„MODERN TECHNOLOGIES FOR THE 3RD MILLENIUM”
5-6 April 2019 ORADEA, Romania

Heritage studies in spatial planning; development and environmental policies

Vîlceanu C.B., Alionescu A., Grecea C., Herban S., Moscovici A.M.
Politehnica University Timişoara, Faculty of Civil Engineering, Timişoara, 2A Lalescu Street
*beatrice.vilceanu@upt.ro

Introduction

There is an urgent need to reposition cultural heritage policies also drawing attention to the environment, which has wider repercussions. Moreover, the reuse of cultural heritage has a significant importance in spatial urban planning. Lately, geodetic tools are more and more used in these domains, photogrammetric studies knowing a growing development within the past years in the field of cultural heritage, setting the framework towards the future in the virtually built environment.

The actuality of the paper is given by the fact that preserving cultural heritage and historical sites represents an important issue that must be taken into account when urban planning projects are required for developing the model of urban growth.

Map of historical buildings in Timisoara with protected bridges

Research

The case study refers to a pedestrian walkway on the Bega River which, because of climate change and the fact that the constructor's warranty has expired, finds itself in need of a structural consolidation, but because it is a historic objective, its identity from this point of view must be preserved.

The bridge connecting the streets of Chrysanthemums and Gelu was built in 1949 and has never been completely rehabilitated ever since. It is currently being used by people who shorten their way from one side of the Bega River to the other, without having to circumnavigate more than one kilometre to the nearest bridge.

Acknowledgment: Supported by CA16219 - Harmonization of UAS techniques for agricultural and natural ecosystems monitoring.

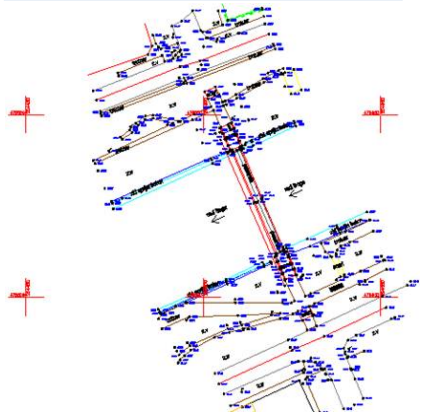
Our contribution to the project consists in conducting topographic surveys by using two methods in order to acquire geospatial data and have a real image of the field situation with a view to obtaining as much details as possible. The two methods are:

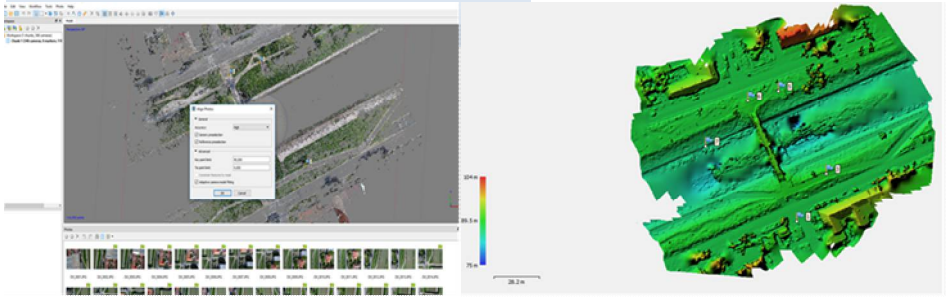
- Surveying engineering using GNSS technology and the total station;
- Photogrammetric measurements using UAVs – drones.

For photogrammetric measurements, a smart drone with 5 directions sensors system composed of vision and infrared sensors, which allows it to avoid obstacles during the flight was used. Its camera delivers unprecedented image quality with improved clarity, less image noise, and greater photo and video resolution (20 Megapixels).

Results

Photogrammetric analysis can create a virtual 3D model of the bridge to be rebuilt after a flood of water or it can be illustrating for architects dealing with its rehabilitation. A realistic impression of geometric 3D data can be generated by draping real colour textures simultaneously captured by a colour camera images.





Conclusion

The documentation of cultural heritage through the acquisition of digital data and the realization of 3D models currently can count on many procedures and survey instruments which have been developed in the last decades and still more specialized for the acquisition of metrical information with high resolution levels, reliability and precision. The paper proves its applicability as photogrammetric technologies are nowadays used at a large scale for obtaining the 3D model of cultural heritage objects, efficient in their assessment and monitoring, thus contributing to historic conservation.