



MEMORI

MEMORI

(EU FP7 – Supported Collaborative Project: 265132)

Measurement, Effect Assessment and Mitigation of Pollutant Impact on Movable Cultural Assets – Innovative Research for Market Transfer



Elin Dahlin¹, Terje Grøntoft¹, Susana Lopez-Aparicio¹, Paul Bellendorf², Alexandra Schieweck², Karin Drda-Kühn³, Maria Perla Colombini⁴, Ilaria Bonaduce⁴, Peter Vandenabeele⁵, Rene Larsen⁶, Dorte Vestergaard Poulsen Sommer⁶, Antje Potthast⁷, Octaviana Marincaș⁸, David Thickett⁹, Guillermo Andrade¹⁰, Ana Tabuenca¹⁰, Marianne Odlyha¹¹, Pip Laurenson¹², Stephen Hackney¹², Colette McDonagh¹³, Philip Bowe¹³, John J. Ackerman¹⁴

¹Norwegian Institute for Air Research, ²Fraunhofer-Gesellschaft zur Förderung der Angewandten Forschung, ³Association "Culture & Work", ⁴Department of Chemistry and Industrial Chemistry, University of Pisa, ⁵University of Ghent, ⁶The Royal Academy of Fine Arts, School of Conservation, ⁷University of Natural Resources and Applied Life Sciences, ⁸University of Arts "George Enescu" Iași, ⁹English Heritage, ¹⁰SIT Transportes Internacionales S.A., ¹¹Birkbeck, School of Biological Sciences, University of London, ¹²Tate, ¹³Optical Sensors Laboratory, National Centre for Sensor Research, Dublin City University, ¹⁴NILU Innovation AS

Aim of the Project

The EU funded project MEMORI started in November 2010. The project aims to provide the conservation market with innovative, non destructive, early warning technology for easy assessment of environmental impact on indoor cultural heritage. In addition a preventive strategy to secure the conservation of movable cultural assets in protective enclosures will be developed. To achieve this aim, the following objectives will be investigated:

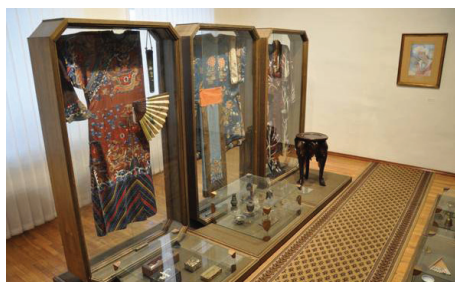
- Integration of two dosimeter technologies from the previous EU projects AMECP and MASTER.
- Production of a PC software and interactive user web page.
- Assessment of the damage impact of organic acids on cultural heritage objects.
- Optimizing active and passive control regimes for protective enclosures.
- Facilitating the use of protective enclosures to save energy and mitigate climate change.
- Integrating results with existing preventive conservation strategies.
- Disseminating results and implementing a business plan.

An Innovative Measurement Technology

Within MEMORI a new early warning dosimeter for the evaluation of the indoor environment will be developed.



Paper samples are exposed to organic acids in the laboratory at NILU.



The Lithuanian Theatre, Music and Cinema Museum is one of the End-users in the MEMORI project.

The MEMORI dosimeter will combine the advantages of the Early Warning dosimeter for Organic materials (EWO), developed by NILU within the EU-MASTER project, and the Glass Slide Dosimeter (GSD), developed by Fraunhofer ISC within the EU-AMECP project.

The new MEMORI dosimeter will be sensitive to indoor climate and light, and to the photo-oxidizing and acidic air pollutants, which are commonly present in indoor locations. By detection of the major damaging factors the MEMORI dosimeter will be a useful early warning system. A handheld reader for in-situ measurements and results evaluation will be developed. This will improve the functionality of the dosimeter, reduce the time for results evaluation and make the system flexible. An important task is to bring this innovative technology to the market and a close co-operation with end-users and stakeholders is established.

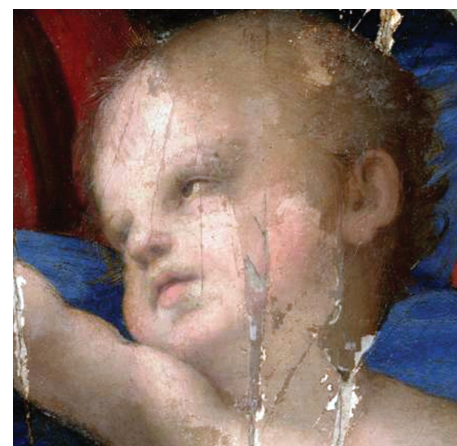
Assessment of Environmental Impact on Organic Materials

Detailed evaluation of the impact of air pollution on indoor cultural heritage objects will be performed using accelerated ageing and advanced non-destructive analytical techniques. The damage effects of organic acids and other pollutants will be assessed on a range of materials such as varnishes, pigments, leather, parchment, cellulosic materials and textiles. Recommended levels for environments and for maximum exposure to organic acids will be evaluated.

Mitigation Methods and Studies for Preventive Conservation Strategies

The developments in MEMORI of measurement and evaluation methodology, impact understanding and mitigation procedures will be integrated with present best practice in preventive conservation strategy. Preventive conservation involves controlling the environment around an object to minimize deterioration.

Research is required to understand and minimize risks from the complex interactions between historical objects and museum environments. Highly aged objects may behave quite differently from new materials. Sealing of enclosures such as showcases and storage boxes, protects cultural heritage from external risks. Within the enclosure, assessment and mitigation of residual risk that would otherwise become apparent through damage, require novel sensor systems, like the MEMORI dosimeter and a new oxygen sensor, which will be developed in the project.

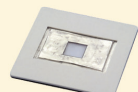


Analysis of varnish aging will be performed by Birkbeck College and the University of Pisa.

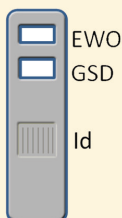
MEMORI Dosimeter for Museum Environments



NILU EWO Dosimeter



FRAUNHOFER GSD Dosimeter



MEMORI Dosimeter



MEMORI Portable Reader

Acknowledgment

The MEMORI project has received funding from the European Community's Seventh Framework Programme under Grant Agreement No. 265132.

More information

For more information about the MEMORI project, please contact the project co-ordinator Elin Dahlin, NILU, Phone + 47 63 89 80 00 or E-mail elin.dahlin@nilu.no Project website: www.memori-project.eu



Norwegian Institute for Air Research



Fraunhofer – Gesellschaft zur Förderung der Angewandten Forschung



Kultur und Arbeit e.V. Kultur und Arbeit



University of Pisa



University of Ghent



Royal Danish Academy of Fine Arts, School of Conservation



University of Natural Resources and Applied Life Sciences



University of Arts "George Enescu" Iași



English Heritage



Birkbeck University of London



SIT Transportes Internacionales



Tate



Dublin City University



NILU Innovation

PP 2/2011 EMD