Quick Unidata Overview

NetCDF Workshop
28 October 2010
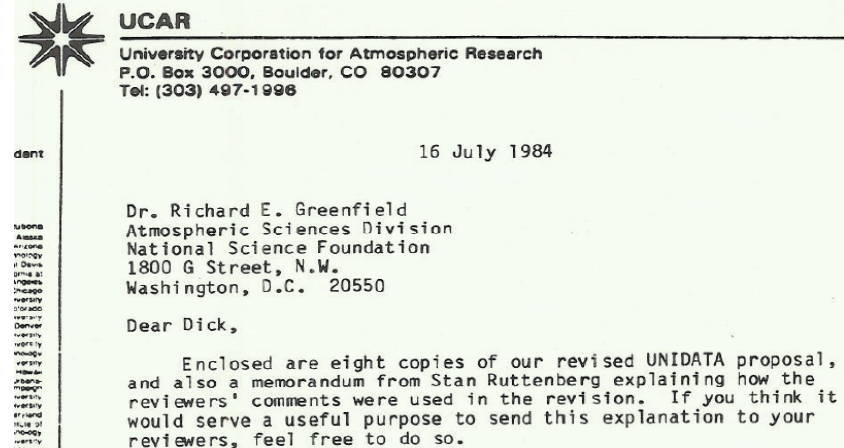
Russ Rew
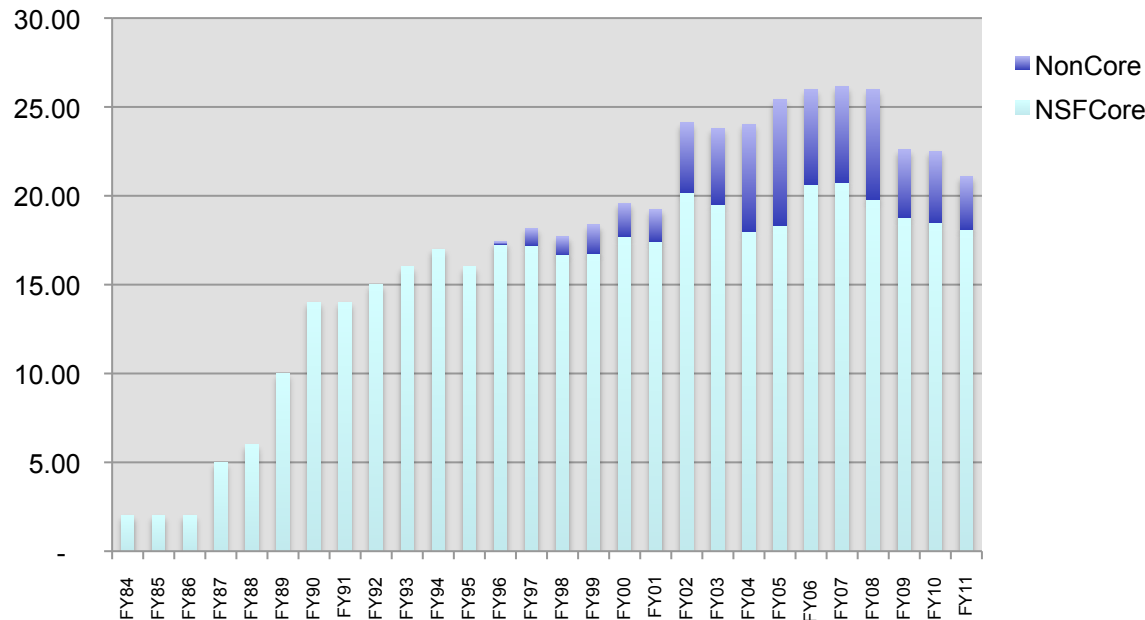
Background

Conceived at a 1983 grass-roots workshop, held at Madison, WI;

Funded primarily by NSF through a core-funding proposal every five years.

UCAR
University Corporation for Atmospheric Research
P.O. Box 3000, Boulder, CO 80307
Tel: (303) 497-1996

16 July 1984

Dr. Richard E. Greenfield
Atmospheric Sciences Division
National Science Foundation
1800 G Street, N.W.
Washington, D.C. 20550

Dear Dick,

Enclosed are eight copies of our revised UNIDATA proposal, and also a memorandum from Stan Ruttenberg explaining how the reviewers' comments were used in the revision. If you think it would serve a useful purpose to send this explanation to your reviewers, feel free to do so.

Unidata Staffing History 1984-2010

Mission

To provide data services, tools, and cyberinfrastructure leadership that advance Earth system science, enhance educational opportunities, and broaden participation.

We do

Facilitate data access

Develop and provide tools for data management, analysis, and visualization

Provide comprehensive support, including training

Empower users to also be contributors

Engage in community building and advocacy to address data-related issues

We don't

Operate a data center

Do science

Serve K-12 education directly

Provide operational support

Collect data from sensors

Develop curricula

Compete with universities

A Snapshot of Services

Data Access and Distribution:

Near real-time data via IDD

Community content and archives via TDS, RAMADDA

Community Services:

Advocacy and liaison on data issues to NSF, NWS, NOAA, NASA, OGC, …

Annual community equipment awards

Software:

Analysis and Visualization: IDV, GEMPAK, McIDAS

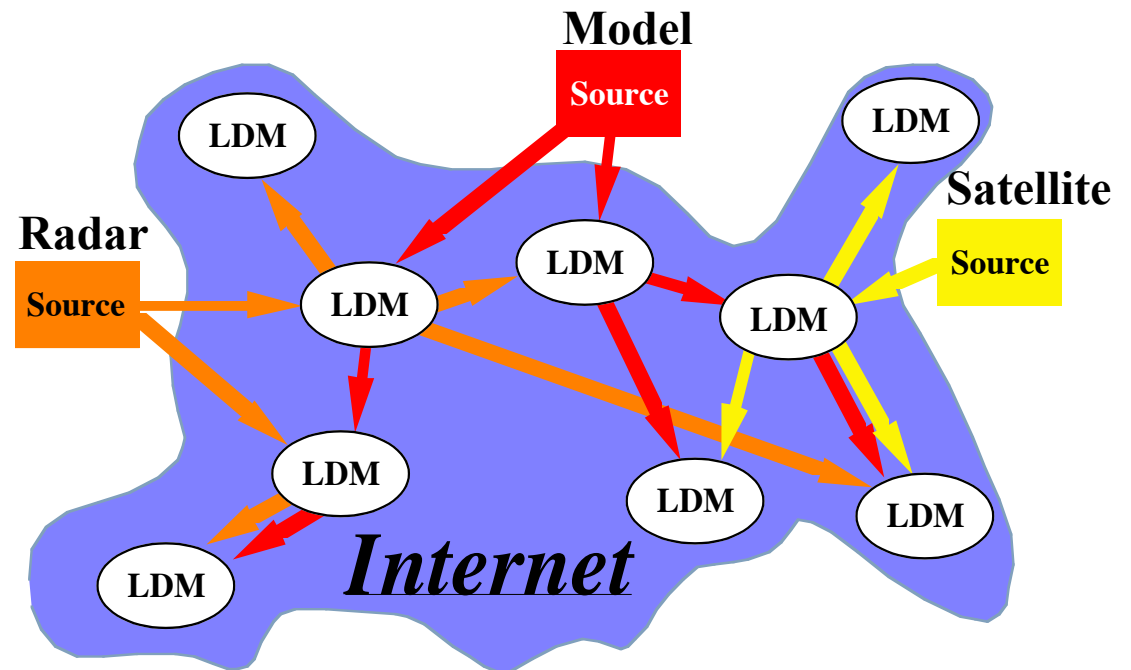Remote Data Access: THREDDS Data Server, RAMADDA, ADDE, OPeNDAP

Data Access Infrastructure: netCDF, CDM, NcML, udunits, libcf

Data Distribution and Decoding: LDM, Unidata decoders

Support Services:

Web presence, searchable software support, mailing lists, online documentation, direct support from developers

Training workshops, triennial users workshops, regional workshops, community seminars

Internet Data Distribution

- Over 260 institutions worldwide are participating in the Unidata-operated real-time data distribution system.

- The IDD uses significant Internet bandwidth: over 4 *Tbytes/day*

The Unidata IDD is like a utility: data flows 24x7 and recipients use the data and our tools without needing to know much about Unidata.

The IDD is International

Unidata IDD
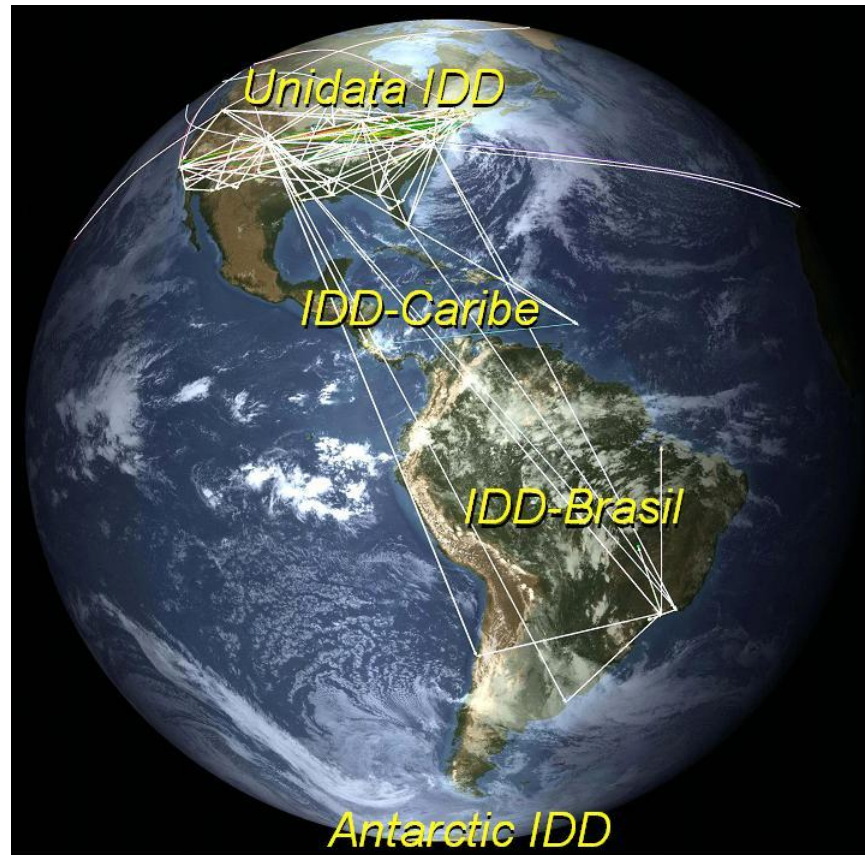North American data delivery and sharing network

IDD-Brasil
South American peer of North American IDD

IDD-Caribe
Central American peer of North American IDD
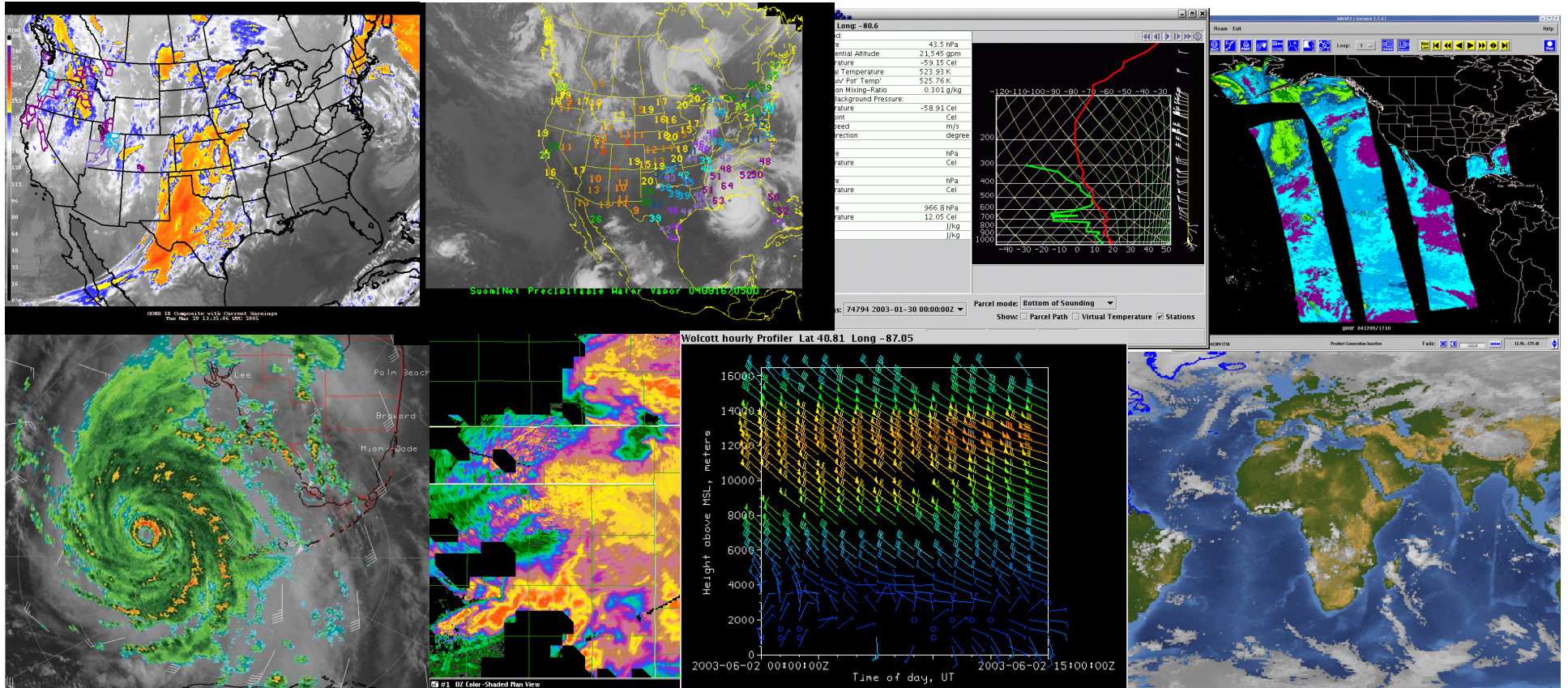
Antarctic-IDD
Support of US Antarctic research community

Participants

United States
Canada
Puerto Rico
Costa Rica
Barbados
Venezuela
Chile
Brazil
Argentina
England
Portugal
Spain
Austria
Russia
Vietnam
China (Hong Kong)
South Korea
Antarctica (incipient)
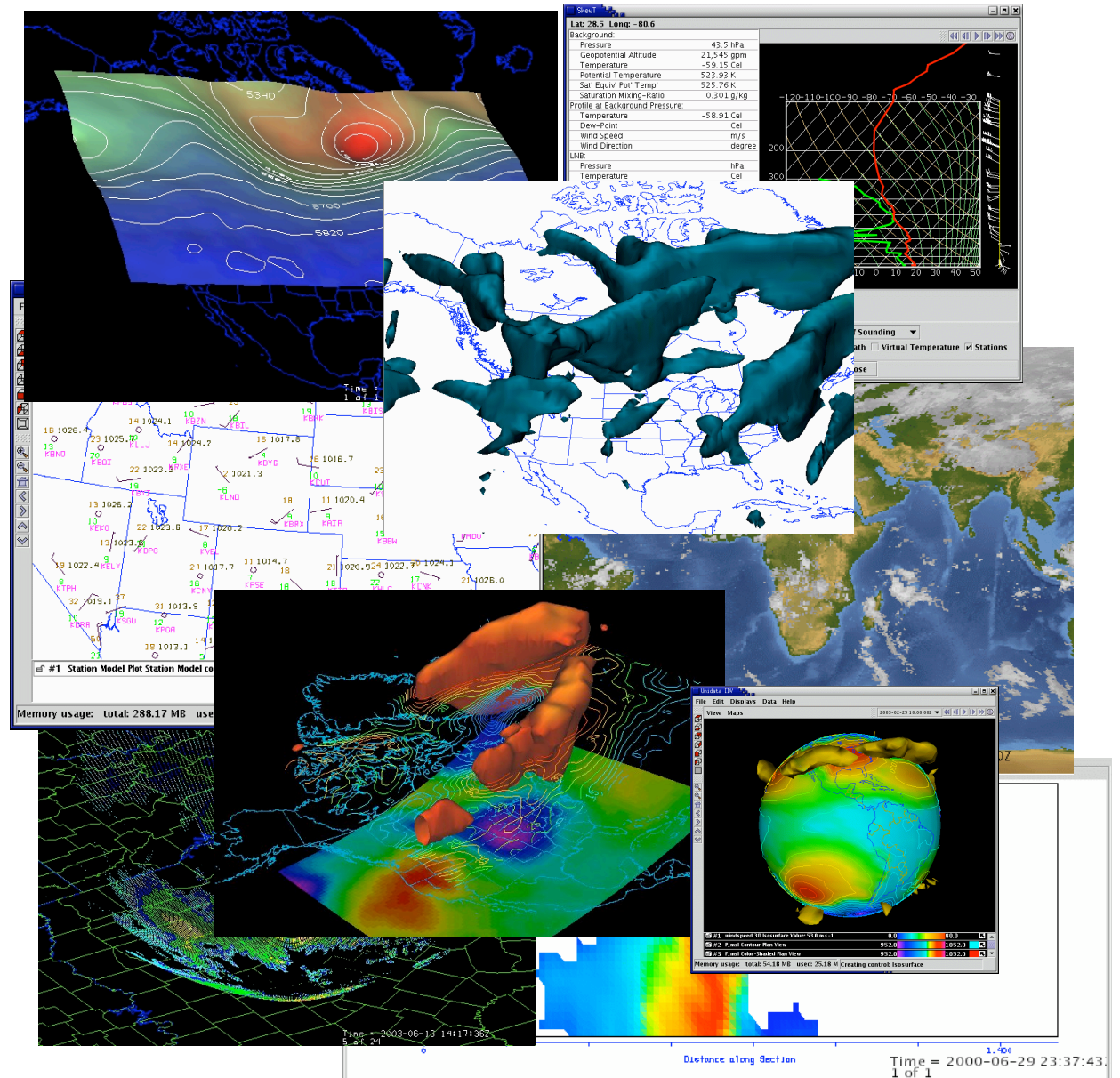
Current Data for Education and Research

We provide access to weather data like surface & upper-air obs., radar and lightning data, satellite imagery, model output, aircraft obs., text forecasts & bulletins, COSMIC Radio Occultation observations, etc.

We provide three applications (IDV, GEMPAK, and McIDAS) for analyzing and visualizing the data.

Integrated Data Viewer

- Unidata's most popular scientific analysis and visualization tool

- Freely available 100% Java framework and reference application

- Provides 2- and 3-D and time animated displays of geoscience data, publication-quality graphics

- Integrates data in diverse formats from local and remote sources

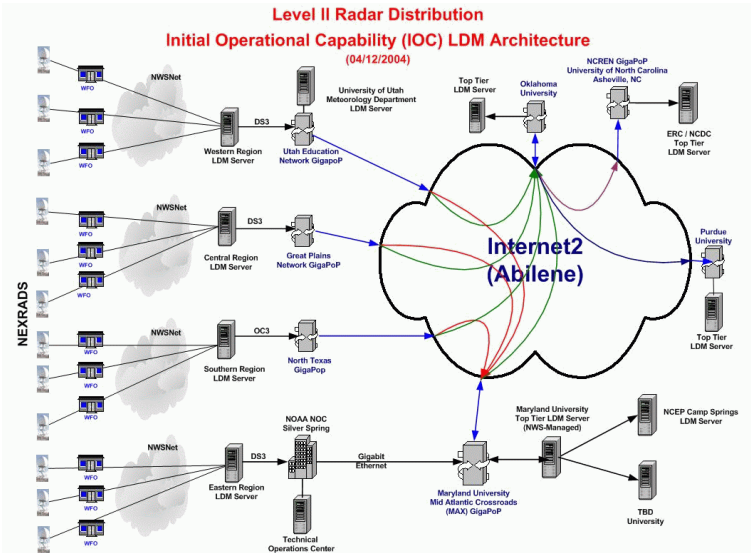- Built on VisAD, makes use of many Unidata technologies
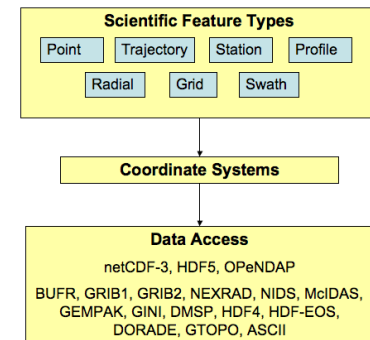
Unidata & Cyberinfrastructure

Unidata's technologies are also used by government agencies and research institutions worldwide.

They include NCAR, UNAVCO, NWS, NCEP, NOAA Labs, NASA, U. S. Navy, JMA, CMA, KMA, ECMWF, and BMRC.

In addition, dozens of companies like the Weather Channel, WSI, Weather Underground, and Weathernews use Unidata tools for their real-time data distribution needs.

Level II Radar Distribution
Initial Operational Capability (IOC) LDM Architecture
(04/12/2004)

INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE

WMO   UNEP

IPCC web sites

About IPCC

Activities

Calendar of Events

"Climate Change 2007"
The IPCC 4th Assessment Report
is coming out

A comprehensive and rigorous picture of the global present state of knowledge

The Physical Science Basis of Climate Change the first volume of the new IPCC assessment report, has been released in Paris, 2 February 2007

Unidata's Common Data Model

Scientific Feature Types

| Point | Trajectory | Station | Profile |
| Radial | Grid | Swath | |

Coordinate Systems

Data Access

netCDF-3, HDF5, OPeNDAP

BUFR, GRIB1, GRIB2, NEXRAD, NIDS, McIDAS, GEMPAK, GINI, DMSP, HDF4, HDF-EOS, DORADE, GTOPO, ASCII

CMIP5 *Coupled Model Intercomparion Project*

WCRP   World Climate Research Programme

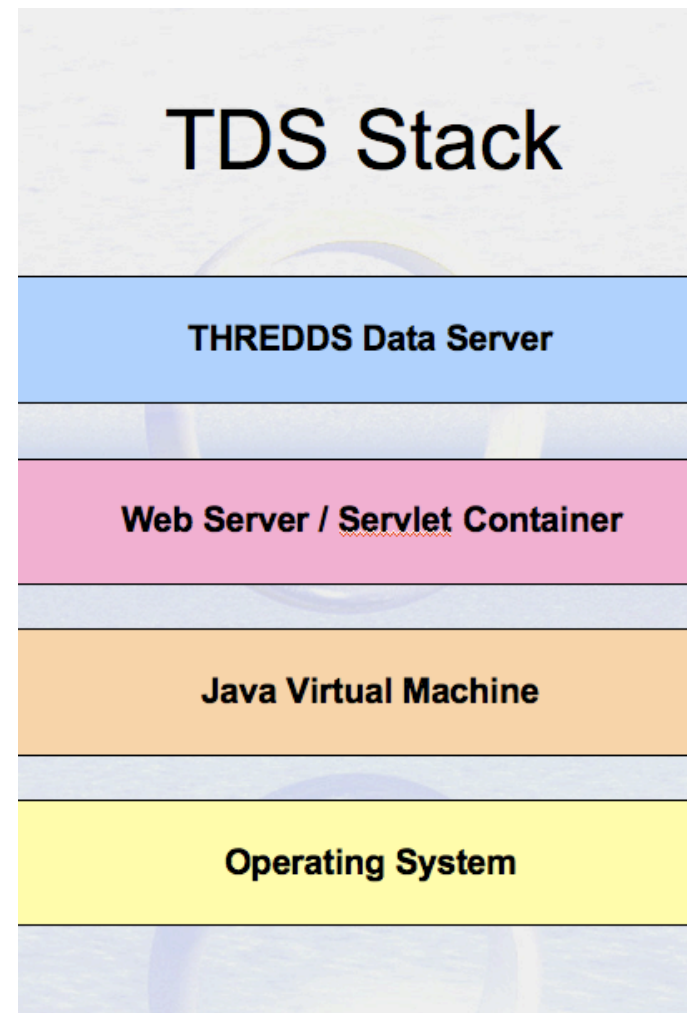• The metadata is constrained by the CF convention (NetCDF Climate and Forecast (CF) Metadata Convention) and as specified in the CMIP5 tables.

• The data is in the NetCDF form. It can be writtenin NetCDF3 or NetCDF4 formats. The new NetCDF4 is able to take advantage of its compression and chunking capabilities. Compression is controlled with the MIP tables using the shuffle, deflate and

NetCDF Use Continues to Grow

➢ Following extensive review, NASA's
  [Earth Science Data Systems Standards Process Group](#) concluded
  that netCDF classic should be adopted as a recommended
  standard.

➢ NOAA NESDIS has adopted netCDF-4 and CF metadata as the
  standard intermediate file format for new satellite products

➢ NetCDF-4 classic model will be used in the CMIP5 archive of
  climate models for the fifth assessment report of the IPCC.

➢ A standards package including netCDF, CF conventions,
  OPeNDAP, and aggregation was promoted to a Recommended
  DMAC Standard by the IOOS DMAC Steering Team.

➢ The International Best Track Archive for Climate Stewardship is
  archiving their data using netCDF.

➢ NetCDF-4 was adopted at the UKAEA Fusion Culham Science
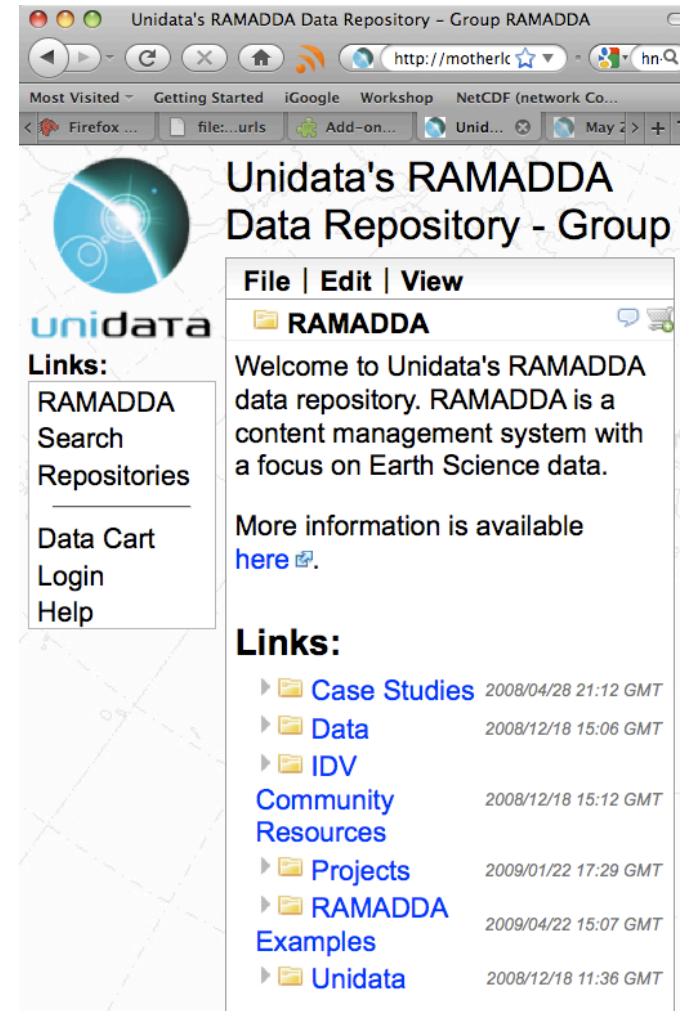 Centre for storing fusion research data and model output.

THREDDS Data Server (TDS)

- THREDDS catalogs provide data and metadata inventory, can be generated statically or dynamically
- Reads netCDF, OPeNDAP, HDF5, GRIB, NEXRAD, GEMPAK, and other formats through a common interface
- Can use NcML to modify and create virtual aggregations
- Has integrated servers for multiple protocols
  - OPeNDAP
  - HTTP
  - Open Geospatial Consortium (OGC) Web Coverage Service
  - OGC Web Map Service (contributed)
- 100% Java, easy to install, configure, secure

TDS Stack

THREDDS Data Server

Web Server / Servlet Container
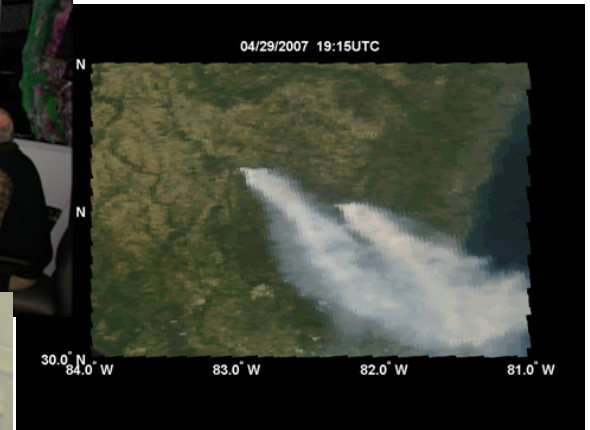
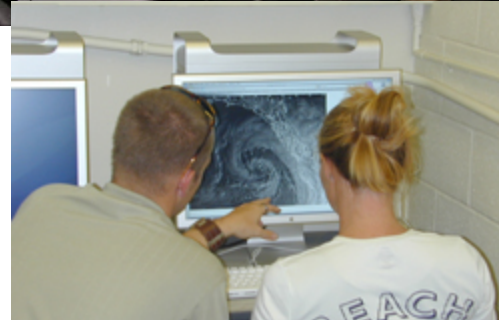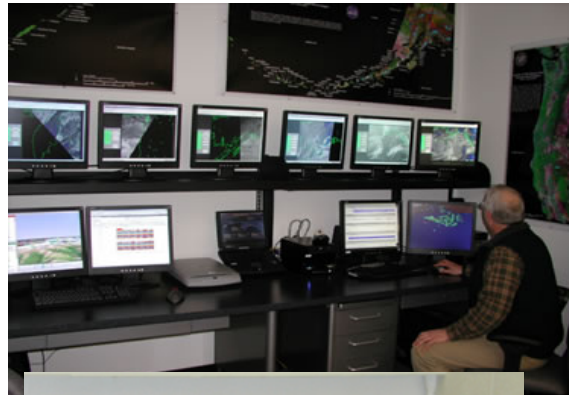Java Virtual Machine

Operating System

Other Unidata Technologies and Projects

- RAMADDA: database approach to content management, collaboration, data and metadata publishing

- GALEON / OGC : GIS and web services using CF-netCDF

- Supporting GEMPAK users in transition to IDV or AWIPS-2

- Involvement in standards, CF conventions, development of libcf supporting library
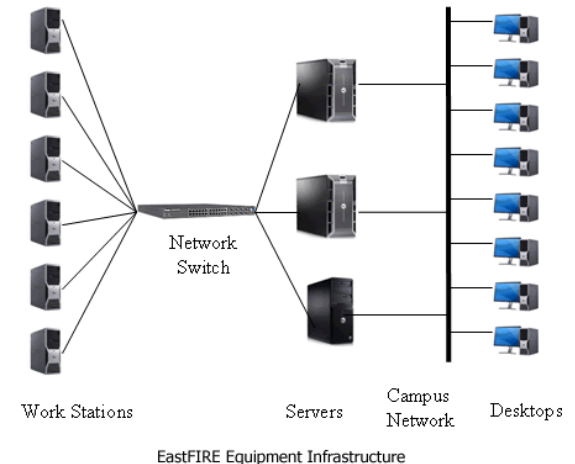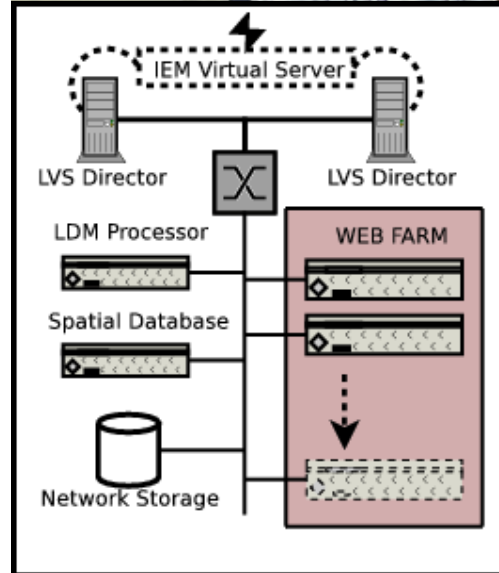
- New web site, Facebook page, twitter feed, …

Community Equipment Awards

❖ The primary purpose is to encourage new universities to join the Unidata community, and for existing members to enhance their participation;

❖ A total of $100K is allocated each year for this program;

❖ Over the past 6 years, we have given money to 40 universities, ranging from $5K to $25K.

04/29/2007 19:15UTC

Modis image of the Georgia Bugaboo Scrub Fire

IEM Virtual Server

LVS Director   LVS Director

LDM Processor   WEB FARM

Spatial Database

Network Storage

Work Stations   Servers   Campus Network   Desktops

Network Switch
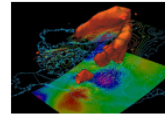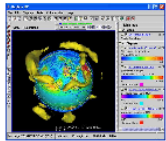
EastFIRE Equipment Infrastructure

Workshops

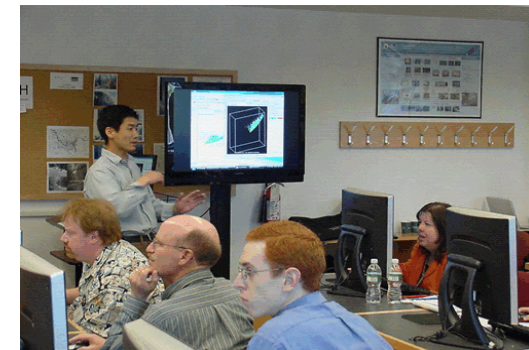**Unidata Regional Workshop**

hosted by

**Plymouth State University
Judd Gregg Meteorology Institute
Boyd Science Center
Plymouth, NH**

May 18-20, 2008

This 2½ day workshop will allow for hands on instruction with Integrated Data Viewer (IDV) software. Participants will be a mixture of university faculty and students, research scientists, K-12 teachers, and other interested individuals from across the New England region. Representatives from Unidata will be onsite to provide tutorials on IDV and to discuss other Unidata projects and initiatives.

- Unidata, with funding from UOP's JOSS program and help from the Universidade de São Paulo, hosted a Latin American Data Workshop in August 2008 on the USP campus in São Paulo, Brazil.

Unidata
*Providing data services, tools, & cyberinfrastructure leadership
that advance Earth system science, enhance educational opportunities, & broaden participation*

Data   Tools   Community   Downloads   Support   Projects   About Us   •   My Account   Logout   Search   advanced

25 years

2009 Unidata Training Workshop

July 29th - August 15th

2009 Training Workshop for Unidata Software

Sign up now, Registration closes on July 1st!

Click Here To Register

The Unidata Program Center is pleased to announce its 2009 Software Training Workshop.

Unidata's training workshops are

Unidata
*Providing data services, tools, & cyberinfrastructure leadership
that advance Earth system science, enhance educational opportunities, & broaden participation*

Data   Tools   Community   Downloads   Support   Projects   About Us   •   My Account   Logout   Search   advanced

2009 Unidata Users Workshop
Using Operational and Experimental Observations in Geoscience Education
June 8 - 12, 2009 in Boulder, CO

See the RAMADDA Workshop site for schedule, presentations and data.

The workshop will provide participants an opportunity to learn about the latest advances in observing technologies and techniques and their use in education, research, and operations. Scientists, engineers, and faculty will present an array of educational and instructional sessions showcasing various observing system with special emphasis on their usefulness in teaching and student learning.

Sponsored by the National Science Foundation