Thinking in End Products

Contractors have to deliver what their clients request, and it is common for those requests to be specified in written agreements. If the end product is a point cloud of planar coordinates with heights, the client will specify which criteria that end product has to meet. Since the creation of high-density digital elevation models (DEMs) has been a highly valued capability of airborne Lidar since its inception in the early '90s, the specifications of Lidar point clouds have evolved to centre on planar coordinates and their heights.

(By Mathias Lemmens, senior editor, *GIM International*)

Hence, after delivery, the client will validate whether the accuracy of the heights in terms of standard deviation is better than 5cm and the systematic error of the entire data is less than 5cm. The client will also check the point density and the homogeneity of the coverage. Furthermore, the written agreement may contain clauses about the ground filtering of the dataset. In other words, the heights have to refer to the bare ground, i.e. buildings, vegetation, cars, animals and suchlike have to be removed either manually or automatically. Another likely clause is that the acquired and filtered dataset must be resampled to an equidistant grid with a grid spacing of 50cm. Such an approach considers other data collected during the survey as ‘chaff’ to be separated from the ‘wheat’.

The specifications on the deliverables will be based on the users’ needs. But how should the users be defined when the client is a governmental agency who maintains one or more fundamental geodatasets that cover the entire nation? To identify valued features, the agency will amass a focus group of (potential) users, including water boards, flood managers, inspectors of river dikes and coastal protectors. They will come together, discuss and agree on a set of features based on their common, present interests and budget constraints. What happens when user needs change over time? This can easily occur when previously unconsidered professionals discover the capabilities of the new technology for supporting their tasks. For example, environmental scientists may recognise that signal strength of the Lidar returns is a valuable asset for the solutions they are seeking, yet the original focus group may have treated signal strength as trash and tossed it into the vacuum of the digital inferno.

Indeed, professionals and laymen alike are used to thinking in terms of end products, and this is not a recent development as history demonstrates. After the founding of the Dutch Cadastre in 1810, surveyors were not obliged to hand in their original field sketches – the cadastral officers only attached value to the end products: the maps and the plot sizes. After their completion and computation, the sketches were discarded as worthless scraps of paper. Gradually it was realised that the field sketches contained invaluable information for staking out property boundaries and hence for settling quarrels between neighbours, so since 1878 the sketches have been carefully archived. This illustrates that data initially considered otiose can become of great value as a result of progressive insight. One often wishes that all the raw data could have been stored rather than just the end products, especially when one wants to trace changes over time for reconstruction or monitoring purposes. Surveyors using Lidar sensors would be doing such future users a great favour if they would save the original, raw data. Today, storage capacity is no longer an issue since an abundance of terabytes can be saved on desktop devices. The challenge nowadays is data management, as rapid retrieval of data that cuts through space, time and attributes is crucial – and data should not end up as the proverbial ‘needle in a haystack’.

This Endpoint column appeared in the March 2015 issue of *GIM International*.