



SEVENTH FRAMEWORK PROGRAMME
Theme 6 Environment



TeACHproject

TECHNOLOGIES AND TOOLS TO PRIORITIZE ASSESSMENT AND DIAGNOSIS
OF AIR POLLUTION IMPACT ON IMMOVABLE AND MOVABLE CULTURAL HERITAGE

ABSTRACT

EXTRACT FROM THE TeACH
PROJECT DELIVERABLES

Version March 2010

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FOREWORD

The following document is an extract from the deliverables produced by the partners of the TeACH Consortium and delivered to the European Commission (until the March 2010).

It gives a brief description (title, lead beneficiary, list of WP participants, authors and summary) of each result as described in the deliverables (most of which are confidential), in order to disseminate via web the content, as expected in the “Dissemination Plan” of the project (published on the web site, www.teach-project.eu).

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Workpackage	Deliverables (until March 2010)	
WP2 Prediction of the pollutants in the changing near and far future scenario & prioritization of the most important ones for protection of movable and immovable CH and effects on materials	Deliverable D2.1	Identification of the pollutants and parameters affecting Cultural Heritage conservation and their change in the near and far future
	Deliverable D2.2	Prioritization of the most important pollutants and parameters for a preventive conservation of the immovable cultural heritage
	Deliverable D2.3	Prioritization of the most important pollutants and parameters for the preventive conservation of the movable Cultural Heritage
WP3 Effects of predicted pollution on treatments	Deliverable D3.1	Selection of protective coatings and organic heritage materials frequently found and applied on European cultural heritage
WP4 Study of identified existing devices and their evaluation for integration in the kit	Deliverable D4.1	Analysis of some identified existing technologies and devices available on the market
	Deliverable D4.2	Identification of the necessary modifications for their introduction in a compact, economical and user-friendly kit
WP9 Guidelines for the future prioritization of air pollution monitoring, dissemination, marketing, economic evaluation and exploitation	Deliverable D9.1	Project web site and leaflet
	Deliverable D9.2	Dissemination Plan

DELIVERABLE D.2.1

WP 2

Title of Deliverable: Identification of the pollutants and parameters affecting Cultural Heritage conservation and their change in the near and far future



Lead beneficiary ISAC CNR

WP participants University of Antwerp, Norwegian Institute for Air Research (NILU)

Authors

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This deliverable is part of WP2: “Prediction of the pollutants in the changing near and far future scenario and prioritization of the most important ones for protection of movable and immovable Cultural Heritage and effects on materials”.

One of the main tasks of this Work-package was to identify the most important pollutants and microclimate variables today threatening cultural heritage in relation to the different materials used in immovable and movable assets. Within this task the main objectives of the present deliverable are:

- Identify the most important pollutants and parameters and microclimate variables currently affecting the cultural heritage, both movable and immovable;
- Predict the most important pollutants and parameters for the conservation of cultural heritage, and their changes in the near and far future.

The work has been performed mainly on the basis on the research carried out to date on this topic and the experience achieved by the Partnership through its participation in European Projects focusing on the environmental impact on cultural heritage. The research work centred on marble, limestone, sandstone, brick/ceramic, lime and hydraulic mortar and cement mortar and concrete, these being the materials selected for inclusion in the project during the Kick-off Meeting, held in Bologna, on 9-10 December 2008.

Moreover, since the TeACH Project focuses on the diagnosis of air pollution impact on immovable an movable cultural heritage, pollution parameters have particularly been taken into account.

DELIVERABLE D.2.2

WP 2

Title of Deliverable: Prioritization of the most important pollutants and parameters for a preventive conservation of the immovable cultural heritage



Lead beneficiary ISAC CNR

WP participants University of Antwerp, Norwegian Institute for Air Research (NILU)

Authors

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This deliverable is part of WP2: “Prediction of the pollutants in the changing near and far future scenario and prioritization of the most important ones for protection of movable and immovable Cultural Heritage and effects on materials”. The present work refers to the research activity planned within Task 2.3 on the *prioritization* of the most important pollutants and parameters for the preventive conservation and maintenance of the *immovable cultural heritage*. The work has been performed mainly on the basis on the results achieved in Tasks 2.1 and 2.2, objectives of Deliverable 2.1:

- Identification of the most important pollutants and parameters and microclimate variables currently affecting the cultural heritage, both movable and immovable (Task 2.1);
- Prediction of the most important pollutants and parameters for the conservation of cultural heritage, and their changes in the near and far future (Task 2.2).

As starting step, the following criteria have been taken into account with the aim of optimizing the work in the selection of the climate and pollution parameters to prioritize:

- Focus on *pollution parameters*, aiming the TeACH project at the development of technologies and tools for the assessment and diagnosis of air pollution impact on Cultural Heritage.
- Focus on the parameters having an impact on the *materials selected for inclusion in the project*: marble, limestone, sandstone, brick/ceramic, lime and hydraulic mortar and cement mortar and concrete.
- Focus on the parameters having an impact on the *building materials* constituting the monuments and buildings selected as sites for the *field tests* planned in Work-package 7 (WP7): S. Maria del Fiore Cathedral (Florence, Italy), the Sukiennice (Cracow, Poland), the Bilbao City Council (Bilbao, Spain), Cologne Cathedral (Germany), National Gallery (Oslo, Norway), City of Salè (Morocco).

DELIVERABLE D.2.3

WP 2

Title of Deliverable: Prioritization of the most important pollutants and parameters for the preventive conservation of the movable Cultural Heritage



Lead beneficiary ISAC CNR

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The “Prioritization of the most important pollutants and parameters for a preventive conservation of the movable cultural heritage” is a confidential document delivered in the context of WP2, Task 2.4. With the same methodological approach used in Task 2.3, this task will focus on the prioritization of the most important pollutants and parameters threatening the movable cultural heritage, with due focus on indoor conditions.

The objectives of the WP2 are:

- Identify the most important pollutants and parameters and microclimatic variables currently threatening cultural heritage, both movable and immovable.
- Predict the most important pollutants and parameters for the conservation of cultural heritage and their changes in the near and far future.
- Prioritize the most important pollutants and parameters for the preventive conservation and maintenance of immovable cultural heritage.
- Prioritize the most important pollutants and parameters for the preventive conservation and maintenance of movable cultural heritage.

This deliverable covers a significant part of the objectives of the WP2 with the identification of the most important pollutants and parameters currently threatening movable cultural heritage. Detail characterization of the most important pollutants and description of their effects on cultural heritage materials is presented in order to contribute to the understanding of the currently threatening parameters. The damage observed on Cultural Heritage objects depends partly on the environment, including pollutants and climate parameters acting in synergy, and partly on the material from which the object is made. Therefore, a prioritization of the most important pollutants and parameters is discussed on the bases of the existing knowledge about posed adverse effects, materials at risk and observable levels in Cultural Heritage locations.

The prediction of the most important pollutants and parameters and their changes in the near and far future constitute one of the goal of the project TeACH. However, recent research studies focussed mainly on outdoors scenarios and therefore, the prediction of future indoor scenarios based on existing knowledge constitutes one of the challenging tasks of the project.

DELIVERABLE D.3.1

WP 3

Title of Deliverable: Selection of protective coatings and organic heritage materials frequently found and applied on European cultural heritage



Lead beneficiary University College London

WP participants LABEIN-Tecnalia

Authors

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The deliverable D3.1 ‘Selection of protective coatings and organic heritage materials frequently found and applied on European cultural heritage’ describes the materials, approaches and technical details to establish weathering tests of the selected materials. The proposal was presented at the TeACH meeting (4-5 June 2009) and the final report was produced with the contribution of UCL, UK and Labein-Tecnalia, Spain.

Deterioration of different heritage materials is a cumulative process which is affected both by climatic and pollution conditions. As materials are exposed under natural conditions, they experience discoloration, crack formation, an increasing brittleness, as well as a host of chemical and physical effects as a direct result of exposure to various environmental factors and air pollutants. In order to predict damage of the materials due to the effects of pollution, the ageing behaviour of the materials under different environmental conditions needs to be investigated and understood.

The selection of coatings with the substrates to be included in this study was performed by Labein-Tecnalia, Spain. Paper heritage materials, representing indoor organic materials used in cultural heritage objects, were selected by UCL, UK. Detailed descriptions, selection criteria and reasonings are given in this report. Selected coatings and paper materials will be further exposed and studied under realistic environmental conditions. The objective will be to determine effects of air pollutants and environment on the stability of the materials. The exposure test environments and measurement methodology were therefore carefully considered as an integral part of test design and summarized in the report. It is hoped that this work will advance our knowledge of the long-term behaviour of the selected materials that will be studied.

DELIVERABLE D.4.1

WP 4

Title of Deliverable: Analysis of some identified existing technologies and devices available on the market



Lead beneficiary LABEIN –Tecnalia

WP participants ISAC CNR, Tecnopenta, Norwegian Institute for Air Research (NILU), Crakow National Museum

Authors

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The deliverable 4.1 “Analysis of some identified existing technologies and devices on the market” is a confidential document delivered in the context of WP4, Task 4.1: “Selective study of existing technology and devices already present on the market for the measurement of the variables and compounds identified in WP2”.

The work presented in this document is based on an analysis of the instrumentation, devices and technologies for the measurement of climate parameters and environmental effects affecting immovable and movable Cultural Heritage. Two were the main sources of information: past European Framework Programme (FP) projects related to Cultural Heritage and the market related to the measurement of the mentioned parameters, including the experience of the TeACH partners in both cases.

The aim of this deliverable is to provide general information on each product / prototype such as the type of instrument / technology, material to be studied, measured parameter and measuring method or technique, etc. so as to have a general overview of the products / prototypes currently available and which could be used as references in the creation of the tool kit.

The conclusions are summarized in two main tables (one for the European FP projects and the other one for the market products) which concentrate the information described above plus additional information on the dimensions of the products / prototypes, possibility to perform in situ measurements, patent request, marketing company and cost. It should be mentioned that some information (mainly related to the cost of the product) was still missing at the time of submitting this deliverable and that it will be updated in future document versions. These tables will later help to select the instrumentation and technologies which best fit the requirements of the tool kit construction.

DELIVERABLE D.4.2

WP 4

Title of Deliverable: Identification of the necessary modifications for their introduction in a compact, economical and user-friendly kit



Lead beneficiary LABEIN - Tecnalia

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The deliverable 4.2 “Identification of the necessary modifications for their introduction in a compact, economical and user-friendly kit” is a confidential document delivered in the context of WP4, Task 4.2: “Identification of the methods and study of the modification and improvement for their introduction in a compact, economical and user friendly kit for the monitoring of the near and far future weathering of outdoor cultural heritage”. The work presented in this document is mainly based on the study of the existing devices and technologies to measure the main environmental parameters performed in D4.1 (of WP4) and the prioritization of the most important pollutants and parameters for a preventive conservation of the immovable and movable cultural heritage, described in deliverables D2.2 and D2.1 (of WP2).

The aim of this deliverable is to select the instrumentation to be included in the compact, economical and user-friendly kit for the monitoring of the outdoor weathering of cultural heritage, and to define the modifications and/or improvements to be performed for their introduction in the kit. Firstly, a definition of the criteria for the selection of the instrumentation presented in D4.1 is given and following the selection of the instrumentation developed in past Framework Programmes and of the products already existing in the market is performed.

The conclusions present the selected instrumentation that could be included in the kit.

DELIVERABLE D.9.1

WP 9

Title of Deliverable: Project web site and leaflet



Lead beneficiary ICIE

WP participants ISAC CNR, LAbEIN-TecNALIA, University of Antwerp, Norwegian Institute for Air Research (NILU), University College London, Cologne Cathedral, Crakow National Museum

Authors

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The deliverable 9.1 “Project web site and leaflet” describes the criteria which the web site and the leaflet layout are based on. The web site has been going live since the “Fiera del restauro” of Ferrara (far before the planned deadline) presenting the starting point of the project.

The work defined in this document were conceived by the ICIE work unit (Giulia Landriscina and Sandra Mattarozzi) and were subsequently approved both by the TeACH project coordinators and its entire workgroup.

What’s here reported is the current version of the web site. A web site is a dynamic structure, so it is intended to be modified, if necessary.

This document constitutes the contractual deliverable “D9.1 – Web site and leaflet” of the TeACH project and belongs to “WP9 – Guidelines for the future prioritization of air pollution monitoring, dissemination, marketing, economic evaluation and exploitation”.

DELIVERABLE D.9.2

WP 9

Title of Deliverable: Dissemination Plan



Lead beneficiary ICIE

WP participants ISAC CNR, LABEIN-Tecnalia, University of Antwerp, Norwegian Institute for Air Research (NILU), University College London, Cologne Cathedral, Crakow National Museum

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The deliverable 9.2 “Dissemination Plan” is a proposal for the actions and the tools to be used by the TeACH project workgroup to disseminate and communicate information regarding its activities and the results of its research.

The actions and tools proposed in this document were conceived by the ICIE work unit and were subsequently shared both with the TeACH project coordinator and presented to its entire workgroup. They may vary as new communications opportunities arise or as a result of decisions made as the project progresses.

The goal of this document is to identify dissemination and communication actions and tools which are in line with the principal European guidelines (see “A guide to successful communication,” Europe Research, European Commission, Directorate C- Science and Society).

A summary outlining the necessary steps to planning dissemination activities has been drawn up for each communication tool. The website, the leaflet and the brochure have been created for the project and the remaining dissemination tools have been proposed and presented in a general description.