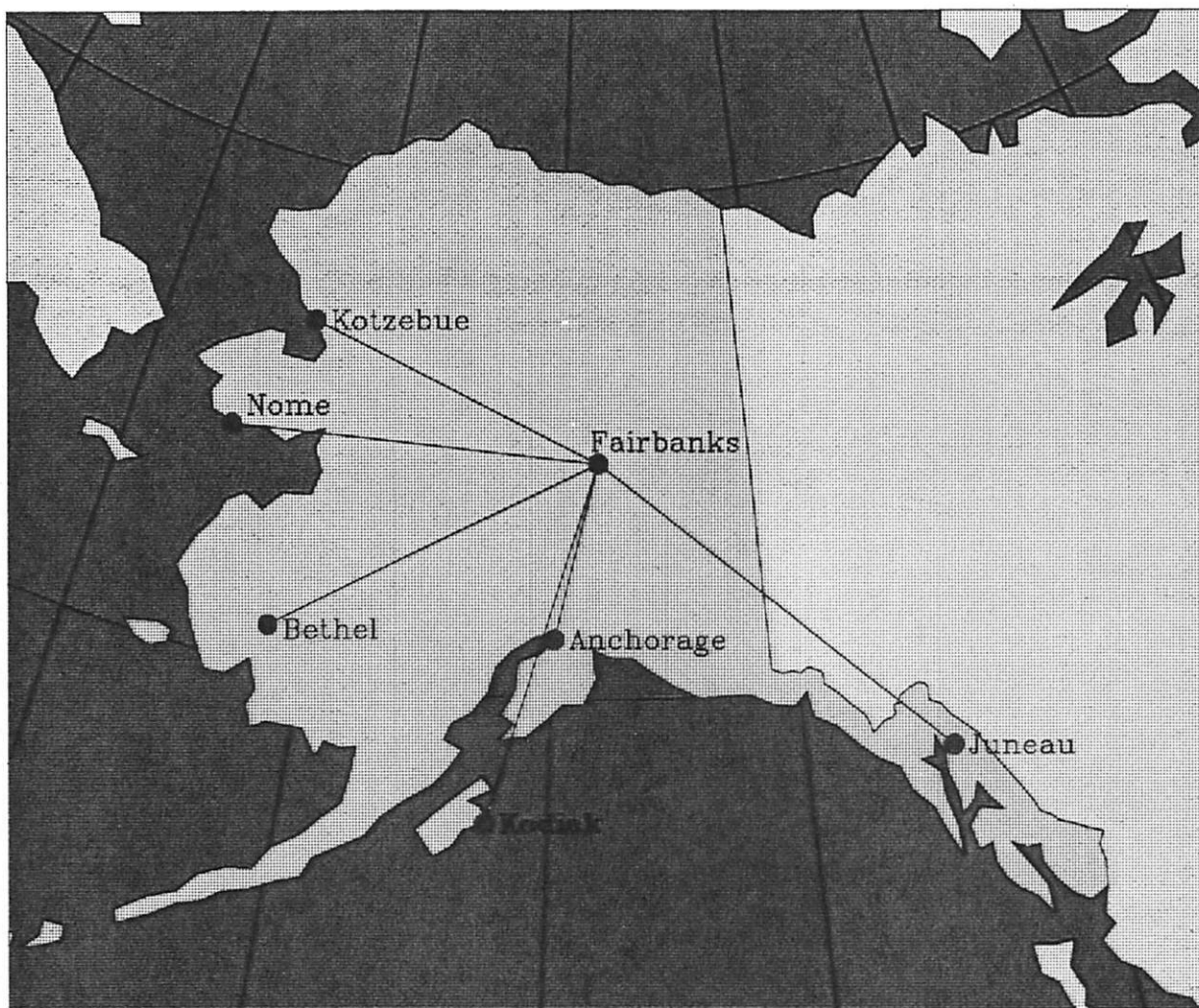


# **Telescience Developments at Geophysical Institute University of Alaska**

***Brenton Watkins & Don Rice***





## DATA COMMUNICATIONS

1970's • Tropo-scatter serial links from *FAIRBANKS* (main-frame computer) to *Anchorage* and *Juneau*

1980 • Satellite links

Main-frames in *FAIRBANKS, ANCHORAGE, JUNEAU*

interconnected with rural educational sites at  
*KOTZEBUE, NOME, BETHEL, KODIAK*

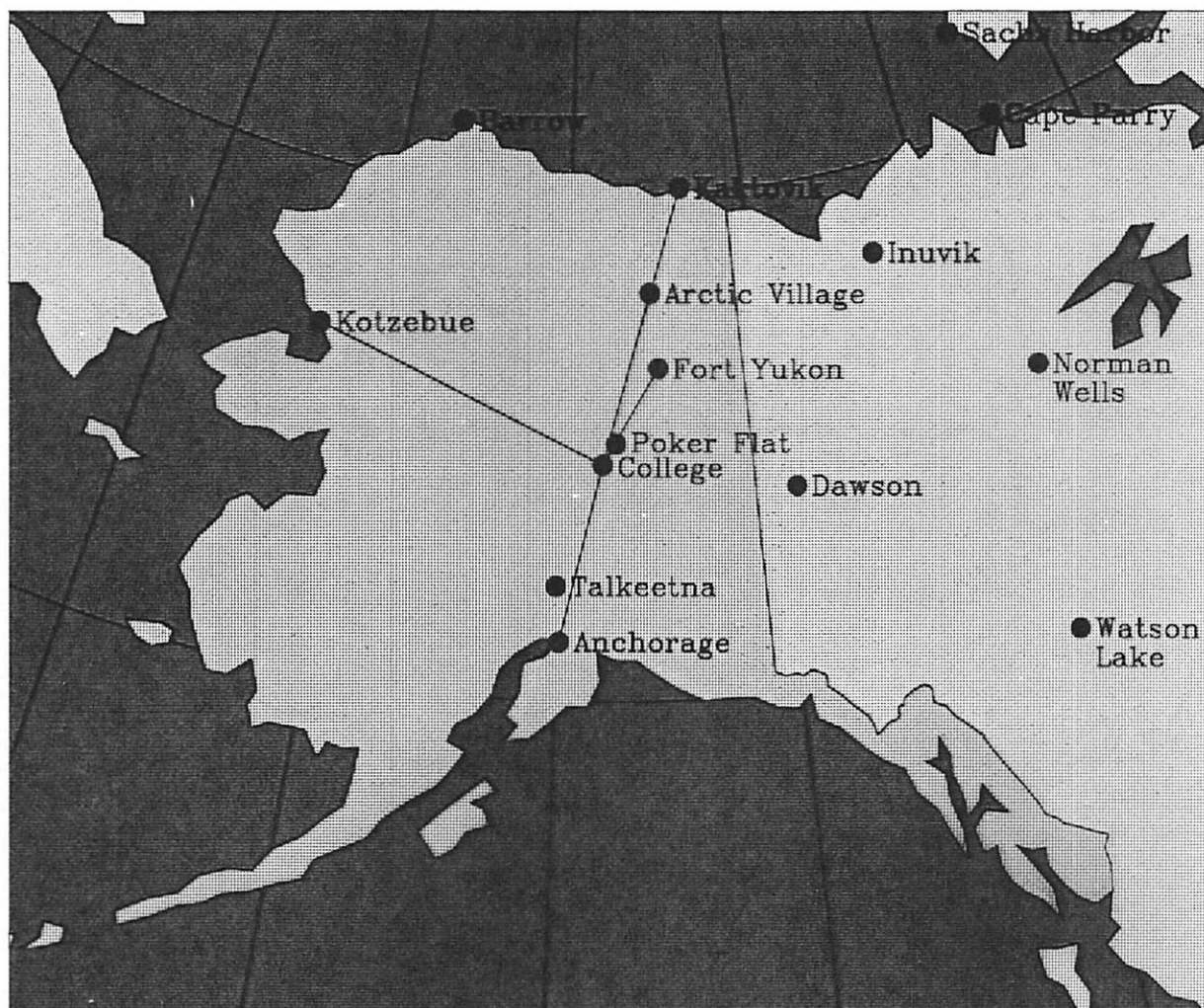
1990's • Distributed desk-top computing  
• Fiber-optic links within Alaska  
• Fiber-optic links to Portland, Oregon and Japan

## **CURRENT TELESCIENCE ACTIVITIES**

- 1. Alaskan instrumentation**
- 2. Sondrestrom, Greenland**
- 3. JAPAN - US Cooperative Research Program**

## ALASKAN INSTRUMENTATION & DATA NETWORKS

(under development)



**Network access to instruments at  
Poker Flat Research Range  
and other remote sites in Alaska**

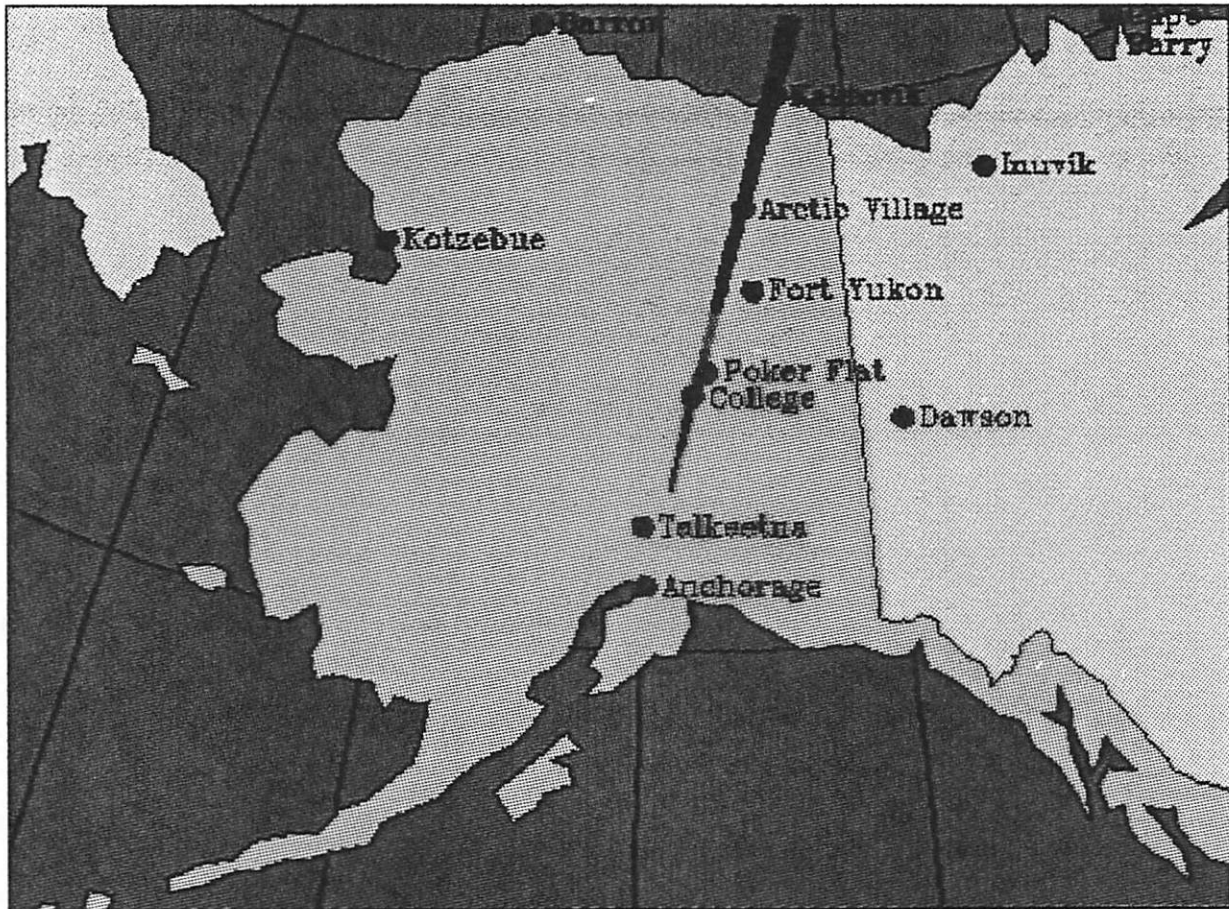
***Magnetometers  
Riometers  
All sky cameras***

***Auroral radar  
TEC***

(Some instrument data is acquired via GOES and SEL)

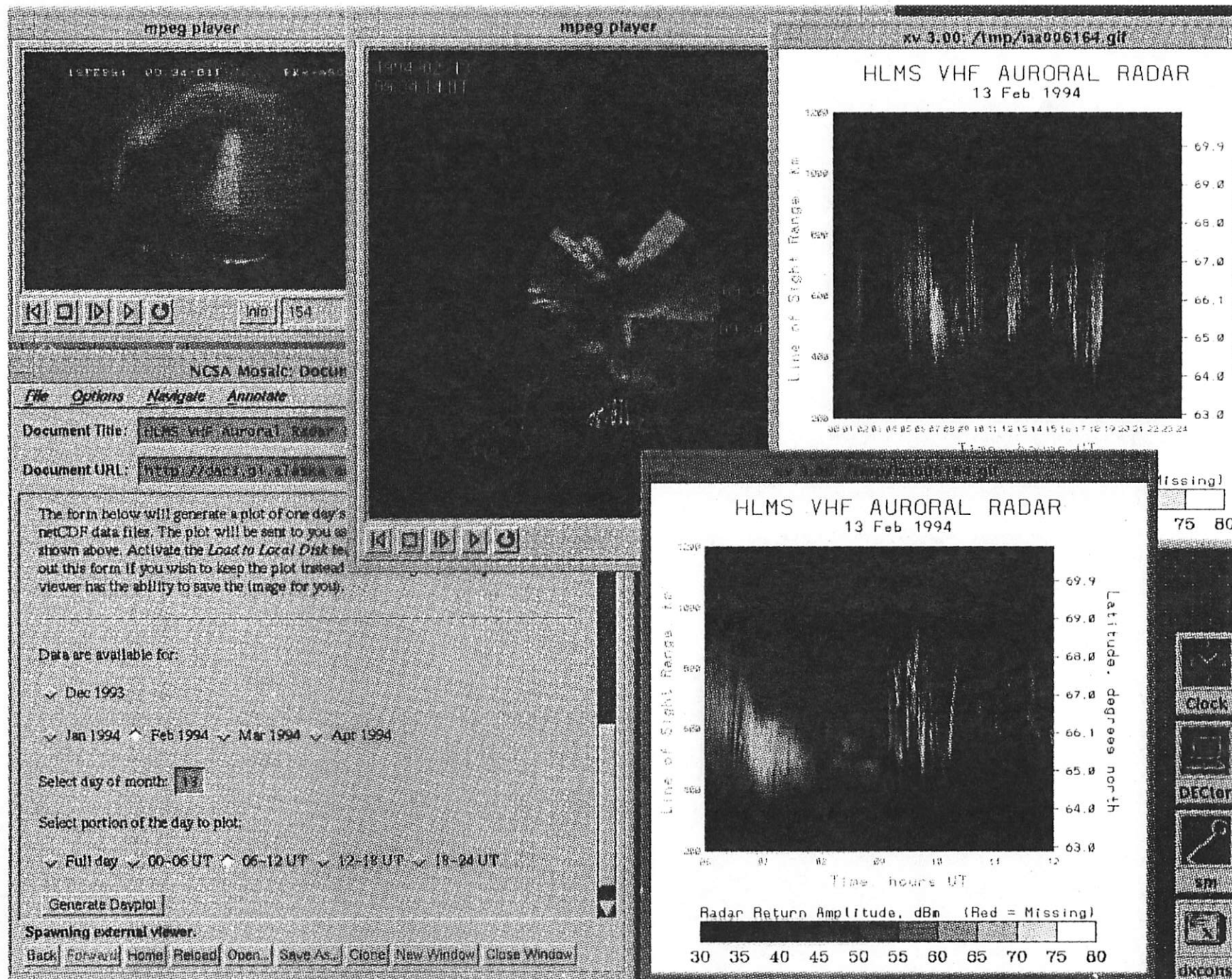
# HLMS VHF AURORAL RADAR

## Typical Radar Coverage



## The High Latitude Monitoring Station (HLMS) VHF auroral radar

- Located at Elmendorf Air Force base near Anchorage
- Operating frequency: 50 MHz
- Single, fixed beam
- Line-of-sight range: 200-1200 km
- 40 range gates of 25 km each



## **SONDRESTROM, Greenland**

- TELESCIENCE ==>**
- **easy student access to real-time data**
  - **monitoring of geophysical conditions at Sondrestrom**
  - **more efficient use of radar time**

### **1. HARDWARE**

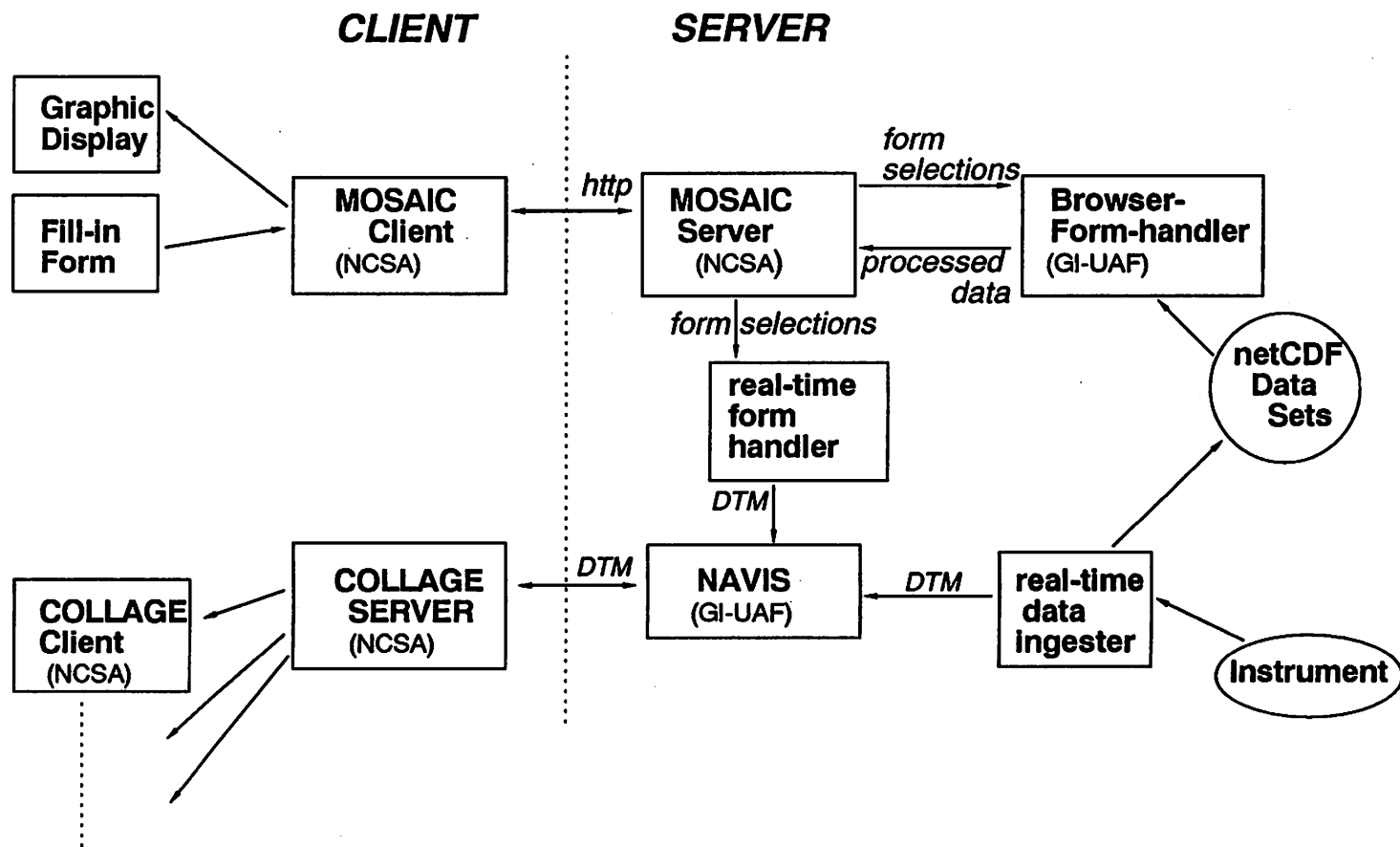
**Installed a reliable data network within building for student access.**

**Fiber optic connections to work-stations on student desks.**

### **2. SOFTWARE**

**Use of MOSAIC and COLLAGE for real-time data access and display.**

- **MOSAIC provides:**
  - **documentation and easy access.**
  - **fill-in forms used to request data plots and processing.**
- **COLLAGE used to deliver real-time data displays to one or more users via NAVIS (Networked Aquisition, Visualization and Instructional Server)**



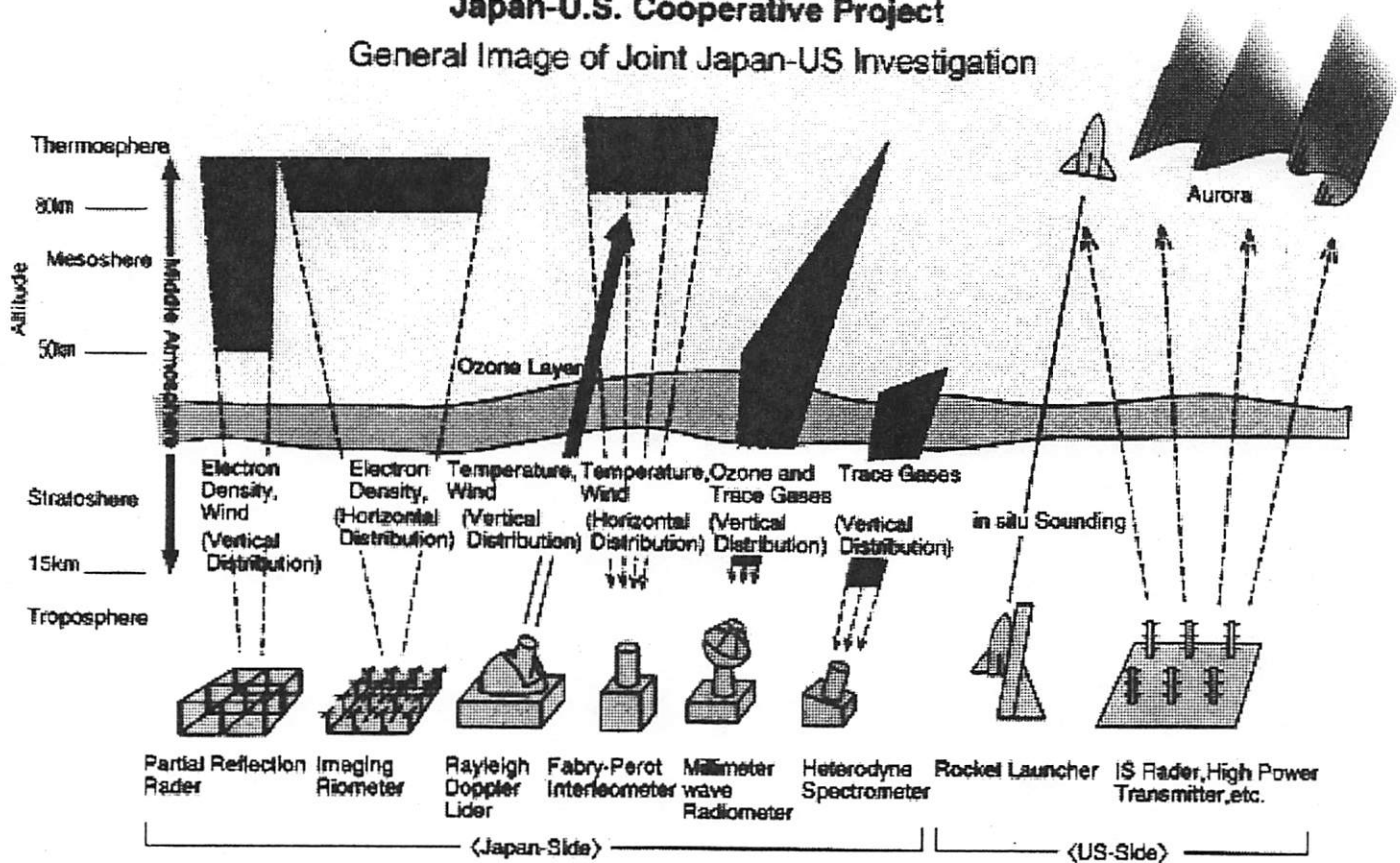
### ADVANTAGES

- MOSAIC and COLLAGE software common with supercomputer centers.
- No local software maintenance (client runs NCSA software).
- Uses simple MOSAIC fill-in forms as user interface.
- Multiple users may collaborate in data analysis.
- Data updates provided in near real-time.

## JAPAN - US Cooperative Research Program

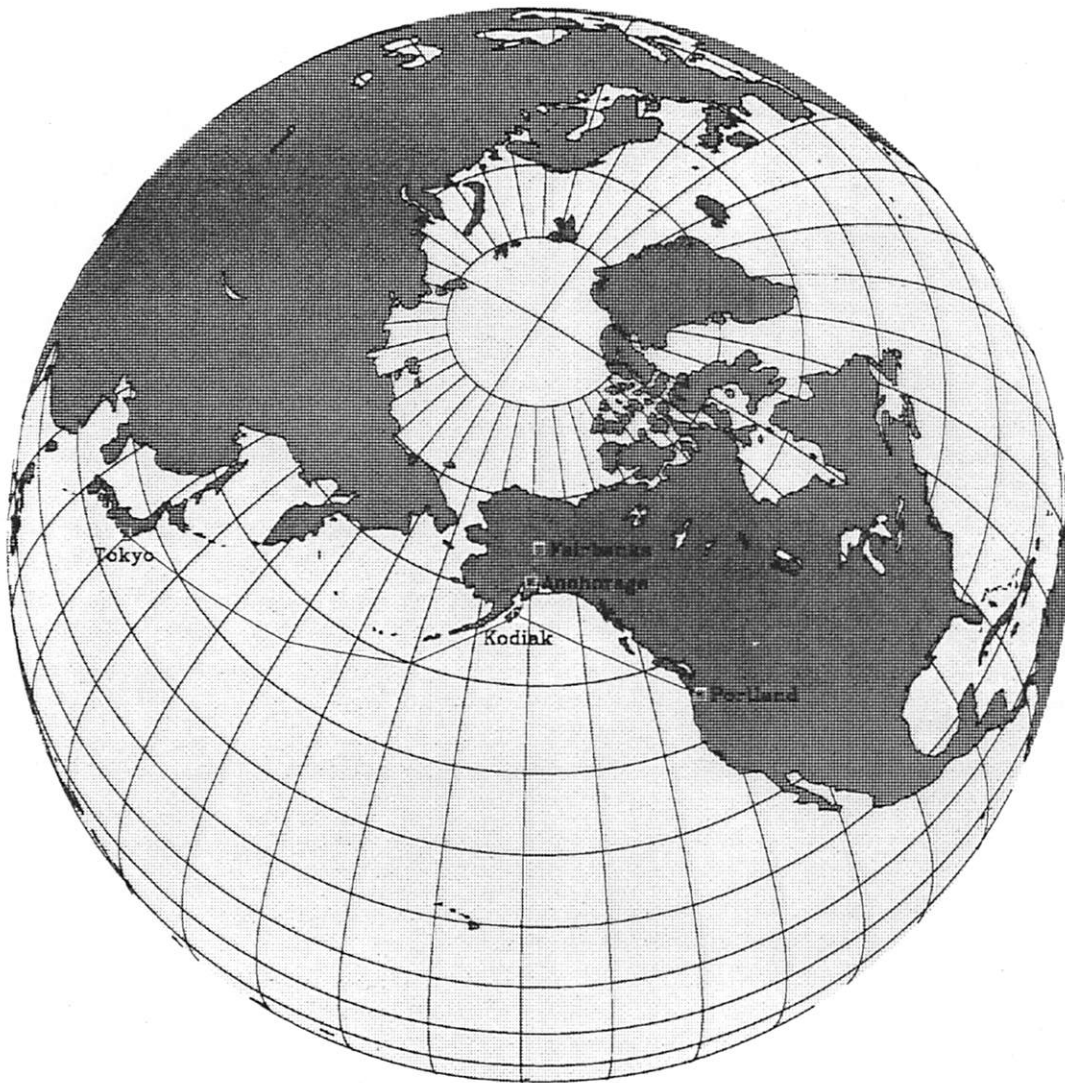
- Communications Research Lab,  
Ministry of Posts & Telecommunications.
- Nagoya University
- Tohoku University

**Japan-U.S. Cooperative Project**  
General Image of Joint Japan-US Investigation



## **TELESCIENCE**

- Real-time data access from Japan
- Interactive data analysis (Japan-Alaska)



## **FIRST INSTRUMENT (1995)**

- 256 beam imaging riometer
- real-time data monitoring at Geophysical Institute and Japan via INTERNET