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Using laser range finder for creation of digital elevation model

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A topographic dataset, including topographic map and digital elevation model, is fundamental material for various kinds of field-based sciences such as geomorphology, geology and archaeology. However, it is usually time- and money-consuming to make a detailed topographic map by traditional or high-tech methods. Also, a method of on-site acquisition of topographic data using laser range finder has been previously proposed but its uncertainties sometimes exceed several to tens of meters. We have developed a method to obtain fine topographic data using laser range finder (LRF) at archaeological fields in the Middle East, which is practical and appropriate for detailed field surveys. The method only requires small amount of time, financial cost and operating persons compared to the traditional or high-tech methods, and is applicable to wider areas with sufficient accuracy. The use of differential GPS (DGPS) also makes the method more practical. The application of this method is appropriate for topography in small to wide areas, approximately on the order of 10ˆ2–10ˆ9 mˆ2, whose data can be obtained within a few hours to days. The obtained digital dataset also enables quantitative analyses of topography and relating ground objects on GIS.