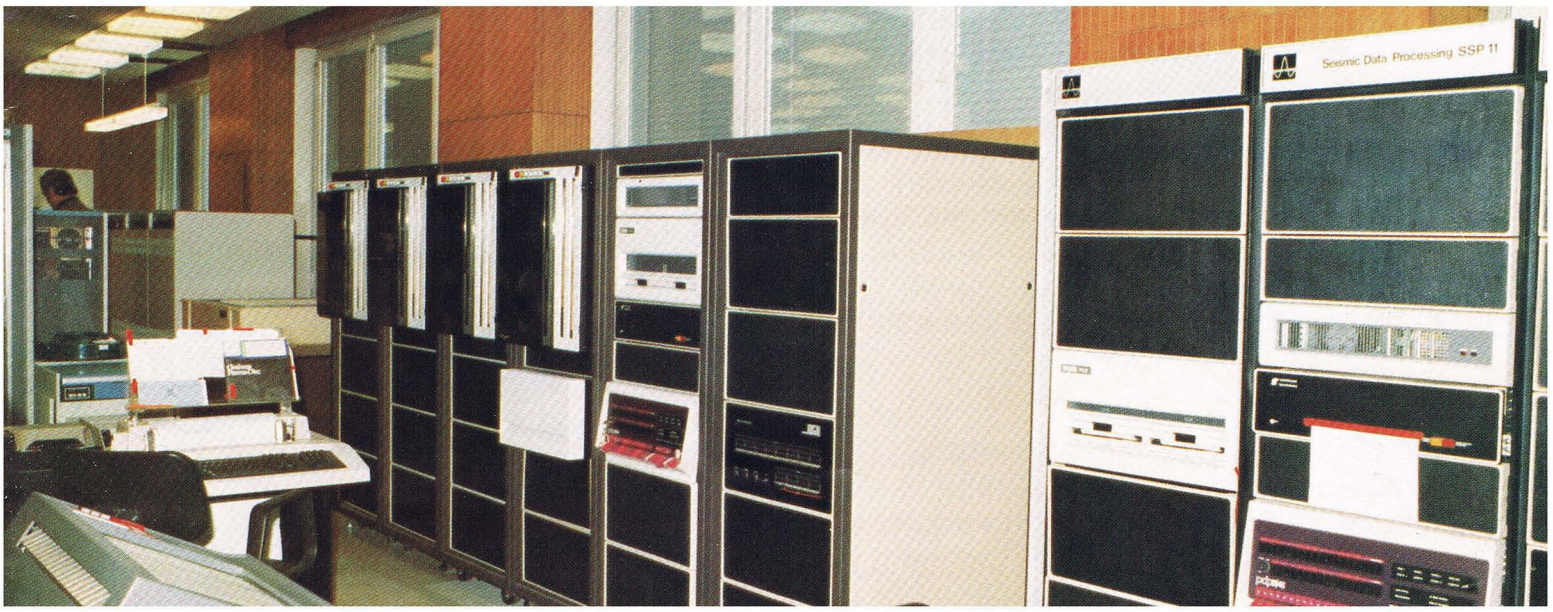
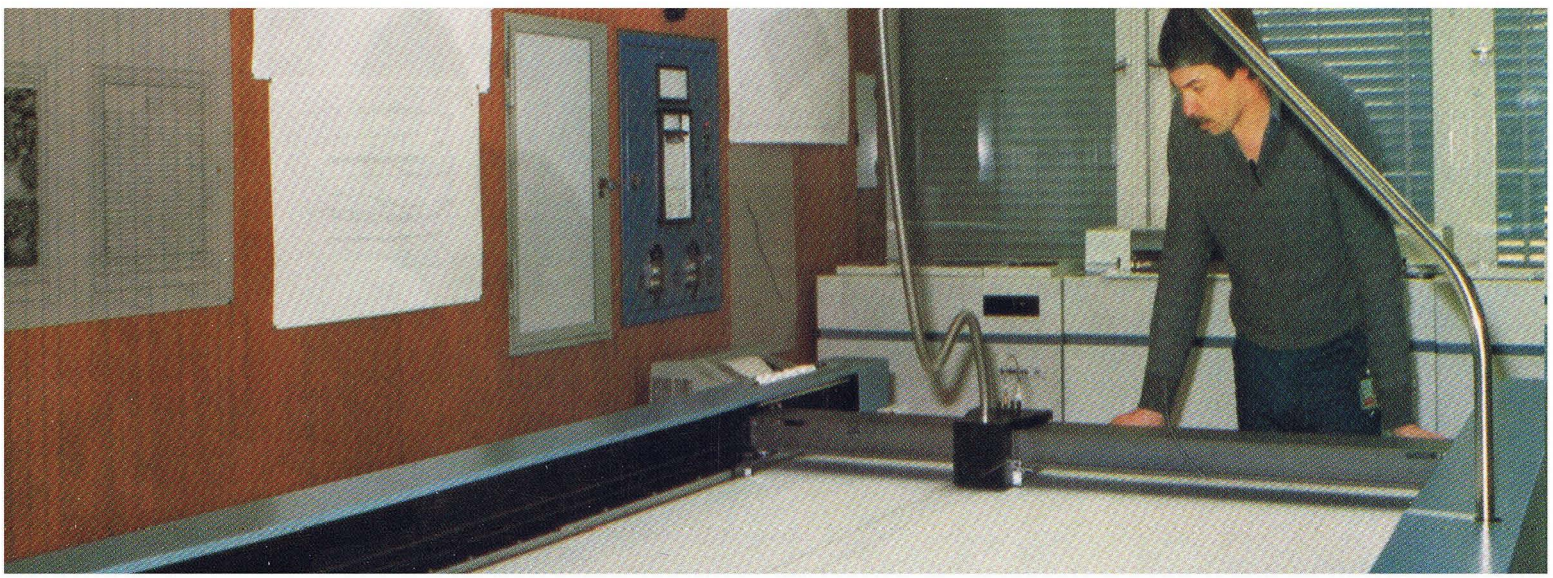
PRAKLA-SEISMOS INFORMATION No. 26

Computer Center Hannover





1961 Since 1961, when PRAKLA-SEISMOS installed a **National Elliott 803** computer in their first digital data center for geophysical purposes, the computer capacity was continually enlarged. An extensive library of data processing programs was developed, covering all disciplines of geophysics, such as gravimetry, magnetometry, seismics and engineering.

1966 Full scale seismic data processing started 1966 with the installation of a **Control Data 3300** computer system and the development of a special PRAKLA-SEISMOS software package DSY. As the volume of work increased continuously, on average one additional CD 3300 per year was installed.

1971 The installation of a **Control Data 6600** in 1971 was a milestone for the PRAKLA-SEISMOS computer center. The new computer was 10 times more effective than the CD 3300 and, with a special geophysical language –GEOPLAN–, the seismic software-package was completely reorganized.

1975 Many of the algorithms were transposed for the **PDP 11/45** computers, which replaced the CD 3300 computers mainly for preprocessing.

1977 As the demand for energy and natural resources increased sharply during the 70's PRAKLA-SEISMOS added more and more hardware and software from pocketcalculators and table computers to trailer-mounted PDP-11-systems and to the advanced **CYBER 175** computer system.

1981 PRAKLA-SEISMOS introduced 2 new computer systems in 1981:
CYBER 750 as main system and
VAX-11/780 mainly for application in Europe and abroad.

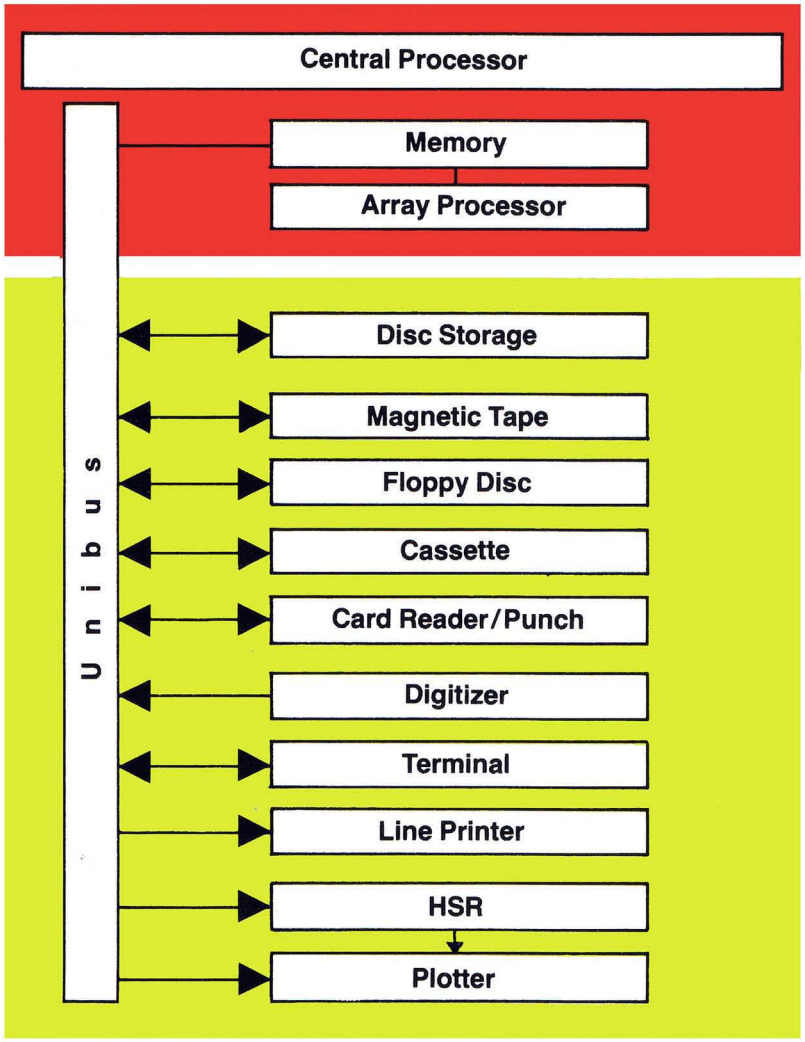
These highly sophisticated computer systems meet the challenge of the 80's in their application of modern interactive methods.

This brochure is to inform our clients about the advanced hardware operating in our computer center in Hannover.

Front page : PDP 11 (Data Preparation)
Cyber 170 (Processing)
Calcomp 748 (Display)

In the PRAKLA-SEISMOS computer center mainly seismic signals are processed. These are handled by the Cyber system, however data preparation is necessary before the main processing can be commenced.

Special hardware and software are available to carry out the **preprocessing** of data, i.e. reformatting, sorting, copying, quality control, correlation and brute stack.



A dozen PDP-11 systems from DEC (Digital Equipment Corp.) with different configurations are available. Central processor is a PDP 11/34 or a PDP 11/45 in connection with an Array Processor APS.

The Unibus links the various peripherals.

The **tape subsystem** can handle
21 track 356 and 712 bpi
9 track 800, 1600 and 6250 bpi

Conversion of data is possible from and to magnetic tape, floppy disc, cassette and punch card.

Computer-controlled **digitizing systems** are available as off-line or comprehensive interactive systems, i.e. Comdig,
Calcomp 660 (with a digitizing area of 152 x 118 cm),
Calcomp 640 in connection with a Tektronix graphic system.

The **high-speed-rasterizer HSR** speeds up the output on electrostatic Versatec plotters.

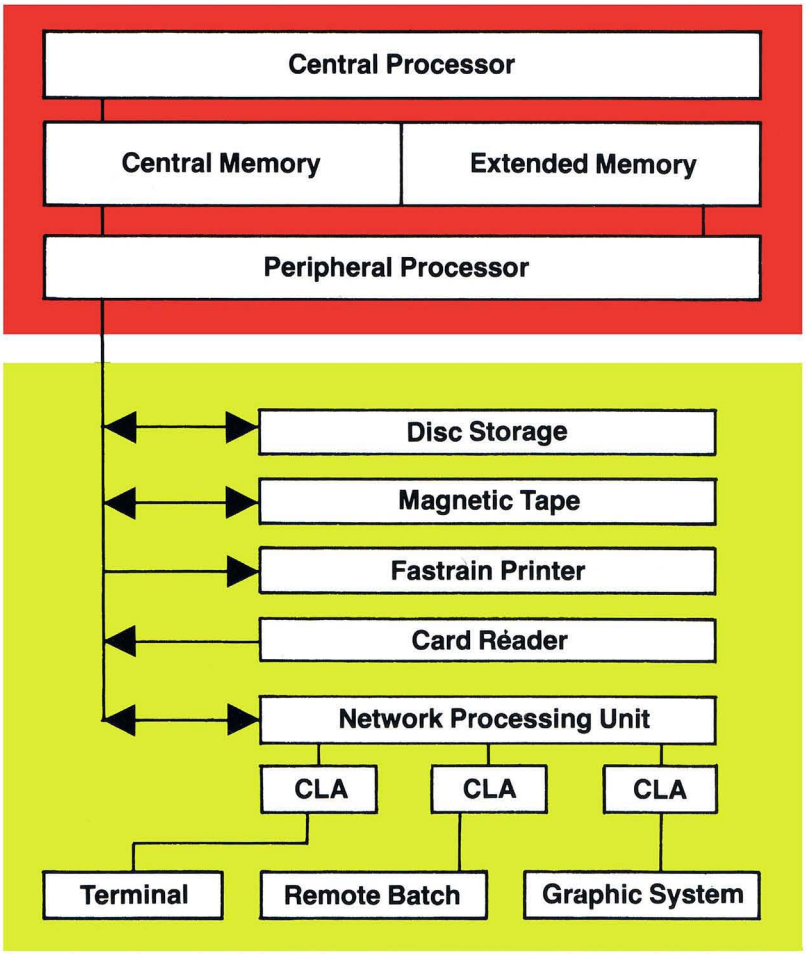
PDP 11/45

Digitizer Calcomp 660

The mining/petroleum industry is faced with increasingly complex problems in the economic extraction of oil, coal, ores etc. There is a need for fast, accurate tools for evaluation of the vast amount of data needed to make correct exploration and production decisions.

PRAKLA-SEISMOS operates 2 large computer systems, the Control Data CYBER 170, model 750 and 175.

These computer systems allow simultaneous batch, transaction and interactive processing, as well as data base management for commercial and scientific applications.



The unique hardware and software architecture separates the Input/Output and terminal functions from the central processor. This structure allows the terminal network to interact with a system via the peripheral processors, concurrent with central processor program execution.

The **disc subsystem** combines fixed and removable media units.

The **tape subsystem** can record and read
7 track, 556 or 800 bpi
9 track, 800, 1600 or 6250 bpi.

The **Network Processing Unit** controls the data flow from and to the local or remote terminals.

The **Communication Line Adapters (CLA)** interface all type of modems including telephone connections.

A **remote batch station** consists of a Cyber 18 with printer, used e.g. for accounting.

The **graphic system** consists of a Tektronix 4081 computer with peripherals like digitizer and plotter.

Cyber 170

Multiprocessing and multiprogramming is supported by the network operating system (NOS) regardless of the mode of operation: local and remote batch, time-sharing or transaction processing. Parallel to the geophysical applications, which are normally batch jobs, other tasks such as program development, tests, modelling etc. can easily be handled.

FORTRAN and COBOL compilers meet the latest ANSI standards.

Due to the type of work in the PRAKLA-SEISMOS Data Center, and due to economic considerations, it was decided to develop a special **programming language** GEOPLAN.

GEOPLAN is the abbreviation for **Geo**physical **Lan**guage. The modules in this language are the main processes used in geophysical data processing, e.g. cross-correlation, corrections, convolution, normalizing, compositing of traces, etc.

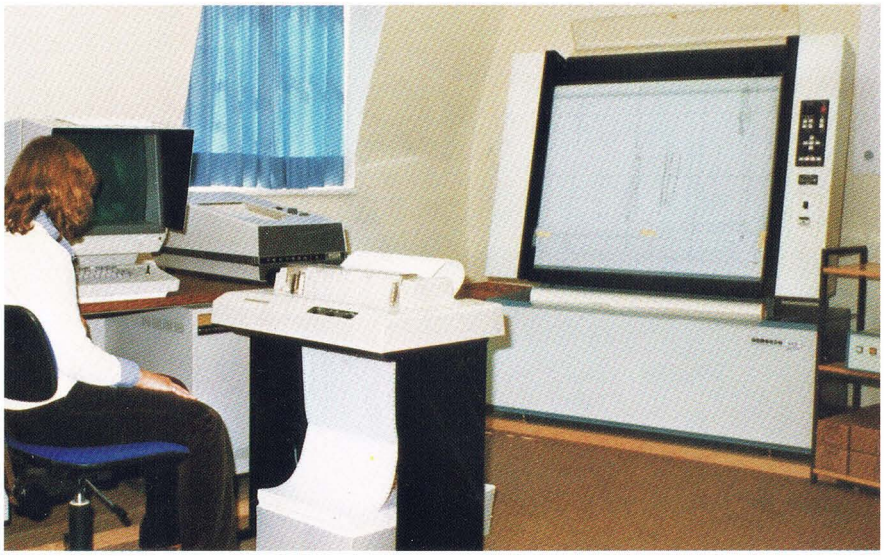
Using these fundamental and optimized program components, optional process sequences can be performed with a minimum of programming work.

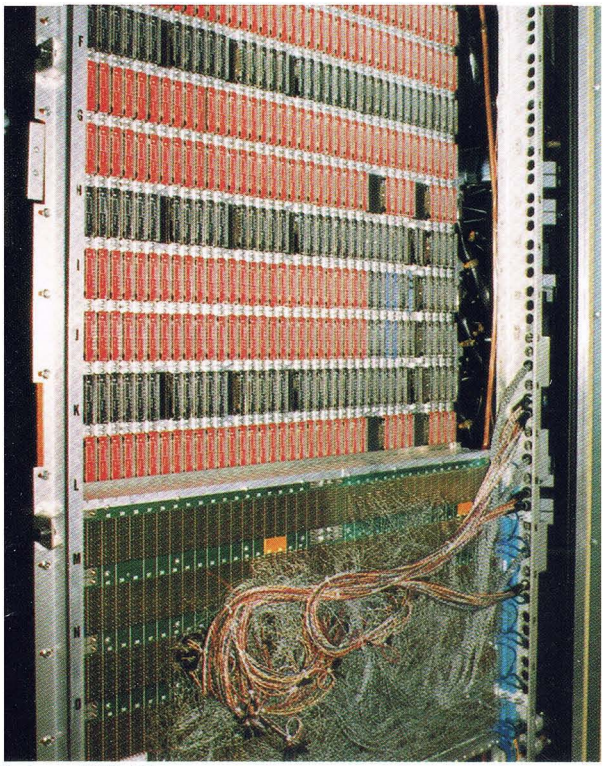
A short description of such processes, with illustrations, can be found in the **"PRAKLA-SEISMOS Information"** series.

Published to date:

No. 1 – Migration of Reflection-time maps
No. 2 – 2D-Migration
No. 5 – Synthetic Velocity Logs
No. 6 – Attenuation of Multiples, Deconvolution
No. 7 – Frequency Analysis
No. 8 – Wavelet Processing
No. 9 – Iterative residual static corrections
No. 10 – Real Amplitude Processing
No. 11 – Meander Processing
No. 14 – Determination and presentation of velocities derived from seismic data
No. 16 – 2D-Modelling
No. 17 – Seismic Modules for Lithological Studies
No. 18 – 3D-Seismic Processing
No. 19 – 3D-Seismics
No. 20 – TSR-Debubbling Technique
No. 21 – Spectrum Filter
No. 22 – Streamer Positioning for 3-D Processing
No. 24 – IAMP – Interactive Modelling

Graphic System: Tektronix 4081 with Calcomp Plotter 960



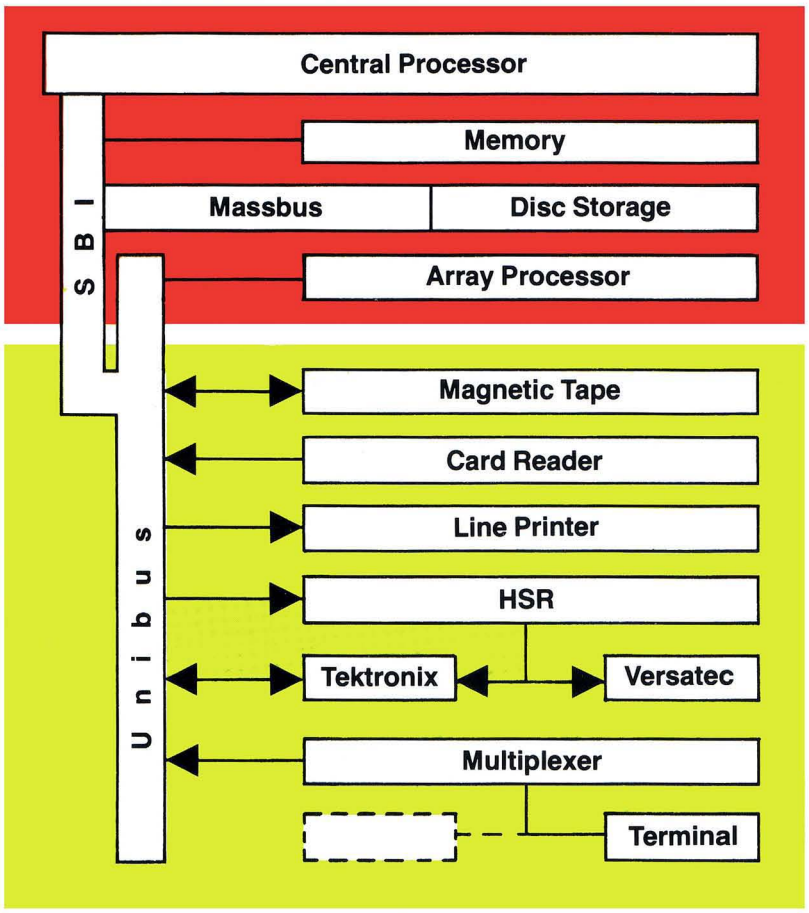


Cyber 170, Memory

Graphic System: Tektronix 4081 with Graphic Tablet

This system is intended for decentralized processing.

The system configuration is determined by its field of application: seismic data processing. The DISCO-program, from Digicon, modified and enhanced by PRAKLA-SEISMOS is available. Parallel to the seismic application other programs (i.e. FORTRAN jobs) can be handled.



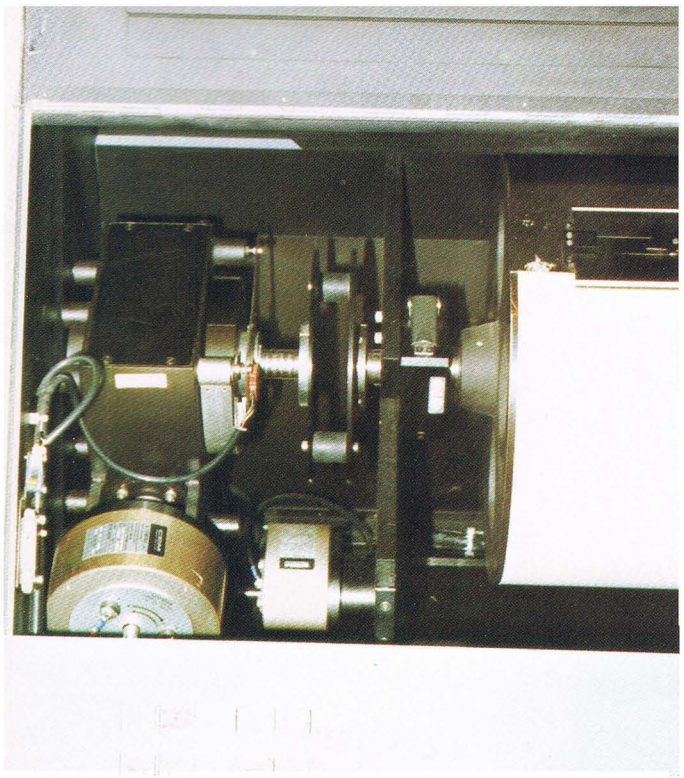
The VAX-11/780 system from DEC (Digital Equipment Corp.) is a 32 bit virtual memory computer system.
The data transfer nucleus is the "Synchronous Backplane Interconnect" SBI with two bus systems, the Massbus and the PDP-11 Unibus.
The Floating point array processor, FPS-100, considerably enhances the performance of the system.

The **tape subsystem** can handle 9 track tapes with 800, 1600 and 6250 bpi.

The **high-speed-rasterizer HSR** speeds up the display of data on Versatec plotter or Tektronix graphic terminal.

VAX/VMS is the multiuser, multifunction **v**irtual **m**emory operating **s**ystem that supports multiple languages, an easy to use interactive command interface, and program development tools.

VAX 11/780



Combined Seismic/Raster Plotter KPU

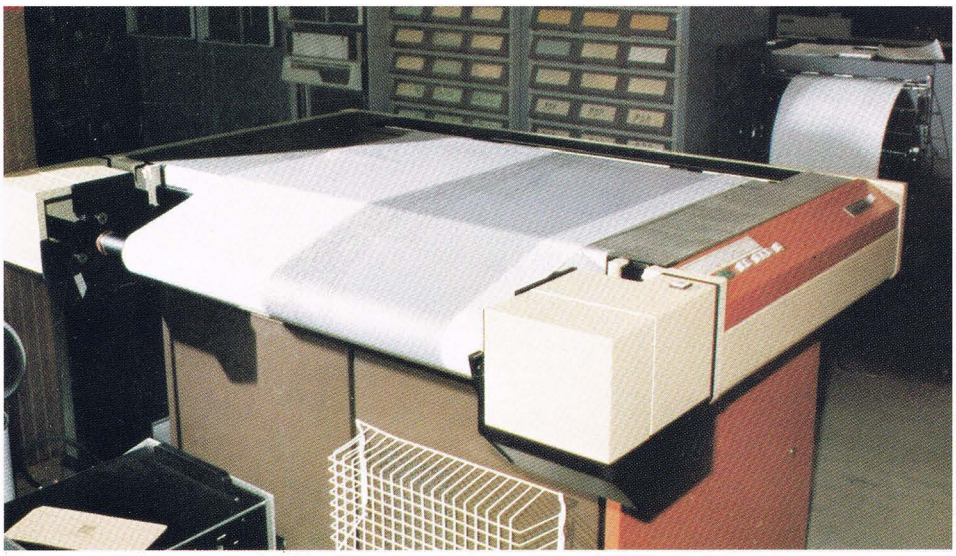
As well as on-line connections of plotters – mainly for interactive uses – there are several off-line plotter systems.

Several **PRAKLA-SEISMOS combined seismic/raster plotter KPU** are continuously in use. The KPU, a high performance photographic drum plotter for seismic, raster, and alphanumeric display, is a result of PRAKLA-SEISMOS' development and experience, over more than 15 years, in the construction and application of drum plotters with cathode-ray tubes.
Maximum plot area: 92 x 150 cm
Parameter handling and plot control by a PDP-11 computer
General application software is available.

The Calcomp plot-software CALEDIT is available on several host computers, with plotting facilities on **Calcomp plotters** (flat bed, size 122 x 208 cm, or drum).

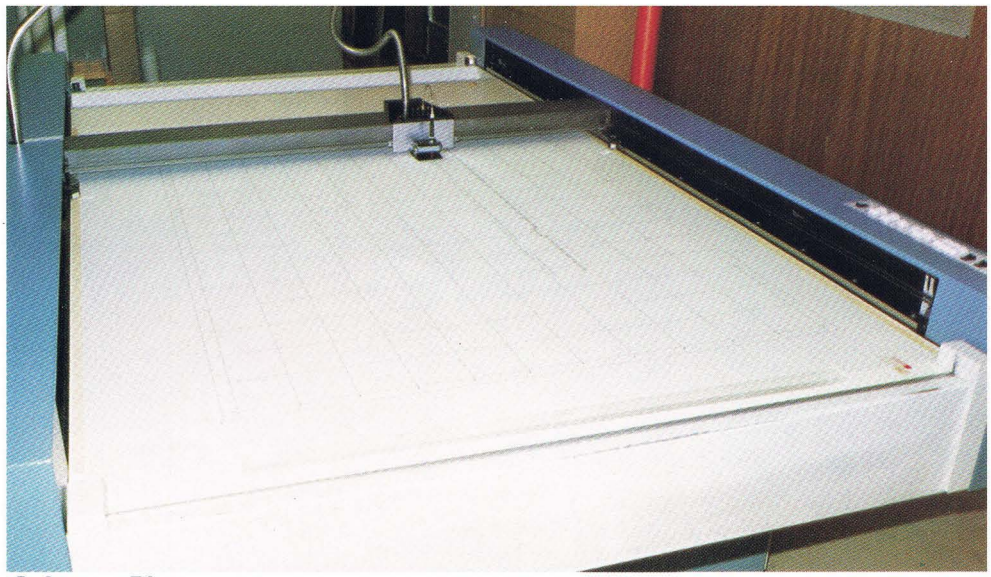
Electrostatic Versatec plotters include models with widths of 20, 22 and 36 inch.

Colour plots, with max. image size of 55 x 86 cm, can be displayed on the **Applicon Ink Jet Plotter** with the GEOPAK software package. GEOPAK operates on a host computer (Cyber or VAX) where it calculates and creates a raster image of the data and transfers it to a colour plotter tape for off-line plotting on the Applicon Color Plotter.

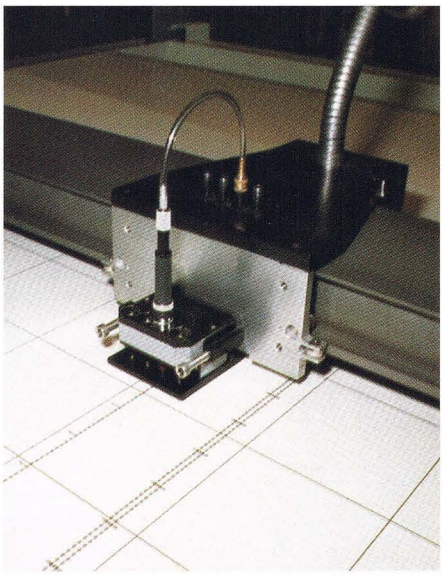


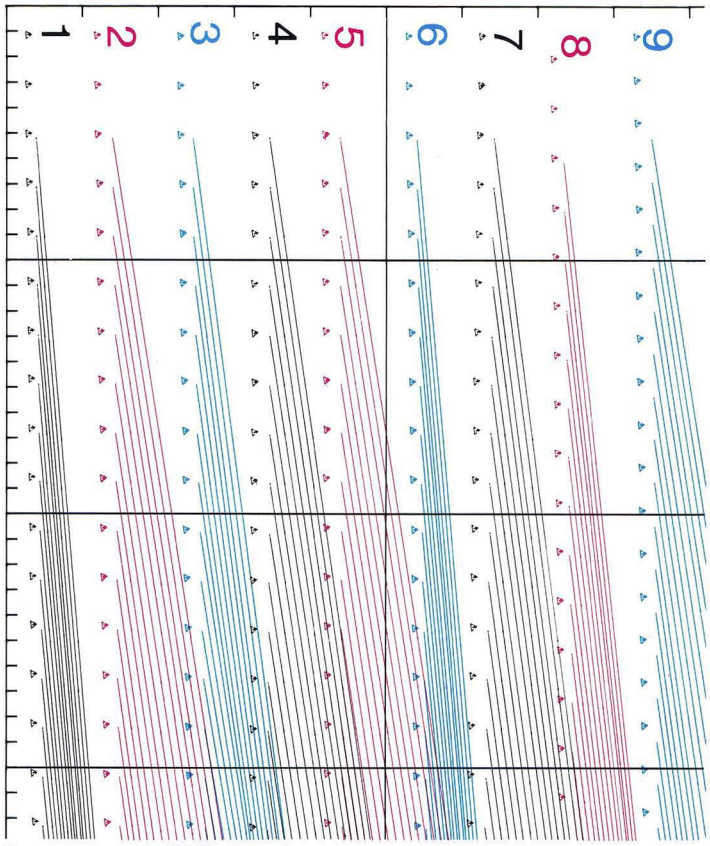
Versatec Electrostatic Plotter

Applicon Color Plotter

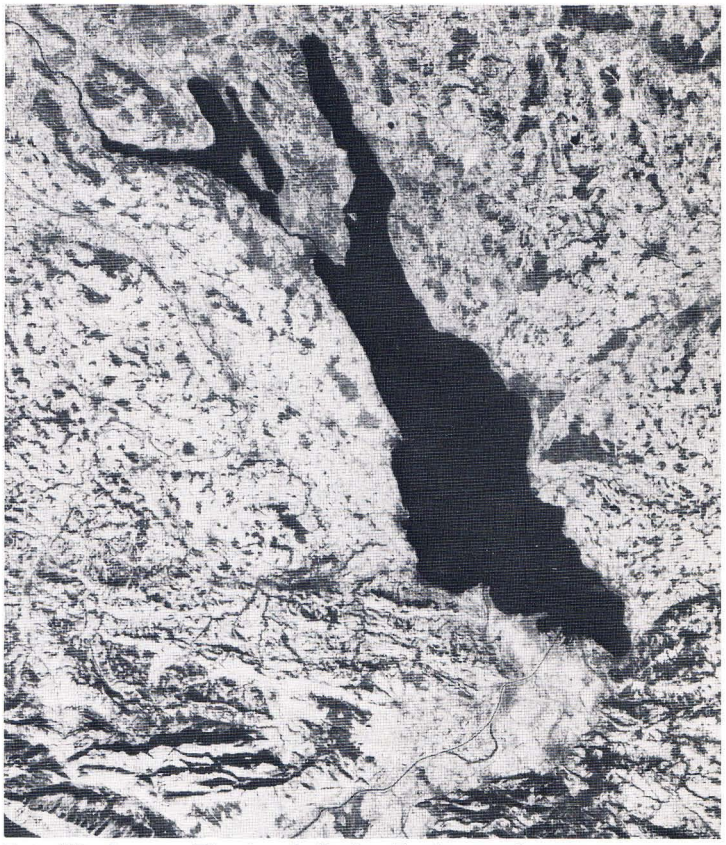


Calcomp Plotter 748

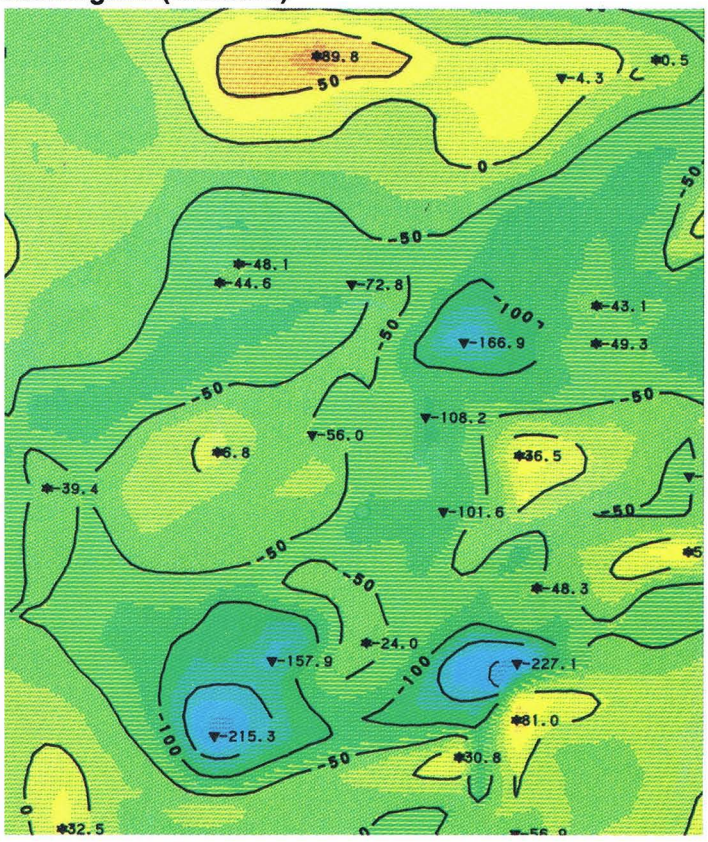




Scattergram (Offshore)



Satellite Image Playback (Lake Bodensee)



Contour Map (Magnetics)

Time Slice

PRAKLA-SEISMOS

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