Director's Report

Unidata Users Committee Meeting

15 September 2014

Boulder, CO

Mohan Ramamurthy
Unidata Program Center
UCAR Community Programs

New Committee Members

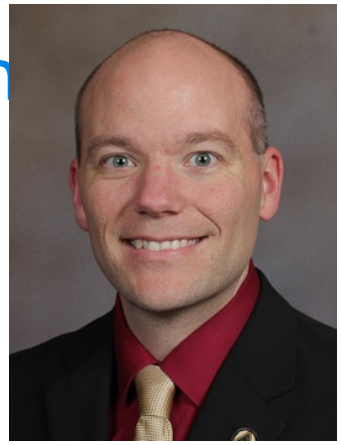
Strategic Advisory Committee:

- Dave Santek, U. Wisconsin

Users Committee:

- Ibrahim Demir, U. Iowa
- Kevin Goebbert, Valparaiso U.
- Gretchen Mullendore, U. North Dakota






Welcome and Thank you!

Members Who Are Rotating Off

Strategic Advisory Committee:

- Dave Dempsey

Users Committee:

- Marty Baxter
- Jennifer Collins
- Bart Geerts

My sincere thanks to all of them for their generous participation, active engagement, thoughtful guidance, and noteworthy contributions.

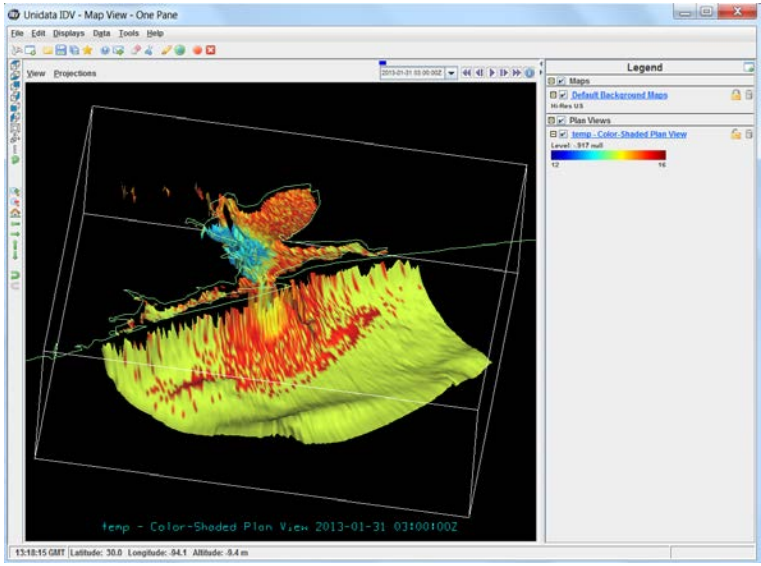
New Staff

- Marty Bright joined Unidata's System Administration team in August.
- Lansing Madry left Unidata in July to attend Medical School.

Rich Signell: 2014 Russell L. DeSouza Award Winner

Rich has been a tireless proponent of Unidata software tools for more than twenty years;

Dr. Robert Hetland of Texas A&M University, who nominated Rich for the award, says “I believe that the general adoption of netCDF as the standard way to store numerical ocean model information is due to Rich's early efforts to promote netCDF.”



UCAR STRATEGIC PLAN 2014 (DRAFT)

VISION

Understanding tomorrow's weather and climate through partnership, research, discovery, and innovation.

MISSION

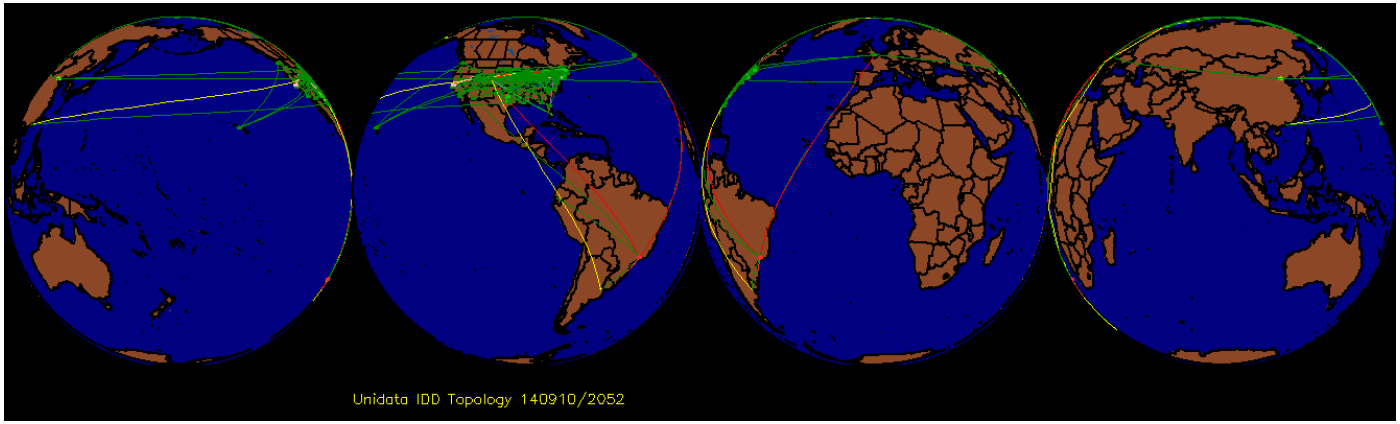
To empower our university members and our national center by

- promoting research excellence,
- developing fruitful collaborations,
- managing unique resources,
- creating novel capabilities,
- building critical applications,
- expanding educational opportunities, and
- engaging in effective advocacy.

GOALS

- Managing operations through best practices
- Advocating for the atmospheric sciences
- Fostering an engaged, inclusive workforce
- Building connections and partnerships
- Inspiring a culture of excellence
- Serving as a locus of capability and innovation
- Supporting NCAR's mission
- Translating our science into learning

Real-time Data Flows



- About 600 machines at ~235 sites are running LDM-6 and reporting real time statistics. These numbers have not changed much in many years, but the volume data ingested continue to grow. Many organizations are using the LDM but not reporting stats.
- UPC's IDD Cluster relays data to about 700 downstream connections. Average data output: ~13 TB/day or 1.3 Gbps! Peak rate exceeds 2.2 Gbps!
- Data input to the cluster is ~16.2 GB/hr because of WSR 88-D Dual-polarization upgrades and the addition of more model output to CONDUIT. WSR 88-D Level II and CONDUIT remain the top two data streams based on volume.
- We are exploring the distribution of data from FIM and HIWPP.

NOAAPort SBN Upgrade

- The NOAAPort SBN, which transitioned from DVB-S to DVB-S2 in April/May 2011, is being upgraded again.
- It will support just over 60 mbps throughput in aggregate, doubling the current bandwidth.
- The UPC has been testing ingest of the high speed broadcast since the onset of a "dual illumination" period (a 45 day window in which existing and new SBN transmissions are active) on August 18.
- Unidata's NOAAPort ingest package is bundled with current versions of the LDM. The current LDM release is v6.12.5.
- The new broadcast, among other new products, will include HRRR model output.

Cloud Efforts

- Unidata's cloud efforts are progressing well and they fall into three categories:

1. **Generating IDD products and other experimentation**
   a) We are operating mid-sized instances in both the Amazon EC2 and Microsoft Azure clouds for the purpose of generating image products for the IDD FNEXRAD (NEXRAD Level III national composites) and UNIWISC (GOES-East/West image sectors) data streams.
2. **Enabling AWIPS II EDEX Data Servers**
   a) We are testing small footprint EDEX servers (no NEXRAD Level 2 or 3 or high-resolution CONDUIT models) on both **Microsoft Azure** and **Amazon EC2** cloud server environments.
   b) An EC2 instance was created cooperatively by Unidata and Embry Riddle Aeronautical University (ERAU) as part of ERAU's equipment grant award.
3. **Running the IDV on Microsoft Azure and streaming the resulting displays to connected devices**
   a) Using the Azure Web API, we are able to dynamically allocate and provision VMs for use with hosting the IDV.

- We are also taking initial steps toward creating a "Motherlode-lite" type data services on Amazon EC2;

Python Efforts

- Our Python efforts will facilitate analysis of geoscience data by enabling data-proximate computations and analyses through Ipython (rebranded as Jupyter – Julia, Python, R) Notebook platform, which can be co-located with the data for analysis and visualization through web browsers.
- Our objective is to develop Python APIs tailored to Unidata technologies.
- **Initial efforts:** Conducting TDS-Python workshop, hosting netCDF-Python, incorporating Skew-T support in Matplotlib, contributing to MetPy, and working on PyUDL, pyCWT, and pyCDM
- Florita Rodriguez, a summer intern, focused on using python and the interactive widgets from IPython to interact with historical tropical storm/hurricane data from the National Hurricane Center.
- **NetCDF-Python:** Python interface to netCDF-4 was originally developed by Jeff Whitaker. Unidata has migrated it and hosting it on its GitHub site, which so far has 33 issues and 22 pull requests.

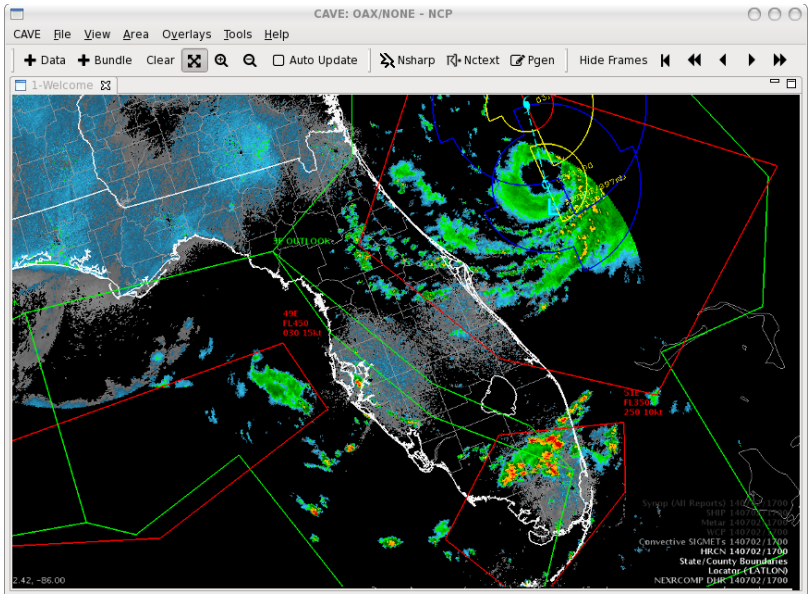
Servers at NCEP Project

- An initiative to result from the Open Weather and Climate Services concept/white paper
- Endorsed by NOAA, NWS, and NCEP
- Bringing processing to model-generated data
  - Server-side processing is needed to effectively use high-volume model output
- A time-limited experimental data processing center co-located at the new NCEP supercomputing facility in Reston, VA
  - It will connect directly with NCEP supercomputer file system via high-speed fiber cable, enabling mirroring of more complete model data sets
  - Computers installed by participating community members will be able to connect directly to the mirrored data file system, allowing value-added processing to occur in the new facility and thereby lowering the volume of data moved to participants' home organizations.

Cancelled as originally envisioned

AWIPS II

- Release 14.2.1 beta made available to the community.
- **It supports 64-bit Linux (RedHat, CentOS 6, and Fedora Core)**
- AWIPS II EDEX servers now running on Amazon EC2 and Microsoft Azure cloud environments.
- Raytheon satellite decoder was updated to support FNEXRAD composite GINI images, and UNIWISC AREA file support added for Mercator and native projections, using the McIDAS gini and AREA decoders bundled with AWIPS II LDM.
- The Azure instance is currently serving data to AWIPS II 14.2.1 beta testers.
- The EC-2 instance was recently setup at for Embry Riddle University.



Integrated Data Viewer

❖IDV 5.0u1 released in August.

System Changes

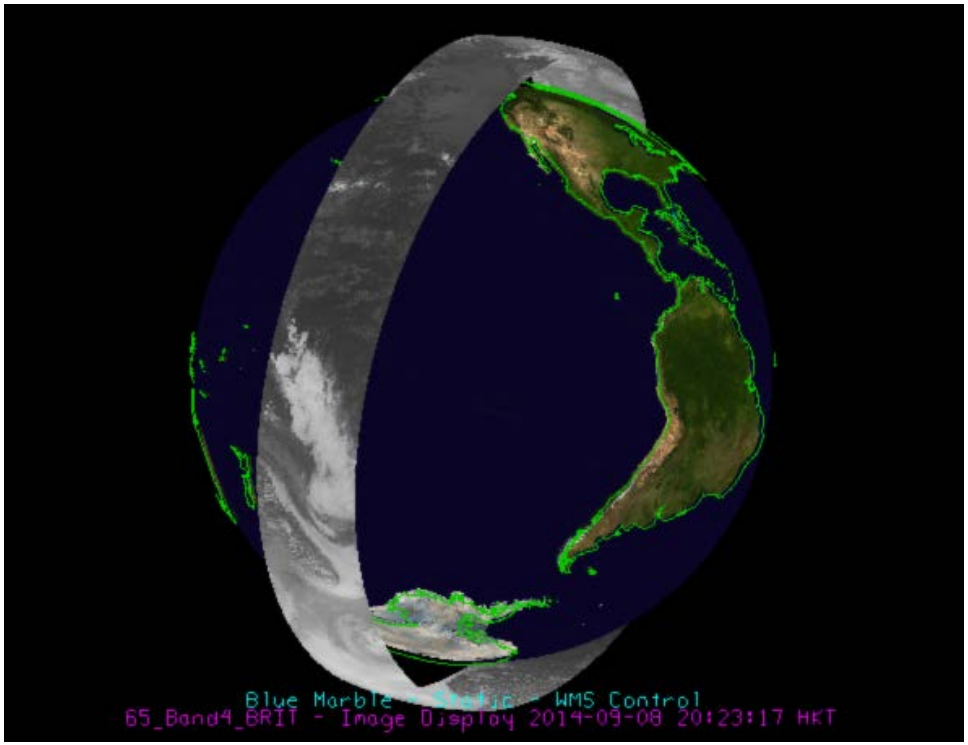
- Java 7 / Java3D 1.6 migration
- Latest VisAD
- Improved Performance
- Install4J Deployment Workflow
- RAM

Display Changes

- New ADDE Image Chooser
- Improved contour labeling
- Match Display Area

Data Changes

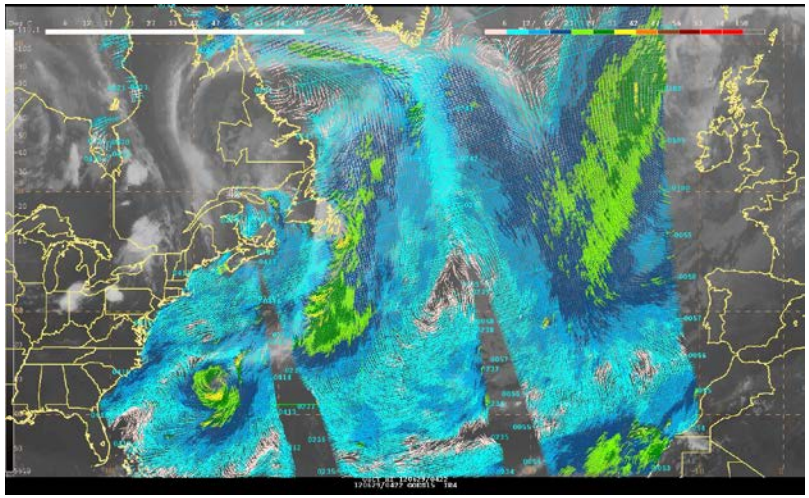
- GEMPAK Upper Air format support
- Match Display Region
- Adaptive Resolution
- CF & Backward Trajectories



NOAA - 15 GAC IR surface and cloud top temperature.

GEMPAK

- GEMPAK 7.1 was released.
- Binary builds for three Linux platforms and OS X Darwin, with rpmbuild spec files hosted on Github.
- Generating/testing new precipitation accumulation composites: OHA, DPA, DAA, etc.
- With the failure of OSCAT, investigating display of ASCAT_HI and Jason data.



OSCAT, RIP!

Rosetta

- The goal of Rosetta is to transform unstructured ASCII data into the netCDF format; once in this format, standard tools, such as the TDS, IDV, Python, and other analysis packages, can take advantage of these datasets with relative ease.
- Added the ability to publish converted files directly to RAMADDA and the ACADIS Gateway
- A live instance of Rosetta is hosted at Unidata for testing: https://rosetta.unidata.ucar.edu

What would you like to do?

[+] Create a new template
[+] Upload, modify, and use an existing template
[–] Upload template and new data file, transform automatically

NetCDF

- An important milestone during the last six months was completion of CMake support for netCDF-Fortran, which makes it possible to now build netCDF-Fortran libraries on Windows platforms, after installing the netCDF-C library.
- A related milestone is prominent use of netCDF data in ESRI visualizations in one of the short opening plenary talks at the recent annual ESRI User Community meeting.
- Another important netCDF-related release is version 2.2.17 of the UDUNITS package, adopted over a decade ago by the CF (Climate and Forecast) Conventions for netCDF metadata. Although previous versions of UDUNITS have been easy to install on Unix-based platforms, this is the first version adapted to support building and installing on Windows.

THREDDS

- THREDDS is comprised of two main areas: the THREDDS Data Server (TDS) and the Common Data Model (CDM) / netCDF-Java library. The TDS provides catalog and data access services for scientific data using OPeNDAP, OGC WCS and WMS, HTTP, and other remote data access protocols. The CDM provides data access through the netCDF-Java API to a variety of data formats (e.g., netCDF, HDF, GRIB).
- In collaboration with OPeNDAP, Data Access Protocol version 4, DAP 4, has been developed. We will be implementing it in the TDS in the next phase.
- Working with US IOOS to distribute the ncSOS plug-in with TDS.
- Added WaterML as output format from NCSS point service.

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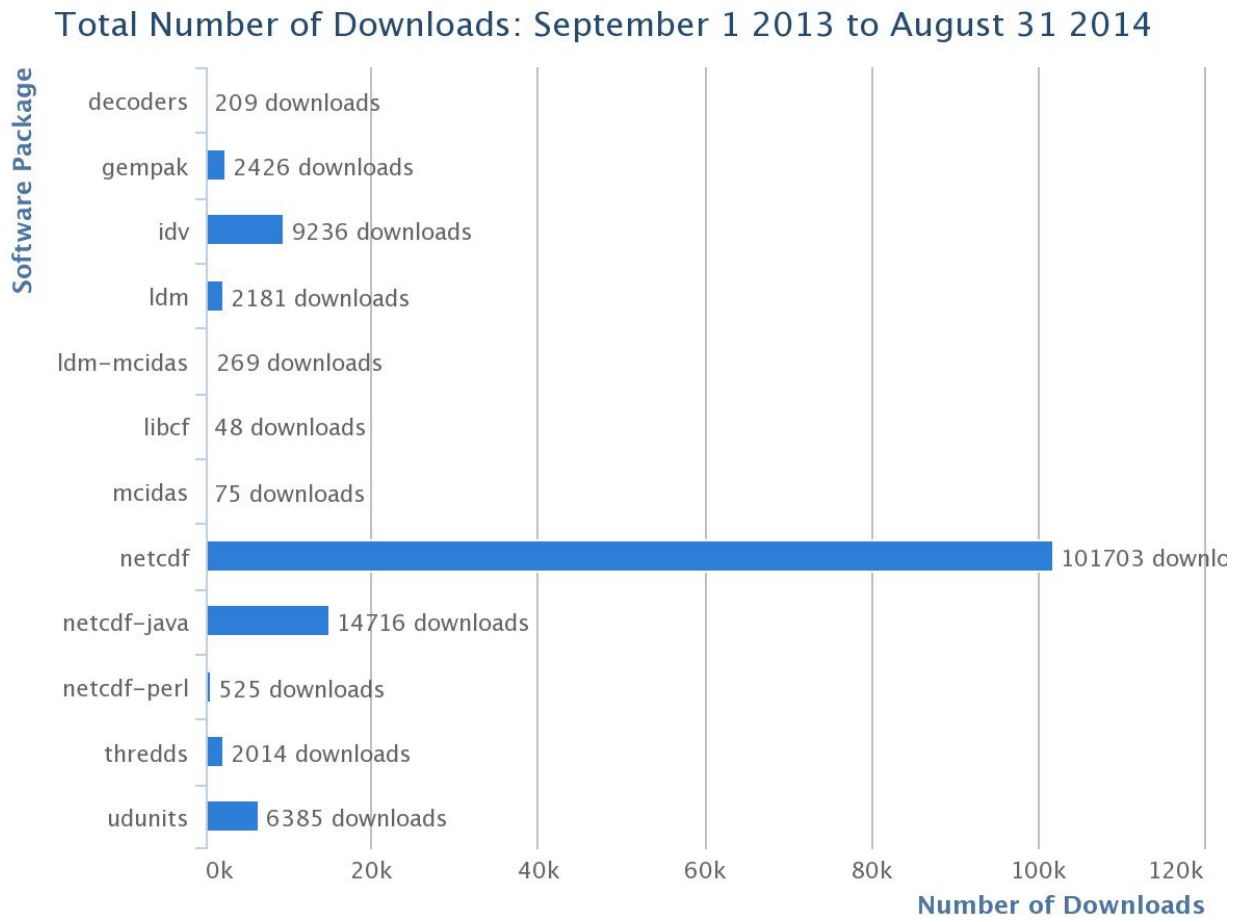
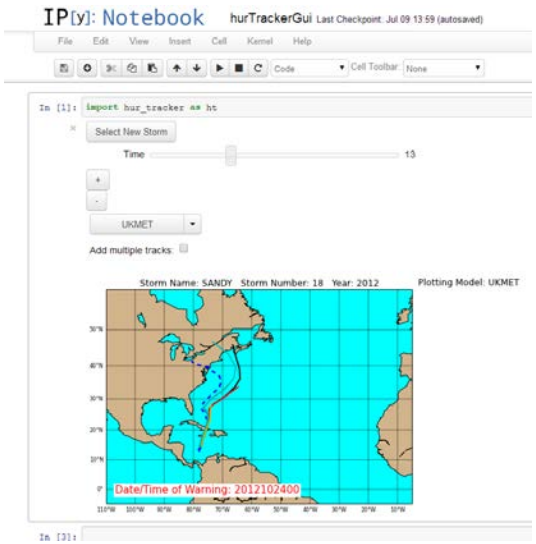
Metrics: Software Download



2014 Summer Student Interns

- This year, the UPC hosted two summer student interns —
  - Florita Rodriguez from Texas A&M University
  - Shawn Cheeks from Marshall University



- Shawn worked on a mobile app to display radar data retrieved from a THREDDS Data Server, continuing his 2013 project.

- Florita created an IPython notebook to plot hurricane track data from the National Hurricane Center's archives.

Unidata Regional Workshop

• The University of Miami hosted a Unidata Regional Workshop on Friday and Saturday, April 18-19, 2014.

• The UPC staff provided introductory and advanced training in the use of the IDV, RAMADDA, and other Unidata data and tools.

• The workshop provided an opportunity to present our plans for the next five years and seek feedback.

• There were 23 registrants from U. Miami, FIT, FIU, and U. South Florida.

2014 Community Equipment Awards

- Special consideration was given to proposals that focused on a) AWIPS II; b) Cloud activities.
- We received 13 proposals and funded 7of them.
  - There was considerable interest in deploying AWIPS II;

- Embry-Riddle Aeronautical University - “Linux Server in the Cloud” - Dr. Curtis James
- Metropolitan State University of Denver - "Enriching Meteorological Education in Undergraduate Courses Using Real-Time, High Resolution Datasets at Metropolitan State University of Denver" - Dr. Sam Ng
- Pennsylvania State University - “AWIPS II Prototype Testing Equipment for a Standalone Experimental EDEX/LDM/CAVE System for Penn State and Unidata” - Dr. Charles Pavloski
- San Jose State University - “Acquisition of AWIPS II EDEX Server and CAVE Client in a Synoptic Weather and Analysis Classroom” - Dr. Sen Chiao
- University of Iowa - "Improving Visualization and Access to Radar Data Using Unidata Tools for Flood Prediction and Management" - Dr. Ibrahim Demir
- University of Missouri - "Increasing Access to AWIPS II in the Unidata Community and at the University" - Dr. Patrick Market, Dr. Bohumil Svoma, Dr. Anthony Lupo, and Dr. Neil Fox

Congratulations to all of the recipients and many thanks to the review panel

UCAR-OGC MOU

- Unidata has negotiated for UCAR a renewed five year Memo of Understanding with the Open Geospatial Consortium (OGC) which provides voting membership for UCAR on the OGC Technical Committee.

- Unidata has also agreed to host a set OGC Technical Committee meetings in June 2015.

- Unidata is continuing to be actively involved in EarthCube.
- One more EarthCube Building Block proposal on which Unidata had partnered this year was funded, bringing the total to four.
  - The CyberConnector project proposes to facilitate the automatic preparation and feeding of both historic and near-real time Earth Observation customized data and on-demand derived products into Earth science models.

ACADIS Update

- In May, NSF conducted a site visit for the ACADIS project, which concluded its third year.

- The panel recommended funding for the fourth year.

- It recommended that the provision of data services for the Arctic community be competed at the conclusion of the fourth year of ACADIS.

- In the final year, the project will be in a wrap-up mode, focused on data collection and migration of the data and metadata database to a cloud environment, and the completion of the ongoing tasks.

- Rosetta integration and documentation will be Unidata's main role in the final year of ACADIS.

State of the Program: A Snapshot

- Community relations : Green
- Data flows : Green
- Software development : Yellow
- Support : Green
- Collaborations & Outreach : Green
- Staffing : Yellow
- Finances : Green

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