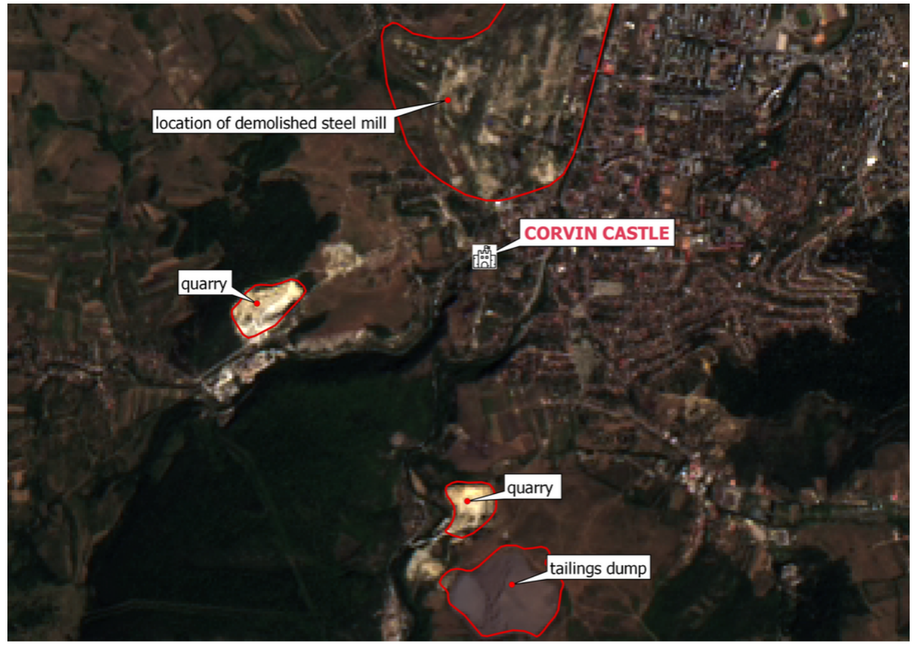
MULTI-SOURCE APPROACH FOR CULTURAL HERITAGE ASSESSMENT AND MONITORING – THE CASE STUDY OF THE CORVIN CASTLE AND ITS SURROUNDINGS

CORVIN CASTLE

One of the most valuable medieval monuments in Romania presents important degradation and is planned to receive major rehabilitation interventions.

This requires complex works of consolidation of the affected areas, as well as interior and exterior restoration works.

Various technologies for preservation of the castle have been used.



Landsat 8 - Aug. 2013
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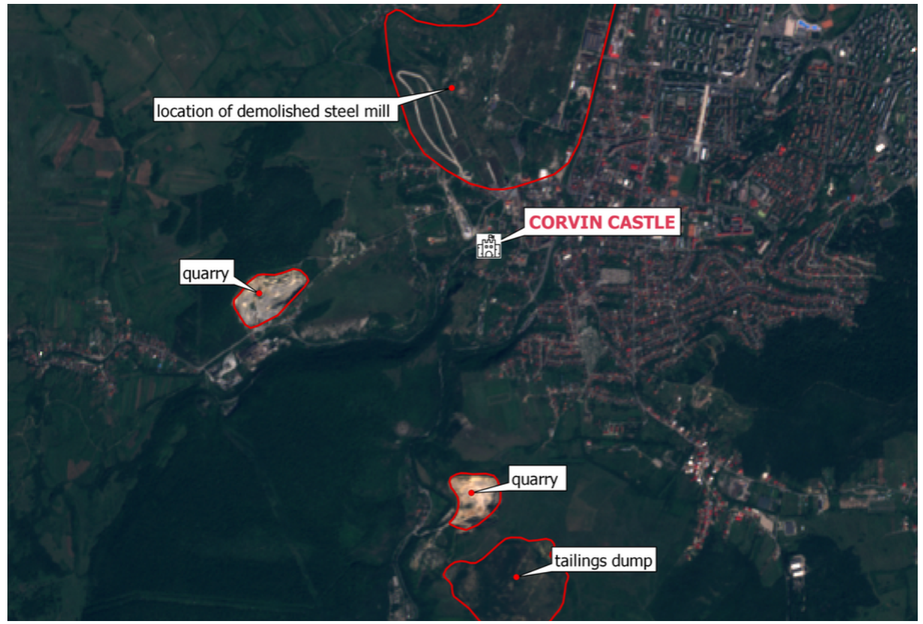

Sentinel 2 - Aug. 2019
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LOCATION AND SURROUNDINGS

Corvin Castle is situated in the vicinity of Hunedoara City.

Hunedoara has a tradition in steel manufacturing, dating from 1880, with a rise in activity during the late XX century.

Nowadays, the local steel industry has low activity and, in consequence, the nearby quarries are closing.

Remote sensing is a powerful tool to asses the environmental changes over long periods of time and large areas.

CORVIN CASTLE

Is an important Romanian Cultural Heritage site, built in the 15th century.

Due to the age of the building, an analysis of stability is required for the safety and security of the tourists.

Space technologies are providing the best repetitive and noninvasive tools. For example, the Persistent Scatterer Interferometry (PS-InSAR) facilitates the monitoring of millimeter terrain and buildings displacements.

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An integrated analysis of structural stability, environment and urban changes is facilitating Cultural Heritage Monitoring.

Focusing on the Castel building, for the PS-InSAR technique, a total number of 37, VV polarization Sentinel-1B images data have been used.

The displacements are varying from -1.70 to +2.64 mm/year.

DIGITAL RECONSTRUCTION

For creating the 3D model of the castle and the additional buildings - a methodology employing photogrammetric and LiDAR data.

To scan the castle, an integrated aerial mapping system has been used: a LiDAR Scout Sensor Velodyne Ultra Puck VLP 32C and a Sony A7R II camera, both mounted on a DJI Matrice 600 PRO UAV platform.

The number of measured points was approximately 80 million and a total of 436 images have been recorded and used to generate the 3D Model.

The digital reconstruction has very good applicability in the field of cultural heritage, in conservation, restoration and rehabilitation works, research or promotion.

3D MODEL

The purpose of the digital reconstruction is to capture with high accuracy the details of the masterpiece castle, in order to pass on this cultural heritage to future generations.

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