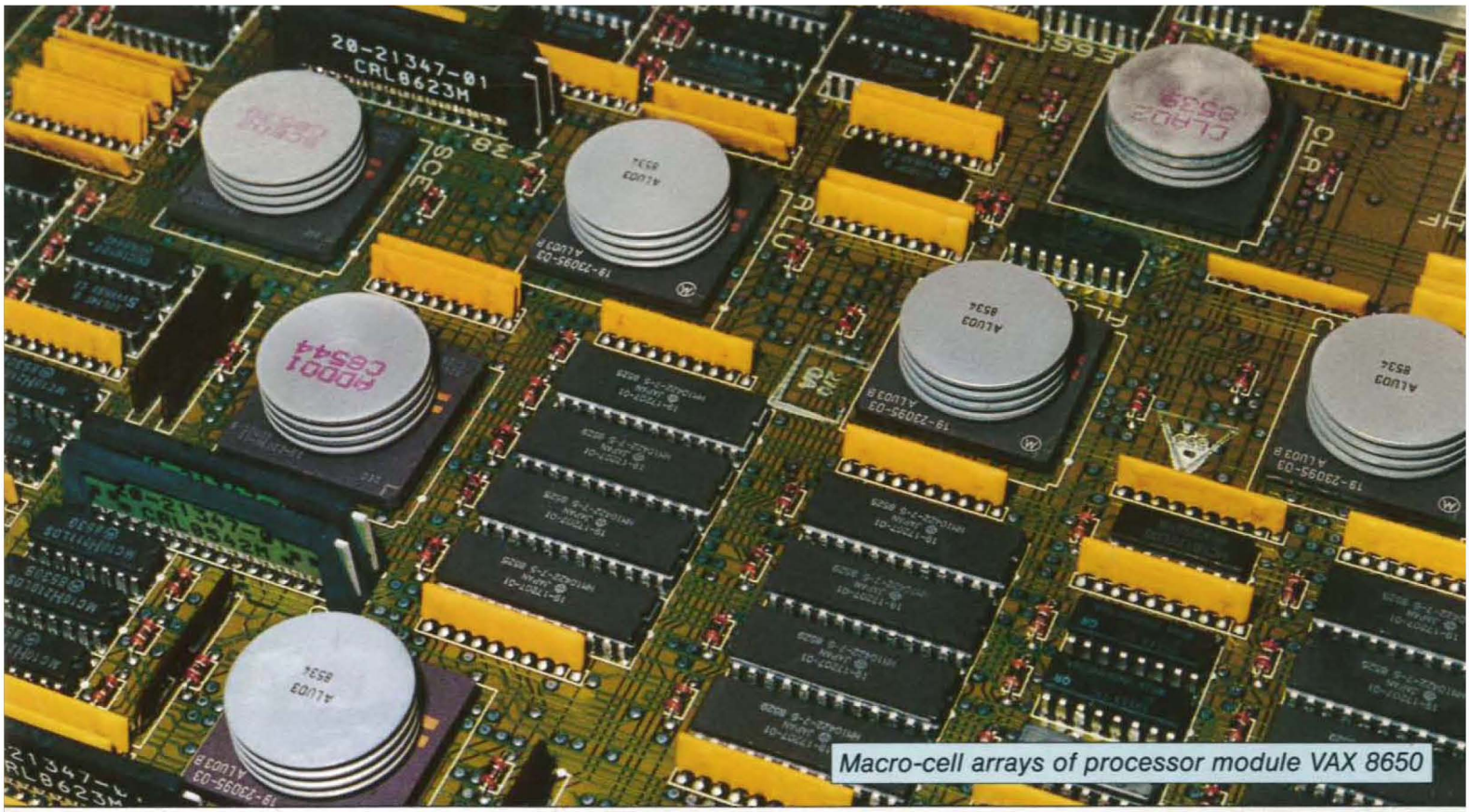
PRAKLA-SEISMOS INFORMATION No. 57

Computer Center Hannover



Macro-cell arrays of processor module VAX 8650

CYBER-mainframe and disc drives

Today's super computers play an important role in the exploration business. A 3–D seismic survey involves vast quantities of data to which sequences of complicated mathematical operations must be applied. In the PRAKLA-SEISMOS Data Centre this computing capacity is available on the CONTROL DATA CYBER 205® vector processor.

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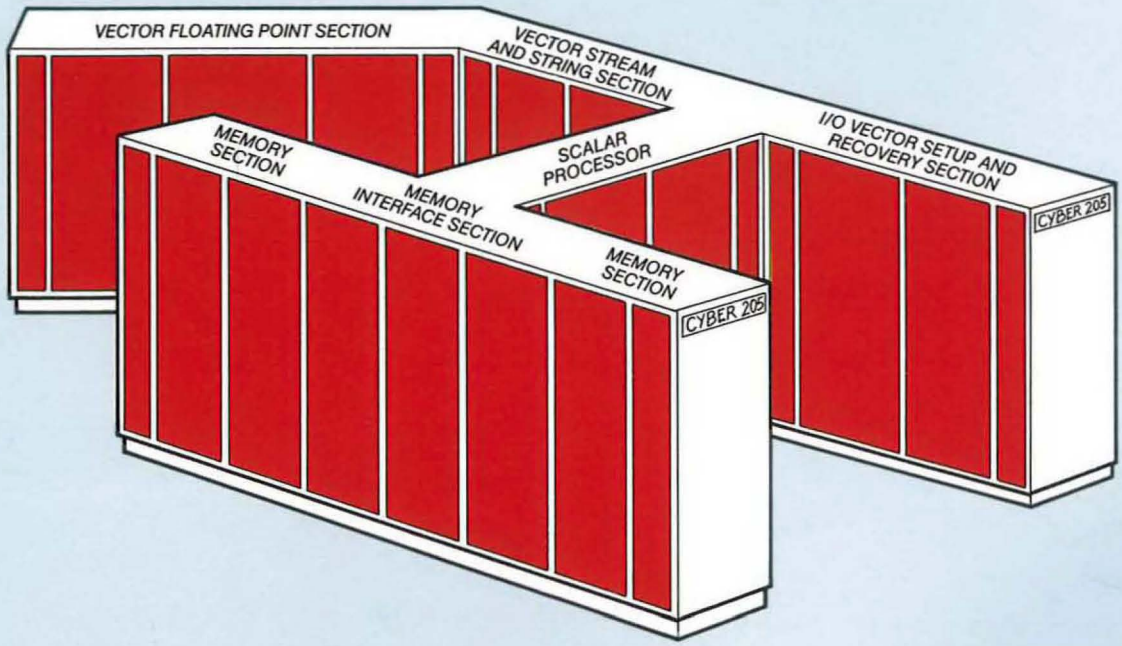
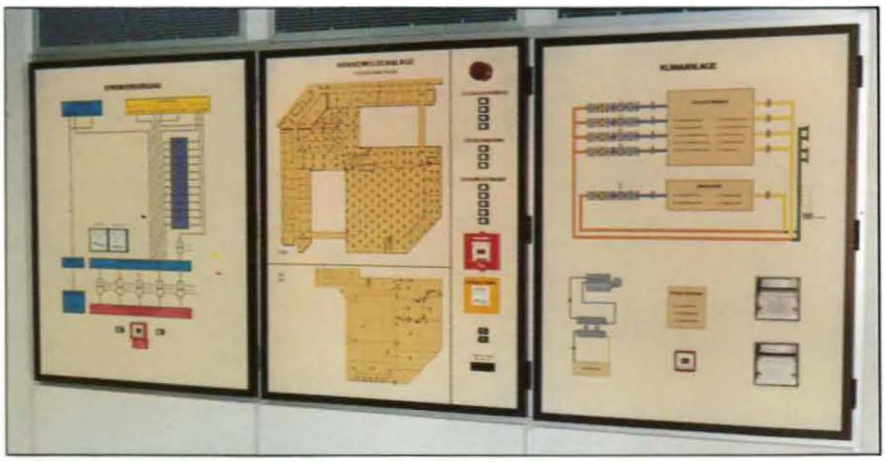
Fast arithmetic logic, fast memory and the vector processing facilities allow up to 400 million floating point operations per second. Most of the algorithms used for seismic data processing can be adapted to vector processing, even recursive methods as used in 3-D processing. The CYBER 205 vector processor is connected via high-speed channels to special disc and tape drives as well as to the front-end-processors.

CYBER 205 central computer floor plan





Control panel for power supply, air-conditioning, security and fire alarm

Highly sophisticated algorithms are a prerequisite for seismic signal processing, whereas data organization (reformatting, sorting, copying, storage, quality control) represents an enormous task for a geophysical data center.

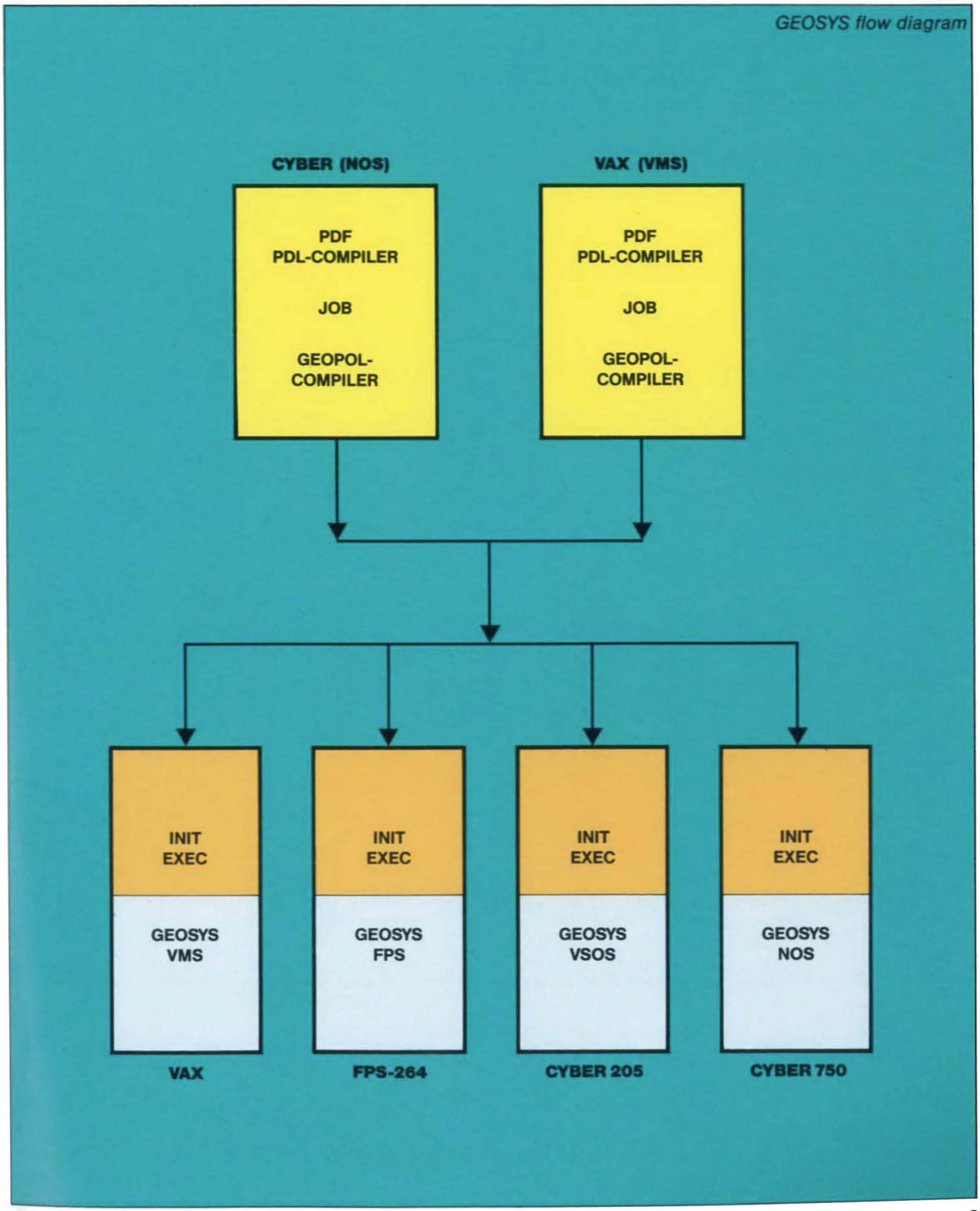
Our headquarters in Hannover offers an excellent base for large-scale operations.

Part of the two-level tape storage archive

The geophysical software package GEOSYS contains the seismic processing language GEOPOL and has been developed particularly for vector computers.

GEOSYS is a comprehensive, powerful and process-orientated tool. It covers preprocessing as well as elementary standard processing and extends to 3-D migration and research-intensive wavelet processing methods.
GEOSYS is PRAKLA-SEISMOS' system for the future. It will be able to accept future algorithms and future computer hardware.

GEOSYS flow diagram



DATAPLAN – the organizational concept of the PRAKLA-SEISMOS Data Center

DATAPLAN is based on integrated processing and communication systems which are interconnected by computer networks, such as LCN (Loosely Coupled Network) and ETHERNET. The computer group consists of CDC-CYBER 205, 750 and 175 as well as DEC VAX 8650 and 11/7 XX®, PDP 11/45 and 11/34 computers. These are the target computers for batch processing.

The user communicates interactively via terminal with the command centre of the group. The command centre is a VAX-cluster operating with the DATAPLAN system. Distinct separation into batch and interactive processing enables not only high data throughput but also flexibility for the user.

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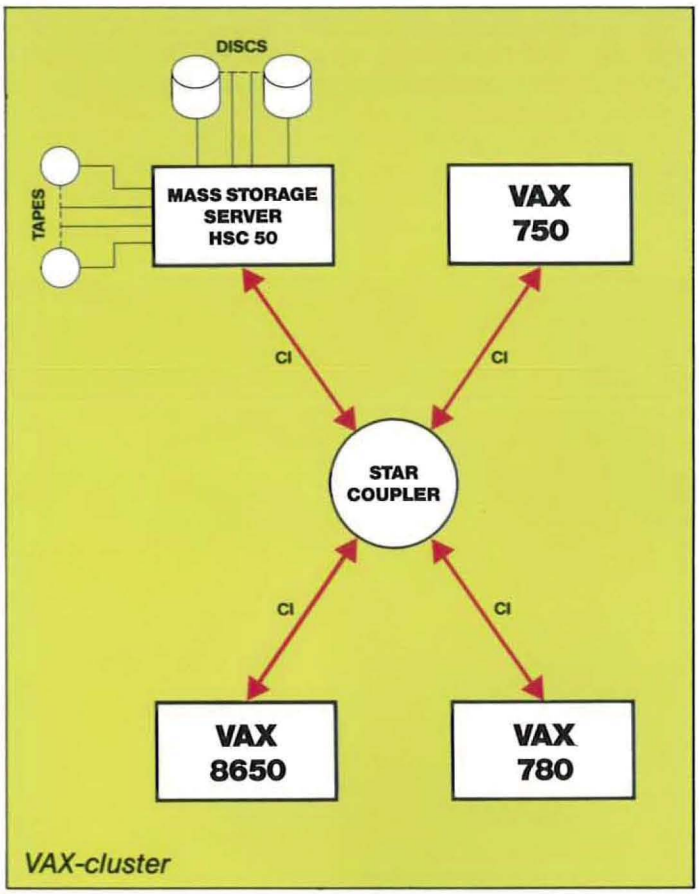
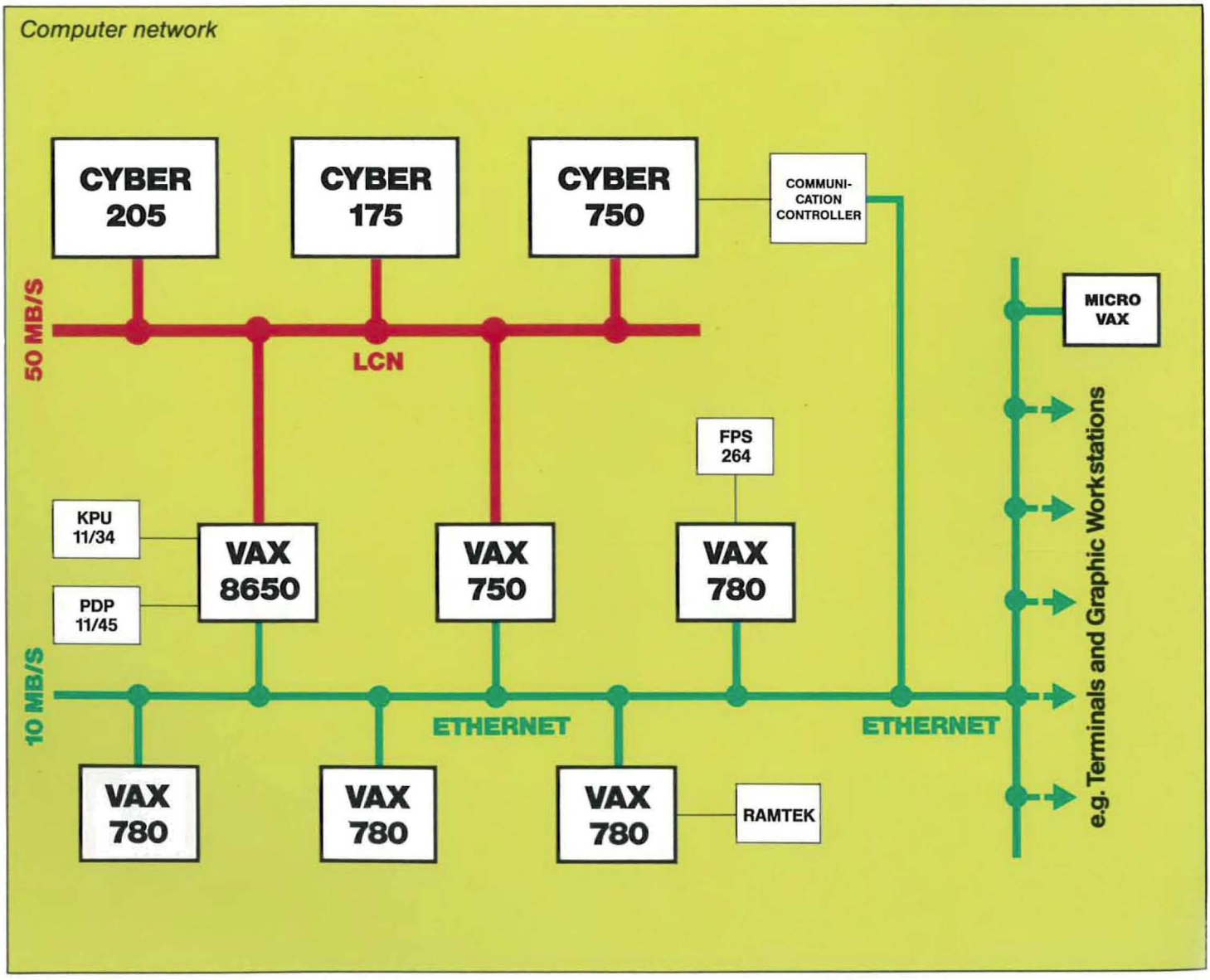


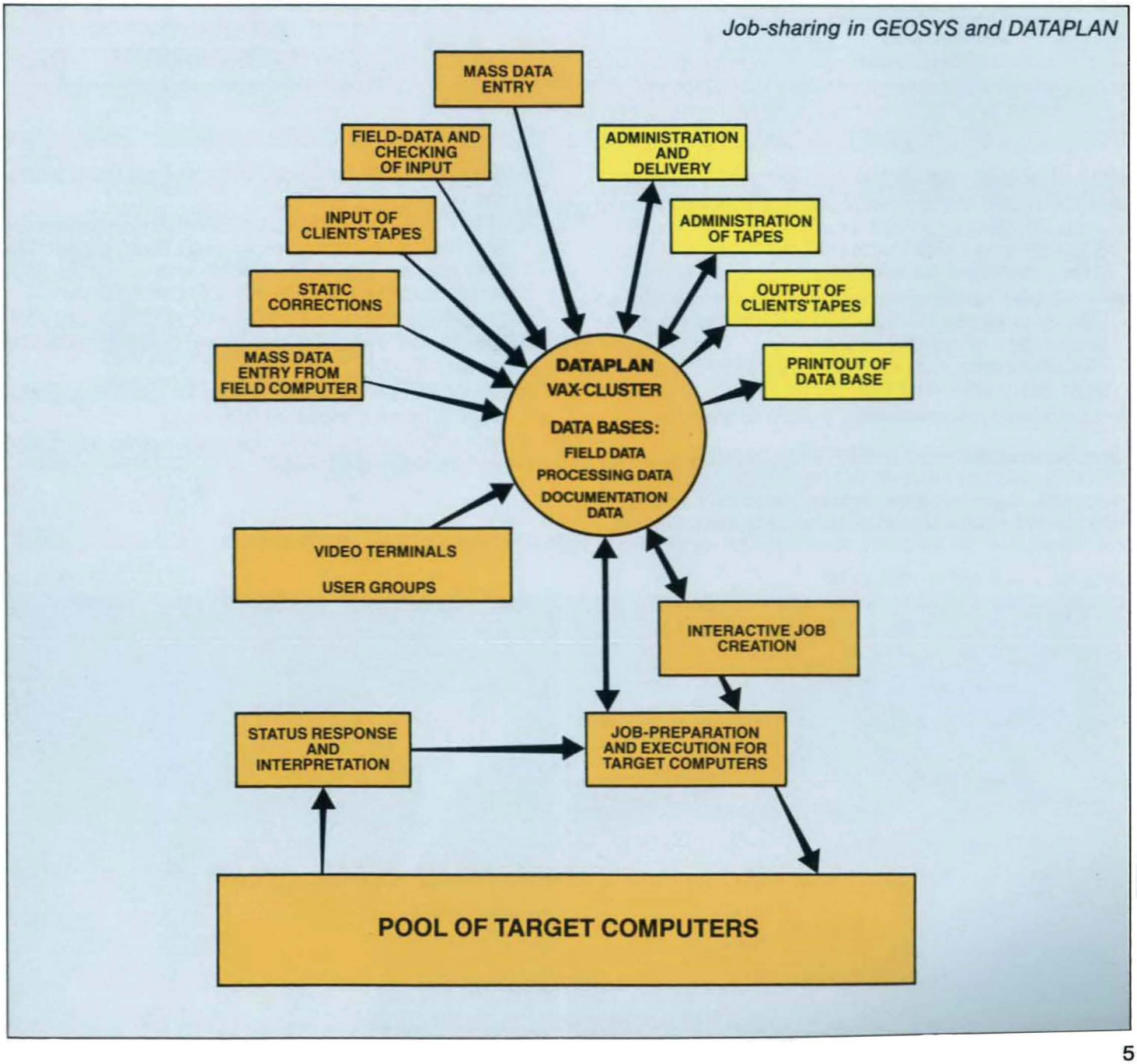


The most important components of DATAPLAN are:

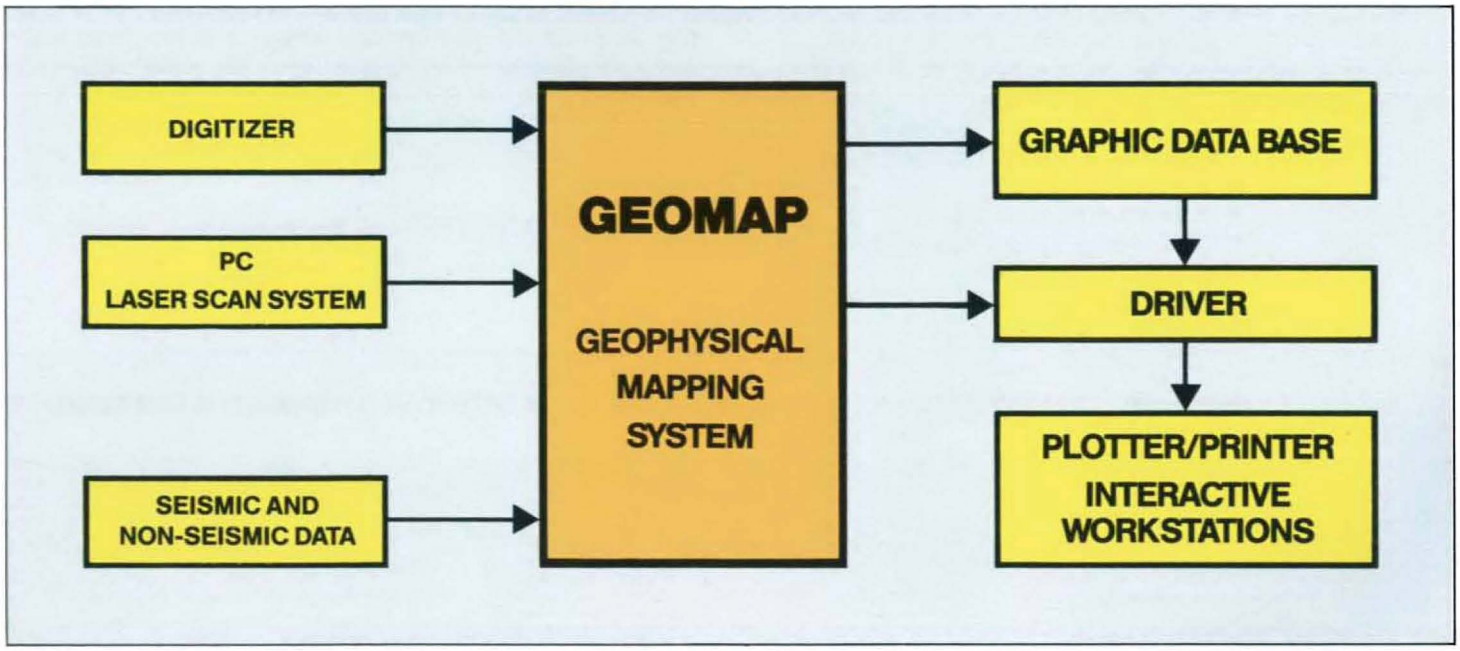
- Database for field, job and documentation data
- Mass data entry
- Job creation: interactive job generation can be realized by the user via video terminal with
  - the modern processing language GEOPOL, designed for the system GEOSYS or
  - the language GEOPLAN on the CYBER 175/750 or
  - other languages, e.g. for the SSP 11 system for preprocessing and plotting on VAX or PDP 11 computers.
- Job organization with the subparts:
  - compilation and administration of job queues
  - submitting jobs to the target computers
  - order preparation
  - job status monitoring
  - job preparation for operating
  - statistical functions
  - tape administration
  - special programs

By logging into HMS (Hierarchic Menu System) the user has access to all DATAPLAN components and subparts via terminal.

Job-sharing in GEOSYS and DATAPLAN



A set of processes for non-seismic applications (e.g. gravity, magnetics, bathymetry, positioning) form the **G**eophysical **S**upport **P**rocessing package GSP.
Plotting routines for GEOSYS and GSP are available in the **Geo**physical **Map**ping system GEOMAP. This is based on device-independent graphic software utilities (UNIRAS, GKS) and runs within the VAX-cluster.
Several plotters and interactive workstations can be used for graphic output.



Input of existing graphics is possible in two ways:

- A CALCOMP digitizer creates X and Y coordinates of map contents or function curves.
  Digitizer area: 1500 mm x 1100 mm
  Max. resolution: 40 lines/mm
- A flat-bed raster scanning system controlled by an IBM-compatible PC automatically builds up raster information of graphic images.
  Scanning area: 400 mm x 285 mm (A3)
  Max. resolution: 0.05 mm

Both systems are connected directly to the VAX.

Graphic workstations RAMTEK 9465, SIGMEX and PERICOM are used for analysis, interpretation, modelling and mapping. These systems enable convenient viewing of processing results and interactive data manipulation.

Final plots can be produced using the following **plotter systems:**

- KPU – a result of PRAKLA-SEISMOS development – is a high resolution photographic drum plotter. The KPU can be driven in special seismic mode or in raster mode with a pixel size of up to 0.05 mm.
- Electrostatic raster plotters from CALCOMP and VERSATEC work on line for high speed plotting (resolution up to 0.06 mm = 400 dots/inch).
- CALCOMP flat-bed pen plotter for precision cartographic maps (resolution 0.05 mm).
- APPLICON ink jet plotter for colour plots (resolution 0.2 mm = 125 dots/inch).

Graphic workstation PERICOM

CALCOMP digitizer

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

1966 Full scale seismic data processing started 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 an additional CD 3300 was installed on average each year.

1971 Installation of **Control Data 6600** represented a milestone for the PRAKLA-SEISMOS Computer Center. The new computer was 10 times more efficient than the CD 3300. Also the seismic software package was completely reorganized with a special geophysical language – GEOPLAN.

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

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

1981 Installation of **CYBER 750** as main system for batch and interactive processing and a **VAX 11/780** system with Digicon's software package DISCO for application in Europe and beyond.

1982 Start of operations with a **trailer-mounted VAX 11/780** system.
In November PRAKLA-SEISMOS moved to the new headquarters. The outstanding addition to the computer centre complex: the **vector computer CYBER 205.**

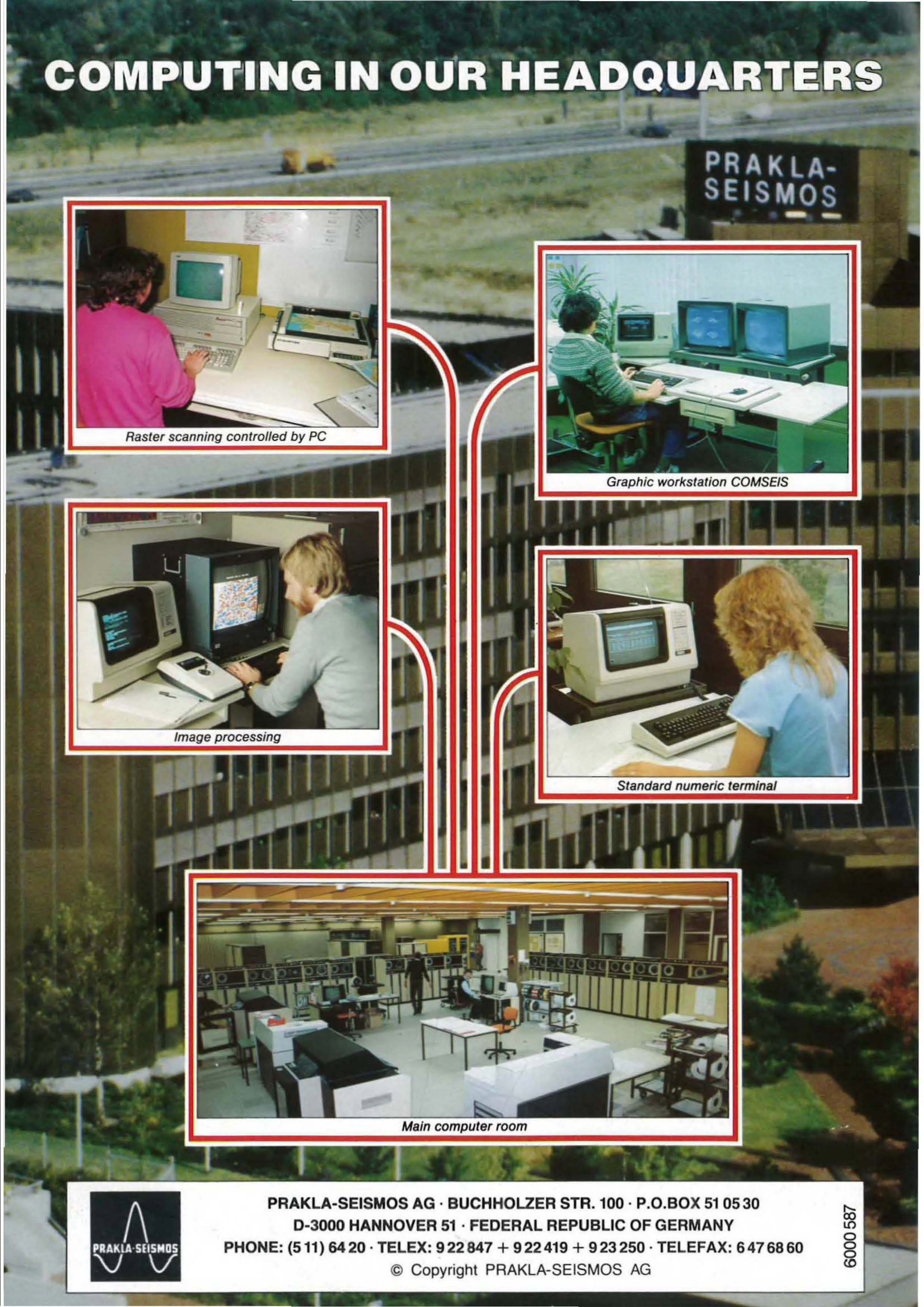
1983 Installation of:
DATAPLAN – the new control software
GEOSYS – the new geophysical processing system
Computer network systems
Interactive graphic workstations.

1984 Introduction of **COMSEIS,** the interactive seismic interpretation system.

1985 Installation of a **VAX 8650** and a **cluster for all VAX computers** with a common interface for peripherals and users.

1986 Installation of a **FPS 264,** a powerful array-processor.

COMPUTING IN OUR HEADQUARTERS



Raster scanning controlled by PC

Graphic workstation COMSEIS

Image processing

Standard numeric terminal

Main computer room

PRAKLA-SEISMOS

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