

The Use of Different Data Sets in 3–D Modelling

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SUMMARY

The needs for photo-realistic, modelling of the complete details, and geometrically accurate 3-D models are growing rapidly in several fields, especially in engineering and cultural heritage documentation. Photorealism and better details can be achieved through using terrestrial imagery but it is a very time-consuming process particularly in large modelling projects. It is possible to improve efficiency by image capture from a moving ground based vehicle but this requires an extra process in the work flow if the initial modelling has been undertaken by aerial photogrammetric processes. Pictometry imagery has been used for visual inspection especially in life-saving situations due to the fact that the Pictometry aerial imagery contains oblique (angled) images which provide better view and greater detail. The more conventional method of collecting aerial images with for example the UltraCamD, can also provide excellent views of roof tops and some of the building facades when located away from the nadir on the images. This paper explored the geometry of the Pictometry images (vertical and oblique) and the possibility of using this imagery in 3-D modelling to produce photo-realistic and accurate models. In addition, merging terrestrial imagery with Pictometry imagery to get more ground level details has been investigated in this research. All work has been carried out using the available software packages at the Institute of Engineering Surveying and Space Geodesy (IESSG) and using data provided by Blom Aerofilms Ltd. The results of the aerial triangulation of different Pictometry blocks showed that high quality image measurements have been achieved for all the image blocks. Extraction of 3D geometry for all buildings in the study area has been performed using both vertical Pictometry imagery and UltraCamD imagery. The successful combining of vertical and oblique Pictometry images provided an excellent opportunity to produce an efficient method of high quality urban model texturing. The integration of terrestrial images of building facades (whose texture needs enhancement) with the combined aerial imagery block has been successfully and automatically performed.