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ENHANCING CULTURAL HERITAGE WITH DIGITAL TOOLS: THE CALLOS DOCUMENTATION SYSTEM AND A CASE STUDY OF A MARBLE PART FROM ATHENS ACROPOLIS

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The **CALLOS Project** combines portable diagnostic laser technologies with an open, interoperable documentation system. It aims to foster **scientific innovation** in Cultural Heritage (CH) conservation while ensuring **public accessibility**

Key considerations:

- Digital tools are transforming conservation documentation practices.
- Structured recording is essential for analyzing, preserving, and interpreting heritage objects.

The Outcome- CALLOS Documentation System (CDS)

A secure, multilingual, web-based platform developed by **FORTH** for the **Ephorate of Antiquities of the City of Athens (EACA)** within the CALLOS project. It is built on the **Synthesis CORE framework**, grounded in the **CIDOC CRM standard** and its extensions (*CRMsci, CRMdig*).

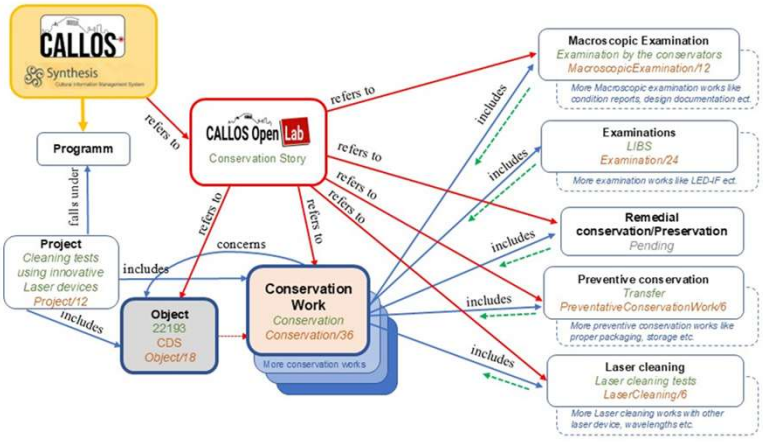
CDS's Features:

- ✓ Secure, multilingual, web-based platform
- ✓ Tracks object condition before, during, and after conservation
- ✓ Connects conservation data with analytical results and media
- ✓ Links documentation with diagnostics and multimedia records
- ✓ Supports conservator-oriented workflows

Key strengths:

- Real-time, cloud-based collaboration
- Interoperability with external databases (e.g. Archaeological Cadastre, EUROPEANA)

Conceptual map of conservation tasks



The conceptual map reflects the conservators' workflow, placing the CH monument at its core. Each **conservation work** requires one or more heritage **objects**, and each object may be linked to multiple tasks. Within the EACA framework, conservation works belong to broader programmes, which may include multiple projects and works. Works may involve macroscopic examination, preventive or remedial conservation, and—within CALLOS—laser cleaning.

Connections in the map are color-coded:

- **Blue arrows**: connections made directly by the user
- **Green dashed arrows**: connections that result as a consequence of the blue ones
- **Red arrows**: connections made specifically for **CALLOS Open Lab**

All elements remain accessible via the menu for easy review, editing, or completion. Interesting projects can be presented to the public via **CALLOS Open Lab**

The CALLOS Open Lab (COL)

A public platform promoting transparency and education in conservation. COL includes:

- A **semantic roadmap** for navigating techniques
- Multimedia **Conservation Stories**
- A **thesaurus** for consistent terminology

All content adheres to structured entry templates via CDS.

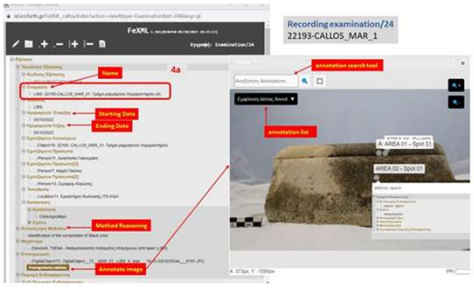
Case Study

Marble Perirrhanterion (22193-CALLOS_MAR_1)

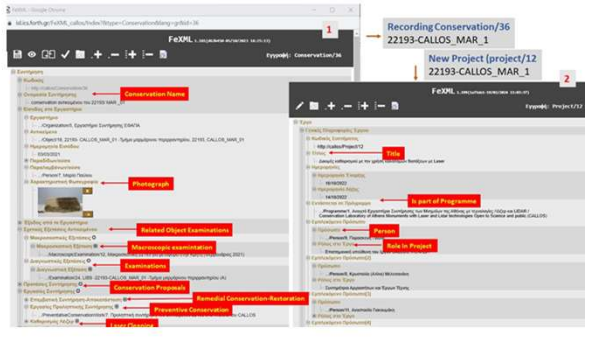
- **Object**: a part of a marble from Athens Acropolis
- **Conservation Examination**: Covered by unidentified black crust
- **Project:** Cleaning using laser technology
- **Conservation Work:** Laser cleaning feasibility tests that result the following conservation workflow (documented in CDS):

- ➢ Macroscopic examinations (of each object sides)
- ➢ Examinations (LIBS, LED-LIF)
- ➢ Remedial Conservation / Preservation (pending-not addressed in this case study)
- ➢ Preventive conservation (packaging, transportation)
- ➢ Laser cleaning tests (using different laser wavelength and cleaning parameters)
- ➢ Public presentation via **CALLOS Open Lab**

Diagnostic LIBS examination interface



Conservation work recording hierarchy in CDS interface



DISCUSSION

- Facilitates structured, accessible conservation data management and is tailored to conservator workflows.
- Promotes interoperability and transparency, bridging scientific research with public engagement.
- Compared to systems like the EUROPEANA or the Archaeological Cadastre

FUTURE VISION

- AI for predictive conservation
- 3D scanning & photogrammetry
- Expanded public engagement via virtual platforms

BIBLIOGRAPHY

- Papida, S. et al., 2023, Digital Technologies for Heritage Conservation Labs Open to the Public. The Case of the CALLOS project, doi.org/10.1007/978-3-031-42300-0_9
- Bekiari, C. et al., 2014, Building comprehensive management systems for cultural – historical information. doi.org/10.2307/jj.15135883.30.
- Bekiari, C. et al., 2021, Definition of the CIDOC Conceptual Reference Model, v.7.1.1, doi.org/10.26225/fdzh-x261.