Satellite Remote Sensing and Heritage applications 2010-2020: A Decade of Change

A. Agapiou[1,2]

[1] Remote Sensing and Geo-Environment Lab, Department of Civil Engineering and Geomatics, Faculty of Engineering and Technology, Cyprus University of Technology, Saripolou 2-8, 3036 Limassol, Cyprus,
[2] Eratosthenes Centre of Excellence, Saripolou 2-8, 3036 Limassol, Cyprus, athos.agapiou@cut.ac.cy

Abstract

Space observations have been well introduced over the last years to support archaeological research, from site detection and monitoring to the reconstruction of landscapes with archaeological interest. During the last decade, a technological shift has been observed in the domain of earth observation. This paper aims to summarise these technological changes and present their impact on archaeological research and practice.

The paper introduces new technology-driven developments of satellite observation, such as the launch of high-resolution resolution radar and optical sensors. Other new technological revolutions have also been reported in the near past. Private companies have designed and launched several mini CubeSats, into a single orbit plane, allowing thus a systematic (daily) monitoring. In addition, optical videos from space are available upon request to end-users, while off-nadir high-resolution images can also be requested for specific purposes, including archaeological research. The launch of the Copernicus Sentinel missions during this decade can be characterised as a milestone of the earth observation science. These sensors can provide with a high temporal resolution radar and optical images in an almost global scale. Already applications from their exploitation can be found in the literature ranging from site detection and prediction modelling as well as reconstruction of archaeological landscapes.

Beyond space sensors, research was also motivated by the exploitation of satellite observation big data services. While the idea of big data remains relatively new, the increasing demand for real-time or near real-time processing capability by many time-critical remote sensing applications have made the data-intensive issue even worse. In this direction, big data cloud services are currently available, spanning from the Public Sector Initiatives, Private Sector Offers and the Public-Private Partnerships. The paper presents some examples from the exploitation of these services for heritage management.

The archaeological community and other researchers interested in the protection of cultural heritage and further exploitation of earth observation data, need to work closely together to ameliorate and finally maximise the impact of big earth observation data. The overall capacity of existing sensors is critical to be well understood by the scientific community and therefore unlock potential synergies between the variety of sensors. This will allow expanding the scope of space-based Earth system science in order to meet the needs of heritage management site monitoring and detection. The integration of space sensors in various research studies can maximise the outcomes and support future research, going thus beyond the processing of existing individual datasets.