

Current Status and Future Directions of Digital Photogrammetry: A Personal View

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In this brief commentary, I will reflect on the current status of digital photogrammetry and on issues related to increasing the degree of automation in photogrammetric processes. First, a note about terminology — or the lack of it! The reader may have noticed that I prefer the term digital photogrammetry over softcopy photogrammetry because it more closely captures the notion of using digital imagery instead of analog photographs. Softcopy refers to the display of a digital image. Consequently, softcopy photogrammetry implies that digital images are displayed (for human interaction). Because not all processes in digital photogrammetry require a softcopy image (or a softcopy workstation for that matter), digital photogrammetry is a more comprehensive term.

The status of digital photogrammetry must be assessed with respect to the three aspects of research, manufacturing, and user. There has always been what may be called a technological gap between the latest findings in research on the one hand, and the implementation of these results in manufactured products, and between the manufactured product and its general use in photogrammetric practice on the other hand. The analytical plotter is a good example to illustrate the case: invented in the late 50s, it took nearly 20 years until it became available on a broad base. It was only in the early 80s when photogrammetrists began to acquire analytical plotters in quantities. In my estimate, there are between 1,200 and 1,500¹ analytical plotters installed worldwide. Comparing these numbers with 4,000 to 5,000 stereoplotters still in use, a compelling conclusion emerges: 35 years after its invention and 20 years after "mass production" began, the penetration rate of analytical plotters reached a mere 30 percent.

¹The numbers cited in this paragraph stem from a market survey I recently conducted. They were verified by experts and should be within 10 percent accuracy.

What do these numbers have to do with digital photogrammetry? First, we can determine the percentage of softcopy workstations as an indicator of the current status of digital photogrammetry. Some 400 softcopy workstations are installed (civilian market). Considering that probably half of these are with research organizations, 200 or so may be assumed as used in a production environment. This leads to the conclusion that probably less than 10 percent of all photogrammetric products are generated by digital photogrammetry.

The comparison with analytical plotters seems also helpful when making predictions about the future of digital photogrammetry. No one believes that the same time delays apply. After all, technology progresses exponentially: the miniaturization of hardware, and the doubling of price/performance ratios of vital elements such as CPUs, memory, and mass storage devices, all indicate a bright future for digital photogrammetry. But its future depends also to a great deal on software development, and here, an equally rosy picture cannot be painted. The user expects from future systems not only increased functionality and comfort but a higher degree of automation, and quite rightly so. If it comes to automate processes previously left to an operator, say orientation, feature extraction, and object recognition, we enter the realm of artificial intelligence, computer vision, and image understanding. Despite over 30 years and billions of research dollars, the endeavor of computer vision has not achieved the quick success that once euphorically was predicted. Without a clear understanding and a solid theory about vision (how does an operator know what and where the corners of buildings are), the computer cannot be instructed to mimic the mental faculty of seeing. This is indeed paradoxical: we see and interpret stereomodels without conscious effort and produce maps effectively, but we do not seem to know "how," at least not at a detailed level. When making predictions about the future of digital photogrammetry, we should never forget that the easier problems have been solved.

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