realization.

Today in the Archaeological Institute of the Dodecanese three major projects are under development: the first covers the monuments and archaeological sites on the whole island of Rhodes, the second deals with the Ancient City of Rhodes and its relationship with the Modern City and the third examines the Old Town of Rhodes as a living monument.

The relationship between written information and spatial data is very important in all three projects and effort is being made both to collect and organize data as well as to create or acquire the necessary maps and drawings in digital form.

The information system on monuments and archaeological sites in Rhodes is based on a 1/50000 digital map of the island (Fig. 1). Archaeological sites and records of monuments are continuously being added to the system, giving us the opportunity to study the distribution of similar buildings, from the architectural or from the historical point of view, or to have a quick reference on existing monuments in a specific area. The recent acquisition of a portable Ground Positioning System (GPS) has been of great assistance in locating in space sites and findings of recent surveys. On the other hand easily accessible and space related information of monuments and archaeological sites on the island is important to all organizations involved in regional planning.

The project on the Ancient City of Rhodes (Fig. 2) supports archaeological research in an attempt to uncover the ancient urban plan. Architectural findings in the numerous excavations are carefully recorded on a general digital map in 1/5000 scale and the image of the ancient city with its streets, building blocks, fortifications and public networks is being created. Records of artifacts are being introduced in a database with space reference. The procedure is time consuming, but when it will be completed it will support
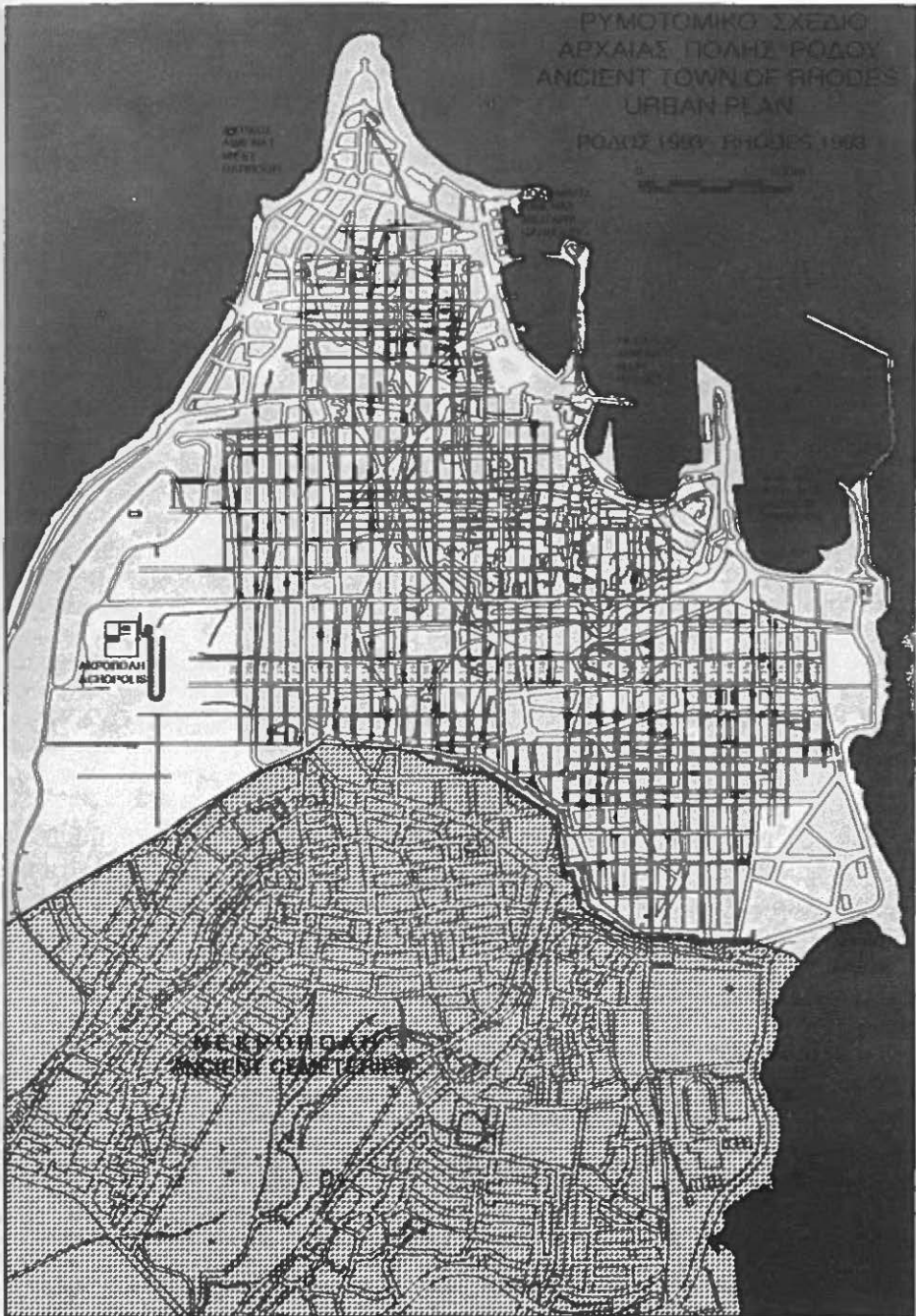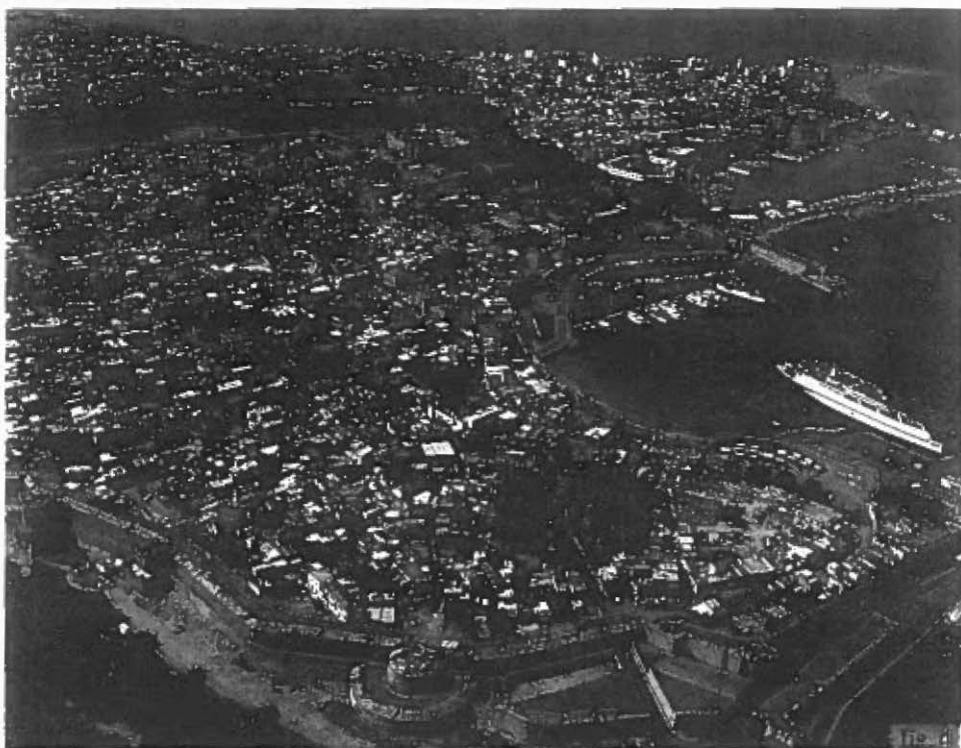
Fig. 1

Fig. 2

Fig. 3

studies on distribution of similar archaeological findings.

The project will be expanded to support a three dimensional image reconstruction of the ancient city during the next year. Although strongly depending on computer aided drafting, information collected in excavations and its interpretation by archaeologists in charge still remains the most important factor.

Experiments with photograph conversion in digital form and digital image editing and manipulation have provided us with a useful tool in presenting information found in archaeological excavations. The creation of digital photo-mosaics and the colouring of architectural elements and stratigraphic information (Tav. XXXI) according to historic periods, based on common software applications, supports a better interpretation of the archaeological space.

In searching for the necessary means to support a comprehensive study of the Medieval Town of Rhodes as a living monument we considered the establishment of a land information system as of great importance (Fig. 3).

The first experiments started in 1986 with a very simple information

system (Fig. 4). Records of buildings in the Old Town have been for the first time translated in digital form and each record has been related to a tiny dot in a 1/4000 digital map in raster form. Buildings were classified according to their historic importance, their architectural features, their general condition and their use. This primitive land information system gave us the opportunity to gain an impression of the distribution of similar conditions in the Medieval town.

All available maps then were in paper form, inaccurate and inadequate. The Italian cadastral map of the Old Town (Fig. 5) and the drawings of the houses have not been updated since 1926. More recent maps were based on aerial photographs never completed with land surveying methods (Fig. 6).

In 1990 a decision was taken to start two surveying projects, one for the outlines of the building blocks of the Old Town and one for the Medieval fortifications. Our lack of experience on digital maps did not allow us to give detailed specifications. As a result we faced a lot of problems concerning the arrangement of information in layers, the use of drawing symbols and the combination of the city map and the map of the fortifications in one general digital map.
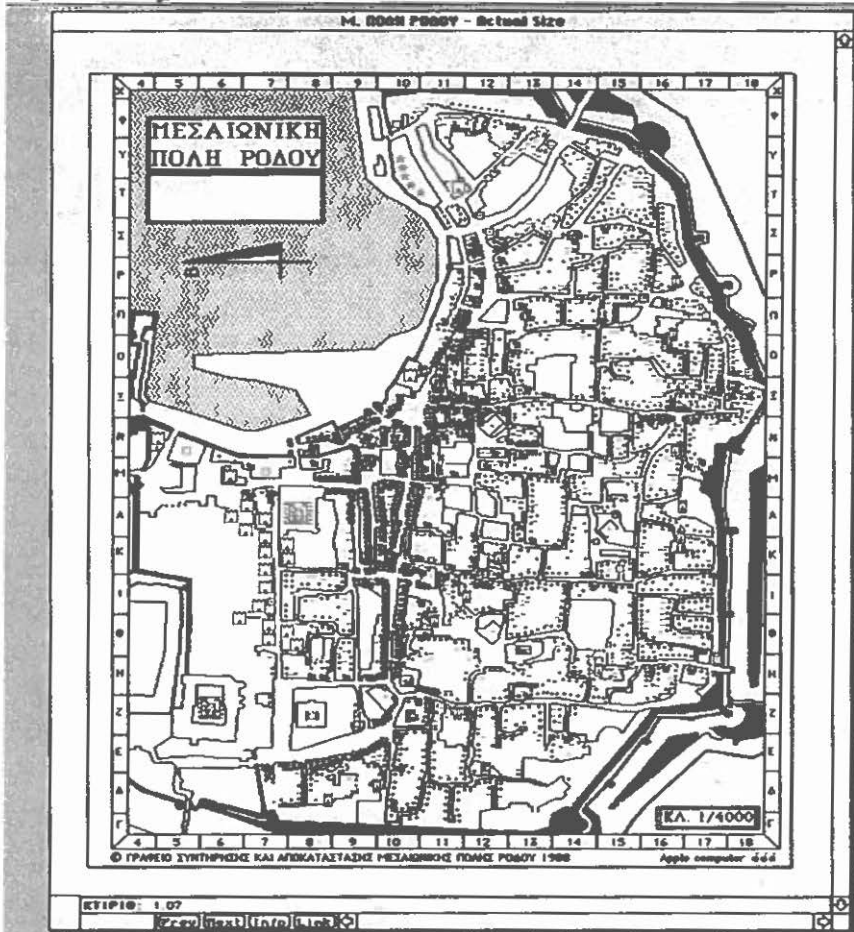
In spite of problems and difficulties the first digital map of the Old Town was a reality (Fig. 7). Considering this map as the more accurate available we tried to combine it with the Italian city map of 1926. First we digitized the Italian map. Due to extensive differences between the two maps they were combined on the basis of each building block. The arrangement of buildings and open space in each building block opened new opportunities for urban and other studies (Fig. 8).

The next stage in the creation of the digital map of the Old Town was its combination with the more recent analog map based on aerial photographs. Information concerning the number of floors, the existence of buildings in ruined state and the number of buildings built after 1926 became available (Fig. 9).

Updating maps with more recent information is of great importance. Aerial photographs taken on behalf of the Municipality of Rhodes in 1993 from a low height by airplane and helicopter provide additional information, although their numerical value is limited.

Graphic information on the map is being associated with non graphic information about the ownership of the buildings, their use, their structural condition, their monumental value, important architectural features, etc. Additional information, necessary for specific projects, may be gathered and added in the database. Detailed maps of certain areas of the Old Town, based on the digital map are being plotted frequently to serve as reference for the recording of public networks (Tav. XXXII) as well as for the exact positioning of archaeological sites.

Sketch drawings of each building in the Old Town are recently made
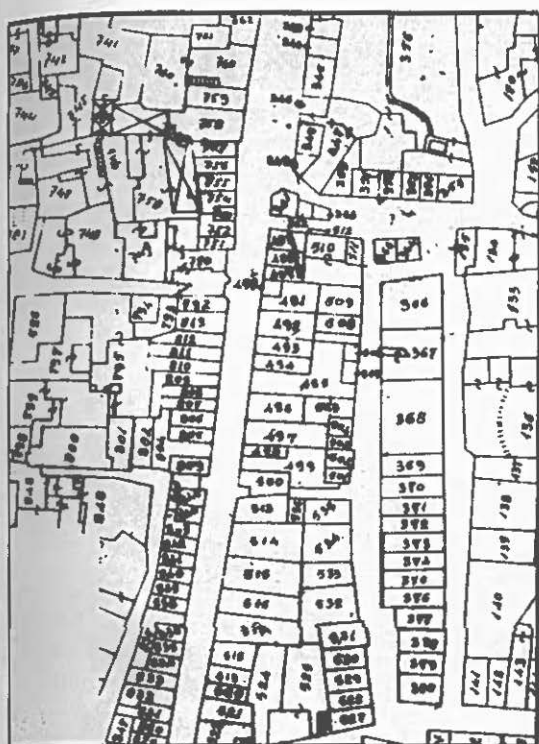
Fig. 4

Fig. 5   Fig. 6

using as reference the cad astral Italian drawings of each property. Detailed architectural information on the building and social information about its inhabitants is being collected. The project receives the support of the United Nations Environmental Project and of the Municipality of Rhodes. Drawings will be converted to digital form and serve as reference for detailed studies in various fields.

Digital image manipulating and editing as well as computer aided design applications are of assistance to all projects. Digital photograph rectification, using non-sophisticated software applications, supports drawing of inaccessible parts in monuments and of structurally dangerous buildings (Fig. 10). Buildings' outlines are drawn by standard surveying methods, their digital photographs are adjusted to fit in, and architectural details are then traced on the printed rectified and scaled photographs to complete the drawings.

Computer aided design is occasionally used in case studies of monuments. Under the REBUILD project of the European Community, in which Rhodes participated, the study for the use of renewable energy sources
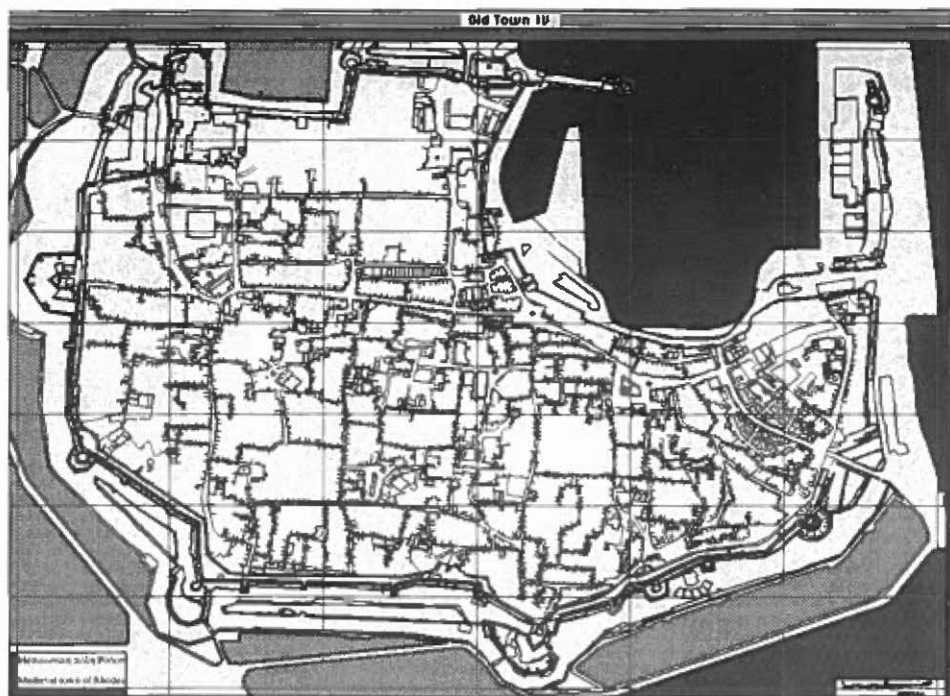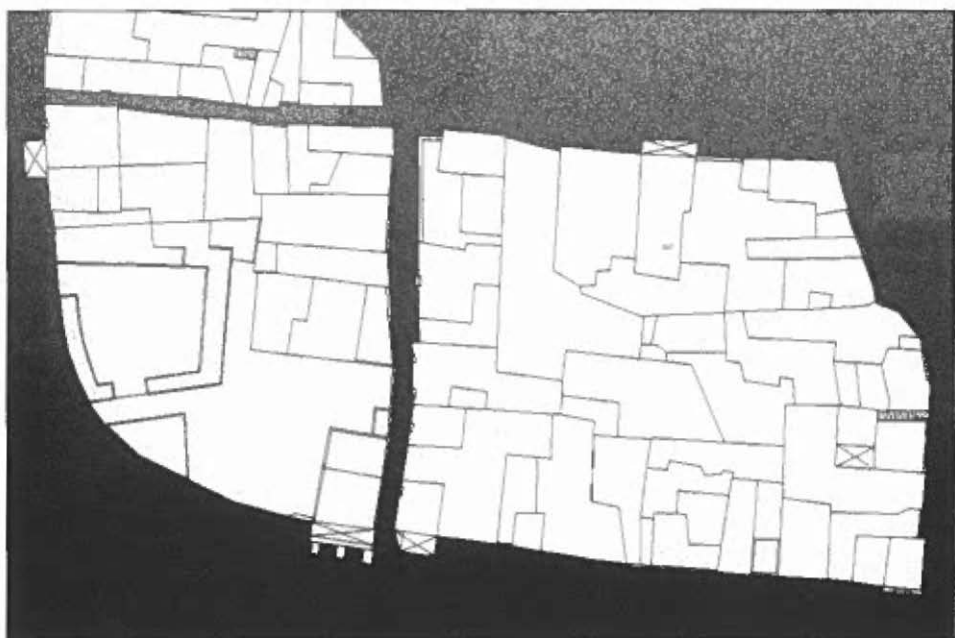
Fig. 7

Fig. 8

Fig. 9

in the Ottoman Baths of the Old Town (Fig. 11) has been supported by com-
puter-aided three dimensional modelling to make the best possible use of
solar energy, with respect for its monumental character, and to understand
the system of hyppocausts (Fig. 12).

The scientific aim of these projects is to facilitate retrieval of information
on monuments and archaeological sites and to provide the means for a better
interpretation of their related space. The digital information system itself,
with all restrictions due to hardware and software limitations, encourages, in
a way, a more clearly defined and better organized data collection procedure.

On the other hand a space-related information system on monuments
and historic sites aims towards a wider consideration of their relation to the
environment. Regional, urban and social studies in reference to historic
settlements and the analysis of the tourist impact on monuments and the
research for cultural touristic ways, need to based on a comprehensive
computerized geographic information system.

The transformation of a non-computerized to a computer-supported
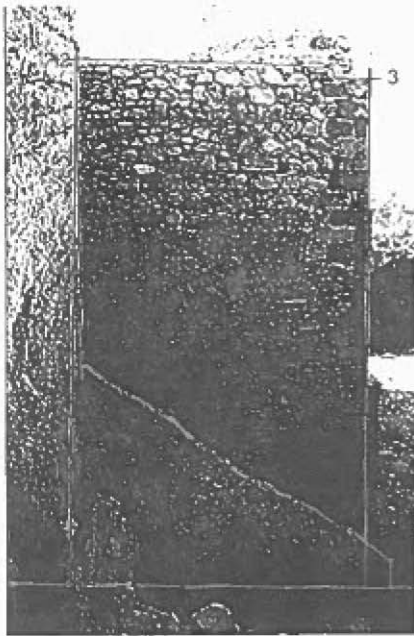institution is a long procedure that, as we believe, should not be imposed but
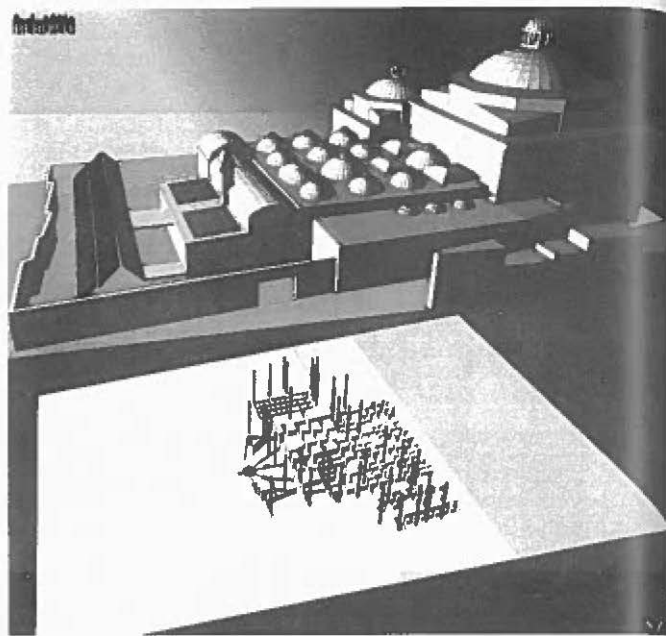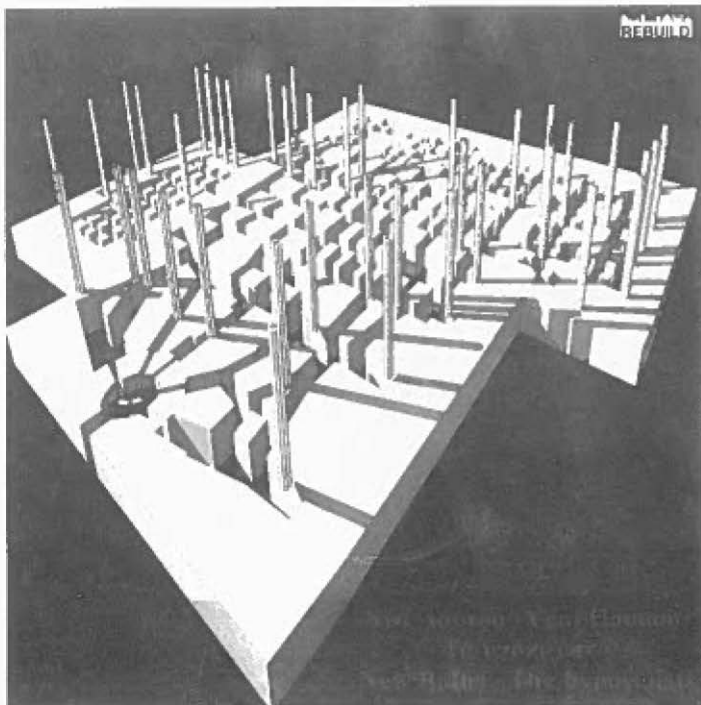
Fig. 10

Fig. 11

Fig. 12

should emerge slowly as a result of the realization of its necessity.

Since the first experiments in 1987, a good scientific background has been achieved, the use of computers has spread in the Archaeological Institute of the Dodecanese and it has been of great support in many projects including case studies, exhibitions, publications, etc.

Data input has always been a major difficulty, as trained personnel have never been available to work exclusively on the project, because of administrative and economic reasons. Due to this fact the full potential of the information system has never been realized. The system depends highly on the continuous data import and information updating and, as such, its accuracy and usefulness are highly vulnerable.

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ABSTRACT

In the Archaeological Institute of the Dodecanese, the need for establishing an information system has been evident for many years. The great expansion in personal computing systems and the development of GIS during the last years have provided the possibility of its realisation. Three major projects are under development. The first covers the monuments on the whole island of Rhodes, the second deals with the Ancient City of Rhodes and the third examines the Old Town of Rhodes as a living monument. Experiments with digital editing of photographs have provided us with a useful tool in presenting archaeological information. Computer aided design is occasionally used in case studies of monuments. The digital information system itself, with all restrictions due to hardware and software limitations, encourages, in a way, a more clearly defined and better organised data collection procedure. The transformation of a non-computerised to a computer-supported institution is a long procedure. Data input has always been a major difficulty. Due to this fact the full potential of the information system has never been realised. The system depends highly on the continuous data import and information updating and, as such, its accuracy and usefulness are highly vulnerable.