HERitage Resilience Against CLiimate Events on Site

Results

Project Information

HERACLES

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Closed project

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€ 6 564 313,75

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€ 6 564 313,75

Coordinated by
CONSIGLIO NAZIONALE DELLE RICERCHE

Italy

This project is featured in...

RESULTS PACK
Heritage at Risk: EU research and innovation for a more resilient cultural heritage

11 June 2018
Deliverables

Documents, reports (48)

- Report on HERACLES impacts at test sites
- Follow-up reports of the dissemination actions performed_M3
- Development of an in-situ diagnostic protocol for quick assessment and monitoring of the weathering state and its progress on the areas of interest for the studied test beds
- Follow-up reports of the dissemination actions performed_M15
- Operational Procedures for disaster prevention and risk management_M34
- Guide lines and data sheets for the virtual training courses M30
- Applicability and long term behavior of the developed material systems
- Definition of the end-users requirements with emphasis on HERACLES test beds
- Intermediate analysis of the experimental and theoretical aspects underlying the state-of-the-art application of the satellite and airborne sensing technologies
- Guide lines and data sheets for the virtual training courses M18
- Methodologies for maintenance, conservation, and restoration
- Operational Procedures for disaster prevention and risk management_M30
Operational Procedures for disaster prevention and risk management

Description of the site and detailed end-users requirements and definition of the logistics for the monitoring system at GUBBIO

Results of the Demonstration Activities at GUBBIO

Report on social impacts, societal resilience and cultural values awareness

Workshop/Symposia including dissemination material

Follow-up reports of the dissemination actions performed_M33

Integration of socio-economic factors in risk analysis

Approaches for correlation/integration of the sensing technologies

Intermediate analysis of the experimental and theoretical aspects underlying the state-of-the-art application of in-situ sensing technologies

Follow-up reports of the dissemination actions performed_M6

Content documents M18

Survey on guidelines and procedures for CH management

Guide lines and data sheets for the virtual training courses M6

Climate change, extreme weather conditions and anthropic pressure modelling
Follow-up reports of the dissemination actions performed, M36 Final Report

Operational Procedures for crisis management

Geomorphological and structural modeling and monitoring

Complete analysis of the experimental and theoretical aspects underlying the state-of-the-art application of the integrated sensing technologies

Best Practices Manual

Operational View Diagrams

Guide lines and data sheets for the virtual training courses M12

Survey of the state of art of the technologies of interest for HERACLES

Follow-up reports of the dissemination actions performed_M27

Critical analysis of the effectiveness of the HERACLES at the test beds with recommendations for future use

Development of a detailed analytical protocol for laboratory analysis for the determination of materials and their alteration for the studied test beds using high resolution sophisticated state-of-the-art analysis and microscopy

Follow-up reports of the dissemination actions performed_M9
Operational Procedures for disaster prevention and risk management

Content documents M36

Determination of the degradation state of the studied structures, structural materials and proposed solutions

Guide lines and data sheets for the virtual training courses M24

Results of the Demonstration Activities at HERAKLION

Roadmap of the results of HERACLES project

Follow-up reports of the dissemination actions performed

Description of the site and detailed end-users requirements and definition of the logistics for the monitoring system at HERAKLION

Definition of a systematic protocol related to the diagnostic and analytical strategies for each different monument to be studied on the basis of the different structures, materials and weathering states

Definition of methodologies for climate change impact evaluation and risk and vulnerability analysis

Websites, patent fillings, videos etc. (7)
Publications

Peer reviewed articles (13)

New evidence about the use of serpentinite in the Minoan architecture. A μ-Raman based study of the "House of the High Priest" drain in Knossos

Author(s): Ioannis Grammatikakis, Konstantinos D. Demadis, Evangelos Kyriakidis, Aurelio Cabeza, Laura Leon-Reina

Published in: Journal of Archaeological Science: Reports, Issue 16, 2017, Page(s) 316-321, ISSN 2352-409X

DOI: 10.1016/j.jasrep.2017.09.029
Assessment of a monumental masonry bell-tower after 2016 Central Italy seismic sequence by long-term SHM

Author(s): Filippo Ubertini, Nicola Cavalaglì, Alban Kita, Gabriele Comanducci
Published in: Bulletin of Earthquake Engineering, 2017, ISSN 1570-761X
DOI: 10.1007/s10518-017-0222-7

The Stretching Method for Vibration-Based Structural Health Monitoring of Civil Structures

Author(s): Chrysoula Tsogka, Emmanouil Daskalakis, Gabriele Comanducci, Filippo Ubertini
Published in: Computer-Aided Civil and Infrastructure Engineering, Issue 32/4, 2017, Page(s) 288-303, ISSN 1093-9687
DOI: 10.1111/mice.12255

Earthquake-Induced Damage Detection in a Monumental Masonry Bell-Tower Using Long-Term Dynamic Monitoring Data

Author(s): Nicola Cavalaglì, Gabriele Comanducci, Filippo Ubertini
Published in: Journal of Earthquake Engineering, 2017, Page(s) 1-24, ISSN 1363-2469
DOI: 10.1080/13632469.2017.1323048

Two-Dimensional Linear Inversion of GPR Data with a Shifting Zoom along the Observation Line

Author(s): Raffaele Persico, Giovanni Ludeno, Francesco Solvovieri, Albéric De Coster, Sébastien Lambot
Published in: Remote Sensing, Issue 9/10, 2017, Page(s) 980, ISSN 2072-4292
DOI: 10.3390/rs9100980

Introducing the HERACLES Ontology—Semantics for Cultural Heritage Management

Author(s): Tobias Hellmund, Philipp Hertweck, Désirée Hilbring, Jürgen Mossgaber, George Alexandrakis, Paraskevi Pouli, Amalia Siatou, Giuseppina Padeletti
Published in: Heritage, Issue 1/2, 2018, Page(s) 377-391, ISSN 2571-9408
DOI: 10.3390/heritage1020026

The Case Study of the Medieval Town Walls of Gubbio in Italy: First Results on the Characterization of Mortars and Binders

Author(s): Fernanda Carvalho, Andreia Lopes, Antonella Curullì, Teresa da Silva, Maria Lima, Giampiero Montesperelli, Sara Ronca, Giuseppina Padeletti, João Veiga
Published in: Heritage, Issue 1/2, 2018, Page(s) 468-478, ISSN 2571-9408
DOI: 10.3390/heritage1020031

Economic and Societal Impacts on Cultural Heritage Sites, Resulting from Natural Effects and Climate Change
Multi-Look in GLRT-Based Detection of Single and Double Persistent Scatterers

Author(s): George Alexandrakis, Constantine Manasakis, Nikolaos A. Kampanis
Published in: Heritage, Issue 2/1, 2019, Page(s) 279-305, ISSN 2571-9408
DOI: 10.3390/heritage2010019

Structural Assessment via Ground Penetrating Radar at the Consoli Palace of Gubbio (Italy)

Author(s): Antonio Pauciullo, Diego Reale, Walter Franze, Gianfranco Fornaro
Published in: IEEE Transactions on Geoscience and Remote Sensing, Issue 56/9, 2018, Page(s) 5125-5137, ISSN 0196-2892
DOI: 10.1109/tgrs.2018.2809538

On the Combined Use of Ground Penetrating Radar and Crack Meter Sensors for Structural Monitoring: Application to the Historical Consoli Palace in Gubbio, Italy

Author(s): Ilaria Catapano, Giovanni Ludeno, Francesco Soldovieri, Francesco Tosti, Giuseppina Padeletti
Published in: Remote Sensing, Issue 10/2, 2018, Page(s) 45, ISSN 2072-4292
DOI: 10.3390/rs10010045

A new wearable monitoring system for investigating pedestrians’ environmental conditions: Development of the experimental tool and start-up findings

Author(s): Ilaria Pigliautile, Anna Laura Pisello
Published in: Science of The Total Environment, Issue 630, 2018, Page(s) 690-706, ISSN 0048-9697
DOI: 10.1016/j.scitotenv.2018.02.208

Hierarchical environmental risk mapping of material degradation in historic masonry buildings: An integrated approach considering climate change and structural damage

Author(s): N. Cavalagli, A. Kita, V.L. Castaldo, A.L. Pisello, F. Ubertini
Published in: Construction and Building Materials, Issue 215, 2019, Page(s) 998-1014, ISSN 0950-0618
DOI: 10.1016/j.conbuildmat.2019.04.204

Book chapters (2)

Heritage Resilience Against Climate Events on Site - HERACLES Project: Mission and Vision

Author(s): Giuseppina Padeletti
Published in: Transdisciplinary Multispectral Modeling and Cooperation for the Preservation of Cultural Heritage - First International Conference, TMM_CH
Monitoring and Mapping of Deterioration Products on Cultural Heritage Monuments Using Imaging and Laser Spectroscopy


Published in: Transdisciplinary Multispectral Modeling and Cooperation for the Preservation of Cultural Heritage - First International Conference, TMM_CH 2018, Athens, Greece, October 10–13, 2018, Revised Selected Papers, Part I, Issue 961, 2019, Page(s) 360-375
DOI: 10.1007/978-3-030-12957-6_26

Conference proceedings (34)

HERACLES: EU-backed multinational project on cultural heritage preservation

Author(s): Dimitri Bulatov, Melanie Pohl, Lukas Lucks, Peter Solbrig, Jürgen Mossgaber, Gabriele Murchio, Giuseppina Padeletti

Published in: Earth Resources and Environmental Remote Sensing/GIS Applications IX, 2018, Page(s) 11
DOI: 10.1117/12.2324661

An ontology for protecting Cultural Heritage against Climate Change

Author(s): Jürgen Moßgraber, Pouli Paraskevi, and Giuseppina Padeletti

Published in: Geophysical Research Abstracts (GRA), Issue Volume 20 – EGU General Assembly 2018, 2018

An ICT Platform to support Decision Makers with Cultural Heritage Protection against Climate Events

Author(s): Moßgraber, Jürgen; Lortal, Gaëlle; Calabrò, Francesco; Corsi, Marco

Published in: Geophysical Research Abstracts, Issue Volume 20 – EGU General Assembly 2018, 2018

Analysis of sensor signals for monitoring of heritage buildings

Author(s): Kym Watson, Siegbert Kunz, Hylke van der Schaaf, Filippo Ubertini

Published in: Geophysical Research Abstracts, Issue Volume 20 – EGU General Assembly 2018, 2018
A Knowledge Base for improving the Situation Awareness of Cultural Heritage buildings

**Author(s):** Jürgen Moßgraber, Tobias Hellmund, Philipp Hertweck, and Hylke van der Schaaf

**Published in:** Geophysical Research Abstracts, Issue Volume 21 – EGU General Assembly 2019, 2019

Methodology for the characterization of Cultural Heritage materials and their degradation state, using ex-situ laboratory analysis and microscopies: the HERACLES project approach

**Author(s):** Antonella Curulli, João Pedro Veiga, Kostas Demadis, Ioannis Grammatikakis, Giampiero Montesperelli, Michele Menichetti, Giuseppina Padeletti

**Published in:** Geophysical research Abstracts, Issue Volume 20 – EGU General Assembly 2018, 2018

Microwave tomography enhanced GPR surveys in Consoli Place of Gubbio (Italy)

**Author(s):** Ilaria Catapano, Giovanni Ludeno, Francesco Soldovieri, Francesco Tosti, and Giuseppina Padeletti

**Published in:** Geophysical Research Abstracts, Issue Volume 20 – EGU General Assembly 2018, 2018

GPR surveys for Cultural Heritage assets: the case study of Consoli Palace at Gubbio – Italy,

**Author(s):** Ilaria Catapano, Giovanni Ludeno, Francesco Soldovieri, Francesco Tosti, Giuseppina Padeletti

**Published in:** EMRS 2018 Conference, Issue EMRS 2018 Conference, 2018

The HERACLES approach for setting the guidelines for predictive and cost-effective monitoring of Cultural Heritage built monuments

**Author(s):** Paraskevi Pouli, Amalia Siatou, George Alexandrakis, Antonella Curulli, Elissavet Kavoulaki, Snježana Knezić

**Published in:** Geophysical Research Abstracts, Issue Volume 21-EGU General assembly, 2019

Multianalytical approach for the characterization of stone crusts. The case study of the Consoli Palace in Gubbio, Italy.

**Author(s):** Antonella Curulli, Fernanda Carvalho, João Pedro Veiga, Giuseppina Padeletti, Giampiero Montesperelli, Francesco Soldovieri, Sara Ronca

**Published in:** Geophysical Research Abstracts, Issue volume 21 - EGU General Assembly, 2019
An Ontology for Cultural Heritage Protection against Climate Change

Author(s): Tobias Hellmund
Published in: International Conference on Advances in Semantic Processing SemaPro, 2018

Modelling the domain of Cultural heritage-materials in relation to climate change

Author(s): Jürgen Moßgraber et al.
Published in: EMRS 2018 Conference, Issue EMRS 2018 Book of Abstracts, 2018

Keynote - Architecture of Early Warning and Decision Support Systems

Author(s): Jürgen Moßgraber
Published in: ISCRAM – ICMT Workshop, Issue ISCRAM – ICMT Workshop 2018 Book of Abstracts, 2018

Management and Applications of Sensor Data using Open Standards

Author(s): Jürgen Moßgraber et al
Published in: Geospatial World Forum, 2019

The case study of the Medieval Town Wall of Gubbio in Italy. First results on the characterization of mortars and binders

Author(s): Fernanda Carvalho, Giuseppina Padeletti, Antonella Curulli, Giampiero Montesperelli, Maria Margarida Lima, Andreia Lopes, Teresa Pereira da Silva, João Pedro Veiga.
Published in: EMRS 2018 Conference, Issue EMRS 2018 Conference Book of Abstracts, 2018

On the traces of the Sir Arthur Evans restoration activities at the Palace of Knossos

Author(s): Francesco Soldovieri, Ilaria Catapano, Giovanni Ludeno, Elissavet Kavoulaki, Elpida Politaki, Maria Lolou, Aristeidis Dokoumetzidis, Elissavet Katsaveli, Giuseppina Padeletti
Published in: Geophysical Research Abstracts, Issue Volume 21-EGU General Assembly, 2019

The use of concrete in the reconstruction of the Palace of Knossos in Crete, Greece: from Sir Arthur Evans to modern times

Author(s): Fernanda Carvalho, Antonella Curulli, Elisabet Kavoulaki, Elpida Politaki, Elissavet Katsaveli, Aristeidis Dokoumetzidis, Maria Margarida R. A.
Black Crusts in the Palace of Knossos, Crete, Greece: a HERACLES Project Case Study  
**Author(s):** F. Carvalho, A. Curulli, E. Kavoulaki, E. Politaki, E. Katsaveli, A. Dokometzidis, M. M. Lima, G. Montesperelli, S. Ronca, G. Padeletti, J. P. Veiga  
**Published in:** EMRS 2019 Conference, Issue EMRS 2019 Conference book of Abstracts, 2019

Far-field earthquake-induced damage detection in a monumental bell-tower after Central Italy seismic sequence (2016) through vibration-based SHM  
**Author(s):** Filippo Ubertini, Nicola Cavalagli, Alban Kita  
**Published in:** Proceedings of the XVII Italian Conference on Earthquake Engineering (ANIDIS 2017), 2017, ISSN 2532-120X

The role of dynamic monitoring for seismic assessment of monumental heritage buildings: an application to Palazzo dei Consoli in Gubbio  
**Author(s):** Nicola Cavalagli, Alban Kita, Filippo Ubertini  
**Published in:** Proceedings of the XVII Italian Conference on Earthquake Engineering (ANIDIS 2017), 2017

On the assessment of microclimate change on building and human resilience: an innovative methodology  
**Author(s):** I. Pigliautile, V. L. Castaldo, B. Pioppi, M. Agabitini, A. L. Pisello  
**Published in:** Proceedings of the 17th CIRIAF National Congress on Sustainable Development, Human Health and Environmental Protection, 2018

FIRST RESULTS OF MIXED STATIC-DYNAMIC STRUCTURAL HEALTH MONITORING OF CONSOLI PALACE IN GUBBIO  
**Author(s):** A. Kita, N. Cavalagli, F. Ubertini  
**Published in:** 10th International Masonry Conference (IMC 2018), 2018, ISSN 2523-532X

The Palace of Knossos and the Venetian Fortress «Rocca a Mare» (Koules) in Heraklion, Crete, Greece: How the HERACLES activities and platform will contribute to their protection and resilience against climatic events
Socio Economic impact of natural and climate change hazards on cultural heritage sites

**Author(s):** Kavoulaki Elissavet, Aristeidis Dokoumetzidi, Eleni Kanaki, Elisavet Katsaveli, Elpida Politaki, Angeliki Psaroudaki, Vassiliki Sythiakaki, and Georgios Tsimpoukis  
**Published in:** Geophysical Research Abstracts, Issue Volume 20 - EGU General Assembly, 2018

Towards an effective fusion of satellite InSAR and in-situ data for structural assessment and monitoring of heritage buildings: first experiences in Gubbio and Heraklion

**Author(s):** George Alexandrakis, Constantine Manasakis, George Kozyrakis, Francesco Tosti, Elisavet Kavoulaki, and Nikolaos Kampanis  
**Published in:** Geophysical Research Abstracts, Issue Volume 20 - EGU General Assembly, 2018

A multidisciplinary integrated approach for assessing structural damage and material degradation of heritage buildings: application to Palazzo dei Consoli in Gubbio

**Author(s):** Nicola Cavalagli, Ilaria Pigliautile, Anna Laura Pisello, Filippo Ubertini  
**Published in:** Geophysical Research Abstracts, Issue Volume 20 - EGU General Assembly, 2018

A methodology for the in-situ chemical analysis and monitoring of environmental and climatic deterioration products on monuments using advanced, non-contact, laser-based technologies

**Author(s):** Paraskevi Pouli, Philippidis Aggelos, Kalokairinou Eleni, Melessanaki Krystalia, Kokkinaki Olga, Siozos Panagiotis, Hatzigiannakis Costas, Kavoulaki Elissavet, Politaki Elpida, Psaroudaki Angeliki  
**Published in:** Geophysical Research Abstracts, Issue Volume 20- EGU General Assembly, 2018

Application of Advanced SAR Interferometric approaches to the Monitoring of Cultural Heritage

**Author(s):** Gianfranco Fornaro, Antonio Pauciullo, Diego Reale, Simona Verde  
**Published in:** Geophysical Research Abstracts, Issue Volume 20 - EGU General Assembly, 2018

Cultural heritage resilience and socioeconomics benefits
Surface coordination chemistry as a mechanistic tool for evaluating calcium-binding consolidants: Application on gypsum stones

**Author(s):** Konstantinos Demadis, Ioannis Grammatikakis, Eirini Armakola  
**Published in:** EMRS 2018 Conference, Issue EMRS 2018 Conference Book of Abstracts, 2018

Evaluation of consolidate efficiency on sulfate stones: A case study of the mineral gypsum from the Minoan Palace of Knossos

**Author(s):** Ioannis E. Grammatikakis, Eirini Armakola, Konstantinos D. Demadis  
**Published in:** EMRS 2018 Conference, Issue EMRS 2018 Conference Book of Abstracts, 2018

In-situ analysis & monitoring of environmental deterioration products on stone monuments using advanced laser-based technologies

**Author(s):** A. Philippidis, E. Kalokairinou, K. Melessanaki, K. Hatzigiannakis, O. Kokkinaki, P. Siozos, P. Pouli, E. Kavoulaki, E. Politaki, A. Psaroudaki  
**Published in:** EMRS 2018 Conference, Issue EMRS 2018 Conference Book of Abstracts, 2018

Climate changes impact, risk management and mitigation of coastal Cultural Hritage sites.

**Author(s):** George Alexandrakis, Nikolaos Kampanis, Paraskevi Pouli, Aggeliki Psaroudaki  
**Published in:** EMRS 2018 Conference, Issue EMRS 2018 Conference Book of Abstracts, 2018

Structural damage and material degradation assessment of Palazzo dei Consoli in Gubbio, Italy

**Author(s):** Nicola Cavalagli, Ilaria Pigliautile, Anna Laura Pisello, Filippo Ubertini  
**Published in:** EMRS 2018 Conference, Issue EMRS 2018 Conference Book of Abstracts, 2018
Datasets via OpenAIRE (1)

Data for: DATA COLLECTED BY COUPLING FIX AND WEARABLE SENSORS FOR ADDRESSING URBAN MICROCLIMATE VARIABILITY IN AN HISTORICAL ITALIAN CITY

Author(s): Pisello, Anna Laura
Published in: Mendeley

Last update: 20 December 2019
Record number: 203438

Permalink: https://cordis.europa.eu/project/id/700395/results

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