



Advanced multi-source approach for cultural heritage assessment and monitoring – the case study of the Corvin Castle and its surroundings

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Remote sensing has already proven to represent an invaluable resource for monitoring the cultural heritage objectives by using non-invasive methods, thus enhancing the capabilities of safeguarding cultural heritage sites. Multiple types of data provide a better insight for the cultural heritage monitoring. Increasing human industrial activities in the vicinity of the Corvin Castle puts a question mark on the long-term conservation of the historic monument. Satellite imagery provides a large amount of data regarding the castle itself and its surrounding areas, enabling authorities and decision makers to assess the natural or anthropic hazards and mitigate potential damages. Freely available high-resolution satellite imagery that spans from mid 1970s until the present day enables an unprecedented opportunity for the creation of multi-sensor, multi-temporal and cross analysis.

In the field of cultural heritage and archaeological research, Light Detection and Ranging (LiDAR) is a significant technology that provides comprehensive data. LiDAR sensors acquire high-precision 3D information (point cloud) of the land surfaces and buildings.

Knowledge of structures stability is essential in early recognition of potential risks and enables preventive diagnosis of heritage sites. Vertical displacements in wide or remote areas can be identified using Persistent Scatterer Interferometry (PS-InSAR) technique. Measuring millimetric displacements using multi-temporal series of data acquired by spaceborne active sensors is less time consuming compared with in-situ measurements. The two-satellite constellation Sentinel-1 mission offers a 6-day exact repeat cycle at the equator, thus providing fast and high accuracy results for emergency situations and hazards monitoring, suitable for PS-InSAR processing. Monitoring the structure stability of this historical monument is of great importance.

The Corvin Castle, also known as Hunyadi Castle or Hunedoara Castle, is the most spectacular Gothic-style construction in Transylvania, Romania. Today, the castle is a rare historical and architectural example. Built in the mid-15th century, the Corvin Castle is split into three large areas: The Knight's Hall, the Diet Hall, and the circular stairways. Each of these three parts is surrounded by both circular and rectangular towers that were used for both defense and as a

prison.

This paper presents the ongoing activities of bringing together various geospatial technologies and data sources in order to set-up an integrated approach for site monitoring and risk assessment related to the Corvin Castle and other similar cultural heritage objectives. The outcomes will provide significant contributions for implementing suitable protection and preservation measures.