

Evolving Computational and Data Collection Needs in Geomatics: Field Requirements and Capabilities.

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SUMMARY

Throughout the history of geomatics field data collection, the emphasis was on providing meaning and intelligence to support the collected observations. Whether the data collection was done in a field book, on a plane table, or using tallies carved into a stick, more information was required than raw observations. As field work became electronic in nature, means of recording the observations was streamlined, but means of recording the meaning and intelligence lagged. Field codes allow some addition of meaning and intelligence, but they slow data collection. Computational support advanced from simplified methods, through log books and slide rules, to basic calculators and laptop computers.

The advent of laser-scanning produced point clouds with high-quality spatial measurement data, possibly some reflectance data, and almost no meaning and intelligence. The addition of meaning and intelligence was deferred to post-processing. This followed the same pattern as used in photogrammetry and remote sensing, where the spatial location and reflectance data are collected almost instantaneously, while the meaning and intelligence is added later.

As faster field data measurement systems have been developed, computational and storage systems have been upgraded, while earlier systems have faded out. The HP-41 and HP-48 calculators that could collect several days' work with a total station are completely overwhelmed by the size and speed of current data collection. 'Big data' is a normal day's work in many surveying organizations. At the same time, the demands of GIS applications include more elaborate attribute data for many measured features. The needs for portability, connectivity, data transfer speed, storage capacity and a flexible user interface often clash during development of field data recorders and computational devices. The need to integrate spatial data from multiple sources, often in the same piece of field work, is of growing

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importance.

In this paper, the authors review critical aspects of spatial data collection over the years, analyzing different trends in technology and techniques, as well as future needs. Suggestions for areas of development are advanced, together with suggestions for solutions to conflicting needs.

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