



S. Gleadah, 1810, Arco di Giano - <https://www.flickr.com/photos/dealvariis/4927287738>

Session 01 - Towards a History of Archaeological Computing

An hermeneutic retrospective on GIS/AIS systems for Public Italian Archaeology

*Searching backward for roots
and looking onwards for
new methodological road-maps,
through losen occasions,
good practices,
institutions digital progress
and fitting achievements*

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and the Workgroup of SITAR Project**

Special Superintendence for Archeological Heritage of Rome - Ministry of Cultural Heritage and Tourism

Some of our main references for the definitions of *AIS - Archaeological Information System*

GILLINGS, GOODRICK 1996,
Sensuous and Reflexive GIS: exploring visualisation and VRML

ARROYO-BISHOP 1998,
GIS and archaeology in France

DJINDJIAN 1998,
GIS usage in worldwide archaeology

CAVULLI, GRIMALDI 2005,
*To see or not To see. Archaeological data and surface visibility as seen by
an AIS (Archaeological Information System) approach*

CARVER 2005,
*Archaeological Information Systems (AIS): Adapting GIS to archaeological
contexts*

Our proposals are for:

- an early retrospective on, and a mapping among:
 - theoretical and historical backgrounds,
 - different cultural policies,
 - scientific and technological references,
 - logical and procedural architectures,
 - tangible achievements and their effects on the evolution of archaeological research and knowledge, both at the respective application period and at the present time
- a particular attention for those projects promoted during the last decades by Italian Ministry for Cultural Heritage and Tourism - MiBACT
- an early base ontology of the “historical AIS landscape” and its representation by means of the different public digital informative systems and interfaces

The state of the art of public AIS

- need of a deeper and more conscious understanding of the cultural values – we mean also the open issues – assumed in the last decades by Archaeological Information System
- main items:
 - scientific processes refinements
 - methodological evolution
 - technological enhancements
 - *innovation* of social role of archaeological knowledge

- an epistemological opportunity of reconsidering ideas, concepts, ontologies, methods, technologies, know-how and closing/opening *trends*, underlaying both to fallen and still alive projects, pilot experiences or simple feasibility studies
- we'll try to implement a metaphorical "AIS project of AIS projects" in which to map and query, ideally and concretely, those primary "knowledge layers"
- a special focus on the latest evolution of public webGIS platforms
- analysis of some italian and european paradigmatic case study like
 - national cultural informative systems
 - Research e-infrastructures
 - Spatial Data Infrastructures
 - public regional or local AIS projects

...being inspired also by the proposals of the French initiative for an
“Observatoire des pratiques géomatiques dans les organisation de l’Archéologie”
 illustrated by Laurent Costa in 2012, in “Archeologia e Calcolatori” Journal

Archeologia e Calcolatori
 Supplemento 3, 2012, 265-277

LA MISE EN PLACE D'UN OBSERVATOIRE DES PRATIQUES GÉOMATIQUES DANS LES ORGANISATIONS DE L'ARCHÉOLOGIE

1. INTRODUCTION

L'utilisation des SIG est devenue courante en archéologie mais leur impact sur notre travail quotidien est peu lisible. C'est pourquoi il devient nécessaire d'observer, pour les comprendre et les contrôler, les mutations technologiques qui se développent au sein de notre discipline. C'est ce que nous avons cherché à faire à l'occasion d'une thèse de doctorat dans laquelle nous nous sommes efforcés de comprendre les enjeux associés à la mise en œuvre des systèmes d'information géographique (SIG) en archéologie.

L'archéologie est vue dans ce travail comme un ensemble d'organisations (organismes, institutions, structures informelles..) qui poursuivent leurs propres objectifs selon des modalités qui leurs sont spécifiques. Il n'y a alors plus «une archéologie» mais «des cadres d'exercice qui permettent de faire de l'archéologie» qui s'interconnectent pour former une discipline. Dans ce contexte, les outils, particulièrement les SIG, traduisent non seulement les logiques propres de la discipline mais répondent aussi aux besoins et aux contraintes des organisations. Ils déterminent autant qu'ils en sont issus les processus de recherche.

Notre objectif a été de faire un premier état des lieux de la mise en œuvre des SIG dans différentes organisations de l'archéologie afin de mettre au jour d'une part des lignes directrices collectives et d'autre part les différences profondes et structurelles, tant au niveau des techniques et des méthodes de développement des projets, des infrastructures matérielles, des objectifs ou des résultats attendus.

Il s'agissait de développer une vision qualitative et descriptive d'unités d'action nommées projets, en tenant compte des différents aspects qui les composent: les objectifs scientifiques tels qu'ils peuvent être lus à la lumière de la documentation disponible, les organisations qui accueillent et participent à ces projets, les acteurs qui les mettent en œuvre et les technologies qui rentrent en jeu (Fig. 1).

Au final, presque 100 projets ont été identifiés et examinés. 4 grands contextes ont été distingués: les collectivités territoriales (département, municipalités), le ministère de la Culture (DAPA, SRA), l'Afan/Inrap et les organismes de recherche et d'enseignement supérieur (UMR, CNRS – Universités, Instituts Français à l'étranger, Ecoles Françaises). Notons dès à présent que

¹ Cet article est le résumé de la première partie d'une thèse de doctorat soutenue en Janvier 2010 à l'Université de Paris Ouest sous la direction de Anne-Marie Guimier-Sorbet. On pourra consulter l'intégralité de ce travail à l'adresse: <http://tel.archives-ouvertes.fr/tel-00448490/fr/>.

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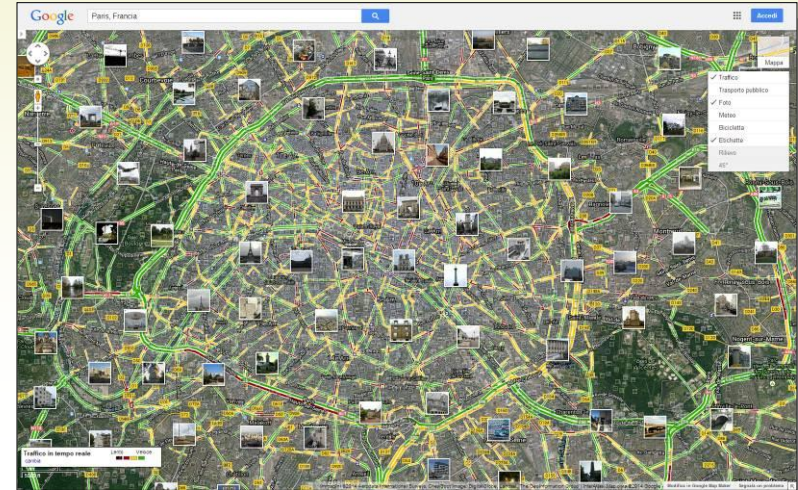
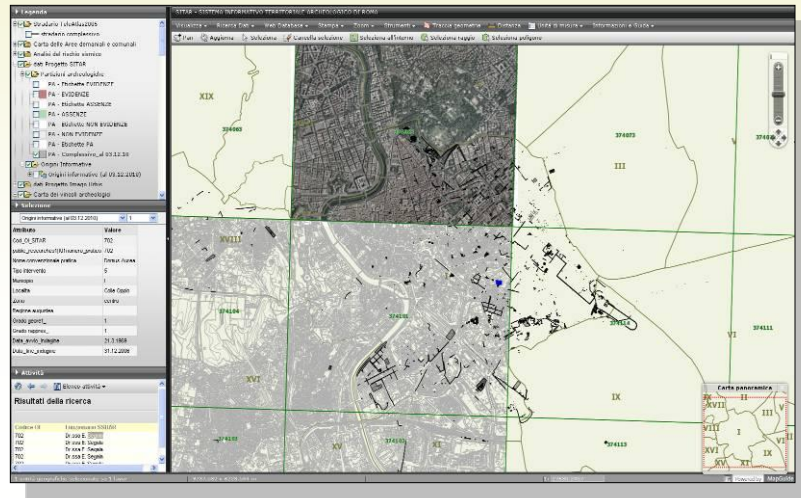
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Our preparatory work arises in the context of Rome and specifically of the SITAR Project (promoted since 2007 by the MiBACT and carried out by the Special Superintendence for Archaeological Heritage of Rome),

- **to better steer all future SITAR' developments**
- **to share our reflections within Italian and European archaeological networking experiences to which SITAR Project workgroup takes part, as:**
 - **MiBACT Committees on public AIS/SDI, Preventive Archaeology, Open Data**
 - **cooperations with our CNR - National Researches Council, Consortium GARR, various University Departments**
 - **ongoing European Projects as *ARIADNE* and *Digital Cultural Heritage-Roadmap for Preservation*, participated by MiBACT**

“what, where, when” isn’t ever visually equal to “who, why, how”

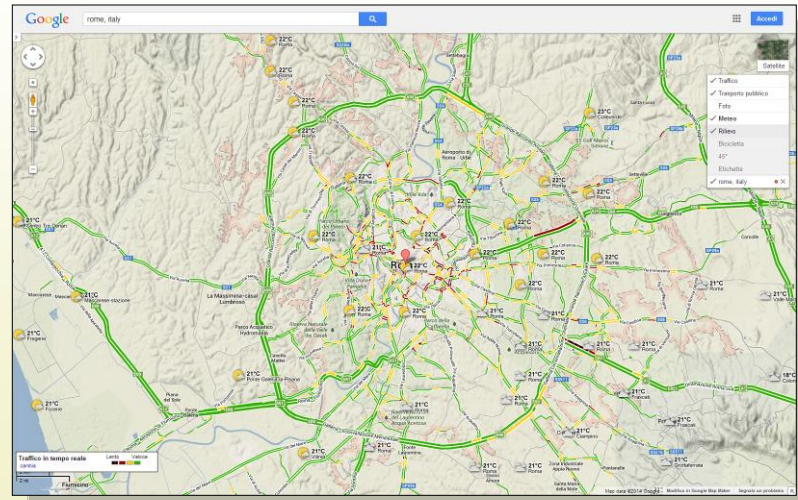
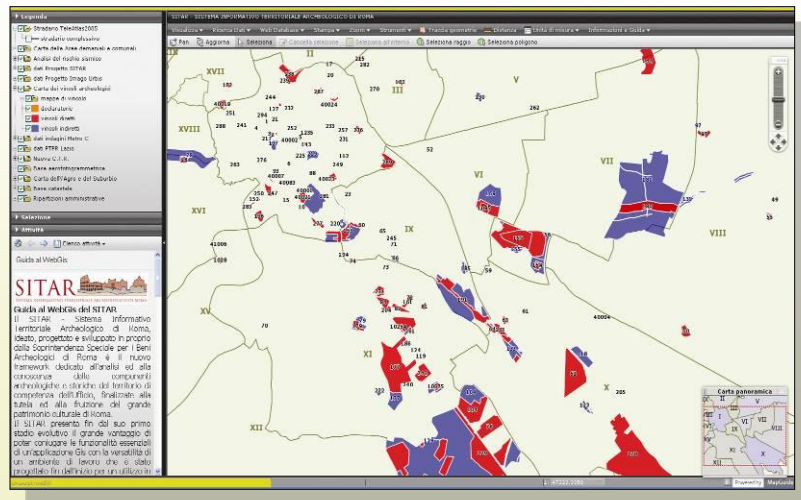


SITAR archaeological map of Centre of Rome

Google Maps - Social knowledge for the Centre of Paris

SITAR archaeological safeguard map of S-E Suburbs

Google Maps - Environmental knowledge about Rome



JOSÉ SARAMAGO



O CONTO DA ILHA
DESCONHECIDA

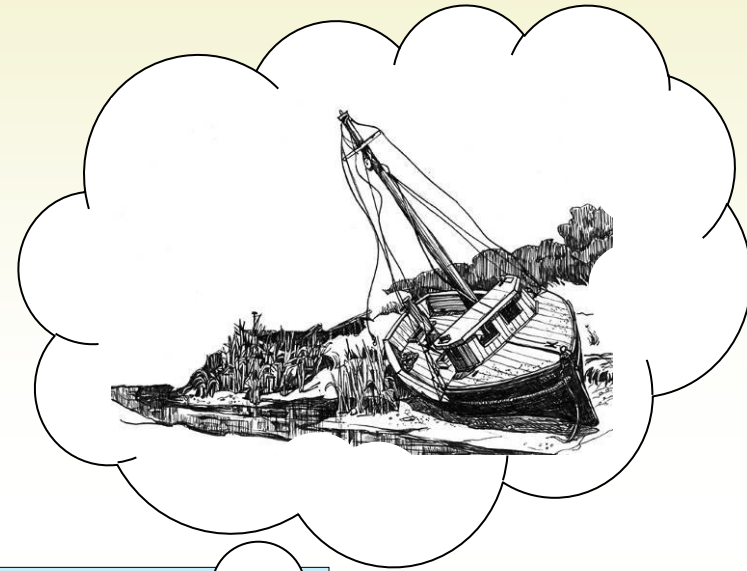


...where a no-named main character (who metaphorically could be an archaeologist) asks the “king” (who, perhaps, may be seen as a personification of any epistemological value or issue itself) of a far away kingdom (in our case the archaeological one) for a boat (let’s see it as an expert system made of methods, processes and tools) to reach an unknown island (could be the goals of the research itself, not ever completely clarified or already defined from the beginning).

But that island isn’t reported on the kingdom official maps, as the vexed king tells him: that is really the only reason to look for it is unknown indeed, as the protagonist answers the king. But that isn’t enough for the unknown island, he is looking for, should not be an existing place...



Around this scene, the people begins to shout to the king
“Give him the boat!”, and so finally the man gets his medium
and can begin the preparations for sailing away from the
harbor, even if without a crew on board and being himself
neither a sailor, nor an expert captain.



Then, from that point the tale switches to a dreamlike dimension that makes the protagonist understand that the real unknown island he was looking for, it is the boat itself;

and suddenly in the dream, his boat begins to change itself in a sailing flourishing garden.



- the role of AIS in theoretical and methodological *innovation* of archaeology and in circular knowledge creation processes;
- their current role in the on going innovation of public archaeology;
- the real level of epistemological and visual correspondences between typical cartographic systems – essentially based on the combination of the three primary pillars: “what”, “where”, “when” – and semantic/interpretative mapping/analyzing tools and systems needed also in social sciences and humanities
- towards a multi-representations of the more extended concepts as “who” (persons/societies), “why” (functions/cultures), “how” (technologies/processes), moreover interrelated across all the times

Towards an early basic ontology for description and analysis of different conceptual classes, instances and items of AIS domain:

- areas to consider and analyze:
 - the specific *domain*, containing and identifying theoretical and methodological needs and approaches, scientific goals and epistemological values
 - the *human inter-actors*, involved in AIS environment, both in institutional/collective and in individual forms, with their own mind road-maps
 - the *epistemological values and open issues*, as impeding/stimulating/permitting factors
 - the *abilitating technologies* and methodologies, becoming themselves new research fields and objects at the same time
 - the *data, information and generally the knowledge*, waiting for being achieved, analyzed and re-thought by scientific and cognitive processes, for new augmented knowledge

- **new trends and declensions in the archaeological domain, as:**
 - preventive archaeology
 - event-based archaeology
 - the diffusion of socializing web platforms
 - a stronger comparison with the knowledge society instances and the themes of re-organization and multi-representation of new fluid and collaborative knowledge
- **new priorities as:**
 - development of a new generation of public Geo-Digital Libraries
 - full integration of actual GIS, AIS, SDI systems, digital libraries and archives, and open access repositories

The italian AIS scenario. The legacy of 80's/90's MiBACT projects:

- first operative framework was derived primarily from s.c. “giacimenti culturali” projects
- traditional archaeological processes have gradually met the potentialities of ICT
- early experimentations with AIS prototypes
- the public cultural management instances have been coupled gradually with the professional and technical scholarships and competences of research/academic experts and/or private companies
- an important, but not always fruitful, bidirectional comparison arised
- different MiBACT projects with their own roads across the years, are still incompletly unified either in a true *ecosystem* of web informative platforms, or in a cultural meta-system

The italian scenario: the main public Information Systems projects

- SITAP (MiBACT - General Direction for Environmental Heritage and Landscape), environment and landscape safeguard;
- “Carta del Rischio” (MiBACT - ICR, now ISCR), main national risk map;
- SIGECweb (MiBACT – ICCD), the General Cataloguing Information System;
- SITIA (MiBACT - General Direction for Archaeological Heritage), a prototype of a national AIS;
- “ArcheoMar”, italian submarine archaeological sites and finds AIS;
- “Atlante dei Beni Culturali - CulturaOnLine”, now flowed into the “CulturaItalia” web portal, the official point of access to many MiBACT cultural repositories and Europeana data provider;
- more recent “National Archaeological Sites Census Project”, digitization of the project of ancient topography “Forma Italiae” of the University “Sapienza” of Rome;
- others different experiences, projects and sub-projects (MiBACT territorial institutes, in cooperation with other agencies like National Research Council, Universities, etc.)

Some observed critical items:

- gradual fragmentation of methods, resources, systems and tools
- true final compliance with real needs and instances of different users
- internal relationships between the specific executive workgroups
- connections between them and the real end-users of the different applications
- critical threshold for a correct project benefits' dissemination to all the other potential users
- clear limit for the same gradual innovation of every practical experience
- relationships between various institutional levels have assumed also a central role as factors which have allowed or impeded a successful implementation of the public informative systems
- adoption of the same paradigm and standards
- “the ability of these systems to answer questions in the furtherance of central and local government objectives” and
- “the need to review and to measure performance against original objectives” (CLUBB, LANG 1996, *Learning from the achievements of Information Systems – the role of the Post-Implementation Review in medium to large scale systems*)

The italian AIS scenario: some of the many regional/local AIS projects

- the system realized over 2000's by the Istituto per i Beni Culturali of Emilia Romagna administrative region, with the well known cases of Modena and Cesena
- the great and extended work carried out by University of Siena, Chair of Medieval Archaeology, especially under the guide of Riccardo Francovich, focused on the surveies, researches, documentation and exploitation of the rich medieval archaeological heritage of Tuscany region
- the NADIR project, a prototype of informative meta-system that is actually under construction with University of Bologna as coordinator of a consortium of five italian Universities
- [...]

The italian AIS scenario: some of the many *urban* AIS projects

- the SITAVR Project, the *first digital archaeological cadastre* for the urban center of Verona (Superintendence for Archaeological Heritage of the Veneto region, University of Verona and Special Superintendence for Archaeological Heritage of Rome), supplied with SITAR data model and operational paradigm;
- the MAPPA project (University of Pisa, Regione Toscana), an experience of re-organization, publication and sharing of archaeological dataset and documentations interesting the ancient centre of Pisa. Very important in both those mentioned cases appear the themes of open data, new methods for analysing and predicting the s.c. archaeological potentials, sharing and collaborative processes, all of them declensed in terms of public archaeology;
- the SIURBE Project, a AIS application focused on an integrated geo-archaeological knowledge of the historical center of Benevento (University of Salerno, Superintendence for Archaeological Heritage of Salerno, Avellino, Benevento, Caserta);
- [...]

The *urban* AIS projects: some fundamental items

- new methods for analysing and predicting the s.c. “archaeological potentials”,
- new logic approaches to the treatment of chronological data (SITAVR contribution at the CAA 2014 session 08),
- Open Data,
- sharing and collaborative knowledge processes,
- [...]

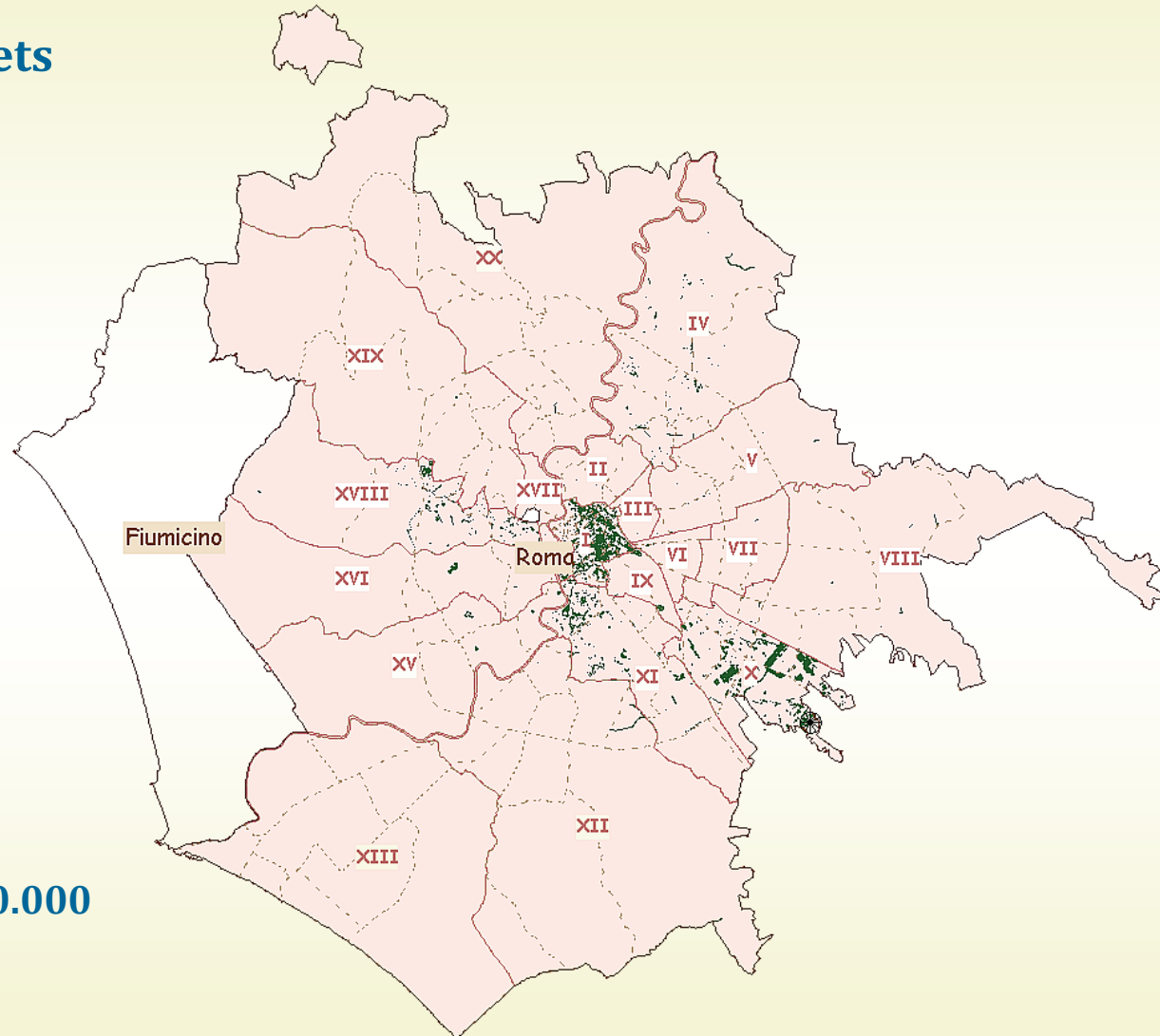


Undoubtedly for its own ancient history, wide cultural heritage scattered in every part of the metropolitan territory and for the current complexity of its rapid urban, social and economical growth, Rome has been the privileged object of many archaeological mapping projects

Rome: the archaeological oldest local mapbases and the recent digital mapping public projects

- *Forma Urbis Romae* realized by Rodolfo Lanciani from 1893 up to 1901
- some later F.U.R. updating activities (by University of Rome up to the middle 1980's; from 1947 to 2005 before by Superintendence to the Antiquities of Rome and then by the Special Superintendence for Archaeological Heritage of Rome)
- the preparatory works of the Commission for the up-to-date of Lanciani's F.U.R., promoted since by 1995 by the Council of Rome - Sovraintendenza Comunale in cooperation with the University Sapienza of Rome
- last activities of data updating and checking and archaeological database integrations into the wider Informative System of Roma Capitale, together museums, art galleries, heritage items and territorial data
- for the later historical periods, with a focus on the digitization and georeferencing of fundamental *historical cartographic resources* (Carta del Nolli, Catasto Pio-Gregoriano):
 - Imago II Project promoted by Archivio di Stato di Roma, Sovraintendenza Comunale, University of Rome "Torvergata"
 - those ones realized by CROMA, a specialized Center for historical urban studies of University of Rome "Torvergata"

the SITAR Project: the datasets



Total records: 13.100

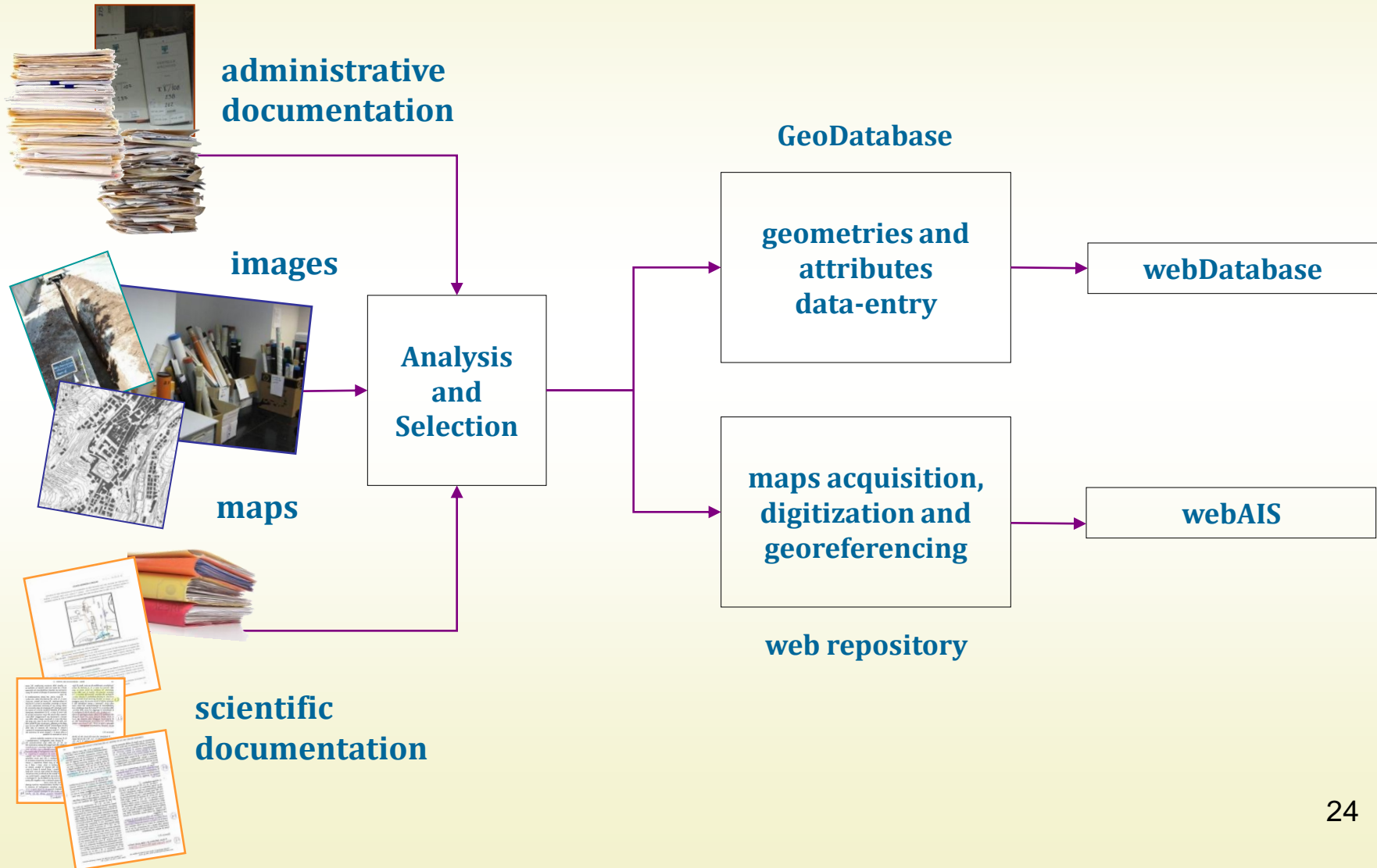
Total Information Sources: 3.100

Total Archaeological Partitions: 10.000

Total scientific reports: 3.000

Total drawings and map documents: 13.000

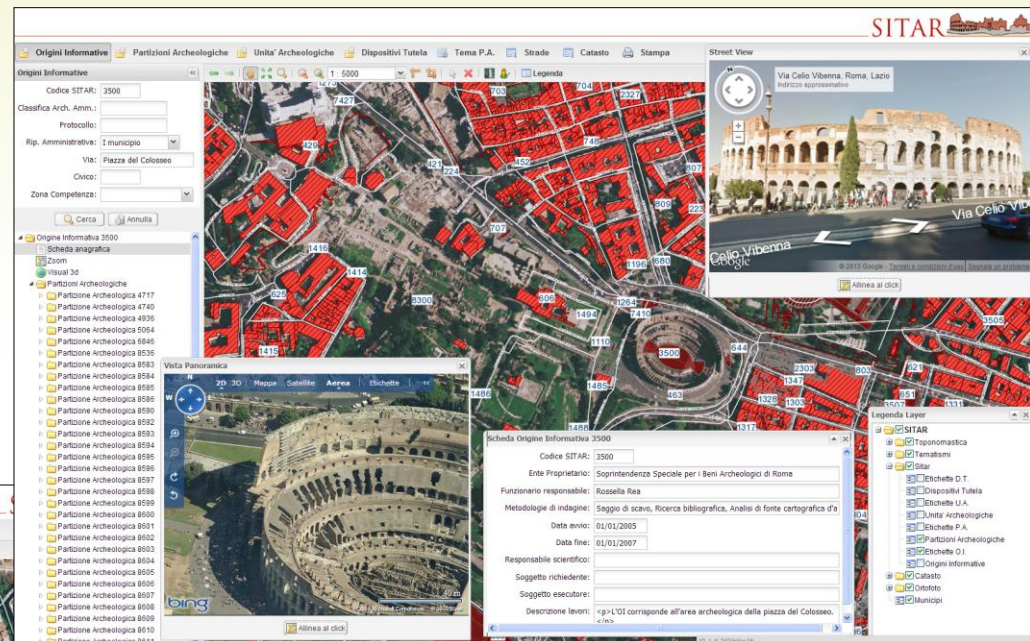
the SITAR Project: data sources, geoDatabase and web repository



the SITAR Project web Archaeological Information System

- webGIS platform
- webDatabase
- Project Knowledge Base

<http://webgis.archeoroma.beniculturali.it>



Never forgetting the introductive words of Italo Calvino to his *“Six memos for the next millennium”*, (*“Lezioni Americane”*):

“Perhaps the sign that the current millennium is ending it is the frequency of our asking on the future of literature and books in this technological so called post-industrial era [...]

My faith in the future of literature consists in knowing that there are things that only literature with its specific means can give”



We trust that this will happen also to public archaeology across this second decade of our century, perhaps primarily thanks to a new generation of AIS

Many Thanks !

Questions ?... Suggestions ?...

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