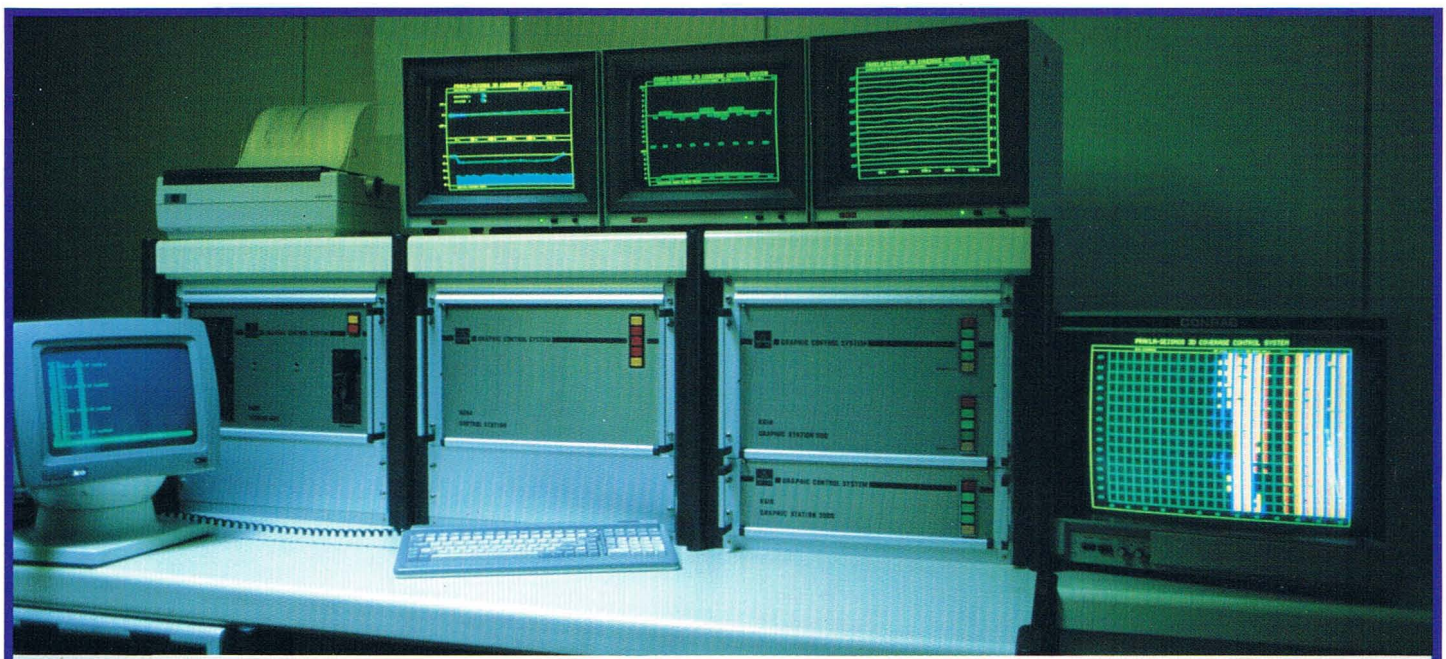
PRAKLA-SEISMOS AG

3D GRAPHIC CONTROL SYSTEM (GCS)



INTRODUCTION

The Graphic Control System (GCS) is a device for ensuring that the required coverage in a 3D marine prospect has been obtained before the vessel leaves the survey area.

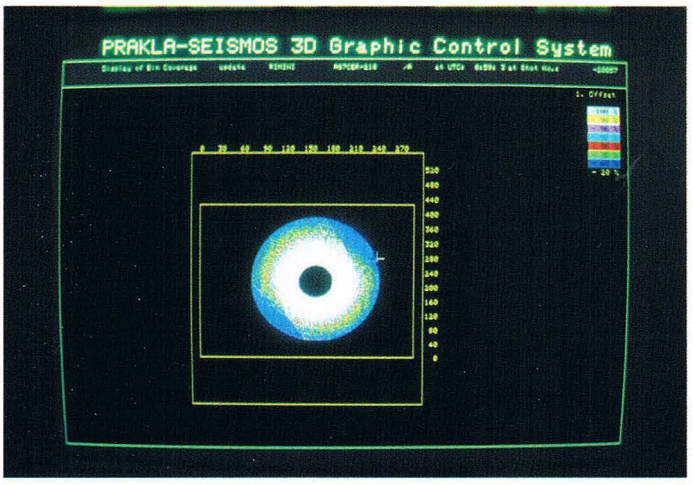
Both conventional surveying (line by line) as well as circle shooting (freely selectable course within the survey area) can be handled.

The operational principles of the system are as follows:

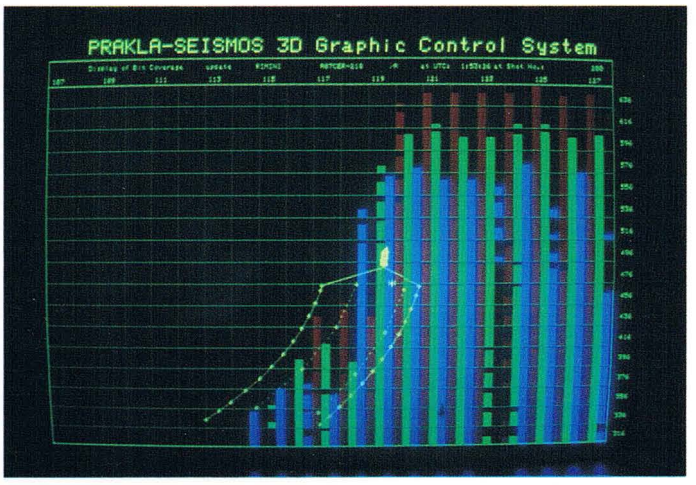
- Acquisition of various data from existing navigation computer systems: position of ship, position of streamer head and tail, position of energy source, streamer-compass readings etc.
- Determination of the streamer-shape function by means of two independent types of sensor information: compass headings on the one hand, streamer head position as well as tailbuoy bearing on the other. The information is combined using weighted polynomial closure.
- Calculation of the position of each hydrophone group along the streamer, calculation of the position of each common depth point (CDP) for each trace and each shot, and storage of the streamer-shape polynomial coefficients.
- Update of the coverage degree of each bin.
- Update of the graphic displays.
- Calculation and update of displays within four seconds of each shot release.

SYSTEM CAPABILITIES

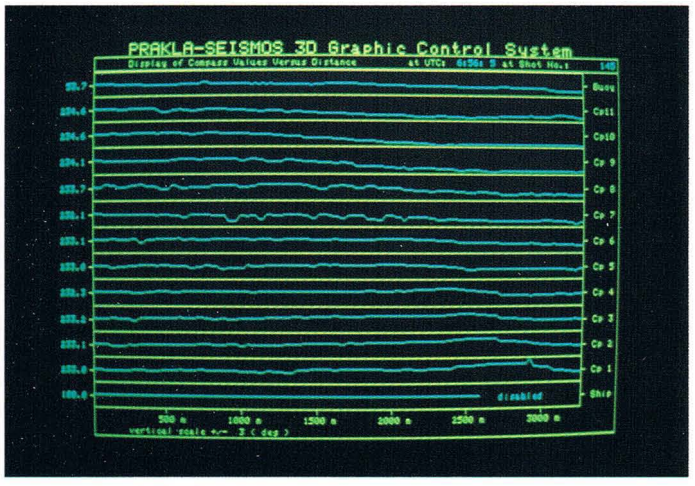
- Presentation of current coverage degree within 4 seconds of shot release.
- Presentation of current device readings and various statistics within 4 seconds of shot release on slave monitors.
- Permanent quality control of streamer heading devices; automatic rejection of faulty readings.
- Automatic azimuthal correction of each streamer compass in steps of 15 degrees from individual correction tables, which can be updated during the survey.
- User-selectable operation mode: calculation of streamer shape from average or instant readings.
- Handling of up to 480 traces in single or dual streamer configuration.
- Handling of up to 15 compasses per streamer, streamer head position and either Syledis tailbuoy or PRAKLA-SEISMOS PDF tailbuoy.
- Output of streamer positioning data to navigation computer for optional post-processing.
- Operator-selectable streamer partitioning in up to 4 sections for individual coverage presentation.
- Multiple streamer operation (more than 2 streamers), available on request.
- Multiple source operation (more than 2 sources), available on request.
- Two-ship-method using PRAKLA-SEISMOS Dual Ship Survey Information System. Realtime data exchange with the second boat.
- Rebinning by defining new grid parameters and recalculation. Display of the recalculated coverage on an additional monitor. The rebinning task runs parallel to the realtime binning system and does not affect the survey in progress.
- Prepared for circle shooting with coverage presentation of entire survey area.
- User-friendly menu-driven dialog system.
- Built-in survey simulator for training.
- Total independence of the 3D Graphic Control System from the navigation computer. Adaptable to any existing navigation processor via standard serial datalink (RS 232).



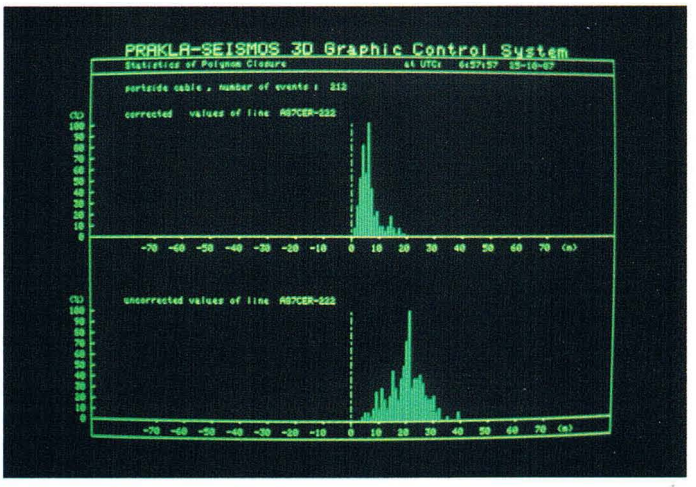
Overall coverage display during circle shooting
Total overview of the survey area in one display. The degree of bin filling is indicated by operator-adjustable colours (see colour scale). The displays for up to four streamer partitions are operator-selectable.



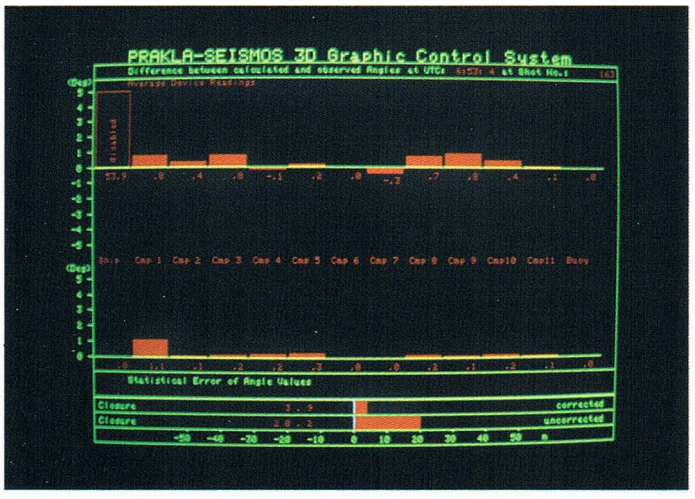
Coverage display during normal surveying
Automatic alignment of the display depending on bin height, bin width and streamer length. Up to four streamer partitions are represented by different colours. The height of the bars indicates the degree of filling.



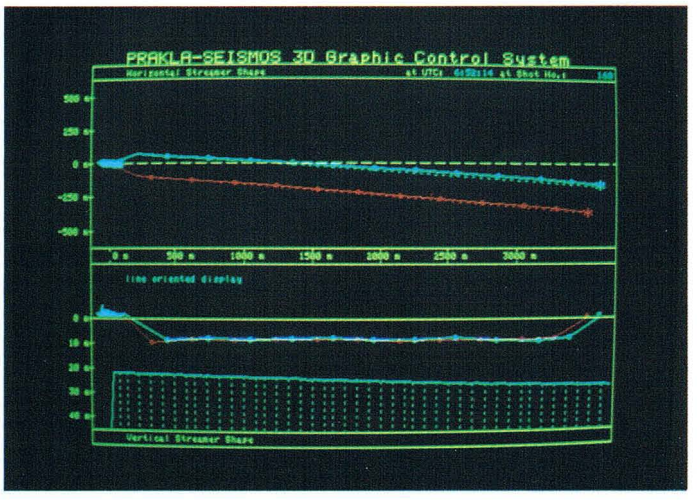
Sensor data display
Display of sensor readings: Values are taken from compasses, tailbuoy direction finder and departure measurement unit.



Polynomial closure display
Display of polynomial closure statistics at end of current line. The display shows the distribution of the uncorrected polynomial closure values, derived from streamer compasses only, and the corrected values, adjusted by the tailbuoy bearing.



Online statistics of compass readings
Top: *Average streamer-compass data over six readings.*
Middle: *Compass correction statistic after streamer-shape adjustment.*
Bottom: *Lateral difference between the tailbuoy position based on compasses only and the position after final adjustment by the tailbuoy bearing.*



Streamer shape display
Horizontal and vertical streamer shape in a linear projection (including seabed profile).

HARDWARE CONFIGURATION

The hardware consists of several rack-mountable modules:

- Control station KGRA
  contains the multiprocessor computer system:
  - up to 8 16-bit processors run in parallel
  - bus controller
  - I/0 interface to graphic modules
  - I/0 interface for video terminal, line printer and data link to navigation system
  - Winchester hard-disk controller
  - floppy-disk controller
  - streamer tape controller

- Storage unit KGDA
  contains the mass storage components:
  - dual floppy-disk drives, each with 1.2 MB capacity
  - dual Winchester disk drives, each with 80 MB capacity
  - streamer tape-drive unit

- Graphic station 2000 KGIB
  contains one graphic module (resolution 3 x 2048 x 2028 pixel) for bin coverage display:
  - 6 graphic boards
  - one control board for interfacing to control unit, monitor and graphic printer (black/white or colour)
  - high resolution 20″ graphic colour monitor

- Graphic station 500 KGIA
  contains 4 colour graphic modules for the control monitors:
  - 4 graphic boards
  - 4 control boards for interfacing to control unit, monitor and graphic printer (black/white or colour)
  - 4 14″ graphic colour monitors

- Operator terminal

- Protocol printer

- Graphic printer (black/white or colour)

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