

INTRODUCTION INTO THE NEW PRODUCT GENERATION FROM ZEISS: P-SERIES Planicom / PHOCUS

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1. INTRODUCTION

Photogrammetry must not be viewed as an isolated discipline any more. Its main task has always been the acquisition of earth-surface-descriptive data for official cartography within the scope of land surveying.

With digital computers becoming ever more suitable for geometrical and graphical data processing, photogrammetry, geodesy and cartography are drawing ever closer. Basically these classical disciplines only deal with different operations on and user interests in the same geographical information.

This trend is also illustrated by international efforts to unite all professional associations in an "International Union for Surveying Mapping". Should the German land surveying agencies not accept their extended role and call themselves land information agencies? It may soon happen that the term "Photogrammetric Week" will no longer adequately cover the subject matter discussed during these meetings!

In product planning, the photogrammetry division of Carl Zeiss, Oberkochen, has been looking beyond the photogrammetric fence and found that development goals should not only be broadly based but long-term targets.

PHOCUS and the P-Series Planicom are the first substantial results of these development efforts; they have been presented to the general public in March 1987 /1, 2, 3/. During this Photogrammetric Week, additional details and enhancements will be presented in detailed papers /4, 5, 6/.

2. CONCEPT

The concept of a future land information system must necessarily allow for a space-related data base.

Further aspects of the concept are defined by the following questions:

- What kind of data should be included?
- For which purpose is the data required?
- What is the current state of the art?
- In which steps should a new system be implemented?

At least the following information should be included:

- Gestalt i.e. the digital elevation model describing the shape of the earth surface.
- Topography, i.e. all natural and artificial objects inclusive of surface coverage or usage to the extent that they are "visible".
- Cadastre, i.e. all existing geometrical data on "hidden" regulations, objects or characteristics such as lot boundaries, underground utility lines or geological features.
- Attributes, i.e. direct space-related additional information such as names, owners, classifications, geometrical dimensions.
- Area statistics, i.e. general and derived data that has to be represented over space such as climatic conditions, inhabitants' behavior etc.

This data should all be integrated in a universal coordinates system in the form of 3D coordinates. On a long-term basis it may become necessary to include also time as the fourth dimension. Only then will it be possible to display the different conditions of conventional maps in a land information system: not only the important current information, but also earlier conditions (obsolete maps) and scheduled or arguable future conditions (planning maps).

The wide variety of information types also indicates the breadth of the application options. Morphological representations, topographical "maps" and cadastral "charts" are of major relevance already today.

Thematical representations, which in the past were produced by the users or by specialized cartographic agencies for capacity reasons are now easier to attain. In addition to two-dimensional planimetric representations in one of the traditional projections used for maps, axiomatic perspective representations will be used ever more widely for specific applications of the type currently shown by the vendors of interactive graphic systems in their demonstrations.

Compared to this future trend, photogrammetry and cartography are currently completing the transition from manuscript drawing to digital mapping, i.e. have just become familiar with the functions and procedures of digital mapping, not to speak of the users of the results - which are still mainly maps. This illustrates the constraints that have to be observed during the transition to land information systems: the future system must be easy to use still "only" for digital mapping, i.e. the land information must be nearly as easy to use as traditional maps. Adequate acceptance will be achieved only if the system is easy to use and allows for individual habits. On the other hand, there must be effective and comprehensive system maintenance functions for the land information system managers in order to ensure the topicality and reliability of the data.

Since setting up a land information system begins with data acquisition and since photogrammetric instruments play a major role in this field, these acquisition instruments have to be included in the concept of the first implementation step.

With a view to future land information systems, the following development goals were therefore set for PHOCUS and the P-Series Planicomp:

- Interactive system for collecting, editing, managing and using space-related data.
- Feature-oriented hierarchical data structure for the geometrical and alphanumerical data.
- User-friendly and flexible handling by users with differing qualifications, habits and languages.
- Ergonomic design of reliable, efficient and cost-effective workstations.
- Graphical workstation concept for implementing individual and application-oriented environments.
- Open system concept allowing workstation integration, data interchange and user programming.
- Comprehensive scope of functions for all basic photogrammetric and cartographic tasks.

These goals have been achieved with PHOCUS and the P-Series Planicomp.

3. PHOCUS

PHOCUS is a universal photogrammetric and cartographic system.

It serves to collect, edit, store, output, analyse and transfer geometrical and related alphanumerical data by interactive graphical methods.

PHOCUS was designed and implemented from scratch using advanced software design methods based on the experience gained with digital mapping (PLANIMAP). Its salient features are a space-related and feature-oriented hierarchical data structure and user-friendly, versatile and flexible handling.

PHOCUS supports the acquisition of all relevant information in particular from cartographic material (digitization of existing maps), geodetic sources (data obtained with recording tacheometers), and stereo pairs by means of photogrammetric plotting with the P-Series Planicomp.

The comprehensive and growing scope of editing functions includes cleaning functions, merging and selection functions, and display oriented design functions. Information representation has been separated completely from information storage and is therefore very flexible.

PHOCUS is an open system regarding workstation interconnection, data interchange and integration of application-related functions, and should therefore be easy to convert into a comprehensive land information system.

PHOCUS has already been expanded considerably compared to the version announced in spring 1987.

The following items may be mentioned as examples:

- Further optimization regarding handling and response times
- Extended operator and project management
- Workstation configuration changes by the users
- Photogrammetric functions
 - Inclusion of aerotriangulation results into the model file
 - Automatic error analysis during orientation
 - Simultaneous use of several models
- Specialized measuring functions
 - Squared polygon house, 4-corner house
 - Snap line
 - Incremental measurement
 - Measurement of digital terrain models (profiles, grids, progressive sampling)
 - Measurement of aerotriangulation data
- Editing functions
 - Intersect, clip, extend
 - Change connection
 - More object(s), object item(s)
 - Change attributes
- Graphical functions
 - Planicomp floating-mark display on graphics terminals and automatic map segment tracking
 - Storage and retrieval of several map sheet orientations
 - Easy symbol construction and graphical symbol surveys
- Data interchange between PHOCUS and PLANIMAP

Further information on the software architecture is contained in /5/ and on applications in /6/.

4. P-SERIES Planicomp

Carl Zeiss has derived the P-Series Planicomp from the C 100 family in order to improve their ergonomics and implement the easier handling provided by PHOCUS. The P-Series consists of three different viewers which all incorporate the proven features of the C 100 family but have a new, highly integrated and intelligent control unit, a computer, peripherals and PHOCUS as the workstation software.

The electronic control unit now consists of only one instead of the three modules used in the past. A microprocessor system for control functions, mathematical LOOP computations and recording control give the P-Viewers model movement autonomy and additional control intelligence, i.e. they relieve the workstation computer of instrument-related routine tasks. The documented microprocessor instruction set enables users to write their own programs (even comprehensive applications) for their P-Viewer (e.g. with a PC).

The three P-Viewers can be described briefly as follows:

- P 1 Planicomp: A high-performance instrument with photocarriages increased in size to 330 mm x 240 mm and integrated digitizing tablet, floating-mark control with photogrammetric 3D cursor or with handwheels and foot disk.
- P 2 Planicomp: The proven C 120 zoom viewer with handwheels and foot disk but without the typical photogrammetric panel.
- P 3 Planicomp: A new low-cost desktop viewer with photogrammetric 3D cursor and/or handwheels and foot disk.

The major innovation of the P-Series is the photogrammetric 3D cursor and the digitizing tablet which affords very sensitive relative floating-mark guiding and data acquisition control with three buttons, but can also be used for coarse movement, absolute positioning with contact prints or maps, and function selection with menu overlays as well as for map digitizing.

Further information on the instruments and instrument-related PHOCUS functions are contained in /3/.

5. CONCLUSION

PHOCUS and the P-Series Planicomp provide high-quality photogrammetric and cartographic workstations whose performance has been increased considerably compared to the prior C 100 family members.

In absolute terms, a modern Planicomp system is no more expensive than a precision analog instrument of the fifties with its considerably lower performance even though general costs have increased by 500 % since then.

The P 3 Planicomp, in particular, is a complete workstation which, because of its low price, will soon replace the remaining analog instruments.

REFERENCES

- /1/ Hobbie, D.: PHOCUS und Planicomp P-Serie
Die neue Produktgeneration von Carl Zeiss, Oberkochen
Bildmessung und Luftbildwesen 55 (1987), Seiten 71 - 75
- /2/ Menke, K.: PHOCUS
Das neue universelle photogrammetrisch-kartographische
System von Carl Zeiss, Oberkochen
Bildmessung und Luftbildwesen 55 (1987), Seiten 83 - 91
- /3/ Saile, J.: Planicomp P-Serie
Die neue ergonomische und intelligente Planicomp-Familie
von Carl Zeiss, Oberkochen
Bildmessung und Luftbildwesen 55 (1987), Seiten 76 - 82
- /4/ Saile, J.: Performance Data of the P-Series Planicomp
Proceedings of the 41st Photogrammetric Week
at Stuttgart University, Heft 12, Stuttgart, 1987
- /5/ Leidel, W.: Principles of the PHOCUS Software
Proceedings of the 41st Photogrammetric Week
at Stuttgart University, Heft 12, Stuttgart, 1987
- /6/ Menke, K.: Production and Revision of Topographical Maps by PHOCUS
Proceedings of the 41st Photogrammetric Week
at Stuttgart University, Heft 12, Stuttgart, 1987

ABSTRACT

In view of future land information systems, Carl Zeiss has chosen a long-term concept for its new product generation: PHOCUS, the universal photogrammetric and cartographic software system for handling and managing space-related data, and the three P-Series Planicomp Analytical Stereoplotters, future-proof photogrammetric workstations with different features. Future trends are shown and the new products described briefly.

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