Laser@Camera

High-resolution aerial imagery and high-accuracy elevation data simultaneously acquired to produce high quality, accurate, precise maps is now possible due to the integration of laser scanning (Lidar) sensors with advanced digital camera technology. At TerraImaging, we now offer this innovative combination of data collection by integrating direct digital image capture with our laser scanning equipment. This allows us to provide clients with the benefits of both advanced technologies, whilst offering the opportunity for cost-effective data production and new mapping solutions in a variety of application areas.

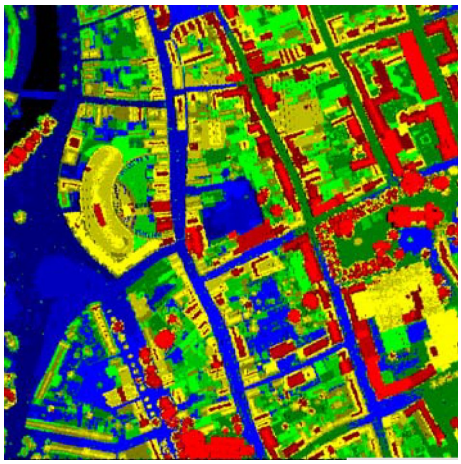
One of the advantages of the simultaneous capture of digital imagery and Lidar-derived elevation data is the ability to rapidly produce coherent data sets. These comprise fused data without the customary differences between the acquisition of the imagery and the height data. Issues such as differences in the time of collection, environmental conditions or area coverage are no longer a problem. This coherence creates advantages in automated processing and classification of the data, reduces costs, decreases processing time, increases the products available from a single mission and expands the potential application areas for the data sets. It adds significant value to the elevation data collection at a relatively small increase in cost.

How it Works:
The laser scanner and digital camera are tightly integrated during the data acquisition. The GPS/INS data recorded during the flight is used for the georeferencing and processing of both the laser scanner data and the image data. TerraImaging has developed in-house software that rapidly automates the processing of fused imagery and elevation data sets. For the generation of orthophotos, the high accuracy and precision of the laser data is directly integrated into the image production process. This ensures accuracy, traceability and repeatability so that not only every building, but every object from dikes to footbridges, is correctly positioned in the image. The automated classification of buildings and vegetation from the elevation data is also made more robust, reliable and accurate since supporting imagery is available.

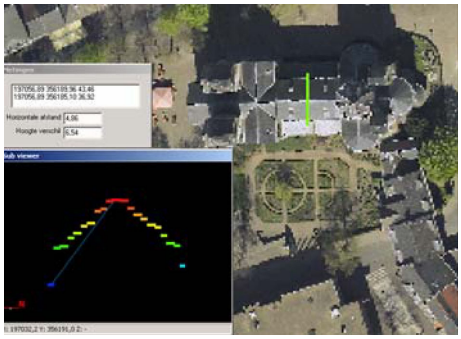
The Products:
Orthophotos and 3D orthoimages in RGB or colour-infrared (CIR) can be generated directly from the raw data collected during the survey flight. Depending on the used lense and flight-height, a pixel resolution of 7.5-30 cm is achieved. The orthophotos match perfectly and seamlessly with detailed large-scale digital maps and data sets can then be delivered in each required coordinate systems. A detailed terrain model is also generated directly from the Lidar data, with bare earth or ground surfaces and the vegetation or building/feature layers delivered in separate data sets. Depending on the flight area and the platform used, standard image resolutions range from 15 cm to as high as 3 cm. The Lidar point densities achieved range from several points per m^2 up to resolutions as high as tens of points per m^2.

The combined application of 3D (elevation) and imagery (spectral) information provides significant advantages for many of today's advanced mapping applications. Accurate, easy and cost-effective 3D mapping is now possible without the need for photogrammetric restitution. We have proved the economic advantages in a number of recent projects.

Roermond, the Netherlands:
ortho mosaic, resolution 7,5 cm



Color-coded digital surface model (DSM)



3Δ-Viewer: profile view of building in DSM

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