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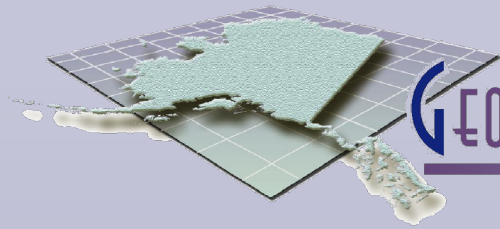
UNIVERSITY OF ALASKA

GINA: A Network of Geo-spatial Data and Activities

www.gina.alaska.edu

Buck Sharpton
Director
President's Professor of Remote Sensing

Our Mission

- ❖ Provide a permanent, accessible (spinning) archive for university geo-spatial data.

- ❖ Provide policy makers and researchers with enhanced access to high-latitude geo-spatial data over the web.

- ❖ Provide soup-to-nuts, server-side analysis and visualization tools.

- ❖ Provide assistance and training in GIS and satellite image processing.
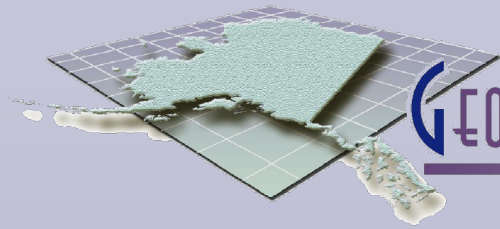
Strategy

- Planning Phase (FY 2001-2002)
- Development Phase (FY 2002-2004)
  - Design/Develop Data System
    - Including metadata service
  - Create Web Presence
    - Interface and Tools for browsing, analysis, display
  - Populate Data System
- Implementation/Expansion Phase (FY 2004-)

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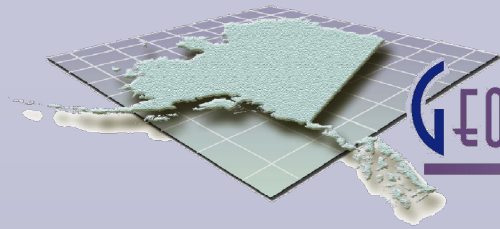
Standards as a foundation for information exchange

❖ FGDC and ISO metadata standards

❖ Z39.50 Communications Protocol for client/server interaction

❖ ESRI ArcSDE and ArcIMS implementation standards

❖ Additional standards as prescribed by Open GIS Consortium and other guiding organizations.

GINA Expertise

Technical Services Manager (**Tom Heinrichs)**
System Analyst; UNIX/Linux System Administration; System Programming; System and Network Security

Data Systems Analyst (Cheryl Haase)
Database Administrator; Data Systems Design; Oracle, Sybase, Ingres Database; Administration; Database Programming (SQL, PL/SQL, Shell Scripts); ArcSDE, ArcIMS; Metadata Standards; Database Security

Receiving Station Manager (Kevin Engle)
System Analyst; Senior Research Programmer; Image Processing; Network Administration, Archiving

Web and Research Programmer (Dan Stahlke)
Web, Application, and Database Programming (Shell, C/C++, Perl, Java, SQL); Network Programming

System Analyst (Dayne Broderson)
System Administration; Web/System Programming (Shell, C/C++, PHP, Ruby); System/Network Security

Web Programmer (Jason Grimes)
Web Maintenance; Graphic Design; XML, CGI, Roxen, Perl Programming

GIS and Research Programmer (Jay Cable)
Web Tool Development; Graphics Programming; C/C++, AML, IMS, XML, CGI, Perl Programming

GIS Technician (Fred Calef; Graduate Student)
Custom GIS Product Development; GIS Client Assistance; ESRI Site License

Administrative Assistant (Rosanna Campi; Undergraduate Asst.)
Digitizing, Web searches, satellite data input and processing, other assistance as needed.

GINA Facilities

Receiving Stations (ION)

EOS/DB X-band (MODIS)
3.6-m antenna
SeaSpace Terascan capture and processing system

HRPT (AVHRR & SeaWiFS)
1.5-m antenna
SeaSpace Terascan capture and processing system

Production

Image Processing
Sun Enterprise 420R server
Sun A5200 disk array 2.4 TB
SeaSpace Terascan & MODIS IMAPP Software

Data Server
Sun SunFire V880 server
Sun T3 disk arrays 7.6 TB
Oracle 9i database
ESRI Arc SDE spatial data server

Public Interface (Web)
Sun SunFire 280R server
Apache Web server
ESRI Arc IMS Mapping Server
Custom Web Applications

Development

Image Processing: Sun V100 Terascan, IMAPP

Data: Sun V120 Oracle 9i, ArcSDE

Web: SunFire V100 Web, ArcIMS, Custom SW

Test Environment

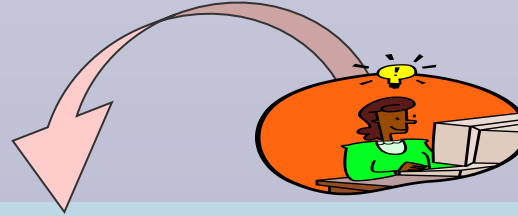**Image Processing:** Sun V100 Terascan, IMAPP

Data: Sun V120 Oracle 9i, ArcSDE, 500 GB RAID

Web: Sun SunFire, V120 Web, ArcIMS, Custom SW

Remote Sensing/GIS Teaching Laboratory
14 Sun Ultra 5 workstations
400 GB Network Attached Storage
Sun Enterprise 420R Server

Enterprise Architecture

Development Environment

- New product and tool development area
- Potentially disruptive work done here
- Most recent, perhaps unstable tools available

Test Environment

- Mirrors production environment to ensure realistic testing
- "Proving ground" for new tools and software
- Fairly mature systems refined here prior to production deployment
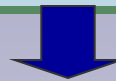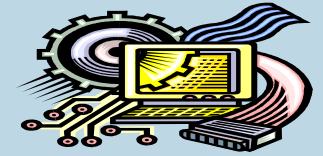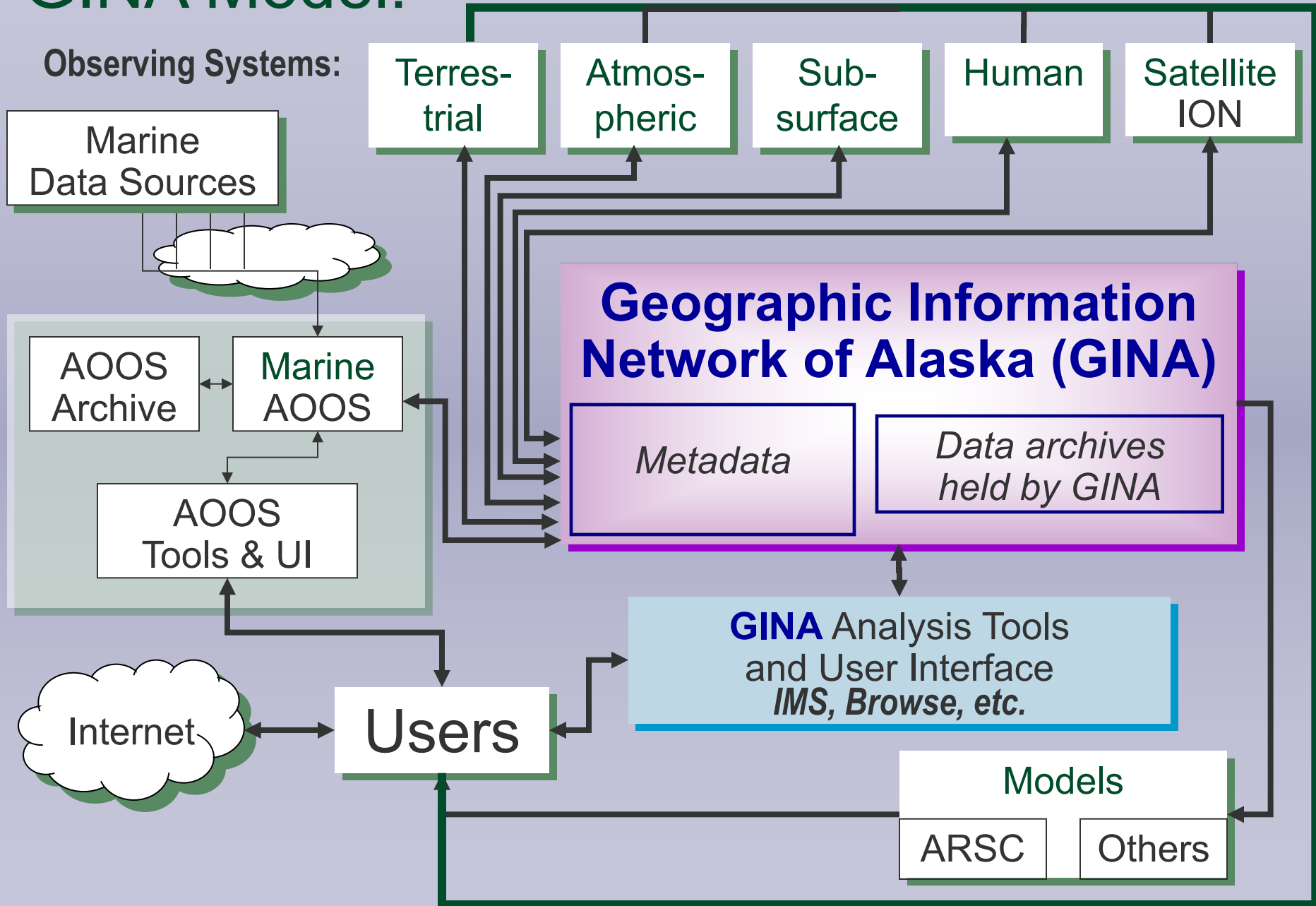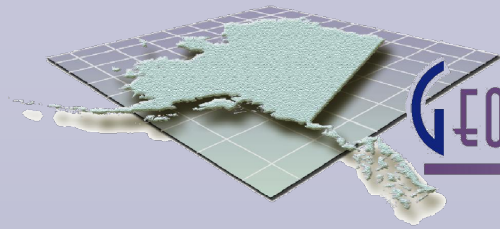
Production Environment

- Stable interface to public and internal clients
- Only well-considered, tested changes made to production environment
- Redundant failover capabilities: single points of failure minimized
- Uptime and stability are priorities

GINA Model:

Observing Systems:

Marine
Data Sources

Terres-
trial

Atmos-
pheric

Sub-
surface

Human

Satellite
ION

AOOS
Archive

Marine
AOOS

AOOS
Tools & UI

**Geographic Information
Network of Alaska (GINA)**

Metadata

*Data archives
held by GINA*

GINA Analysis Tools
and User Interface
IMS, Browse, etc.

Internet

Users

Models

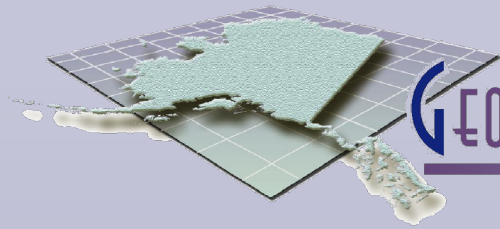ARSC

Others

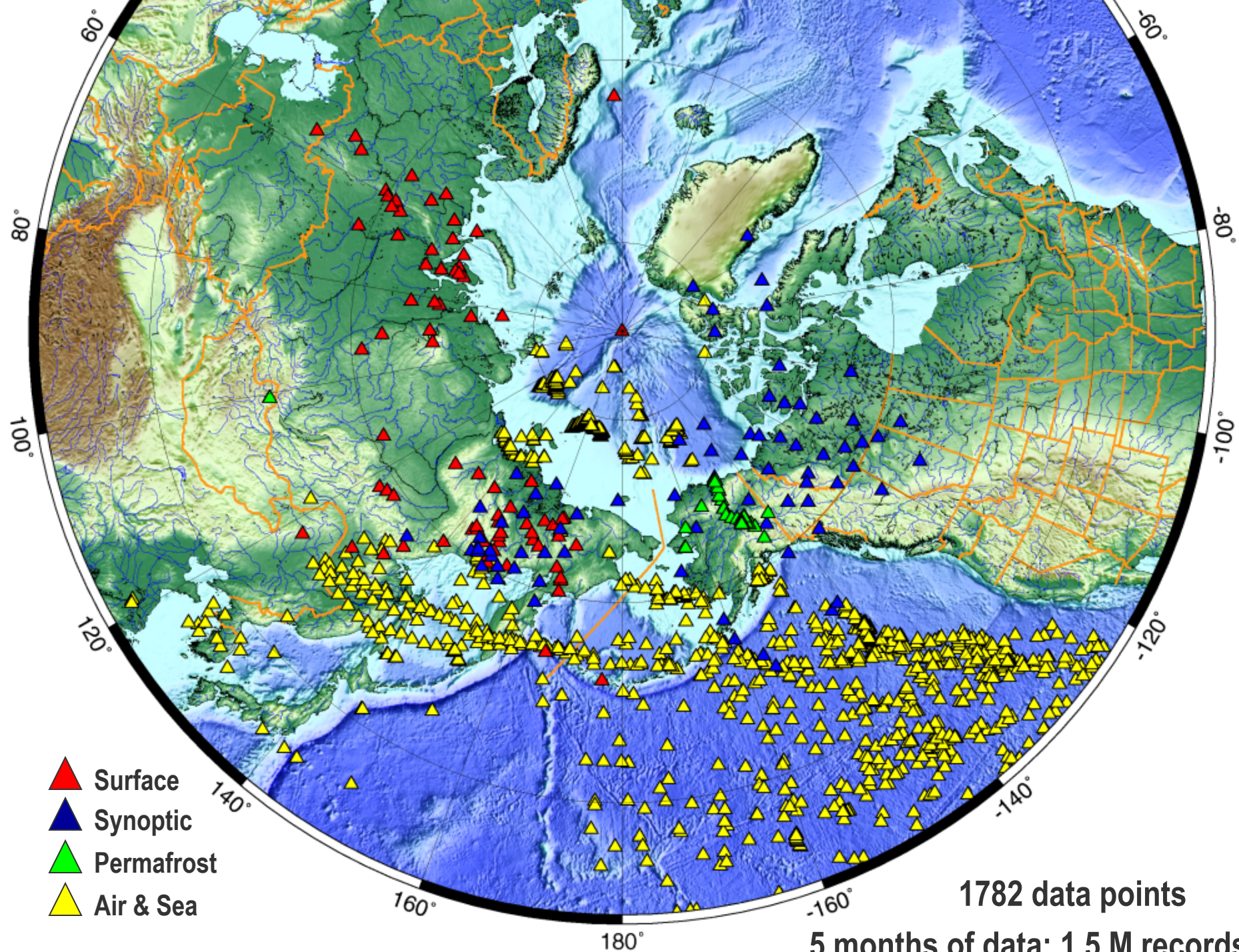GEOGRAPHIC INFORMATION NETWORK OF ALASKA
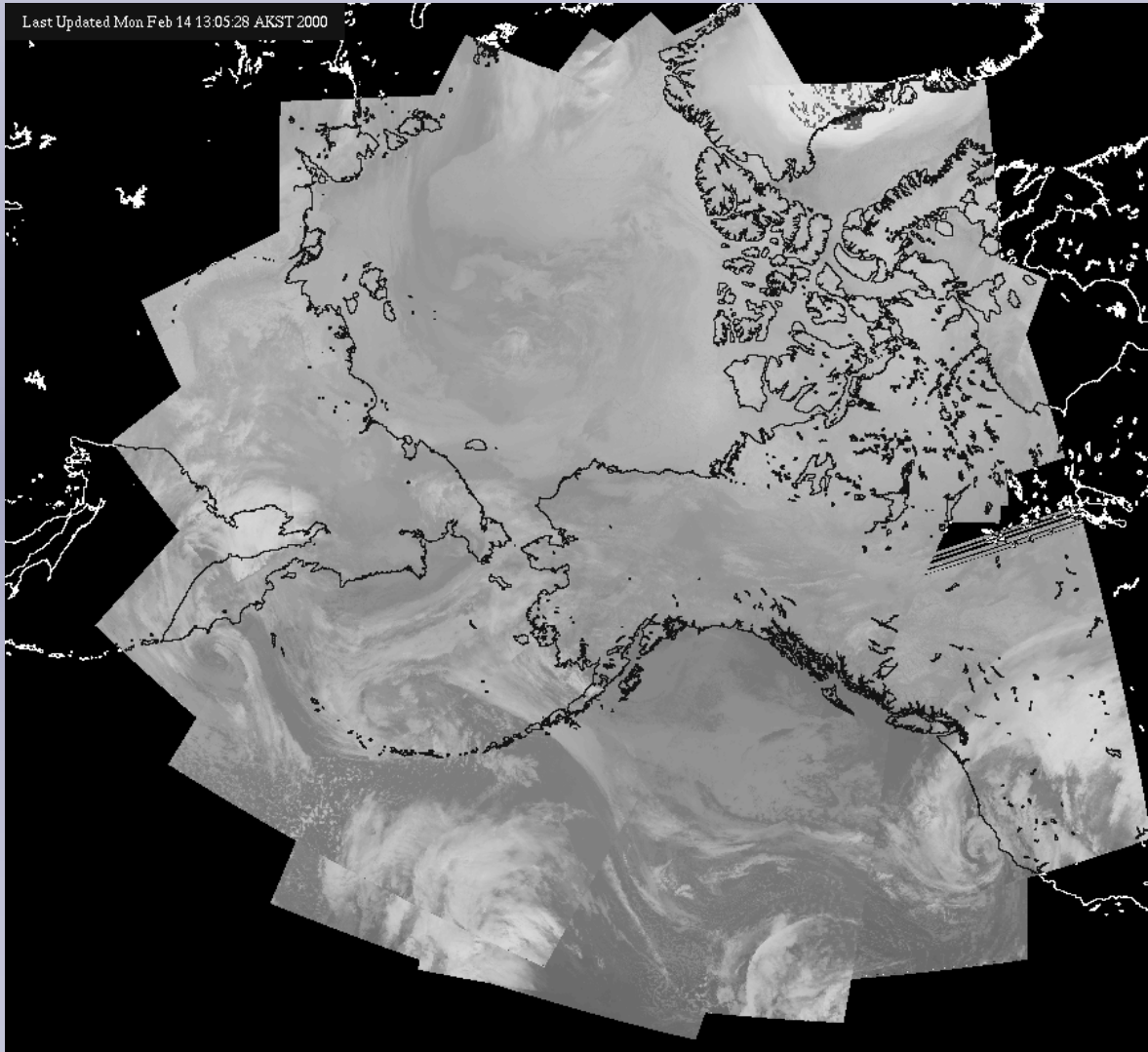UNIVERSITY OF ALASKA

Data Sets/Data Systems (so far)

- Imagery from optical, polar orbiting satellites (ION)
  - \>56,000 AVHRR Images + 35 passes per day
  - \>4,000 MODIS Scenes + 16 passes per day
  - \>5,500 SeaWiFS Scenes + 6 passes per day
  - \>300 Landsat 7 Scenes
- Arctic Contaminants (AMAP)
- Invasive Species in AK
- Endangered Species in AK

Data Sets/Data Systems (so far)

❖ National Weather Service Observations

- ◆ 1.5M records to date (representing 5 months of data)

❖ Permafrost (GI; Vladimir Romanovsky)

❖ Boreal Fires (Hokkaido Univ.)

❖ Global Topography*/Bathymetry**

❖ Global Impact Studies Program

*30 arc-second; **TOPEX, Poseidon, IBCAO data

Surface
Synoptic
Permafrost
Air & Sea

1782 data points

5 months of data; 1.5 M records

International Observatory of the North

Last Updated Mon Feb 14 13:05:28 AKST 2000

Real-time Satellite Reception

- MODIS
- AVHRR
- SeaWiFS
- GLI*
- OCM*

Landsat Distribution

- AmericaView
- MRLC

Application Development

- Boreal Fire Monitoring
- Volcanic Hazards
- Coastal ANWR Circulation

**Visualization and Tool Development**

Training/Certification

Basic Research

Validation Studies

ion.gina.alaska.edu

*Planned

Satellite Information Products

- ❖ Sea Surface Temperature
- ❖ Ocean Circulation
- ❖ Ocean Color*/Sediment Characterization*
- ❖ Vegetation indices*
- ❖ Land Temperature*/Thermal Anomalies
- ❖ Snow/Ice Distribution*
- ❖ Soil Moisture Estimates*
- ❖ Cloud Distribution/Properties*
- ❖ Atmospheric Water Vapor
- ❖ Atmospheric pollutants* (smoke, SO_X)

*requires development/refinement of high-latitude algorithm
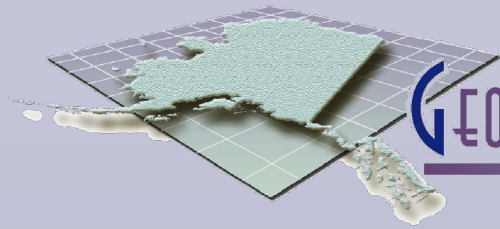
Partnerships Within UA:

UAS
- Environmental Sciences

UAA
- Geomatics Program
- ENRI
- AK Natural Heritage Program

UAF
- UA Museum
- Arctic Region Super Computer Fac.
- Geophysical Inst.I
- Inst. Arctic Biology (AGC)
- Alaska SAR Facility
- Inst. Marine Sci. (SALMon)
- Intern. Arctic Research Center
- Provost's Office
- VP Research (ARAD)

Partnerships Outside UA:

❖ International
  ◆ NASDA-Japan
  ◆ Hokkaido Univ.
  ◆ Russian Acad. Science
  ◆ IUGG/IUGS

❖ National
  ◆ NASA
  ◆ NSF
  ◆ AmericaView, Inc.
  ◆ USGS
    ◆ Eros Data Center
    ◆ Alaska Science Center
    ◆ NBII
  ◆ MRLC

❖ National (cont'd)
  ◆ US F&WS
  ◆ DOE/ARM
  ◆ AVO

❖ State
  ◆ ADNR
  ◆ ADEC
  ◆ AFS (BLM)
  ◆ AGDC

❖ Local
  ◆ Kenai Peninsula Borough

❖ Tribal
  ◆ Tanana Chiefs