Acronym – HYPERION

Title – Development of a Decision Support System for Improved Resilience & Sustainable Reconstruction of historic areas to cope with Climate Change & Extreme Events based on Novel Sensors and Modelling Tools

Scientific Coordinator – Fabrizio Antonelli

Scientific sector – GEO/09

Iuav Role – Project partner

Lead partner – Institute of Communication and Computer Systems – Athens

Duration – 42 months

Start – 01/06/2019

Closure – 30/11/2022

Project budget– € 5.997.728,75

Iuav Budget – € 260.445,00

Funding to Iuav – € 260.445,00

Source of funding – EU Call: Horizon 2020 - Call: H2020-LC-CLA-2018-2019-2020 - Topic: LC-CLA-04-2018

Description – HYPERION aims to introduce a research framework for downscaling the created climate and atmospheric composition as well as associated risk maps down to the 1x1 km (historic area) scale, and specific damage functions for Cultural Heritage materials. Applying atmospheric modelling for specific Climate Change scenarios at such refined spatial and time scales allows for an accurate quantitative and qualitative impact assessment of the estimated micro-climatic and atmospheric stressors. HYPERION will perform combined hygrothermal and structural/geotechnical analysis of the Cultural Heritage sites and damage assessment under normal and changed conditions, based on the climatic zone, the microclimate conditions, the petrographic and textural features of building materials, historic data for the structures, the effect of previous restoration processes and the environmental/physical characteristics of the surrounding environment. The data coming from the integrated monitoring system will be coupled with simulated data (under the holistic resilience assessment platform-HRAP) and will be further analysed through a data management system, while provide proper adaptation and mitigation strategies, and support sustainable reconstruction plans for the CH damages. The produced vulnerability map will be used by the local authorities to assess the threats of CC (and other natural hazards), visualize the built heritage and cultural landscape under future climate scenarios, model the effects of different adaptation strategies, and ultimately prioritize any rehabilitation actions to best allocate funds in both pre- and post-event environments. The project outcomes will be demonstrated to four European historic areas in Norway, Spain, Italy and Greece (representing different climatic zones).

Objectives – HYPERION aims to leverage existing tools and services (e.g., climate/extreme events models, and their impacts, decay models of building materials, Copernicus services, etc.), novel technologies (terrestrial and satellite imaging for wide-area inspection, advanced machine learning, etc.) to deliver an integrated resilience assessment platform, addressing multi-hazard risk understanding, better preparedness, faster, adapted and efficient response, and sustainable reconstruction of historic areas.
HYPERION will take into account the local eco-systems in the Cultural Heritage areas, mapping out their interactions and following a truly integrated/sustainable reconstruction approach (technical, social, institutional, environmental and economic level), by incorporating active communities participation (using the PLUGGY social platform) and by supporting new business models based on the concept load-balancing and offering financial risk-transfer tools (insurance, Catastrophe-CAT-bonds) that can ensure the immediate funds availability to fuel timely build-back-better efforts.

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