

Integrating Lidar and Photogrammetry Mapping Technology



What are the latest trends and technologies in aerial mapping, including hybrid systems of cameras with Lidar? The airborne market for wide-area 3D data acquisition is experiencing a noticeable trend towards a fusion of Lidar and photogrammetric mapping.

When Photogrammetry Meets Lidar: Towards the

Airborne Hybrid Era

The airborne market for area-wide 3D data acquisition is experiencing a noticeable trend towards a hybrid mapping concept. In the near future, most airborne data collection will be performed by a combination of active and passive sensors. There are two main reasons for this. Firstly, collecting all relevant data while flying is an efficient and cost-effective solution, even when the flying restrictions and regulations are factored in. Secondly, exploiting the advantages of both light detection and ranging (Lidar) and dense image matching (DIM) point clouds will improve the quality of the final geospatial products. This article reports on the latest developments in the field of airborne hybrid systems, including

both data acquisition and processing.

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Comparison of 3D points from multi-view-stereo image matching and Lidar measurement (height coded).

Integrating UAV-based Lidar and Photogrammetry

Recent unmanned aerial vehicle (UAV or 'drone') platforms jointly collect imagery and Lidar data. Their combined evaluation potentially generates 3D point clouds at accuracies and resolutions of some millimetres, so far limited to terrestrial data capture. This article outlines a project that integrates photogrammetric bundle block adjustment with direct georeferencing of Lidar point clouds to improve the respective accuracy by an order of magnitude. Further benefits of combined processing result from adding Lidar range measurement to multi-view-stereo (MVS) image matching during the generation of high-precision dense 3D point clouds.

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Simultaneous Capturing of Lidar and Imagery

People continue to migrate from rural areas to major cities, driving sustained urban growth and increasing the demand for accurate, detailed and up-to-date 3D city models. The creation of such models is still a cumbersome endeavour but new advances, such as the combination of three sensor types – nadir camera, oblique cameras and a Lidar unit – in one and the same geodata acquisition system, may bring relief. Aerial surveys conducted in major cities in the UK and Ireland demonstrate the potential of this solution.

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3D hybrid mesh extracted fully automatically from the IGI LiteMapper-4800 sensor with an integrated RIEGL VQ-480i Lidar and nadir camera, using the nFrames SURE software. (Data courtesy: IGI)

