



Active Satellite Sensors for the needs of Cultural Heritage: Introducing SAR applications in Cyprus through ATHENA project

Demetris Kouhartsiouk (1), Athos Agapiou (1), Vasiliki Lynsadrrou (1), Kyriacos Themistocleous (1), Argyro Nisantzi (1), Diofantos G Hadjimitsis (1), Rosa Lasaponara (2), Nicola Masini (3), Ramon Brcic (4), Michael Eineder (4), Thomas Krauss (4), Daniele Cerra (4), Ursula Gessner (4), and Gunter Schreier (4)

(1) Cyprus University of Technology, Civil Engineering and Geoinformatics, Limassol, Cyprus (athos.agapiou@cut.ac.cy), (2) National Research Council, Institute of Methodologies for Environmental Analysis, C.da S. Loya, 85050 Tito Scalo, Italy, (3) National Research Council, Institute of Archaeological and Monumental Heritage, C.da S. Loya, 85050 Tito Scalo, Italy, (4) Earth Observation Center - EOC, German Aerospace Center – DLR, Wessling, D-82234 Oberpfaffenhofen, Germany

Non-invasive landscape investigation for archaeological purposes includes a wide range of survey techniques, most of which include in-situ methods. In the recent years, a major advance in the non-invasive surveying techniques has been the introduction of active remote sensing technologies. One of such technologies is spaceborne radar, known as Synthetic Aperture Radar (SAR). SAR has proven to be a valuable tool in the analysis of potential archaeological marks and in the systematic cultural heritage site monitoring. With the use of SAR, it is possible to monitor slight variations in vegetation and soil often interpreted as archaeological signs, while radar sensors frequently having penetrating capabilities offering an insight into shallow underground remains.

Radar remote sensing for immovable cultural heritage and archaeological applications has been recently introduced to Cyprus through the currently ongoing ATHENA project. ATHENA project, under the Horizon 2020 programme, aims at building a bridge between research institutions of the low performing Member States and internationally-leading counterparts at EU level, mainly through training workshops and a series of knowledge transfer activities, frequently taking place on the basis of capacity development. The project is formed as the consortium of the Remote Sensing and Geo-Environment Research Laboratory of the Cyprus University of Technology (CUT), the National Research Council of Italy (CNR) and the German Aerospace Centre (DLR).

As part of the project, a number of cultural heritage sites in Cyprus have been studied testing different methodologies involving SAR imagery such as Amplitude Change Detection, Coherence Calculation and fusion techniques. The ATHENA's prospective agenda includes the continuation of the capacity building programme with upcoming training workshops to take place while expanding the knowledge of radar applications on conservation and risk monitoring of cultural heritage sites through SAR Interferometry. The current paper presents some preliminary results from the archaeological site of "Nea Paphos", addressing the potential use of the radar technology.