SITAR Web-GIS: A Tool for Managing Archeological Data in the Cultural Heritage Conservation and Town Planing

Petra GRINGMUTH / Stefania PICCIOLA / Simone RUGGERI

Soprintendenza Speciale per i Beni Archeologici, Rome, Italy

Abstract: The SITAR geospatial databank is a project of the *Soprintendenza Speciale per i Beni Archeologici di Roma* that draws on the talents of a team consisting of archaeologists, topographers, and computer experts. SITAR uses RDBMS architecture to record the archeological data that enter the data base directly, analytically and without interpretation. The logic of the system is designed to organize, within one single databank, data deriving from bibliographic and archival research, as well as data from the entirety of the various territorial investigations (including remote sensing, boreholes, geophysical surveys, preventive excavations, etc.).The system is structured on three logical levels of detail which enable data deriving from a given number of corresponding conceptual categories to be archived and also allow very heterogeneous types of data sets to be organized.

The cognitive and analytical path works either bottom-up or top-down, and has as its primary goal the description of any given archaeological context. In order to acquire and use the geo-topographical information, an optimal procedure for the digitization of archive materials has been developed.

This consists of successive steps of rasterizing, georeferencing within the cartographic system shared by the other offices that deal with town planning, vectorizing and entry into the databank. This procedure produces an archaeological GeoDatabase that can be used both internally by the Soprintendenza and externally through sharing and exchange with other offices and universities.

Keywords: SITAR; webGis; Urban Archaeology and city planning.

SITAR Web-GIS: A Tool for Managing Archeological Data in the Cultural Heritage Conservation and Town Planing

The SITAR *(Sistema Informativo Territoriale Archeologico di Roma)* geospatial database is a project of the *Soprintendenza Speciale per i Beni Archeologici di Roma* that draws on the talents of a joint team of archaeologists, topographers and computer experts. SITAR operates on geo-RDBMS architecture to record the archaeological data, which enter the database directly, analytically and without interpretation.

A key commitment undertaken in developing the referral system is to enable a continuous mapping between the Sitar data model and the data provided by the ICCD[1].

The SITAR project aims to establish, maintain and develop a real spatial data infrastructure, in line with the guidelines provided by the Directive INSPIRE[2], by *Commissioni Ministeriali* for the creation of the SITAN[3] *(Sistema Informativo Territoriale Archeologico Nazionale)* and for the Preventive Archaeology[4].

---

[1] ICCD Institute for Catalogue and Documentation, responsible for process standardization.

[2] The E.C. in c.d. Directive INSPIRE "INfrastructure for SPatial InfoRmation in Europe", issued by the European Parliament in 2007.

The archaeological GeoDatabase that can be used both internally by the *Soprintendenza*, and externally through sharing and exchange with other offices and universities.

The logic of the system is designed to organize data from different sources, within a single database in few and very flexible geo-spatial features classes.

These can originate from field work (excavations of various kinds - from underground utilities trenches to planned excavations -, geophysical surveys, core sampling and restoration) and case studies (bibliographical records, scientific publications, historical and epigraphic sources, historical maps) (Fig. 1).
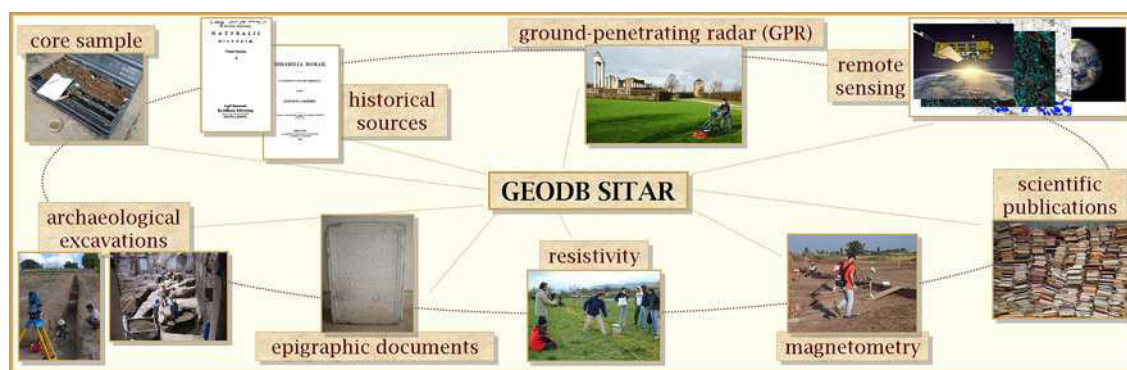

Fig. 1 – Geo-spatial features classes (Copyright: MiBAC – Soprintendenza Speciale per i Beni Archeologici di Roma).

The system is based on three logical levels of detail which makes it possible to archive data associated with the equivalent conceptual categories and to systematize extremely heterogeneous types of information.

The *Origine dell'Informazione (O.I.)* represents each intervention of archaeological and geognostic research implemented methods, purposes and at different times, both in the field and in archives.

It also takes into account interventions that have generated negative data (absence) or non significant data (not evidence).

The *O.I.* record collects the administrative and statistical information.

The *Partizione Archeologica (P.A.)* includes every knowledge element derived from each research intervention *(O.I.)* to which it's permanently associated.

The *P.A.* record analyzes and describes the archaeological finds on the basis of chronological and functional criteria.

The *Unità Archeologica (U.A.)* identifies each historical and architectural context uniquely identified through chronological and functional criteria, based on the processing of all the knowledge elements acquired at the lower logical hierarchy level *(P.A.)*.

The *U.A.* record may be utilized for the synthesis and interpretation of each archaeological context.

There can be multiple *P.A.* records for each *O.I.* record (Fig. 2).

---

[3] *Commissione Paritetica* for the creation of the Archaeological Information System of the Italian cities and their territories, established in 2009.

[4] *Commissione Paritetica* for the Preventive Archaeology, established by the Director General of Antiquities in 2008.
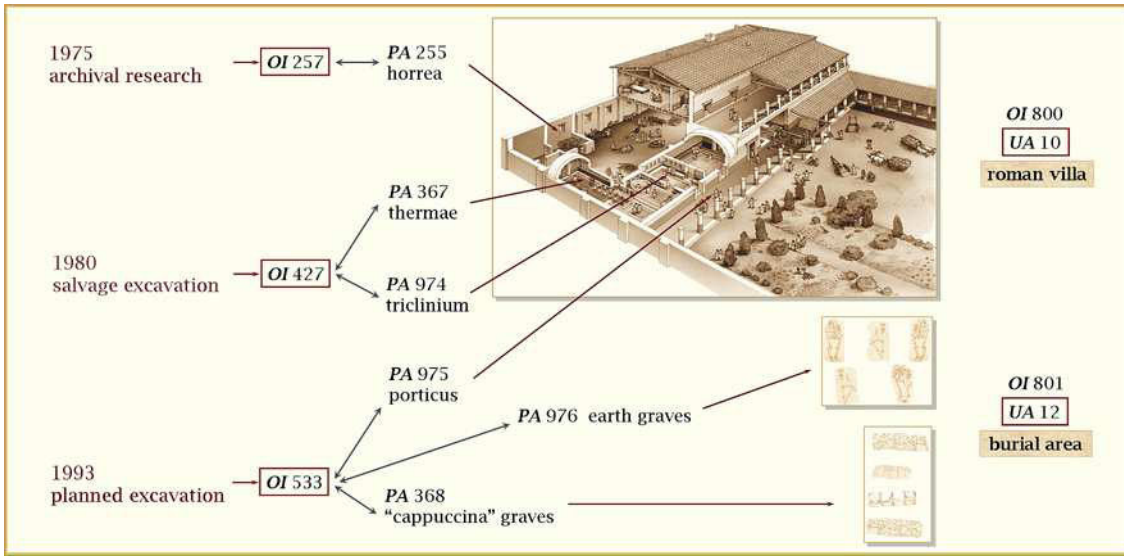
Fig. 2 – The logical levels (Copyright: MiBAC – Soprintendenza Speciale per i Beni Archeologici di Roma).

Equally, there can be only one *O.I.* record for each *U.A.*, referring to the specific study, and multiple *P.A.* records referring to the individual component elements (Fig. 3).
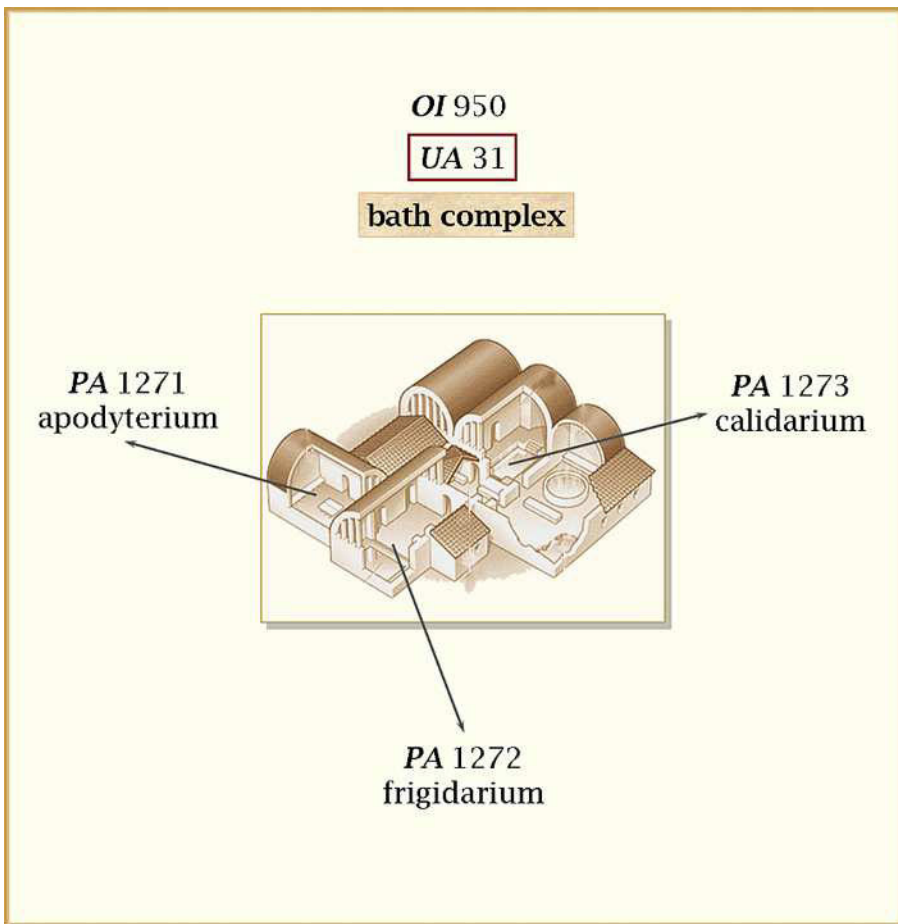

Fig. 3 – The logical levels (Copyright: MiBAC – Soprintendenza Speciale per i Beni Archeologici di Roma).

The cognitive and analytical path works either bottom-up or top-down, and has the primary goal of describing each archaeological context in a progressively more detailed manner (Fig. 4).
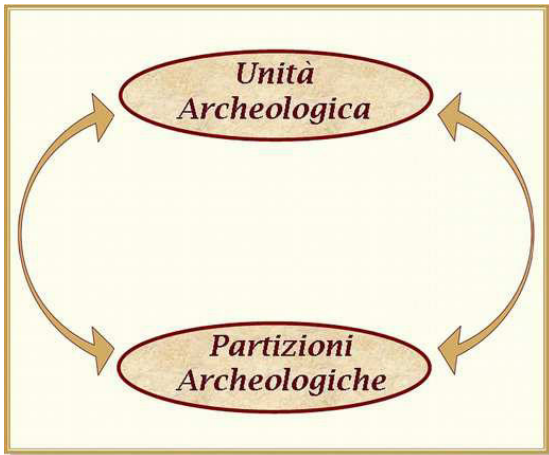

Fig. 4 – Bottom-up or top-down (Copyright: MiBAC – Soprintendenza Speciale per i Beni Archeologici di Roma).

In order to acquire and use the scientific data, an optimal procedure for the digitization of archive materials has been developed. Research starts from the archives, selecting all the documents that permit the identification of an *O.I.*, and of the *P.A.* derived from it, exhaustively describing each survey carried out. These are administrative documents, scientific documents (archaeological, geological, non-invasive investigations, bibliographic research, etc.) and cartographic documents (topographic locations on different maps, detailed plans, sections and front elevations).

This consists of successive steps of rasterizing, geo-referencing within the cartographic system shared by the other organizations that deal with urban planning, vectorizing and entry into the database (Figs. 5–7).

Fig. 5 – The *O.I.* record (Copyright: MiBAC – Soprintendenza Speciale per i Beni Archeologici di Roma).

Fig. 6 – The *P.A.* record (Copyright: MiBAC – Soprintendenza Speciale per i Beni Archeologici di Roma).

Fig. 7 – The *O.I.* geo-referencing and vectorizing on land registry archive materials (Copyright: MiBAC – Soprintendenza Speciale per i Beni Archeologici di Roma).

One of the most innovative aspects of the project envisages that all new information from archaeological excavations, studies, etc. can be uploaded directly into the GeoDatabase by those who produce them. The WebGis Sitar interface allows this implementation, with different levels of access, and especially the online consultation of all the information for purposes of research, design and urban planning (Figs. 8–10).
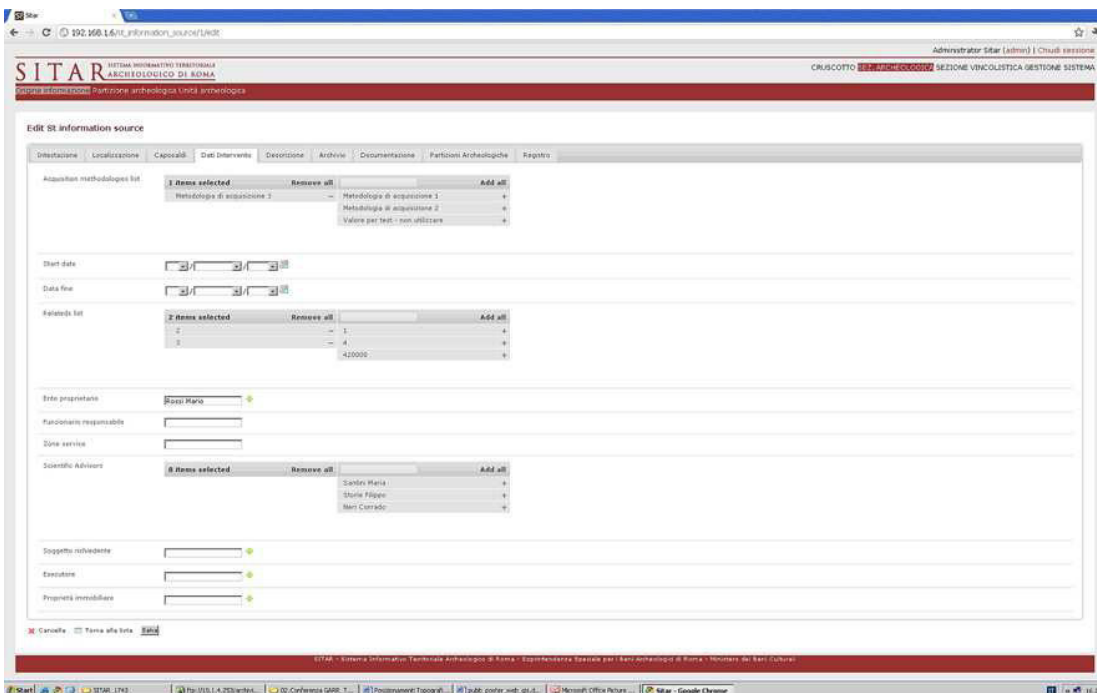
Fig. 8 – WebGis SITAR (Copyright: MiBAC – Soprintendenza Speciale per i Beni Archeologici di Roma).

Fig. 9 – WebGis SITAR (Copyright: MiBAC – Soprintendenza Speciale per i Beni Archeologici di Roma).

Fig. 10 – WebGis SITAR, the *P.A.* geo-referencing and vectorizing (Copyright: MiBAC – Soprintendenza Speciale per i Beni Archeologici di Roma).