NASA REGIONAL PLANETARY IMAGE FACILITY
IMAGE RETRIEVAL AND PROCESSING SYSTEM

Susan Slavney
Washington University

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- RPIFs were set up by NASA to house and maintain image data produced by space probes to moons and planets.

- There are currently nine RPIFs in the U.S. and four in Europe.

- In the near future, RPIFs will provide access to digital planetary image data.

- Washington U. and USGS Flagstaff are jointly developing a MicroVAXII based system to manage and analyze planetary image data.

NASA RPIF
IMAGE WORKSTATION

- Workstation main functions will include:
    Search through database
    Retrieval of digital images
    Processing and display of digital images

- The MicroVAX effort is being done under the auspices of the Planetary Data System (PDS).

- The workstation will be used as a prototype RPIF image processing system in PDS Build One.

- The workstation will eventually be replicated at other RPIFs.

DESIGN CONSIDERATIONS

Types of information to be stored:

- General information about planets and planetary exploration

- Information about specific data sets

Types of data to be stored:

- Digital images on magnetic tape or CD

- Non-digital data such as photographic prints and maps

Types of users:

- Experienced users such as RPIF staff and scientists

- Occasional, knowledgeable users such as visiting scientists

- General public such as high school science teachers.

DESIGN CONSIDERATIONS

Data presentation:

- View single entries or tables of data

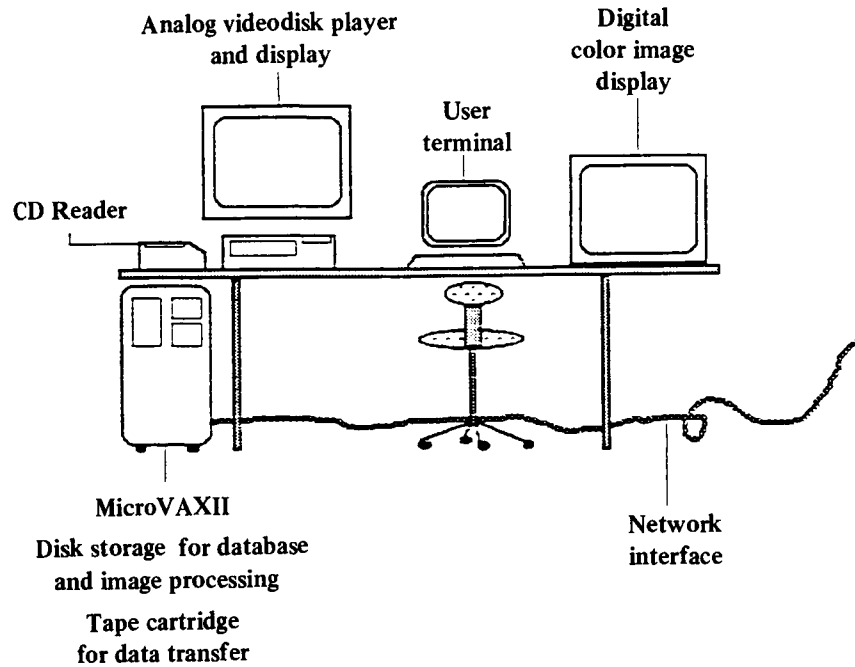- Output to terminal, file or printer

- Some simple graphics

Browse capability
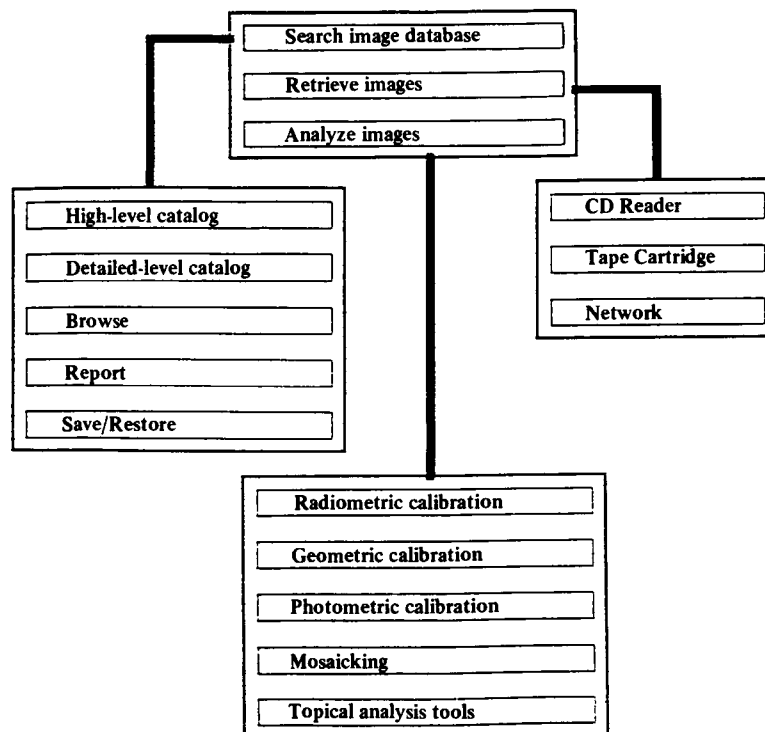
Access to digital data

Image processing capabilities:

- Radiometric and geometric calibration

- Color image display

WORKSTATION COMPONENTS

Analog videodisk player
and display

Digital
color image
display

User
terminal

CD Reader

MicroVAXII

Disk storage for database
and image processing

Tape cartridge
for data transfer

Network
interface

MAJOR FUNCTIONS OF WORKSTATION

| Search image database |
| Retrieve images |
| Analyze images |

| High-level catalog |
| Detailed-level catalog |
| Browse |
| Report |
| Save/Restore |

| CD Reader |
| Tape Cartridge |
| Network |

| Radiometric calibration |
| Geometric calibration |
| Photometric calibration |
| Mosaicking |
| Topical analysis tools |

DATABASE DESIGN

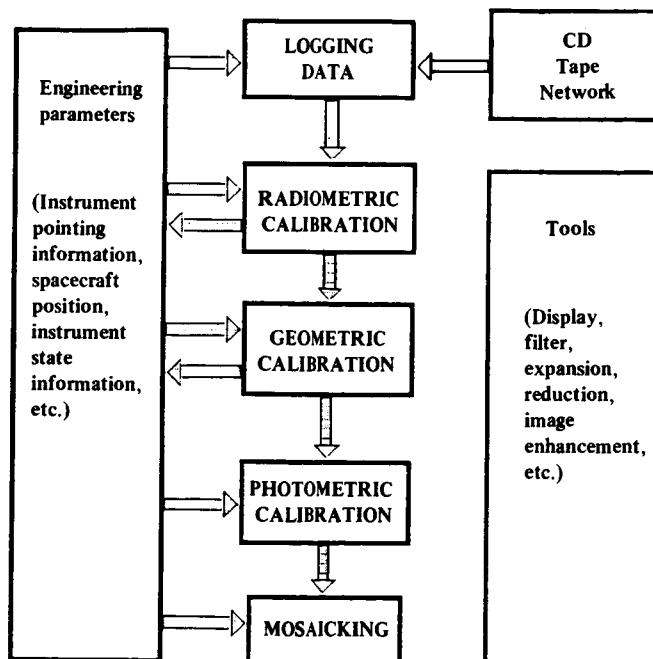The database is divided into **high-level** and **detailed-level** catalogs.

The high-level catalog is used to find out about planets and planetary exploration. It contains information on:

- planetary missions
- spacecraft
- instruments
- planets

The detailed-level catlog is used to find data to be analyzed. It contains information on:

- engineering parameters for images (picture location, filter, etc.)
- maps produced from planetary images
- mosaics of planetary images
- location and format of digital data

IMAGE ANALYSIS FUNCTIONS

Engineering parameters

(Instrument pointing information, spacecraft position, instrument state information, etc.)

LOGGING DATA

CD Tape Network

RADIOMETRIC CALIBRATION

GEOMETRIC CALIBRATION

PHOTOMETRIC CALIBRATION

MOSAICKING

Tools

(Display, filter, expansion, reduction, image enhancement, etc.)

Software developed by USGS Flagstaff

USES OF TAE IN WORKSTATION

- Menus used for main functions

- File access and image processing programs use TAE tutor screens to receive parameters from user, and TAE subroutines to pass parameters to programs.

- Database access and reporting programs use TAE tutor screens in conjunction with commercial database forms package

- PDS is evaluating TAE as a possible user interface for Build One

CURRENT STATUS OF DEVELOPMENT

- System hardware installed, including hard disk for image storage, CD-Reader for image retrieval, digital image display, and analog videodisk player and monitor.

- TAE and database management software installed on MicroVAXII. Installation of image processing software in progress.

- Database design for high-level and detailed-level catalogs in process

- Developed test programs to read and display digital images from CD.

- Prototype workstation expected to be completed by March 1987.