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Photogrammetric Engineering

Remote Sensing

Special Issue:
Softcopy Photogrammetric Workstations

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Foreword

Design Issues of Softcopy Photogrammetric Workstations

THIS ISSUE OF *Photogrammetric Engineering & Remote Sensing* contains ten of the 13 papers presented at a Workshop on Design Issues of Softcopy Photogrammetric Workstations held in Boulder, Colorado on 21-22 March 1991. The meeting was part of the program of the International Society for Photogrammetry and Remote Sensing (ISPRS) Intercommission Working Group II/III, whose topic is Design and Algorithmic Aspects of Digital Photogrammetric Systems. Three of the presentations were given orally and no paper is included*.

"Digitization" is the most important photogrammetric development at the present time. It concerns all aspects of photogrammetry from sensing through data analysis to data presentation. The working group is concerned with instrumentation and algorithms but the papers in this volume focus on instrumentation. A number of very important issues, which could affect the future form of map production systems, is discussed. To what extent is the introduction and acceptance of digital systems dependent on automation? To what extent is it dependent on availability of inexpensive but high quality digitizing facilities? How important are open systems which will permit the portability of software? What features are required to justify the high cost of systems with high functionality? Is the solution with MS-DOS-based personal computers preferable or with UNIX-based workstations? Which mapping products can be most cost effectively produced from digital systems? How long before automated functions are available as production tools? All of these questions are discussed in the papers and answers are put forward to some of them.

A number of trends can be extracted from the papers. There are in excess of 15 vendors who offer digital workstations, some with very efficient interfaces for the production of "marketable" mapping products. Not all of them can be described in this issue, but a good cross-section of the current state-of-the-art are covered in this volume. The first trend is the adoption of digital workstations for specific tools such as orthoimage production, for which commercial systems exist in the market and are beginning to become accepted for routine application. The production of orthoimages and their subsequent use for monoplotting is a feature of the system of the U.S. Geological

*J. Bethel (Purdue University, West Lafayette, Indiana) discussed the use of the PIXAR II Image Computer in the "Photogrammetric Softcopy Stereo System at Purdue University."

B. Horn (Massachusetts Institute of Technology, Cambridge, Massachusetts) discussed the combination of stereo matching and shape-from-shading; this is being investigated for NASA's program for "Applied Information Systems Research."

D. McKeown (Carnegie-Mellon University, Pittsburgh, Pennsylvania) presented work that has previously been published in

Perland, F. P., and D. M. McKeown, 1990. Scene Registration in Aerial Image Analysis, *Photogrammetric Engineering and Remote Sensing*, Vol. 56, No. 4, pp. 481-493.

McKeown, D. M., 1991. Information Fusion in Cartographic Feature Extraction from Aerial Imagery, *Digital Photogrammetric Systems* (H. Ebner, D. Fritsch, and C. Heipke, editors), Wichmann Verlag, Karlsruhe, Germany.

Survey described by Lee and Skalet (this volume). The demands on hardware and software are not as great for this application as they are for stereo viewing or for feature extraction.

Other examples of marketable workstations are the low-cost PC system DVP (described by Nolette, Gagnon, and Agnard, this volume) and the DMS (described by Welch, this volume). These instruments fill niches for low cost mapping from digitized aerial photographs and for an interface between satellite images and a GIS, respectively. The products from HAI (Miller *et al.*, this volume), Autometric (Greve *et al.*, this volume), I²S (Boniface, this volume) and MDA (Ahac *et al.*, this volume) are further examples of how photogrammetric instrumentation mutates into photogrammetric computer workstations.

Miller *et al.* also address the historical developments in the U.S. which resulted in high cost solutions which are generally beyond the reach of non-military users; these solutions did and do demonstrate, however, the desirable features of digital photogrammetric workstations. Other desirable functions, related to automated stereo-model set-up and feature extraction, are not yet even possible although Schenk and Toth (this volume), McKeown *et al.* (see footnote), and Horn (see footnote) showed in their presentations the direction in which research is going and some of the prospects for the future. The only automation that has reached near-operational maturity addresses the problem of image matching for the creation of Digital Elevation Models, as discussed by several authors, most prominently by Norvelle (this volume).

We believe that the meeting in Boulder is the first ISPRS workshop devoted entirely to digital photogrammetric workstations, and it is appropriate that this should be held in North America, the continent on which Dr. U. Helava in 1958 introduced the photogrammetric community to analytical plotters and Mr. Hobrough made such important strides in automation. It is gratifying also that so many key workers in the field of digital photogrammetry presented papers or attended the workshop. The digitization of photogrammetry was also the exclusive topic of a conference on Digital Photogrammetric Systems organized by ISPRS Intercommission Working Group II/III in Munich in September 1991; moreover, it will be the focus of three sessions of this Working Group at the ISPRS Congress in Washington in August 1992. We have no doubt that the rapid development of computer technology will, by that time, have caused important new developments to be reported, but the papers published in this issue are a very current representation of the state-of-the-art in softcopy photogrammetry.

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