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Introduction

ENGINEER project [1] aims to enhance the Department of Civil Engineering and Geomatics of the Cyprus University of Technology (CUT) research and innovation potentials through coordination and support actions provided by the Twinning call. Built upon its unique character, as the single University Department of the country where Civil and Geomatics Engineers come together, the Twinning project will fulfil and extend inter-departmental research activities in Cultural Heritage.

The Cyprus University of Technology (CUT) has joined forces with three leading European institutions - the Polytechnic University of Milan (POLIMI), the University of Aveiro (UAVEIRO) and the University College of London (UCL) - to advance research and innovation in the fields of Civil Engineering and Geomatics, as well as with the Eratosthenes Centre of Excellence (ECoE) for the interaction with the wider society and industry. The leading teams have been working closely with the local team, providing targeted training and research activities, mobility actions, networking, and in situ pilot applications.

The consortium has completed its first year of activities. During the project's first year, a summer school and workshop on the domains of 3D modelling, data acquisition, processing, and visualization were carried out at the UNESCO World Heritage site "Tombs of the Kings in Cyprus (Tomb 7)". During these activities, the use of state of the art sensors, such as terrestrial laser scanners, low altitude, and close-range cameras, has been demonstrated such. Moreover, advanced partners have provided a detailed evaluation report including local institution existing capacities, baseline assessment, as well as a GAP analysis, providing a list of recommendations and actions to be taken.

Finally, virtual meetings were regularly organized by the advanced partners for other complementary activities including research performance, innovation capacity, infrastructure, and resources. Moreover, short-term staff exchange and other coordination and support action related workshops between team members have been implemented. The ENGINEER project has already been presented at European conferences [2], webinars and workshops as well as to local society while scientific outcomes have been drafted [3].

Workshops

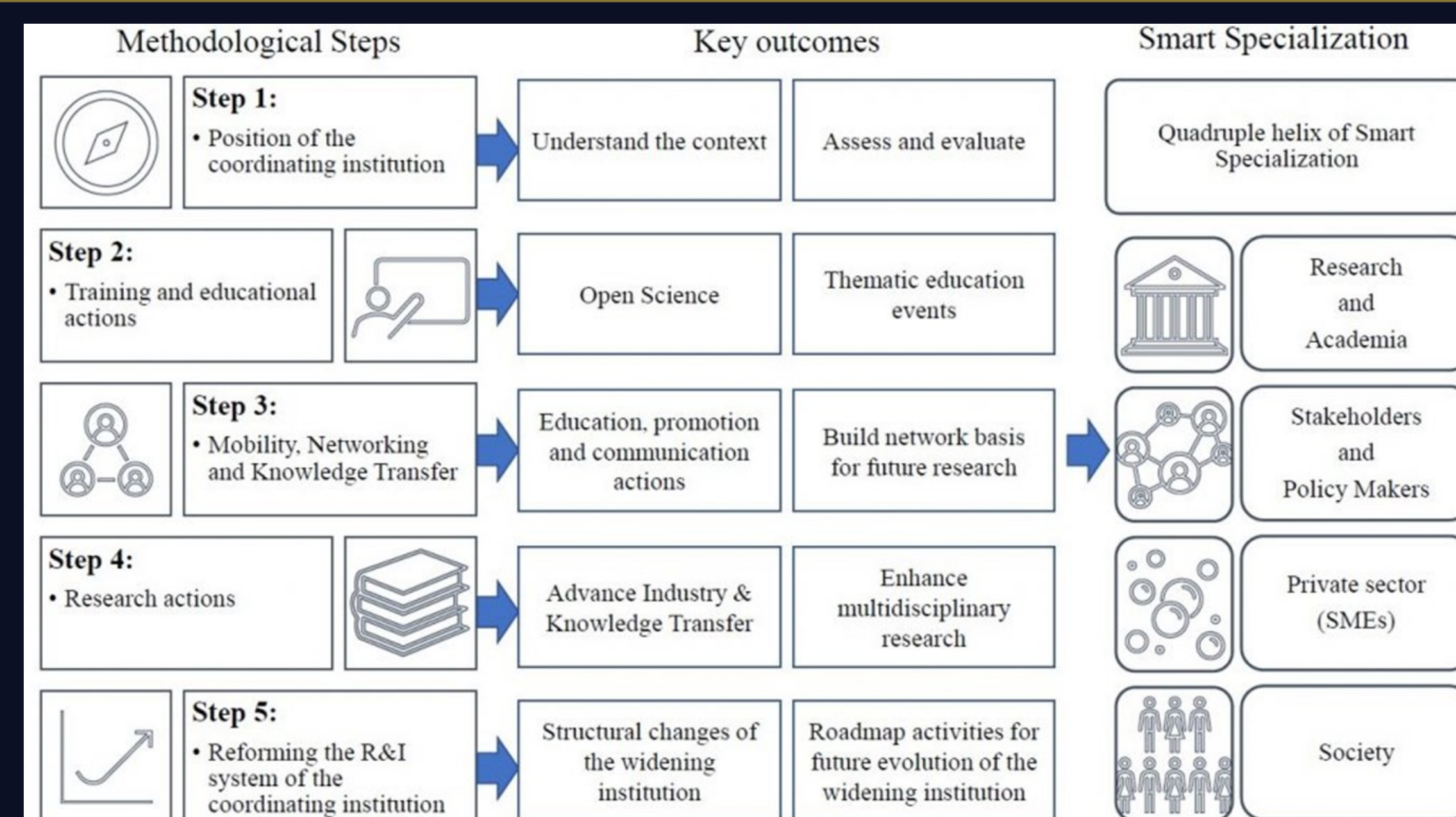
The inaugural 3D Modelling and Technologies Workshop and Summer School brought together CUT and POLIMI to document Tomb 7 of the Tombs of the Kings, a UNESCO World Heritage site. They used various technologies including photogrammetry, laser scanners, GNSS sensors, and more. UAVEIRO contributed virtually with presentations for future project activities.



Workshop was entirely spent at the place of the case study at Paco da Ermida, Ilhavo. There, CUT staff had the chance to visit the area of the listed building both from the exterior and interior of the building. Then an illustration of the survey and assessment instruments for building assessment was provided and a flapjack test as well as a resistivity analysis were performed in place by UAVEIRO team.



Methodology



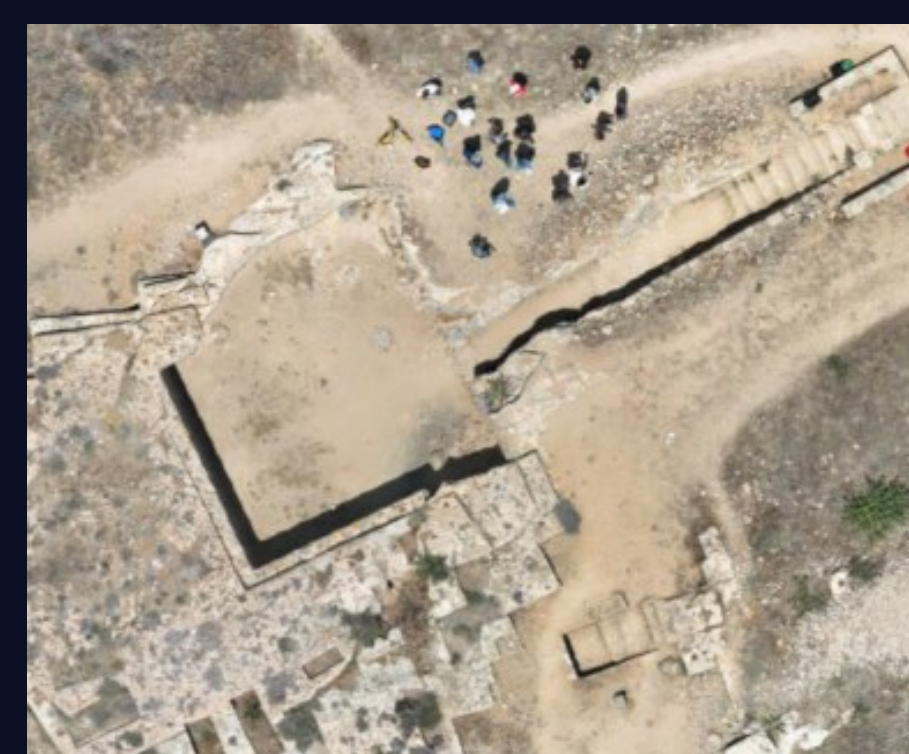
Summer Schools

Dr. A. Agapiou spoke at the "Re- envisioning Cultural Heritage Documentation in the Metaverse Age" Summer School organized by the ERA Chair of Digital Heritage and UNESCO Chair.

Dr. Agapiou discussed non-contact remote sensing approaches for cultural heritage in their presentation titled "Earth Observation for Cultural Heritage: Applications Overview."



MSc students in the "Geoinformatics and Earth Observation" program at CUT are analyzing low altitude drone RGB images from the first summer school of the ENGINEER project. This activity is part of the GEO 554 course, taught by Prof. Dimitrios Skarlatos, aiming to teach advanced photogrammetric skills and software for air triangulation and orthophoto production at the "Tombs of the Kings" archaeological site.



Trainings

JanusExplore mobile laser scanner was tested for data collection at the Tombs of the Kings. In case of proceeding with JanusExplore purchase, the equipment will be acquired via CONNECTING project although the data will be re-used in ENGINEER project. The potential acquisition of the laser scanner will also facilitate the planned activities of the CUT team within the context of the ongoing research projects while engaging national stakeholders (i.e., DoA) in the data collection process.



CUT members had the opportunity to work on the data collected the day before at the Tombs of the Kings. Laser scanner registration and cleaning the noise, orthophoto production of the low altitude cameras, GNSS Rinx correction, cross-sections in a CAD environment and many more!



References

- ENGINEER project, <https://engineer-twinning.eu> (accessed 24th of Oct. 2023)
- Agapiou A., Aktas Y. D., Barazzetti L., Costa A., Cuca B., D' Ayala D., Kyriakides N., Kyriakidis P., Lysandrou V., Oreni D., Previtali M., Skarlatos D., Tavares A., Vlachos M., Geomatics and civil engineering innovative research on heritage: introducing the "ENGINEER" project, *Int. Arch. Photogramm. Remote Sens. Spatial Inf. Sci.*, XLVIII-M-2-2023, 27–32, <https://doi.org/10.5194/isprs-archives-XLVIII-M-2-2023-27-2023>, 2023 .
- Agapiou, A.; Skarlatos, D. Geomatic Sensors for Heritage Documentation: A Meta-Analysis of the Scientific Literature. *Heritage* 2023, 6, 6843-6861. <https://doi.org/10.3390/heritage6100357>

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