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## INTEGRATING TERRESTRIAL LIDAR WITH POINT CLOUDS CREATED FROM UNMANNED AERIAL VEHICLE IMAGERY

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**Abstract.** Using unmanned aerial vehicles (UAV) for the purposes of conducting high-accuracy aerial surveying has become a hot topic over the last year. One of the most promising means of conducting such a survey involves integrating a high-resolution non-metric digital camera with the UAV and using the principals of digital photogrammetry to produce high-density colorized point clouds. Through the use of stereo imagery, precise and accurate horizontal positioning information can be produced without the need for integration with any type of inertial navigation system (INS). Of course, some form of ground control is needed to achieve this result. Terrestrial LiDAR, either static or mobile, provides the solution. Points extracted from Terrestrial LiDAR can be used as control in the digital photogrammetry solution required by the UAV. In return, the UAV is an affordable solution for filling in the shadows and occlusions typically experienced by Terrestrial LiDAR. In this paper, the accuracies of points derived from a commercially available UAV solution will be examined and compared to the accuracies achievable by a commercially available LIDAR solution. It was found that the LiDAR system produced a point cloud that was twice as accurate as the point cloud produced by the UAV's photogrammetric solution. Both solutions gave results within a few centimetres of the control field. In addition the about of planar dispersion on the vertical wall surfaces in the UAV point cloud was found to be multiple times greater than that from the horizontal ground based UAV points or the LiDAR data.

[Conference paper](#) (PDF, 1314 KB)

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