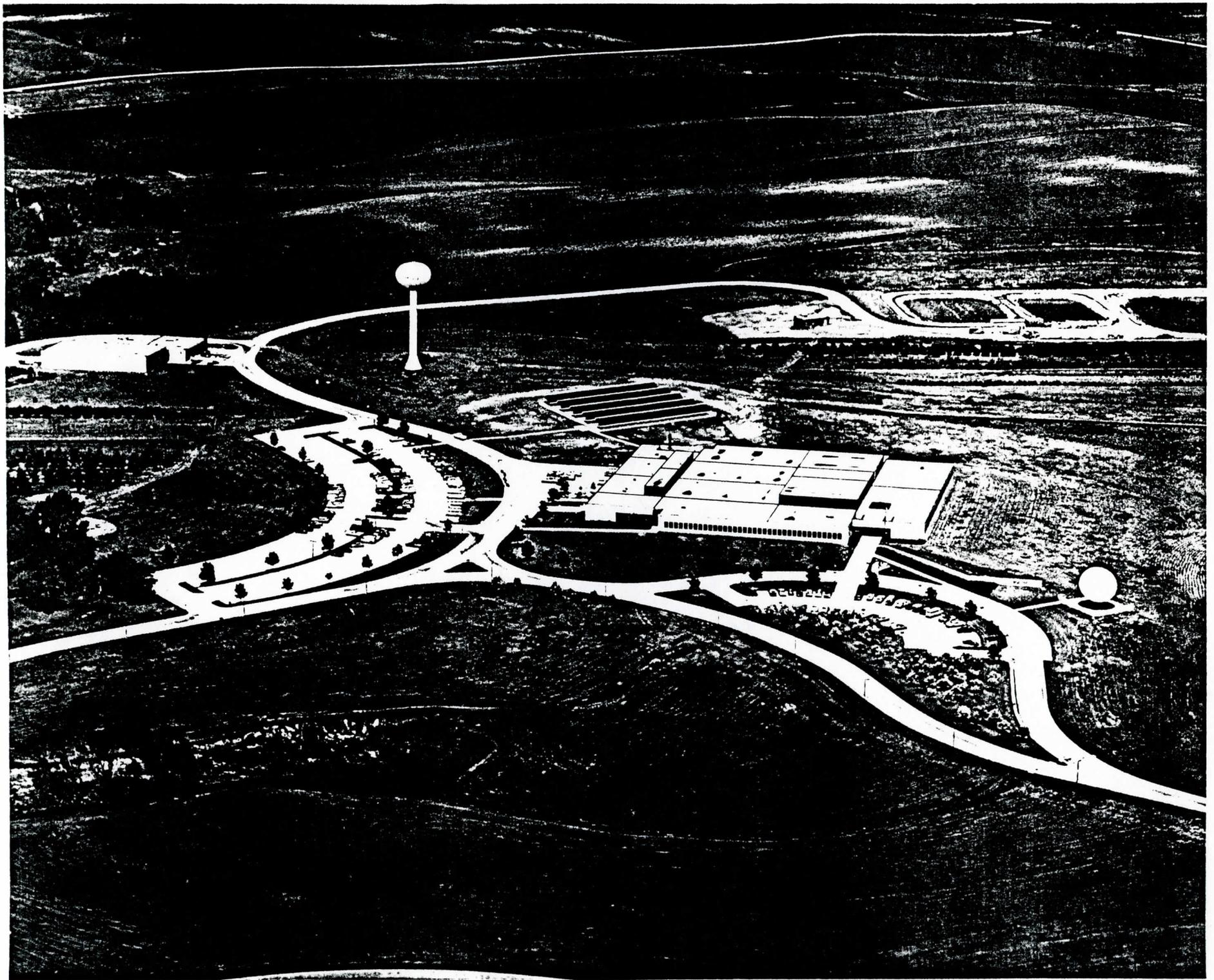
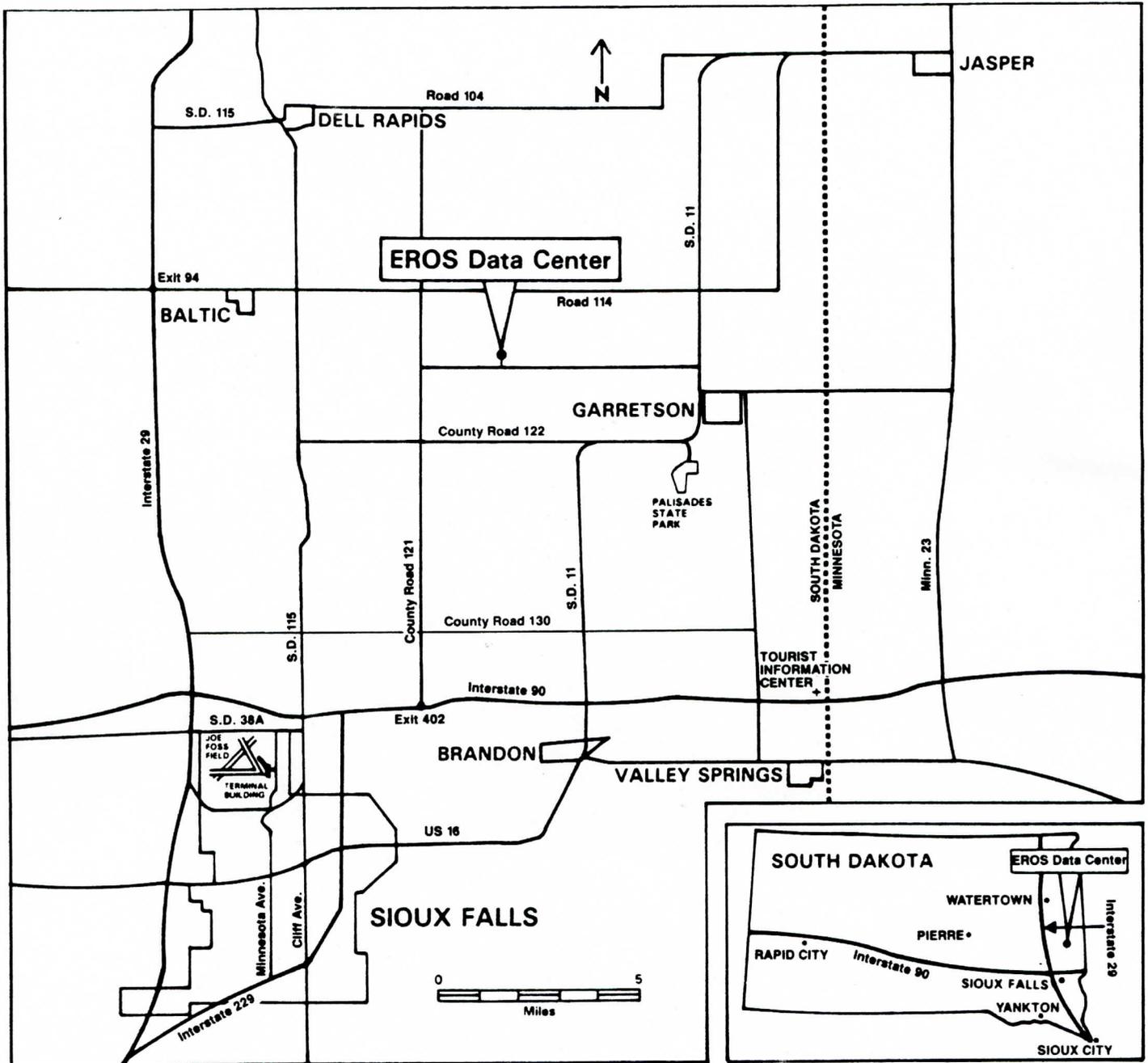


PURPOSE

To describe the capabilities of the U.S. Geological Survey's EROS Data Center which may be of interest to other Federal agencies, and to explore possibilities for additional use of the Center by other Federal agencies.







LOCATION ROUTES TO THE UNITED STATES GEOLOGICAL SURVEY EROS DATA CENTER

7-29-87

EROS DATA CENTER U.S. GEOLOGICAL SURVEY

- Established in Central U.S. location in 1972 to store, process, and distribute Landsat satellite data, and to conduct remote sensing research, applications development, and training.
- Administered by the U.S. Geological Survey (USGS) within the Department of the Interior (works closely with NASA, NOAA, and other Federal agencies).
- Facilities and equipment valued at \$40-50 million.



- Approximately 350 employees.
- Annual operating budget of approximately \$17 million.
- Operation of an inquiry, order, and customer accounting system to support distribution of a broad variety of NASA, NOAA, and USGS products.
- Nationwide computer network for accessing and ordering data products.
- Remote sensing data archive of over 7 million aircraft and satellite scenes (film and digital).



- Digital earth science, cartographic, and terrain data storage, handling, and dissemination.
- Worldwide index of foreign ground station and foreign satellite data availability.
- Multidisciplinary scientific staff in the fields of geology, hydrology, cartography, geography, agronomy, forestry, soils, meteorology, statistics, computer science, and telecommunications.
- Blanket procurement authority with civil satellite data suppliers for Federal agencies.



- EROS Digital Image Processing System (EDIPS) for Landsat data processing and product generation.
- Communications satellite link with NASA GSFC for satellite data transfer.
- Direct reception and processing of AVHRR image data from NOAA polar orbiting meteorological satellites for land applications.
- Data analysis laboratory for analysis of remotely sensed and other digital earth science data to support research and applications development.



- Advanced image processing capabilities for development and production of custom-tailored, enhanced, derivative image, and digital products.
- Geographic information system development and implementation capability.
- Production digitizing capabilities.
- Image and thematic mapping capabilities.
- Scientific and business systems software development capabilities.
- Development of image processing and data analysis systems and software.



- Large computer complex for:
 - Data reception, processing, cataloging, and production control
 - Image processing, mosaicking, geometric correction, enhancement, display, and hardcopy output
 - Geographic information system development and implementation
 - Data inquiry, order handling, and accounting
 - Spatial data transformation, conversion, merging, and manipulation
 - Remote sensing data analysis, research, and applications development
- Field office in Anchorage for Alaska user support.

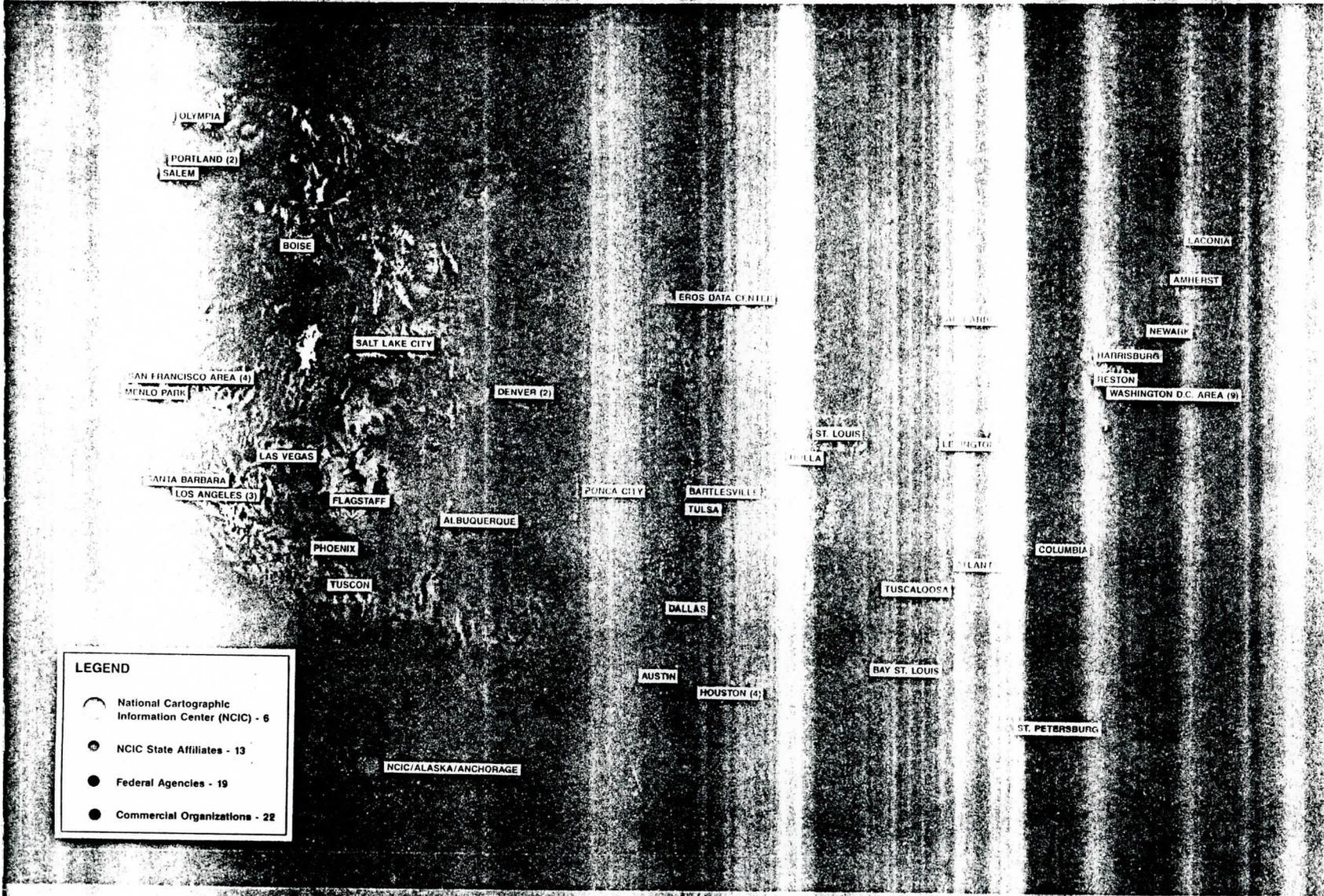


DATA CATALOGING AND PRODUCTION SYSTEM 1975 - 1989

Traditional mainframe with DBMS applications software and dedicated communications to describe available data, manage production of customer orders and account for payments.

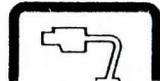
- Mainframe computer system
- National terminal network (dedicated links)
- Central index to image files
 - Landsat (film and digital)
 - Foreign Ground Station Data
 - Aircraft Photography
- Integrated system for order processing/production/accounting





LEGEND

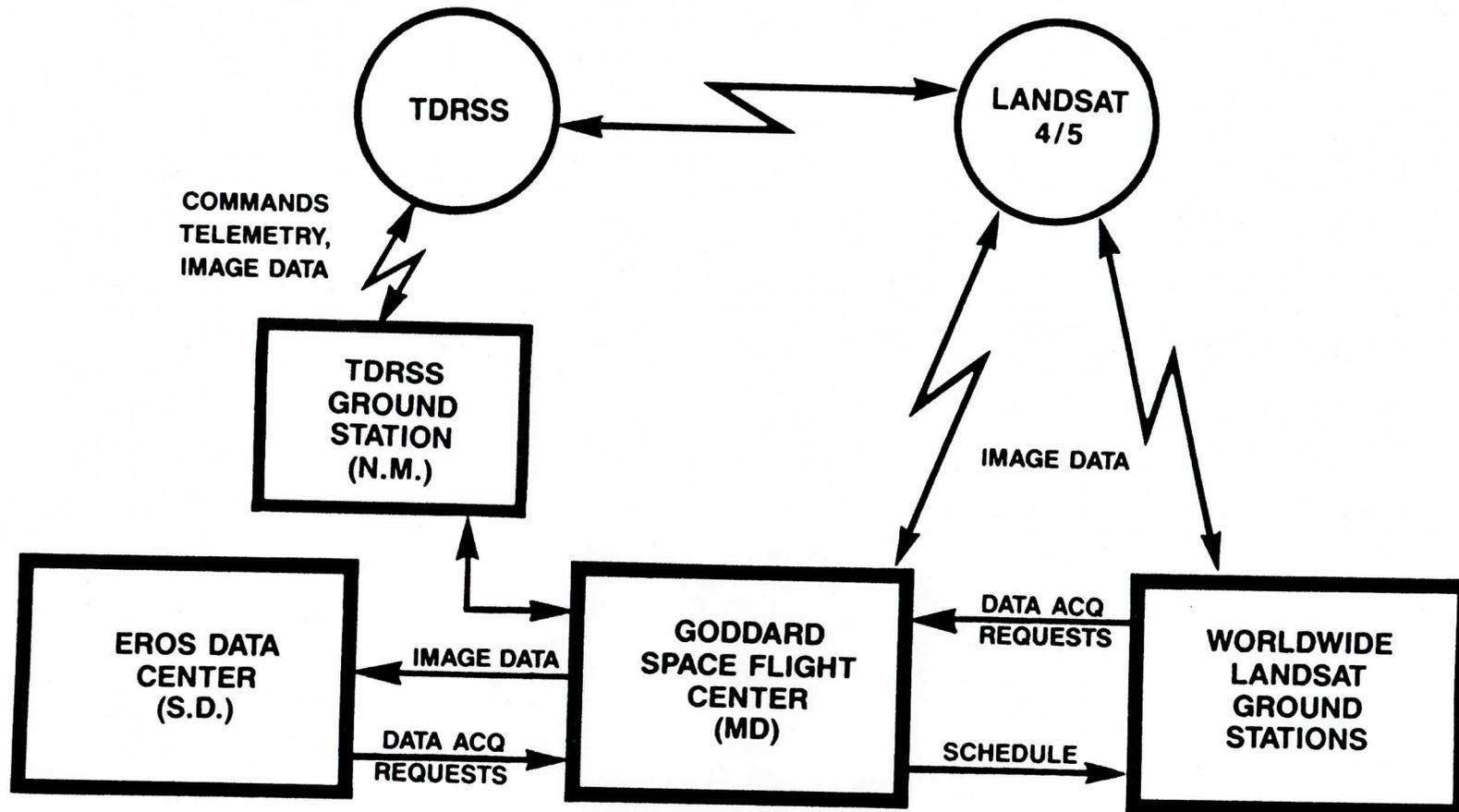
- National Cartographic Information Center (NCIC) - 6
- ★ NCIC State Affiliates - 13
- Federal Agencies - 19
- Commercial Organizations - 22



GEMINI
Transparency Mounts



LANDSAT 4/5 GROUND SYSTEM



- Inquiry & Order Processing
- Data Acquisition Requests
- MSS Processing & Product Generation
- MSS & TM Product Distribution
- MSS HDT, CCT & Film Archive
- TM CCT & Film Archive
- Worldwide Catalog System

- Mission Management
- Spacecraft Control & Scheduling
- Data Acquisition
- MSS Preprocessing
- TM Processing & Product Generation
- TM HDT Archive

- Data Acquisition
- Image Processing
- Product Generation & Distribution
- Data Archive

AVHRR DATA ACQUISITION/PROCESSING SYSTEM

Hardware/software system to track NOAA satellites, acquire AVHRR data real time and produce archival and registered product data files for Federal research and applications requirements.

- Provide daily nadir coverage of conterminous U.S.
- Acquire nighttime data on request
- Acquire foreign-coverage data from NOAA on tape
- Maintain 90-day archive of all data acquired
- Establish permanent archive of screened data
- Provide radiometrically and geometrically corrected data on tape, diskette or film
- Overlay image data with selected map data
- Produce fully processed data set within 24 hours of receipt
- Maintain index of temporary and permanent acquisitions



EDC Reception Coverage Circle with 5° Antenna Elevation



DATA ANALYSIS LABORATORY

A laboratory of colocated raster and vector analysis tools to support image processing and analysis, image and non-image data integration, geographic information analysis and custom product generation.

- Equipment

- 2 DeAnza 8500 → VAX 11/780

- 1 DeAnza 6400 and 1 Comtal Vision One → IDIMS

- 2 Raster Tech → Sun 2 Workstations

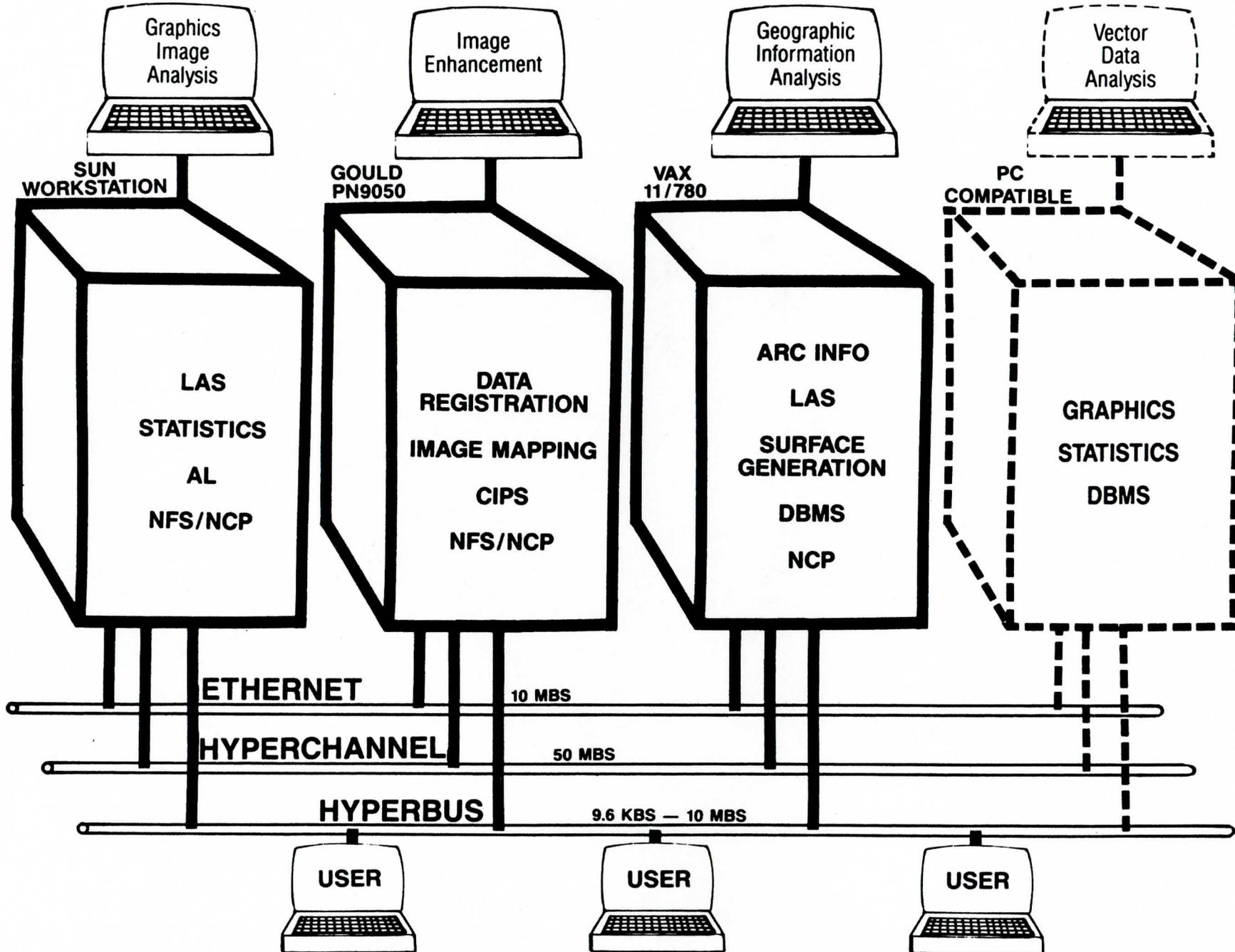
- 2 Intergraph Workstations → PDP 11/23

- 1 Adage 3006 → VAX 8200

- 1 Sun 3 Graphics Workstation



IMAGE/GEOGRAPHIC INFORMATION PROCESSING SYSTEM



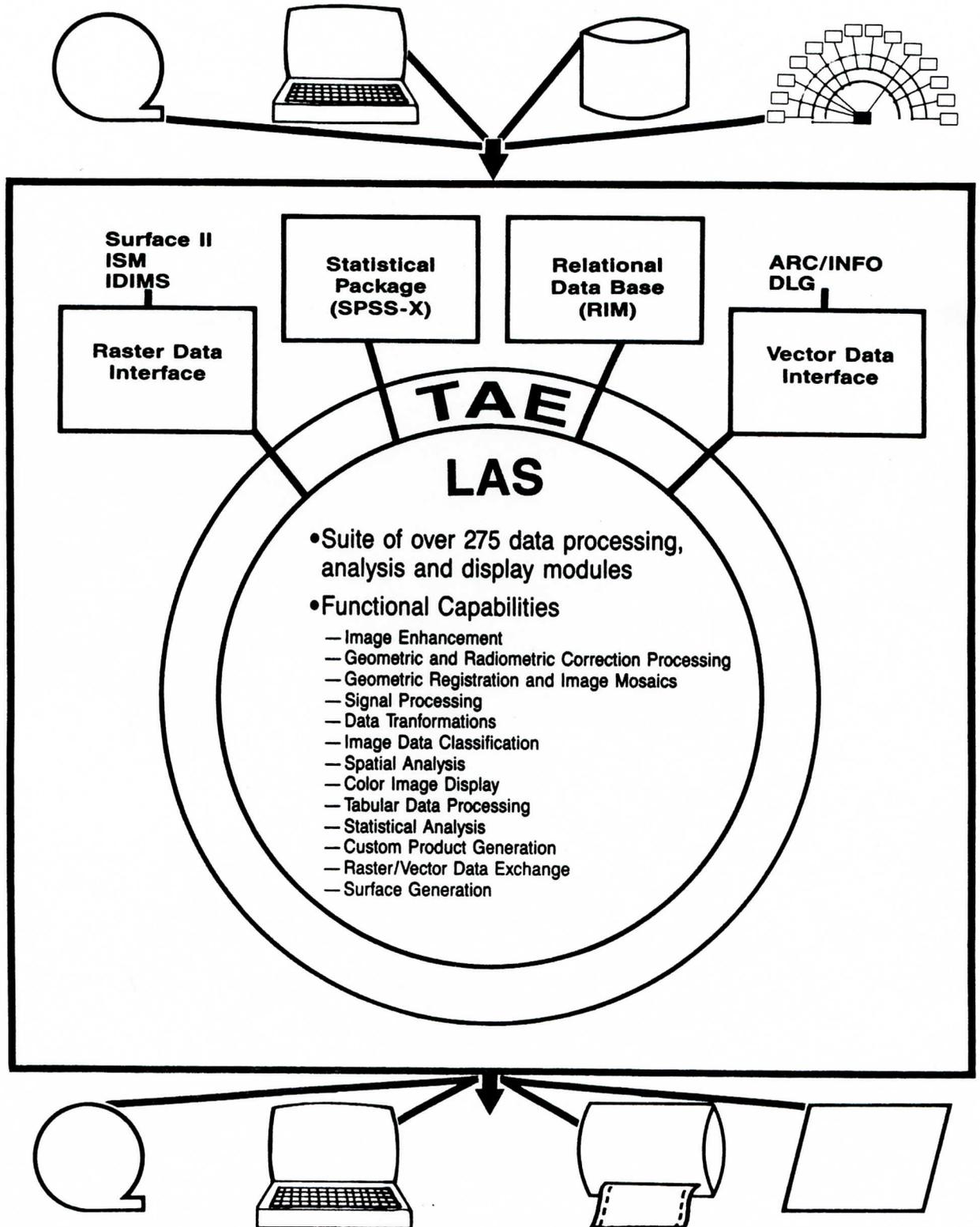
THE LAND ANALYSIS SYSTEM

Software system using an applications executive, development standards and device independence to support image and geographical information processing.

- Cooperative development between EDC/GSFC
- Transportable architecture to support migration to new hardware
- Processes Raster, Vector, Statistical and Tabular data
- Modular building blocks
 - Applications Executive
 - 275 Applications
 - Display Management Subsystem
 - Math Library (3K)
 - Statistics Package (7K)
 - Relational DBMS (15K)
 - Applicon Plotter Interface
 - Color Film Recorder Interface



Overview of the EROS Data Center LAS Processing Environment

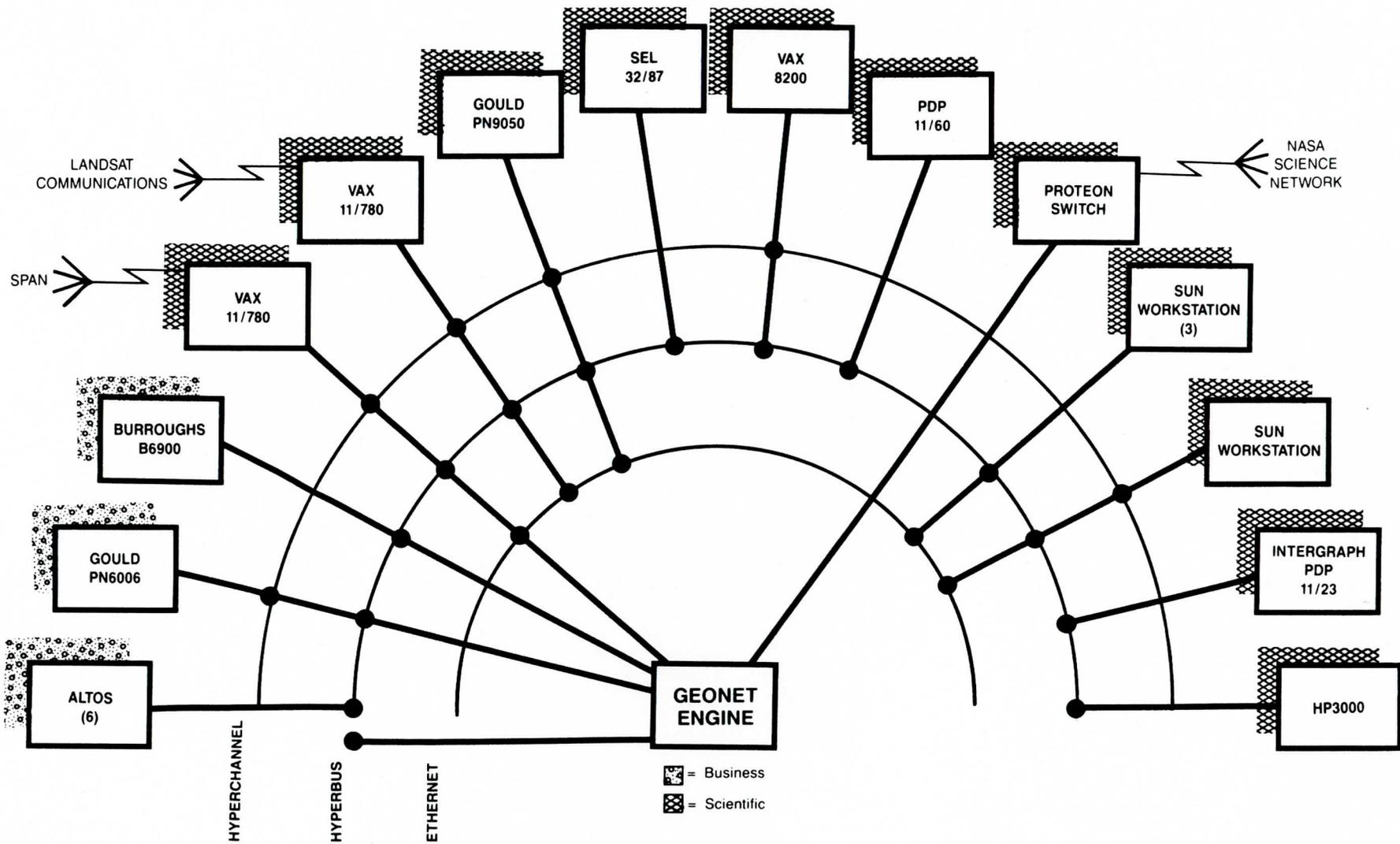


LAS IMPLEMENTATION STATUS

- VAX VMS prototype is functionally complete
- Transportable implementation (VMS and UNIX) underway
 - Applications Executive Installed
 - Library Services Complete
 - Image Mapping/Enhancement Modules Completed
 - Display Management Subsystem Complete
 - New Development Occurring In UNIX/C environment, then ported to VMS
- Active users
 - GSFC
 - EDC
 - EDC - Alaska Field Office
 - USGS - Western Mapping Center
 - DIA
 - University of Colorado
 - North Carolina State University
 - University of Alaska
 - Several Private Companies



EDC LOCAL AREA NETWORKS AND EXTERNAL INTERFACE



SUMMARY

An established broad capability for exploitation of civil satellite land remote sensing data and GIS technology

- Accessible by:
 - Assignment of personnel to the Center (Cooperative Federal Land Remote Sensing Research Program)
 - “Level-of-effort” cooperative agreements
 - Specific task agreements



POSSIBLE AREAS OF INTEREST

- Data acquisition (domestic and foreign)
- Data cataloging, indexing, and archiving
- Order handling and data distribution
- Standard and custom product generation
- Image processing and analysis
- Applications development
- Remote sensing and GIS R,D,T,&E
- Systems and software development

