

**The use of immersive visual technology in the promotion & conservation of prehistoric encultured landscapes:  
A case study from the Tràng An World Heritage property,  
Ninh Binh, Vietnam**

Thorsten Kahlert

Theme

Conservation, management, interpretation and presentation of cultural heritage

**Abstract**

Tràng An Landscape Complex is a UNESCO inscribed mixed cultural and natural World Heritage site located in the Red River delta in the province of Ninh Binh, Vietnam. Since its inscription in 2014, Tràng An has seen increasing international interest, both as a visitor attraction as a site of research activity. In late 2016, the SUNDASIA research project began a programme work in Tràng An under the direction of PI, Ryan Rabett (Queen's University Belfast). This AHRC funded multi-disciplinary and multi-institutional project is investigating past human responses to climate change and resulting cycles of sea transgressions and regressions that transformed Tràng An from an inland to a coastal environment at least three times over the last 60,000 years. Using UAV and ground based 'structure from motion' techniques and topographical surveys, part of the work of SUNDASIA has been to create a detailed digital surface model of the Tràng An core zone in order to refine existing ancient coastline models. A GIS database has been created to collate the topographic data produced by this effort together with other environmental, archaeological and geological information to reconstruct paleo-environmental conditions since the late Pleistocene, and to predict past subsistence and settlement patterns within this highly dynamic landscape. 3D modelling and GIS are the foundations of this research but can also be integrated effectively in educational and museum contexts as a series of virtual landscapes and objects that enable remote immersive access without compromising the integrity of sensitive archaeological remains. They can also provide heritage managers with a powerful, cost-effective conservation tool: providing reference intervals from which to track and assess changes in site or landscape integrity. Hang Thung Binh 1, one of the caves that have been the focus of archaeological and palaeoenvironmental analysis by the SUNDASIA project is used herein as a case study to present the front end and underlying framework for creating such a virtual environment for exhibition and heritage management purposes.