



Intelligent Decision Support System for Climate-Resilient Cultural Heritage Structures

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The preservation of Cultural Heritage (CH) is acknowledged as a major component of achieving sustainable development and an integral part of the socio-cultural and economic fabric of the built environment. However, the current and future extreme climatic projections are anticipated to amplify the degradation processes of historic monuments, associated with environmental and flood related hazards. In addition, in the era of global financial recession, state policy and its relevant institutions are also required to continue protecting and preserving climate vulnerable CH under decreasing budgets and scarce human resources. The existing practices to manage and maintain CH assets are also considered to be insufficient, as evident by recent heritage disasters, such as the collapse of the historic Plaka stonebridge in Greece (2015) due to undetected erosion related processes at the foundation structure after prolonged periods of extreme flooding.

This project aims to develop an intelligent Decision Support System (i-DSS) to enable public and private bodies to proactively manage climatic-risks at historic monuments. This will be achieved through an interdisciplinary approach combining both engineering aspects and socio-economic impacts stemming from the potential degradation of iconic CH structures.

The architecture of the project is presented which consists of a Strategic Screening Tool (SST) employed as a 'fast-scanning' method and combines critical engineering parameters coupled with social and cultural value of historic structures, to identify the most climate-vulnerable CH assets. The Climatic Hazard Monitoring System (CliHaMoS) comprises a structural health monitoring system to provide real-time alerts related to climatic risks and particular scour and flood related hazards on iconic monuments. Finally, the holistic online platform is presented with main aim to ensure that risks associated with climatic hazards are properly communicated to end-users. The obtained information will enable stakeholders to plan adaptation strategies and proactively manage and maintain cultural heritage structures.