PHOTOMODELING S’ANT’OMOBONO
Meeting the challenges of topographic documentation in a waterlogged urban environment

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Openings between the four sides of the box provided the only possible sightlines. However, the corners either did not allow for secure setup of a total station or were seen for access to the trench, particularly in a permanent total station setup. A sufficient and efficient methodology for documenting D10 was decided—sufficient, that is, no more information should be lost than would be lost using a total station, and efficient, in that the documentation should neither unduly delay work in D10 nor impose documentation of other trenches being dug concurrently. The sufficiency criterion ruled out hand-based setup entirely, while the efficiency criterion ruled out setting up the total station anew each time it was necessary to document a new level. Digital photogrammetry (‘photomodeling’) in project partner Agisoft PhotoScan promised to offer a sufficient and efficient solution, inspired by and based in part on methodologies developed for the Ghibli Project (Optiz and Nicolson 2012).

The ‘blue box’ turned to be a most efficacious thing. The box being in turn anchored the vertically-mobile steel sheeting, periodically lowered in pace with excavation. A series of monochrome photos were captured using a single mode using point and shoot, easy to attain, and using surfaces of sufficient size as to be easily visible in photographs. In the coordinates of these targets more seen meaningful through the camera’s viewfinder rather than an ambient light mode. Although the box is immeasurable in a micro scale, vertical shifts of up to several centimeters were noted, in particular during the lowering of the steel sheeting. Hence, it was necessary to reestablish the marked points at minimum after every episode of lowering the sheeting, and ideally more frequently, at the beginning of each shift.

Using a handheld digital camera, a series of overlapping photographs was taken of both the archaeological surface and at least three fixed points located at the bottom of the trench. The total number of photographs taken varied with the area and complexity of the surface to be documented, up to a maximum of several hundred. More photos, however, resulted in a number of photographs necessary to produce a sufficient model—even four could adequately model simple surfaces—the additional investment in time was slight enough to err on the side of caution.

The photomodeling strategy for D10 proved sufficient and efficient. Though not without its problems, it was possible to compute elevation data derived from a model with total station measurements. A photograph, a few with the same or less time than measuring it with a total station, and processing time of compiled model was also comparable with that of total station data. However, the (largely automated) creation of the models themselves added to the overall processing time. The most complex models strained the capacity of the laptop computers available in the field and could run to several hours in the worst instances.

The creation of detailed models for field use, however, sufficient to use in the analysis of hand-drawn drawings; can be done rather more quickly, and the creation of highly-detailed models moved to the post-archaeological processing phase. All processed data was also comparable with that of total station data. However, the (largely automated) creation of the models themselves added to the overall processing time. The most complex models strained the capacity of the laptop computers available in the field and could run to several hours in the worst instances.

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The relationships between modeled stratigraphic units can be visually scanned and manipulated on a variety of the surface, such as the topographic and architectural components of AgiSoft. The models can also serve as frameworks for hand-drawn oriented drawings; it is critical that computer-generated views of the site can again, replacing only but assist human vision in archaeological interpretation.

REFERENCES

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