



Portable Heritage Metric Test Object - Optimisation of evaluation for image-based 3D modelling techniques. New design iteration and different recording strategies.

(COSCH Working group 2/ Cost Action TD 1201)

REFERENCE: Short Term Scientific Mission (STSM), COST TD1201

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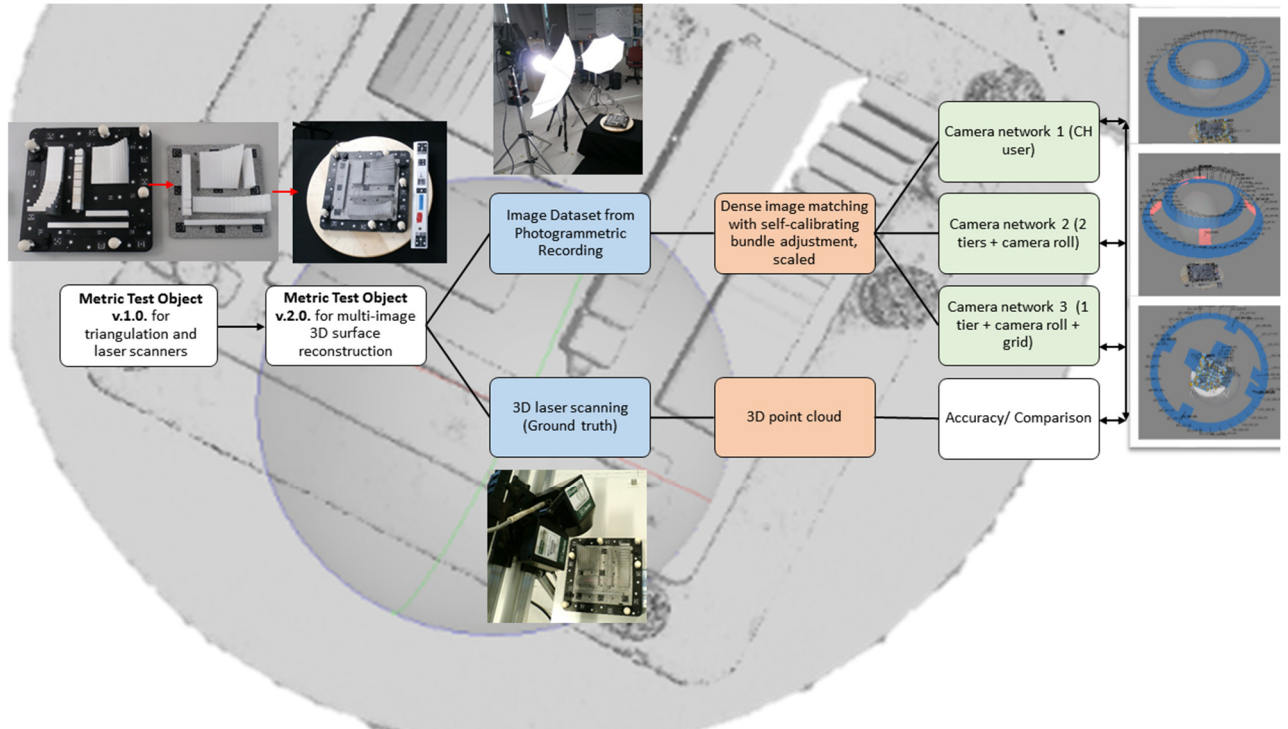
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A *Portable Metric Heritage Test Object v.1.0.* has been designed by Mona Hess at 3DIMPact/ UCL CEGE and was optimized for metric characterization of active 3D imaging sensors (i.e. laser scanners, fringe projection scanners, etc.). This STSM developed and presented a new iteration of the *Test Object (v.2.0.)*, which is designed and specifically directed to optimize evaluation of image-based, multi-view 3D imaging techniques, such as photogrammetry and Structure from Motion (SfM). Through the introduction of a finely-resolved textured surface structure and a new distribution of the geometric features, the test object is now suited 3D image matching and provides a scientific evaluation of the performance of different 3D surface reconstruction results.

Therefore, photogrammetric 3D surface reconstructions are computed from three different image network recording strategies (for example typical network by a cultural heritage user, and two photogrammetric image networks) but from the same image dataset with a commercially available software. Surface reconstruction is achieved by dense image matching with self-calibrating bundle adjustment and subsequent scaling via known distances. 3D surface reconstructions are compared against a 3D laser scan ground truth using the same geometric Test Object v2.0.

The newly developed version of the *Portable Metric Test Object v.2.0* is aimed at a target audience of non-engineering users, and specifically to cultural heritage practitioners with photographic skills. It has proven useful for all three: the use of training in photogrammetric recording and to camera network planning skills as well as metrology verification skills. The research topic is addressing the aims of *Working Group 2: Spatial object documentation*, and here specifically the evaluation of comparative '3D imaging strategies and assessment of techniques'.



Graphical Abstract: Development of a new version of the Portable Metric Heritage Test Object (v2.0) and testing strategy of 3D data outcomes from different camera networks (COST-STSM-ECOST-STSM-TD1201--051015-063123)