Fall 2025 Joint Committee Meeting

(Times are Mountain Standard Time)

Wednesday, September 24, 2025, 1:00pm – 5:00pm: (Users Committee)

[Meet online and in UCAR FL4-1201 (Unidata conference room)]

Meeting Commences After Lunch at 13:00

13:00 – 13:05 Administrative Items (Chairs /Tanya)

13:05 – 13:25 Welcome/Introductions (Mohan Ramamurthy/Chairs)

- Name, Institution, Role

13:25 – 13:45 NOAA NCEP Agency Report

13:45 – 15:15 NSF Unidata Portfolio Presentations and Discussion

15:15 – 15:45 Review Day's Proceedings, Actions, and Wrap-up

15:45 – 16:00 Walk to FL2

16:00 – 17:00 DeSouza Award Presentation and Q&A (Dr. Brian Blaylock, FL2-1022)

17:00 Adjourn

Thursday, September 25, 2025, 9:00am – 4:30pm (Joint Committee)

[Meet online and in the Damon Room (Mesa Lab (ML) campus)]

08:00 - 09:00 Drive / Shuttle from CG/FL to ML (Shuttle leaves CG at 08:03 and 08:33)

09:00 – 09:30 Administrative Items and Welcome (Chairs/Tanya)

- Committee Members Thank You and Welcome
- Introductions - Member Highlights

Reflect: Setting the Stage

09:30 – 10:00 Director's Opener

10:00 – 10:30 Share-Out Community Assessment Survey Results

10:30 – 10:45 Break

Restore: Refocused planning through renewed priorities – who needs what we offer, why us, why now?

10:45 - 10:50 Introduce MoSCoW Prioritization Planning Activity and Outcomes (Tanya)

10:50 – 11:05 Restore: NSF Unidata Planning Proposal of MoSCoW Prioritization (Mohan)

11:05 – 12:00 Restore: Joint Committee MoSCoW Advisory Activity (Committee)

12:00 – 13:15 LUNCH at NCAR ML Cafeteria

13:15 – 14:45 Restore: Joint Committee MoSCoW Advisory Activity Continued

14:45 – 15:00 BREAK

15:00 – 15:30 MoSCoW Activity Group Share-Out

15:30 – 15:45 **Recast: Recasting our future path, NSF Unidata Moving Forward**

- Closing from NSF Unidata Senior Leadership and Chairs

15:45 – 16:00 Vote on Committee Model

16:00– 16:15 Administrative Items and Wrap-Up

16:15 Adjourn

16:30 Drive / Shuttle from ML to CG/FL (Shuttle leaves ML at 16:30 and 17:00)

18:00 Dinner at The Post, 2027 13th St., Boulder, CO 80302 (map)

Friday, September 26, 2025, 9:00am – 1:00pm (Strategic Advisory Committee)

[Meet online and in UCAR FL4-1201 (Unidata conference room)]

09:00 – 09:15 Administrative Items and Welcome (Chair/Tanya)

09:15 – 09:35 TBD

09:35 – 09:55 NOAA NWS Agency Report (Scott Jacobs)

09:55 – 10:15 USGS Agency Report (David Blodgett)

Recast Continued: Moving Forward, Project/Activity ideas for creating sustainable and monetized opportunities for impact

10:15 – 11:35 Introduce Recast Activity: Generating Ideas that Benefit Wider Community and Potential Partners

11:35 – 12:00 Group Share-Out of Recast Ideas

12:00 – 12:30 Committee Model Implementation and Open Discussion

12:30 – 12:40 Administrative / Wrap Up

12:40 – 13:00 All Other Business/Lunch/Meeting Adjourned

Status Report: Strategic Advisory Committee Actions

March 2025 - September 2025

Unidata Program Center Staff

Actions from the Previous Meeting (March 2025)

Action 1

Continued work on the committee model [Kevin Goebbert, Casey Davenport, Alex Davies, Tanya Vance]

Result

Complete. Committees to vote on Charter at Joint Meeting.

Action 2

Report back after community survey [Program Center]

Result

Complete. CA Survey results shared with Committee members and summary will be provided at the Joint Meeting.

Action 3

Generate a list of critical stakeholders [Program Center]

Result

This action was in reference to the Community Assessment being shared beyond academia. The subcommittee developed a strategic communication and delivery plan, and the survey was actively shared across program and organizational-wide communication channels as well as agency representatives, ESS working and advisory groups, partner organizations, other listservs, as well as private sector and extended network channels.

Action 4

Follow up on fall meeting dates [Tanya Vance]

Result

Complete.

Prepared *August 2025*

Status Report: Users Committee Actions

March 2025 - September 2025

Unidata Program Center Staff

Actions from the Previous Meeting (March 2025)

Action 1

Committee to provide Sean Arms with examples of useful, open source datasets that might profitably be exposed via the TDS. [Committee, SeanA]

Result

Delayed, to be brought forth again during the Joint Meeting session.

Action 2

Committee to think about good times for fall Joint Committee meeting, Tanya Vance to follow up. [Committee, TanyaV]

Result

Complete.

Action 3

Doug Dirks to ask for comments about nominee, create announcement, and letter to nominee working with AlexD and CaseyD. [DougD, AlexD, CaseyD]

Result

Complete

Action 4

Tanya Vance to poll committee on additional input for Committee Model [TanyaV]

Result

Complete. Input from members and staff integrated into Committee Model Charter, reviewed by Senior Leadership and Chairs, and iterated upon review. Charter to be shared with agenda materials and voted on during Joint Fall Meeting.

Prepared *August 2025*

Status Report: AI/ML

March 2025 - September 2025

Thomas Martin, Nicole Corbin

Executive Summary

NSF Unidata ML Staff wrapped up classroom work with our colleagues at MSU Denver and published the final two modules of the Supervised Machine Learning Readiness eLearning series.

As part of the UCAR President's Strategic Innovation Fund program, began work on a needs assessment on AI/ML training in the classroom, and barriers to teaching AI/ML. A survey has been circulated throughout the Earth Systems Science community, seeking feedback on how UCAR programs can facilitate educators' use of AI/ML in the classroom or provide training.

The two primary members of NSF Unidata's AI/ML team, Nicole Corbin and Thomas Martin, both left the program during the previous six months to pursue other opportunities. As a result, new activities in this space are currently paused.

Questions for Immediate Committee Feedback

- None at this time

Activities Since the Last Status Report

- Published modules 2 (Applications) and 3 (Analysis) of the Supervised Machine Learning Readiness eLearning series (funded by the Cybertraining award).
- Completed the Cybertraining project and filed final reports to NSF.
- Transitioned leadership of the President's Strategic Innovation Fund project to other UCAR collaborators.

New Activities

There are currently no planned new initiatives.

Prepared *September 2025*

Status Report: AWIPS

March 2025 - September 2025

Tiffany Meyer

Executive Summary

We currently have one build (version 23.4.1) available to support RHEL/Rocky 8 and 9 that was originally released back in June 2024 as beta, but is now in production as of July 2025. We have decommissioned all older builds due to running on old RHEL7 systems. EDEX, CAVE, and python-awips are available for install as well as source code available. I am working on a release for the end of the year which will focus on updating Java from version 11 to 17.

The National Weather Service (NWS) has halted on adding new functionality into AWIPS builds. Their focus in the next one-to-two years is to move AWIPS to the cloud. Initially they are focused on transitioning the current capabilities to run in a cloud environment. Eventually, they will focus on refactoring the architecture to take advantage of cloud-native services and break down the EDEX services into microservices.

Based on feedback from Universities running a Windows Lab, we've created a CAVE installer for Windows that installs at the admin level. This way, CAVE only needs to be installed once, but all users on that machine can use CAVE.

We will be hosting an AMS Student Workshop focusing data visualization within metPy, python-awips, and CAVE.

Questions for Immediate Committee Feedback

Are there any new datasets, visualizations, capabilities you would like to see added to Unidata's AWIPS?

Activities Since the Last Status Report

AWIPS

Our EDEX servers have been continuously running on the new Jetstream2 platform. Since the last status report, NWS finally released their version of 23.4.1 operationally, so we were able to move from beta to production. Additionally, one minor build of python-awips has been released. All python-awips notebooks were updated to work with the latest packages and dealt with all depreciation warnings and errors. The main focus of recent builds is to fix/add new functionality on the back-end to better track our users.

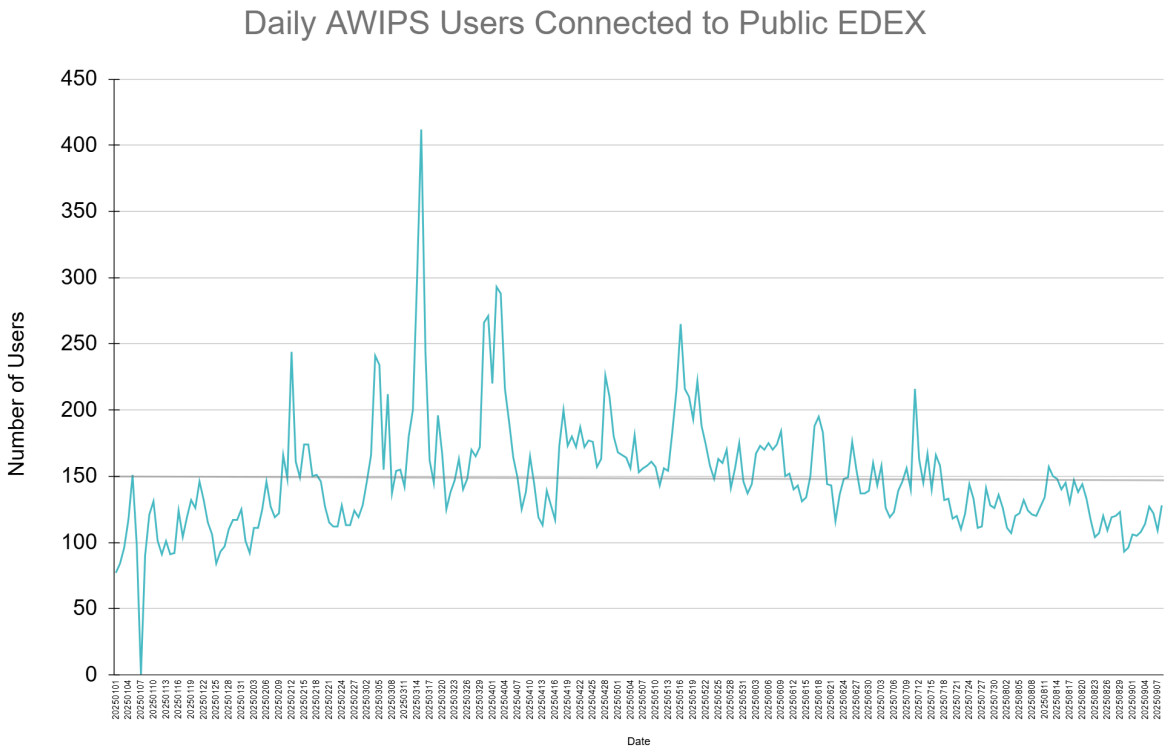
A couple new products have been added to AWIPS:

- New Advected Layer Precipitable Water (ALPW) product
- Updates to Gridded Turbulence for GOES 19 updates
- Updates to RRQPE product replacement
- New RGB Product - Blowing Snow

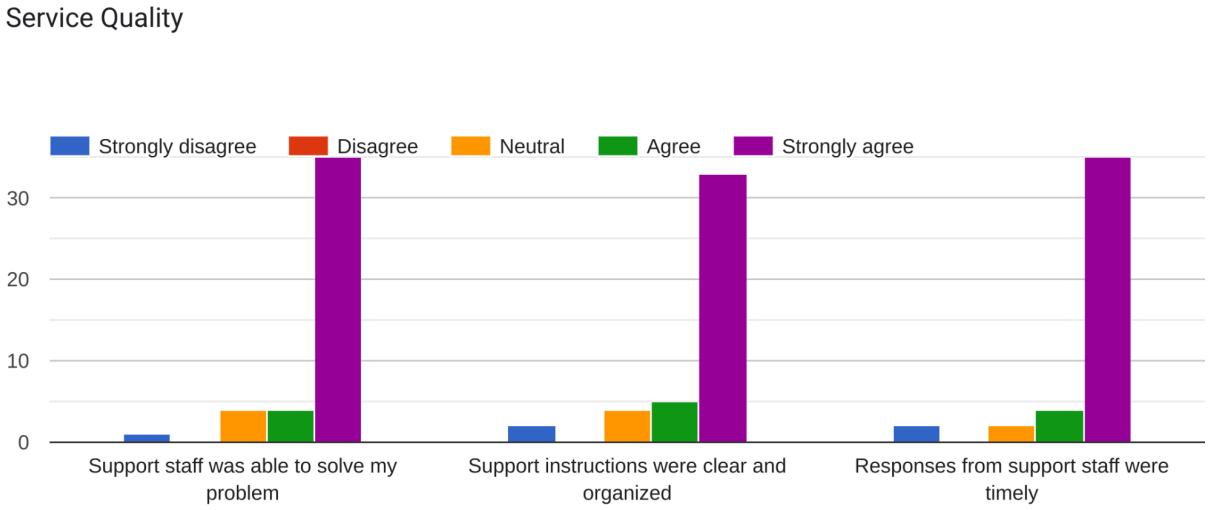
Our blog series, AWIPS Tips, successfully ran every other week for just over three years. The breakdown of all the entries can be found on our documentation website in the Educational Resources page. Announcements and important information is shared through our mailing list (awips2-users@unidata.ucar.edu), and our social media accounts (Facebook, Bluesky, LinkedIn, and YouTube when applicable). However, due to reduced staffing levels blogs are only released on certain occasions.

We have asynchronous training available for both CAVE and Python-AWIPS on the Educational Resources website. We encourage everyone to check out both courses regardless of your experience level or familiarity with python or CAVE. Our courses can be accessed from our elearning website.

The AWIPS team has started tracking the number of users that are connected to our public EDEX. These numbers are likely an underestimate because any user who uses our Virtual Machine option comes across as “awips@localhost” which is only counted once. In addition to tracking the number of users, the team hopes to gain a better understanding of who is connecting by tracking IP addresses and mapping them to Universities, private or government entities, or the general public.



The AWIPS group typically has quite a bit of interactions with users via our support email. Through our support signatures we still have an active [support evaluation survey]. The majority of our feedback has been overwhelmingly positive, and the graphic below is a summary from all responses we've received regarding the quality of service we provide:



Some of the latest open-ended feedback from the support evaluations includes the following:

- *Great job and much appreciated!*
- *Absolutely amazing response and the issues were resolved.*
- *Tiffany is the most knowledgeable, professional, approachable, fast to answer, very helpful and always spot on. She is just the best. Thank you so much!*

Software Releases

AWIPS	Date	EDEX	Win	Mac	Linux	VM	python-awips
23.4.1-1	July 11, 2025	X	X	X	X	X	
23.1.1	Sep 10, 2025						x

Since the last status report, the beta release has been made “production ready” for EDEX and CAVE. All source code is now available. In addition, all python-awips notebooks were updated to work with the latest packages and dealt with all depreciation warnings and errors.

The naming convention the AWIPS Team follows for AWIPS releases tries to follow/reference the NWS. For example, version 23.4.1-0.4 is based off the NWS 23.4.1 code base where:

23 - is the year the NWS planned on releasing (although this is typically delayed)
4 - is the fiscal quarter the NWS planned on releasing
1 - is the major version
1 - is the subversion that Unidata uses for releases. If there is a preceding “0” that means the release is in beta. Each release made we will increase this number.

Activities Ongoing/In-Progress

AWIPS development activities are constantly ongoing. Currently the following activities are in progress:

- creating a docker/podman image of EDEX to review case data (ex. Review radar data)
- looking into users of AWIPS (number of users, University vs public vs government vs private, etc.)
- actively developing new content to incorporate into v23
- maintaining EDEX builds on the Jetstream2 platform, with the help of the Science Gateways team
- responding to all AWIPS support questions from the community and striving to provide realistic solutions in a timely manner
- actively updating and refining our online documentation to be as accurate and useful as possible

Future Activities

Future plans are constantly evolving to meet the needs of our users. With the halt in new capabilities being added by the NWS, Unidata will be looking into adding new products and displays to AWIPS. I am actively participating in conferences, workshops, and virtual message boards (blogs) to expand our user base.

Unidata software developers will be hosting an AMS Student Workshop to explore visualization options with Unidata tools such as metPy, python-awips, and CAVE. All students are encouraged to attend.

Metrics

n/a

Prepared *September 2025*

Status Report: IDV with RAMADDA

March 2025 - September 2025

Yuan Ho, Julien Chastang

Executive Summary

We continue to support, update, and enhance the 3D data visualization and analysis tool IDV for our community. Our current activities include: coordinating with netCDF-Java group to add new data formats, collaborating with the SSEC developers to enhance the VisAD library, and working with our community to promote the usage of the IDV in research and education.

Questions for Immediate Committee Feedback

We have noticed that many advanced features of the IDV, such as formulas and trajectory displays, have not been widely used in the community and many data servers that the IDV can directly access are less well known to IDV users. We would like to provide help to classes, research groups and project teams to use these resources. Can committee members help to establish such connections?

Activities Since the Last Status Report

IDV Releases

IIDV 7.0 was released on **August 25, 2025**, built on **Java 21.0.6**, followed by the **IDV 7.0u1 update** on **September 4, 2025**. With this release, the IDV has successfully migrated to Java 21. This upgrade improves performance, strengthens security, and ensures compatibility with modern Java features, keeping the IDV robust and aligned with current development standards.

IDV System Changes

__IDV Certificates__

Java Windows app and MacOS certificates have been renewed and will be valid until at least May 30, MacOS certificate is valid until 2026). Moreover, as properly signing the IDV under these different environments can be an involved process, this information has been thoroughly documented here.

__Changes to nightly release that will eventually be incorporated into into stable version__

- IDV uses the latest Java 21 AdoptOpenJDK

The Adoptium provides high-performance, cross-platform, open-source prebuilt Java runtime Temurin JDK. The version of the JDK distributed with the IDV is jdk-21.0.6+7. This is a significant step forward in modernizing our software ecosystem, as Java 21 offers many advantages in terms of performance, security, and long-term support. See the Temurin JDK Library for more detailed information.

- IDV employes latest Java3D (1.6.2)

Updated the following Java 3D libraries to the latest versions: j3dcore, j3dutils, vecmath, and jogamp. Replaced the legacy Java Extension mechanism with the explicit classpath-based linking to ensure better modularity, compatibility with modern Java versions, and ease of deployment across platforms.

- Latest netCDF-Java Version (5.9.1)

The version of the netCDF-Java library currently distributed with the IDV is 5.9.0. See the netCDF-Java Library for more detailed information.

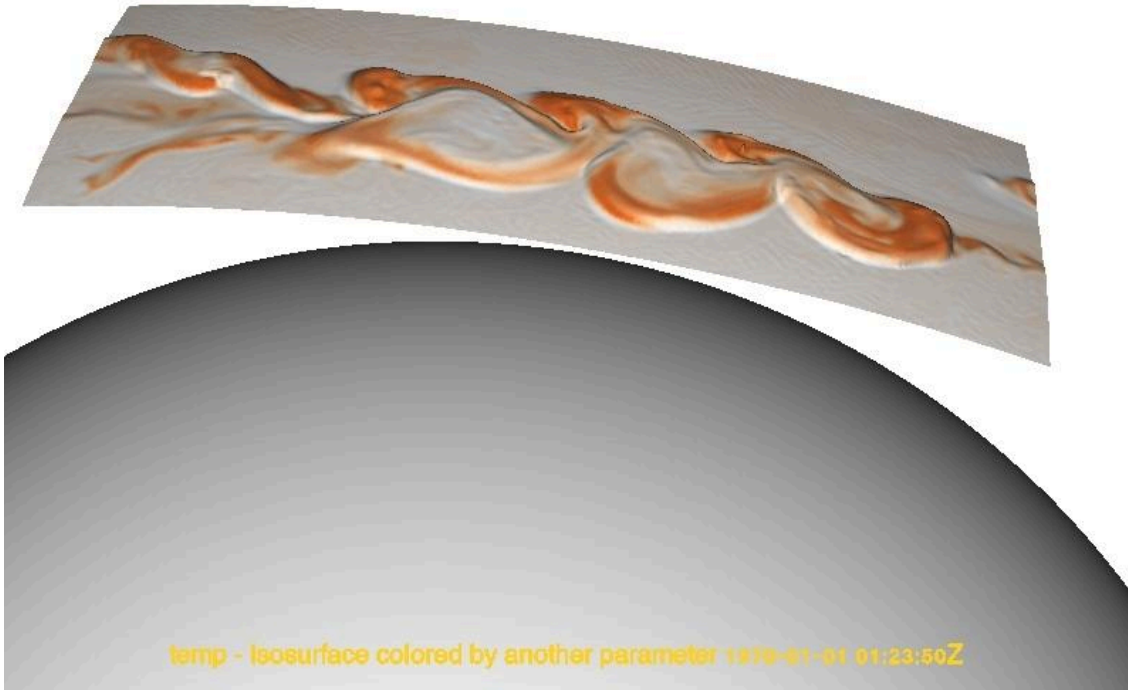
IDV Display Changes

__Gemini 2.5 AI process IDV integrated 3D displays__

Using Gemini to analyze the 3D IDV visualization output of weather data offered a powerful and intuitive experience. By feeding Gemini the integrated display of specific parameters such as temperature, wind vectors, and geopotential height at pressure surfaces, radar reflectivity, and satellite imagery rendered by the IDV, I could ask questions about current weather, local weather and atmospheric dynamics. Its ability to process visual information alongside contextual weather knowledge allowed for a deeper and faster understanding of complex meteorological phenomena depicted in the IDV's spatial representation, far surpassing simple observation.

__3D Jupiter data display __

I worked with Sean and summer intern Lifeng Li to make the 3D display of model output in the IDV:



IDV Community Support

With the tightening of computer system security, it has become more challenging for our community to host data and bundles on their own systems. As a result, UNIDATA RAMADDA is now hosting the IDV LMT Lab Manual, which is widely used in university weather teaching and laboratory settings.

https://ramadda.unidata.ucar.edu/repository/entry/show?entryid=fa7adc01-66a4-40ad-a89f-ec38be50e935

Yuan conducted a successful remote IDV training session with Maria Rizou and her students at Hellenic Mediterranean University (HMU) , focusing on accessing and analyzing large datasets from NASA and NOAA servers, including IPCC report data. The session covered both basic and advanced IDV features, improving participants' ability to visualize and interpret complex weather and climate data. The training was well-received, and follow-up support is planned to reinforce the newly gained skills.

Univ of Millersville IDV remote class

We are offering two remote IDV training sessions on September 22 and 29 for students at the University of Millersville. These sessions will focus on the basics of IDV as well as accessing

and working with satellite data.

IDV Publication Highlights

Synoptic–Dynamic Meteorology in 3D: Introducing an IDV-Based Lab Manual by Gary Lackmann, B. Mapes and K. Tyle

A Google Scholar Search reveals a number of publications that cite use of the IDV (doi:10.5065/D6RN35XM).

IDV and RAMADDA Training, Conference Attendance and Presence

__2026 AMS Annual Meeting__

- Bridging Geoscience Data and GEMINI AI with the UNIDATA Integrated Data Viewer (IDV)

Ongoing Activities

We plan to continue the following activities:

__Experimenting IDV 3D output with Gen-AI Gemini__

- Staying updated on new features and capabilities.
- Exploring different ways to integrate Gemini into IDV workflows
- Verifying the information provided by Gemini.
- Learning effective prompting techniques to get the best results.

The future with Gemini holds potential and transformation across geo sciences. We should stay informed with evolving capabilities and embrace the new levels of productivity and creativity.

New Activities

Over the past few months, we plan to organize or take part in the following:

We have been in the process of upgrading the version of OPenJDK Java 21. This change will necessitate in depth testings and the IDV building and distribution workflow.

Relevant Metrics

__E-Support__

The IDV team continues to provide the geoscience community with high-quality support through e-support software and idv-users mail list. In the last half year the IDV team has closed ~40 e-support tickets. Each individual ticket may and often does involve many back-and-forth messages. There is an especially large number of support requests coming from international users.

Top ten universities running IDV are: Millersville, Oklahoma, University of Utah, St Cloud state, Plymouth, NC State, West Kentucky, Lyndon State, University of Illinois, and San Francisco State.

__GitHub Pull Requests__

In the area of greater collaborative development, since the migration of the IDV project to github, we have closed a total of 125 “pull requests” or code contributions from internal and external collaborators.

__Youtube IDV Instructional Videos__

In the area of online IDV training, the Youtube IDV instructional videos have been viewed thousands of times.

Prepared *August 2025*

Status Report: Python

March 2025 - September 2025

Ryan May, Drew Camron, Julien Chastang, Ana Espinoza, Tiffany Meyer, Nicole Corbin, Thomas Martin

Executive Summary

Unidata's Python efforts continue to encompass: training on the use of Python for the community; development and maintenance of several tools for the community (most notably MetPy but also Siphon and data processing scripts); and participation within the broader scientific Python community. As a result of changing resource availability, *MetPy Mondays* production is paused, and we are de-prioritizing synchronous training events to instead prioritize authoring high quality asynchronous online examples and engineering new technical solutions to learning problems in the community. We will present a workshop in collaboration with Python-AWIPS at the 2026 AMS Student Conference. Siphon development is low in immediate priority, but is supported by stable infrastructure and a simmering community engagement. MetPy development continues through 1.7.0 (released April 2025), 1.7.1 bugfix (released August 2025), and 1.8.0 slated for release late Fall 2025. MetPy 1.8.0 will include our C++-based performance enhancements. Also new is our public MetPy Benchmarks metrics. Community and intern contribution to the project prove key to its continued success. We are exploring new collaborations with other Unidata staff projects, and seeking new project planning and funding opportunities to support MetPy and Siphon development and resume production of *MetPy Mondays*. MetPy's impact on science continues to grow, with 419 theses and peer-reviewed publications mentioning or citing MetPy, including 49 so far in 2025.

Questions for Immediate Committee Feedback

Nothing at this time.

Activities Since the Last Status Report

Python Training

As a result of reduced resource availability at the Unidata Program Center, we are de-prioritizing synchronous training activities in this reporting period. To still prioritize building skill and knowledge in the community, we instead focus on technical creations and enhancements that will benefit open learning of Unidata Python tools. We are still exploring training opportunities selected for high impact and high staff experience availability. To this end, we successfully proposed and are developing a new MetPy + Python-AWIPS workshop session in collaboration with the Unidata AWIPS team for delivery at the 2026 AMS Student Conference. We are beginning a new collaboration with the Unidata Science Gateway Reimagined team to apply technical development towards a prototype for self-paced discovery and education. We are proposing a Jupyter-based dashboard for exploring data and documentation, powered by MetPy and THREDDS+Siphon. We are still

primary contributors to the learning material and technical infrastructure of Project Pythia. In partnership with our collaborators at NSF NCAR and UAlbany, we successfully planned and delivered the 2025 Project Pythia Summer Hackathon to nearly 60 in-person participants across four days of synchronous “hacking”. This is an opportunity for students and researchers alike, where we create community skill-building and co-development. The next Hackathon will be offered again in June 2026, with more information to be provided to committees as available. Alongside this, the *MetPy Cookbook* has been refreshed and re-released with new examples.

Progress has been made on the following:

- We are collaborating with AWIPS to produce a new MetPy + Python-AWIPS workshop for the 2026 AMS Student Conference (proposal accepted).
- We are collaborating with Unidata Science Gateway Reimagined to prototype a user-facing Jupyter dashboard for data exploration and self-paced learning.
- Project Pythia’s ***MetPy Cookbook*** is updated with new examples and is newly released on a new web-first MyST architecture.
- Unidata continues technical, educational, and community leadership on Project Pythia, including primary involvement in planning and delivery of the annual Pythia Hackathon.
- Creation of new *MetPy Mondays* YouTube videos is on hold. We are seeking new opportunities to fund John Leeman’s resumed production of content.

MetPy

Development continues to be driven by requirements for our dedicated awards, in addition to responding to community issues and contributions. MetPy 1.7.1, released in August 2025, is a bugfix release which updates the new NEXRAD AWS S3 clients to support the new unidata-nexrad S3 buckets and includes community maintenance and bugfixes. MetPy 1.7.0, released in April 2025, includes a wide array of enhancements:

- Clients to access NEXRAD Level 2 and 3, GOES, and Machine Learning Weather Prediction products hosted on AWS S3
- Tools to automatically identify field maxima and minima, as well as plotting them
- Support in declarative plotting interface for surface analysis plots
- Updated calculation of saturation mixing ratio for water and ice (Ambaum 2020)
- Analytic LCL calculation (Romps 2017)
- Shear and curvature vorticity calculations (community contribution)

As part of the Unidata Summer Internship 2025, two interns contributed major deliverables for our dedicated awards. Jaye Norman contributed a brand new benchmarking infrastructure, which can be used for performance comparisons of Pull Requests and as long-term metrics available at https://unidata.github.io/MetPy-benchmark/. These metrics are generated weekly by dedicated Unidata hardware on-premises for consistency. Linfeng Li authored, tested, and benchmarked C++ implementations of major thermodynamic calculations with Python bindings, resulting in speedups for CAPE, LCL, and more. These are in-development, awaiting CI infrastructure and project architecture that will integrate these contributions into the next major MetPy release. Their results were shared at the UCAR

Internship Poster Symposium and have been submitted for presentation at the AMS Annual Meeting 2026.

Progress has been made on the following:

- MetPy 1.7.0 released April 2025
- MetPy 1.7.1 bugfix released August 2025
- MetPy 1.8.0 is in-progress for late Fall 2025
- 419 total theses or peer-reviewed publications citing or mentioning MetPy, with 49 so far in 2025.

Siphon

Previously reported Siphon maintenance keeps the CI infrastructure relatively stable, though a few small CI migrations from MetPy are in-waiting. Active development on Siphon is near-zero and there are no new releases to report. Community engagement through Issues and Pull Requests is quiet, but still active.

Proposed Siphon development is currently included in ongoing project & proposal planning in collaboration with THREDDS.

Ongoing Activities

We plan to continue the following activities:

- Engage in support of Project Pythia and adjacent UCAR Python education efforts
- Engage in synchronous Python training when impact- and resource-appropriate
- Deliver enhancements towards the goal of MetPy's dedicated award to address big data challenges
- Maintain Siphon as a tool for remote data access across a variety of services
- Grow and develop MetPy as a community resource for Python in meteorology

New Activities

Over the next three months, we plan to organize or take part in the following:

- Begin prototyping MetPy dashboard with Unidata SGRI team
- Develop content for 2026 AMS Student conference workshop with Unidata AWIPS
- Begin preparing 2026 Pythia Hackathon
- Develop and submit proposal for Python + THREDDS technical enhancements
- Release MetPy 1.8.0

Over the next twelve months, we plan to organize or take part in the following:

- Deliver MetPy + Python-AWIPS workshop at the 2026 AMS Student Conference
- Plan and facilitate the 2026 Project Pythia summer hackathon
- Explore and report additional project planning and funding opportunities for Python

technical development, internal collaborations, and MetPy Mondays production

Relevant Metrics

- MetPy
    - According to GitHub, 779 repositories and 88 packages depend on MetPy
    - 49 citations/mentions in 2025, 419 total
- Siphon
    - According to GitHub, 277 repositories and 33 packages depend on Siphon

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Prepared *August 2025*

Status Report: Data Standards and Technical Engagement

March 2025 - September 2025

Ethan Davis, Ward Fisher, Sean Arms, Stonie Cooper, and Ryan May

Executive Summary

Engage with federal science agencies, international standards bodies, and other communities focused on data and technology including NASA, NOAA, USGS, World Meteorological Organization (WMO), Open Geospatial Consortium (OGC), Earth System Information Partners (ESIP), CF Conventions for netCDF community, OPeNDAP, and the Zarr and GeoZarr community.

Unidata's netCDF teams continues to engage with the Zarr community on:

1) Zarr support in both the netCDF-C and netCDF-Java libraries;
2) the development of the Zarr version 3 specification; and
3) the development of the GeoZarr convention.

Questions for Immediate Committee Feedback

No questions at this time.

Activities Since the Last Status Report

WMO WIS 2.0

For the last several years, Unidata has been tracking the development of the WMO Information System 2.0 (WIS2) and discussing, internally and with WIS2 developers, how it might interact with Unidata technologies like LDM and THREDDS. Moving forward (2-6 years) WIS2 will be the framework for WMO data sharing, eventually replacing the GTS. WIS2 is built on modern messaging standards (e.g., MQTT) and OGC metadata, catalog, and data standards.

The LDM team has experimented with running a WIS 2.0 Node, using the wis2box package (docs)(GH), to better understand WIS 2.0 technologies. Further investigation will be needed.

NCZarr/Zarr Specification Efforts

As part of implementing Zarr support in both the netCDF-C and -Java libraries, the NCZarr convention/extension has been developed to provide a clean and complete mapping between the netCDF and Zarr data models. During this work, the netCDF developers have been participating in discussions around clarification and evolution of the Zarr (version 2 and 3) specifications.

The Zarr v3 specification continues to evolve. The Zarr developers have been struggling with community implementations outpacing the specification process, resulting in a growing divergence between community-supported features and the features outlined in the specification. There exists a reality in which the netCDF team must consider community supported features which deviate from the spec, in order to maintain broad compatibility, although we are hoping to minimize this.

Progress has been made on the following:

- Members of Unidata's netCDF teams regularly participate in the bi-weekly Zarr Community and ZEP calls.
- Members of Unidata's netCDF team participated in discussions around the GeoZarr convention. GeoZarr builds on the Climate and Forecast (CF) Conventions for netCDF and will be developed within the OGC community standards process.
- Members of Unidata's netCDF team are assisting with GeoZarr interoperability testing of netCDF-C and -Java libraries.

CF Conventions for netCDF activities

Unidata has a long history of involvement in the development of the Climate and Forecast (CF) Conventions for netCDF. These efforts continue with ongoing participation in development conversations on the CF GitHub repositories, participation in and help in organizing the annual CF Workshops, and participation in the governance of CF.

Progress has been made on the following:

- The 2025 CF workshop (website) is being held virtually 22-25 September 2025.
- Ethan Davis continues serving as chair of the CF Governance Panel.

OGC activities

UCAR will host the Oct 2025 OGC Member Meeting, 28-31 October 2025 at UCAR CG1.

We continue to follow and participate in the OGC MetOcean working group as well as the working groups for standards being used by the WMO WIS 2.0.

OPeNDAP activities

Unidata and the OPeNDAP group have been working together to strengthen the DAP4 specification. Part of this effort has been to bring the behaviours of the Hyrax and TDS implementations of DAP4 into better alignment using PyDAP as an independent client. These efforts have been fruitful in identifying various bugs across all three platforms involved.

Ongoing Activities

We plan to continue the following activities:

- Track and engage in WMO data standards efforts
- Continue efforts to update and reorganize the NetCDF User's Guide (NUG)
- Continue conversations with CF, WMO, ECMWF, and others on the development of mappings between CF Standard Names and GRIB/BUFR variable names.
- Represent Unidata in Earth System Information Partners
- Represent UCAR and Unidata in OGC and various OGC working groups
- Organize regular meetings of the OGC netCDF SWG.

Prepared *August 2025*

Status Report: IDD, LDM, and WIS 2.0

March 2025 - September 2025

Stonie Cooper, Jennifer Oxelson Ganter, Sean Arms, and Mike Schmidt

Executive Summary

NSF Unidata's LDM developer and IDD maintainer continues to update LDM source code and operating paradigms with ever-changing computing implementations and user requests. The IDD continues to be enhanced with data redundancy and inclusion of new data.

Questions for Immediate Committee Feedback

Not at this time.

Activities Since the Last Status Report

Although not the only technology for distributing data, the IDD is the preferred source for automatically streaming environmental data in real-time. The service-level software for streaming data across the IDD is LDM, and as such, emphasis is placed on maintaining the source code for stability and efficiency. A large temporal hole exists in the IDD and LDM activities during this period due to a work stoppage/furlough.

Progress has been made on the following:

- LDM: a pthreads bug discovered with the full implementation of pthreads in the latest Linux kernel causing earlier logging code to exit with error on a redirect to /dev/null.
- LDM: compiling issues resolved with the removal of esoteric code not used by anyone or any entity, creating a more open platform for compiling not only across Linux distributions, but BSD (Mac OS), as well.
- LDM: final code review in progress for next full version release.
- IDD: feed source and data type cataloging is in progress.
- WIS 2.0: a review was conducted, and to date, it is not felt that WIS is a viable LDM replacement, but rather would be a complementary paradigm in the near term. As time allows, more resources will be put into an effort to design a WIS <-> LDM paradigm.

Dependencies, challenges, problems, and risks include:

- Ever changing landscape of new data types, adjustments from data source paradigms.
- Uncertain scientific development environment on a whole causing work hesitation.

- Reduction in developer and maintainer resources and multitasking across multiple responsibilities.

Ongoing Activities

I plan to continue the following activities:

- Supporting and maintaining LDM and ancillary software.
- Supporting IDD data sourcing with new opportunities and operational observation platforms.
- Implementing data bandwidth metrics to provide real-time data usage accounting.
- Supporting users of the LDM and IDD with quick and professional responses.
- Migration of LDM training to on-demand video/wiki training sessions.

Relevant Metrics

- The LDM software provides the streaming technology for the NSF Unidata IDD network. Metrics on that program are available upon request.
- Number of LDM package downloads immediately following latest version releases.
- Number of support tickets and training requests, views, or downloads.

Prepared *September 2025*

Status Report: Information Technology

March 2025 - September 2025

Mike Schmidt, Matt Perna, & Jennifer Oxelson

Executive Summary

Our role is to maintain and enhance the productivity of the staff and assist with the resolution of issues in service to the community. Primarily, that consists of keeping end-user and developer systems secure, and keeping servers and services highly available, patched, and operational for the community. This report is informational and there are no pressing issues.

Questions for Immediate Committee Feedback

Unless committee members or the community are experiencing performance issues that we could help resolve, no other feedback is requested.

Major Activities

- Unidata IT staff continue to update and patch end-user and server systems to optimize security, productivity, and uptime.
- UCAR continues to migrate select services to a centralized model and Unidata is involved in implementing the service(s) for our systems and users. Recently competed and/or anticipated are;
  - centralized Identity and Access Management (IAM, coming very soon)
  - centralized end-user security agent (Palo Alto Cortex XDR, ongoing updates)
  - corporate device management (continuing to evolve)
  - updating hardware infrastructure as required

Local and cloud backups have been implemented redundantly on all Unidata end-user devices. Unidata IT can remotely manage Unidata client devices when they are connected to the Internet through UCAR's VPN service.

UCAR's Mesa Lab Data Center (MLDC) co-location facility upgrade is complete and bulk Unidata moves into that facility are finished for now. Going forward, there will be further consolidation of computer spaces away from the Foothills Lab campus, and Unidata will be involved in some of those efforts including the recently vacated FL0-0110 space. Intermittently, there will be the need to roll some of our Internet-based services between the NWSC in Cheyenne and the Mesa Lab Data Center (MLDC) in Boulder to avoid community visible service outages, as will happen with a MLDC outage in Mid-October 2025

Daily, we continue efforts to keep services and systems secure which takes consistent attention and occasional herculean immediate efforts (to patch everything all at once). UCAR continues to embark on new initiatives to segment the network into smaller and smaller zones and gain a more dynamic inventory of assets on the network. Unidata continues to play

a role in these efforts.

Ongoing Activities

We plan to continue the following activities:

- Day-to-day system and network support to the community as needed
- Resolve daily staff help desk issues
- Maintain security profile and exceed UCAR security standards
- Following UCAR directives regarding cybersecurity initiatives

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Prepared *August 2025*

Status Report: netCDF

March 2025 - September 2025

Ward Fisher , *Ethan Davis* , *Sean Arms*

Project Summary: Green

Executive Summary

The netCDF team continues to work towards maintaining the sustainability and viability of the netCDF libraries. While facing challenges when prioritizing work against the resources available, we are fortunate to have an engaged community of users and developers.

The status of the netCDF project can be summarized as follows:

NetCDF is healthy and remains viable, thanks to the engagement and support of our community.

Our efforts to serve the community are reciprocated, through high levels of engagement and contributions, for which we are immensely grateful. The netCDF team lacks the resources to quickly evaluate every potentially useful emergent technology or address every bug report, and we must therefore triage based on what best serves our communities interests at large. We continue to advocate for our community through participation in external data-oriented/focused groups.

Questions for the Committee

How can we encourage additional community engagement, from students and/or faculty? We benefit greatly from the involvement of our community, making netCDF truly a collaborative effort. How can we encourage/expand this collaboration? What makes it rewarding to engage with the netCDF developers?

NetCDF Project Status

Team Status

The active team is composed of the C/Fortran/C++ team lead, Ward Fisher, Sean Arms as the lead developer on netCDF-Java, and our community of developers. Work continues apace, with a strong focus on community building and bug fixing.

Status of Community Relationships

NetCDF User and Developer Community

NetCDF continues to enjoy a high amount of community engagement, for which we are very grateful. The primary avenues of engagement with the netCDF community are as follows:

- Committee Meetings (always a pleasure, you're all great).
- Github (issues, conversations)
- Email - Direct, or through the NSF Unidata eSupport system
- Professional events - AGU, RMCC HPC Symposium, SEA ISS Conference
- Invited Talks

Broader Community Engagement

The netCDF team continues to represent the netCDF community in the following areas:

- Zarr Community Meetings: The Zarr implementation council has reorganized, and while NSF Unidata no longer represents a seat on a committee, we continue to represent our community via engagement in the community meetings and through the established relationship with the developers behind Zarr.
- Renewed efforts are underway to re-establish collaboration with the HDF Group. We are working to revive an older tradition of having regular, informal meetings where our teams can discuss ongoing work, consult on roadblocks, and consider the broader picture within the NSF Unidata community.
- Working, ongoing collaboration with developers at the German Climate Computing Center (DKRZ) to enhance `ncZarr`.
- Working with the OPeNDAP group to reconcile differences between DAP4 access via Hyrax and the TDS, as the netCDF libraries are key clients of both servers.
- Various one-off symposia, conferences, workshops, etc, focused on data formats and data standards (see Data Standards for more information).
    - Selected talks:
        - UCAR Earth System Data Science (ESDS) Forum: July 21st 2025
            - NetCDF - Maintaining a healthy, community-supported software project
            - Thematic Real-time Environmental Distributed Data Services (THREDDS) – a polyglot future
        - NOAA NCEP Engineering and Implementation Branch (EIB)/Environmental Modeling Center (EMC) Group meeting: September 2nd 2025
            - Latest Developments in Everyone's Favorite Format: NetCDF

Short-Term Priorities

With the release of netCDF `netCDF-C v4.9.3`, we have turned to revitalizing our infrastructure, so that the work we do can be accomplished more effectively and efficiently. This has included revitalization of our `docker`-based regression testing, `docker.unidata.ucar.edu/nctests` (image) (configuration files here: https://github.com/Unidata/docker-nctests). These have been integrated into netCDF-Fortran, and we are working to integrate them into the `4.10.0` release of `netCDF-C`.

This will help improve the speed of our development cycle, and help us avoid situations where we have to fix interface-library-breaking bugs that inadvertently made their way into a release. Short-term priorities for netCDF-Java can be found in the THREDDS Status Report.

Challenges

Lack of resources refers to “Not having enough developer hours to address all of the issues which need to be addressed, in parallel”. This leads to triaging issues and figuring out which issues need to be addressed in what order. Even assuming perfect efficiency, the overhead of this sort of project management in-and-of-itself requires an allocation of resources which would otherwise be spent addressing said issues. The netCDF team does not enjoy perfect project management efficiency.

The reduced resources limit the amount of effort that can go into directly implementing new features in netCDF. Furthermore, time is spent between purely technical tasks and other, equally important but nebulous tasks such as community maintenance and support, project management, and research into emergent technologies and how they can be used to meet the needs of our community.

Roadmap

The following items are prioritized in the medium-to-long term:

- Documentation
    - NetCDF has added a lot of functionality that has not been documented as well as we would like.
    - The documentation organization isn’t very good.
    - The NUG needs to be modernized.
        - This has been ongoing for quite a while
- More reliable Amazon AWS access via ncZarr + documentation.
- Integration of cloud-HDF functionality.
- Continued bug fixes, optimization.
- Evaluation of the next generation of emergent technologies; we have had great success in the past anticipating what will be useful to our community. We want to continue this success.

Information specific to netCDF-Java can be found in the THREDDS Status Report.

Prepared *September 2025*

Status Report: THREDDS

March 2025 - September 2025

Sean Arms, Jennifer Oxelson, Ryan May, Ethan Davis

Executive Summary

This THREDDS status report, covering March to September 2025, highlights recent releases of netCDF-Java and the TDS, alongside ongoing efforts to transition to a more sustainable, cross-language architecture while maintaining backwards compatibility. Key activities include investigating new architectural options, renewing documentation efforts, and releasing updated versions with bug fixes and security improvements. Also introduced is a prototype Python-powered backend for the TDS which opens up a 6 TiB collection of ERA5 analysis stored in an icechunk store for access by the various TDS services. Overall metrics indicate over 1,900 unique IP addresses started the TDS in the past five months, with a total of over 47,000 unique startups since 2014. A recent deep dive identified 108 publicly accessible TDSs, roughly split between US and non-US institutions, with 20 US academic institutions operating one or more servers. When compared to startup metrics, this deep dive provides a better understanding of the actual number of TDSs running around the world.

Questions for Immediate Committee Feedback

Question from the previous report: We are actively creating a requirements document for the next generation THREDDS Data Server, and your input is critical. When thinking about accessing data from thredds.ucar.edu, what are your most important features? Does that look different when considering other TDSs? Please reach out to Sean with your thoughts (sarms@ucar.edu)–your input is very important to us!

Activities Since the Last Status Report

General

- We continue investigating options for moving netCDF-Java and the TDS to a more sustainable, cross-language architecture while maintaining as much backwards compatibility as possible.
- Renewing documentation effort on netCDF-Java and TDS, which is in alignment with some of the the findings from the NSF Unidata Community Assessment survey.

NetCDF-Java

- Versions 5.8.0, 5.9.0, and 5.9.1 have been released since the last update. These contained a number of bug fixes, security updates, and improvements. See also: https://github.com/Unidata/netcdf-java/releases/tag/v5.9.1.

TDS

- Version 5.7 has been released since the last update. This contained a number of bug fixes, security updates, and improvements. See also: https://github.com/Unidata/tds/releases/tag/v5.7.
- In an effort to reduce the complexity of running the TDS and the TDM (required when serving GRIB collections), we've created a local API to allow the TDM to send triggers to the TDS without the need for setting up authentication / authorization via Tomcat when both are running on the same machine. Instead of relying on Tomcat auth infrastructure, the local API uses a signature based authentication, similar to AWS v4 authentication. The signing keys are managed "under the hood", and rotate upon TDM startup.

Ongoing Activities

Server management

- Unidata hosts and maintains the following THREDDS servers:
    - thredds.ucar.edu always runs the latest stable release of the TDS (unless a quick security update is required).
    - thredds-test.unidata.ucar.edu always runs the latest development version.
    - thredds-dev.unidata.ucar.edu will be the testbed for the new cross-language TDS. It is not expected that this server will host the same set of data as thredds.ucar.edu or thredds-test.unidata.ucar.edu, although there may be some overlap.
    - Additionally, the Cloud Activities group manages cloud-hosted TDS instances (see cloud activities report for details).

Development

- netCDF-Java
    - Following the success of seamlessly integrating the libaec C library with netCDF-Java for compression, we will next turn our attention to the blosc library (critical for overall Zarr support).
- TDS
    - We continue to investigate and prototype cross-language options for netCDF-Java and the TDS; here is a demo replacing netCDF-Java I/O functionality in the TDS with a python powered backend: https://thredds-dev.unidata.ucar.edu/thredds/catalog/icechunk.html?dataset=icechunk/era5
        - 0.25 degree hourly analysis from 1959-10-10T00:00:00Z–2023-10-29T23:00:00Z
        - 6 TiB of array data accessed via icechunk and xarray
        - Services (OPeNDAP, NCSS, WMS, etc.) provided by the TDS

- In alignment with some of the findings from the NSF Unidata Community Assessment survey, we are renewing documentation efforts for the TDS. Currently, the “user guide” is more aligned with a “server administrators” guide and tutorial. We are actively working to split and enhance the user guide into three separate sets of documentation:
  - A new user guide, focused on non-server specific end-user access to the TDS (how to use various services, API documentation, lists of tools known to interact with the TDS)
  - A quickstart guide, designed to get administrators up-and-running with a TDS quickly
  - An admin guide, complete with a full tutorial and full documentation on how to run a TDS

The following active proposals directly involve THREDDS work:

- None at this time.

New Activities

As development progresses on the technology to bridge the Java and python ecosystems (in support of a more sustainable TDS tech stack), we will continue to seek out datasets to exercise this new functionality. Along the lines of the icechunk store of ERA5 analysis, what other datasets would you like to see us target for development?

Relevant Metrics

THREDDS Startup Metrics

	2025-03 — 2025-08	2014-08 — 2025-08
TDS Startup (unique IP address count)	1,943	47,653

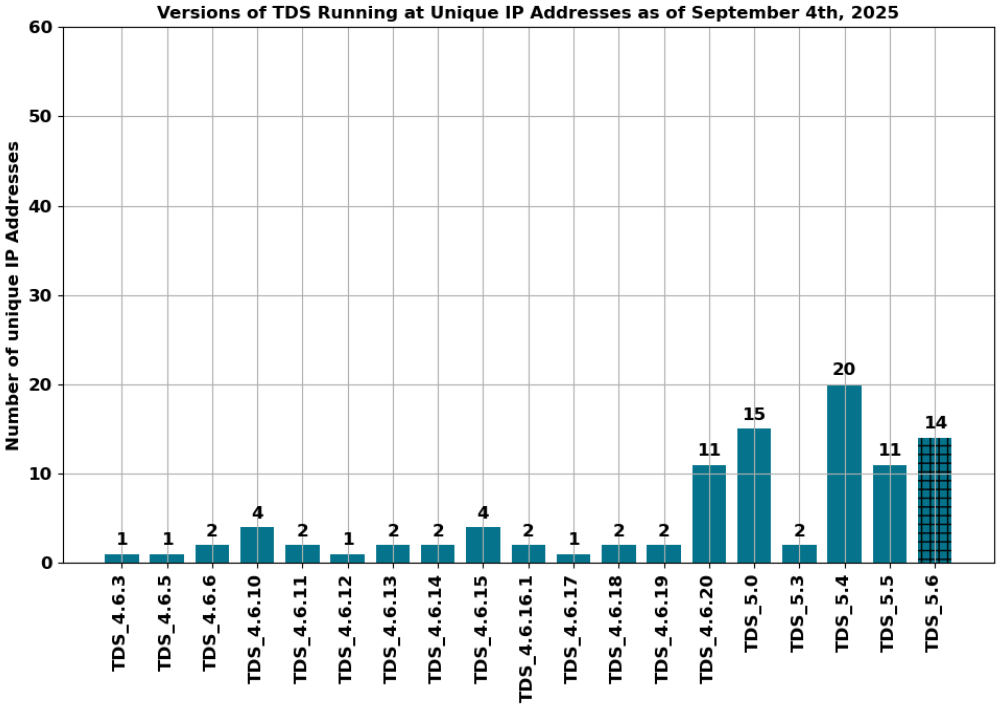
	Total Servers	Information page updated
Publicly Accessible[1] TDS count	99	53

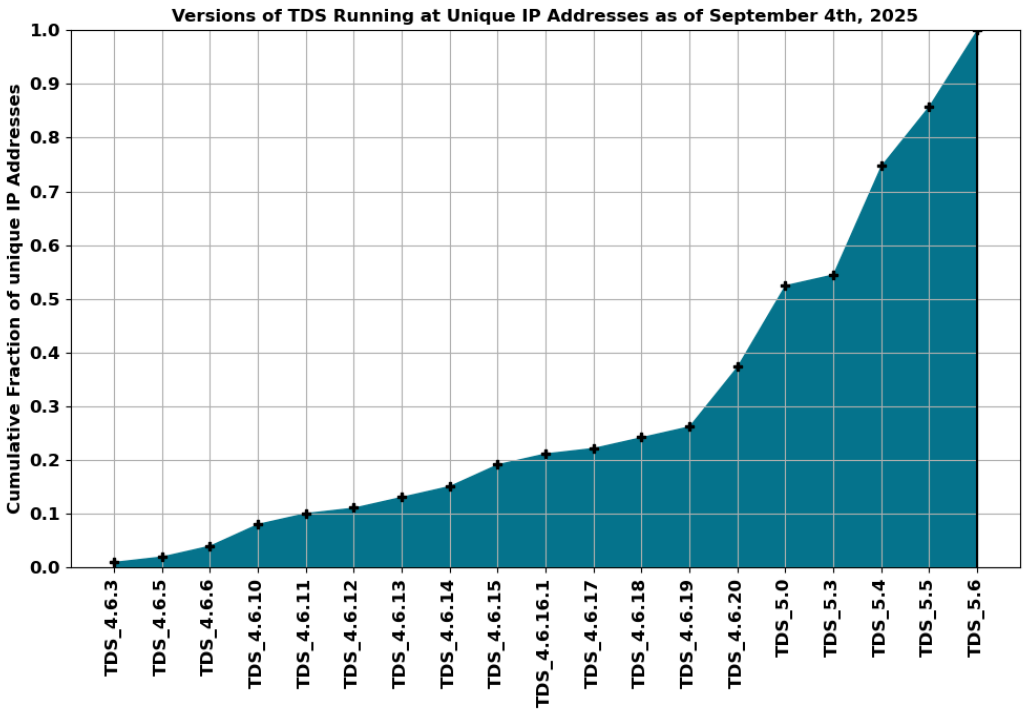
Over the past 5 months, **1,943** unique IPs started up the TDS (March 2025 through

[1] “Publicly accessible” means we could find a top-level THREDDS Client Catalog. We checked <server>/thredds/catalog.xml (version 4), <server>/thredds/catalog/catalog.xml (version 5), including the most common ports of 80, 8080, 443, and 8443.

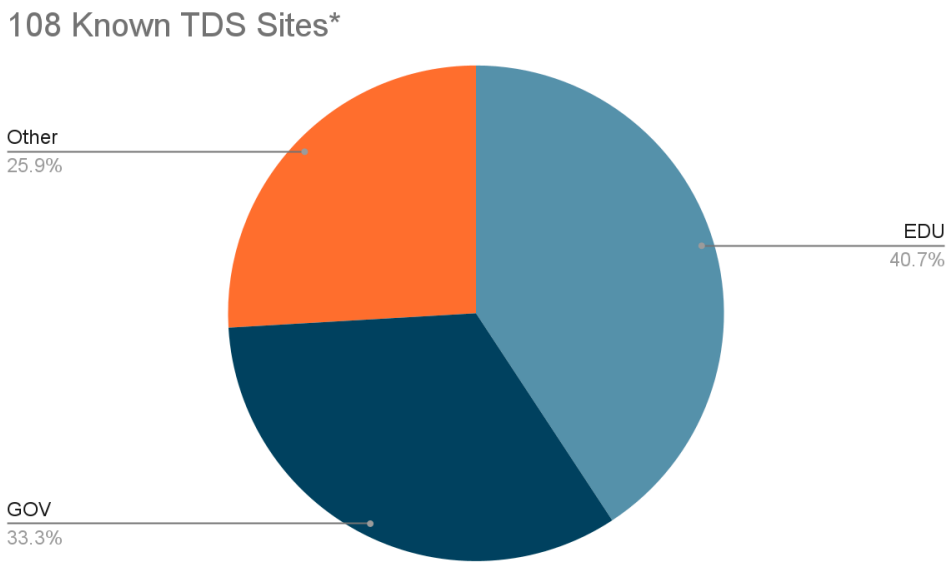
September 2025). Since we've started tracking these metrics (v4.5.3, August 26th, 2014), we've seen the TDS startup from **47,653** unique IP addresses. There are currently **106** publically accessible TDSs running "in the wild". Of the **99** publically accessible servers, **53** have updated the name of their server in their server configuration file (taken as a sign that they are maybe, possibly, intended to be used by others...maybe…).

The figures below show the distribution of TDS versions (top), and the fractional share of servers running version X or older (bottom). Each labeled version includes betas and snapshots, not just the official release of that version, for presentation simplicity. TDS v5.4 is the dominant specific version running in the wild (although more have migrated to TDS v5.5), and we are seeing a shift to the latest (v5.6, as of this report), which was released in January 2025.

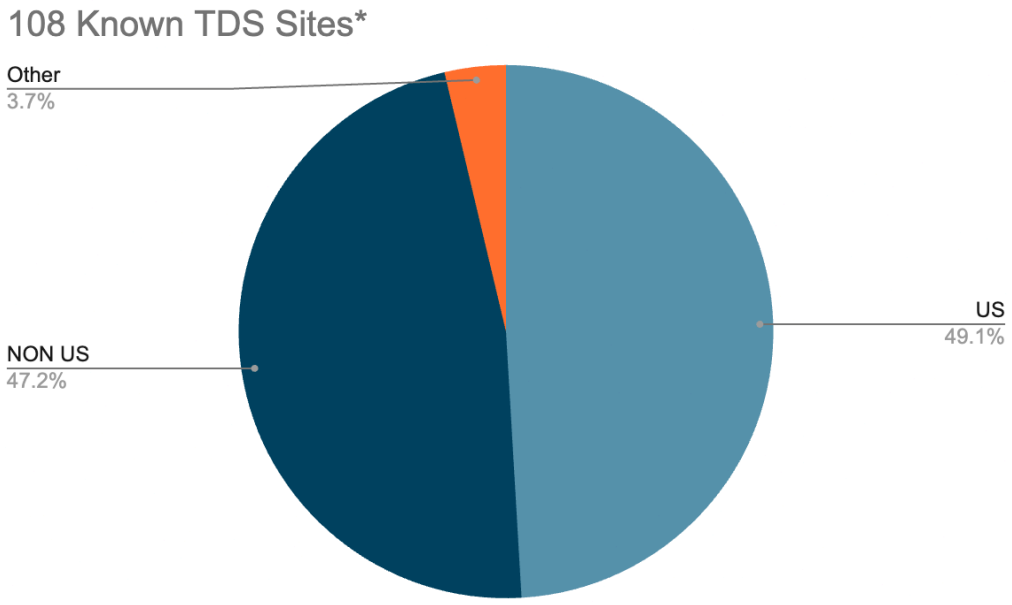




While mining startup metrics has proven useful, the startup logs only capture part of the picture, as checking for updates on startup is optional. In early June of this year, UPC staff took a deep dive into TDSs running in the wild using a variety of techniques and found a total of 108 publicly accessible TDSs that appear to be intended for external use (as opposed to the 53 identified by mining startup logs alone). The breakdown of sites by high level entity type is as follows:



These sites are roughly split between US and NON-US institutions:



20 US Academic institutions currently operate one or more publicly accessible TDSs:

Prepared *August 2025*

Status Report: Science Gateway and Cloud Computing Activities

March 2025 - September 2025

Sean Arms, Julien Chastang, Ethan Davis, Doug Dirks,
Ana Espinoza, Ward Fisher, Ryan May, Tiffany Meyer, Jennifer Oxelson Ganter, Mike Schmidt,
Tanya Vance

Executive Summary

- Submitted an NSF Jetstream2 ACCESS request for CPU and GPU resources to support ongoing Science Gateway activities.
- Successfully deployed autoscaling JupyterHub clusters with OpenStack Magnum, improving efficiency and scalability.
- Enabled browser-based access to IDV and AWIPS CAVE on JupyterHub using virtual desktop streaming, now being used in live classroom settings.
- Explored AI-based NWP workflows (FourCastNet, Pangu) on GPU-enabled JupyterHubs using NVIDIA's earth2mip package.
- Improved logging and monitoring with Kubernetes FluentBit on Jetstream2 JupyterHub clusters.
- Continued collaboration with Millersville University to deploy a single-column WRF model for instructional use.
- Provided customized JupyterHub environments for 411 students across 20 institutions and workshops since Spring 2025.
- Collaborated with the LROSE team to integrate radar meteorology tools into JupyterHub environments with desktop streaming.
- Preparing an NSF GEO OSE proposal with LROSE and NSF NCAR EOL to advance open science infrastructure in radar meteorology.
- Transitioned Kubernetes deployments from Kubespray to Magnum in collaboration with Jetstream2 experts.
- Maintained and scaled AWIPS EDEX services in the Jetstream2 cloud, with up to 300 daily clients.
- Delivered or submitted several presentations and papers for AMS 2026, Gateways 2025, and the Improving Scientific Software conference.
- Preparing for upcoming conference engagements, including Gateways 2025 and AMS 2026.

Questions for Immediate Committee Feedback

We are excited to offer in-browser access to NSF Unidata's IDV and AWIPS CAVE with streaming desktop technology (no local installation required) via our PyAOS JupyterHub

offerings. Would you be willing to pilot this in a course or workshop and share brief feedback on user experience and performance?

Activities Since the Last Status Report

Jetstream2 2025-26 ACCESS Grant Request

NSF Unidata has submitted a request to the NSF ACCESS program for 5,104,375 CPU SUs and 467,000 GPU SUs to support the upcoming Jetstream2 cycle, beginning October 1, 2025. The requested allocation is smaller than in the 2024–25 cycle, reflecting the transition to Magnum, which allows more efficient use of Jetstream2 resources (see discussion below). The GPU request has also been reduced following Thomas Martin's departure and our limited ability to use the full GPU allocation in the last cycle. If approved, this allocation will provide continued access to essential services including EDEX, JupyterHub, THREDDS, RAMADDA, and LDM/IDD nodes and ensure uninterrupted operation of CPU and GPU virtual machines in various configurations.

JupyterHub Activities

PyAOS JupyterHub and Magnum Autoscaling on Jetstream2

Fall 2025 PyAOS (Python for Atmosphere and Ocean Science) JupyterHub deployments on Jetstream2 using OpenStack Magnum are underway, with encouraging early results. Magnum provides automatic scaling of computing capacity, so the hub adds resources during busy periods and releases them when demand is low. We no longer need to size each hub for the maximum expected number of users, which reduces idle virtual machines and makes more efficient use of our Jetstream2 allocation.

JupyterHub Virtual Desktop Technology for IDV and CAVE

In parallel with the Magnum autoscaling work, our NSF Unidata Science Gateway JupyterHubs now provide browser-based access to NSF Unidata's Integrated Data Viewer (IDV) and AWIPS CAVE through streaming desktop technology (no local installation required). We plan to make this capability standard on all upcoming hubs. Early classroom use is promising. Professor Brian Mapes (University of Miami) reports a positive experience and is using IDV via the hub in his Fall 2025 graduate course. In addition, we will be using this capability for a forthcoming demonstration of IDV and CAVE at Millersville University with Professor Sepi Yalda.

Exploring AI-NWP Models with earth2mip on Jetstream2

In collaboration with our NSF Unidata colleague Thomas Martin, we tested NVIDIA's earth2mip package to run pre-trained AI-based numerical weather prediction models, including FourCastNet and Pangu, on GPU-enabled JupyterHub servers deployed on Jetstream2. These experiments demonstrated the feasibility of executing AI-driven forecasting workflows in cloud-based instructional environments. Our findings are detailed in a published blog post: Running Pretrained AI-NWP Models in the Cloud.

Kubernetes Fluent Bit Logging for PyAOS JupyterHub Clusters

To improve collaboration with NSF Unidata system administrators, we have implemented Fluent Bit for log aggregation on PyAOS JupyterHub clusters running on Kubernetes. This technology ensures that all relevant logs are collected and stored on a dedicated virtual machine within the local network, providing system administrators with the necessary logs for monitoring and troubleshooting.

Work is being done to automatically archive and compress “stale” or old logs in order to handle the large volume of logs generated by these clusters.

WRF Single Column Model in JupyterHub

During the spring and fall 2025 semesters, we continued our work with Greg Blumberg from Millersville University and deployed an idealized single-column WRF model in a JupyterHub environment for undergraduate instructional objectives. One of Dr. Blumberg’s former undergraduate students will continue using the gateway for their graduate studies at a new institution (UNC Charlotte).

JupyterHub Servers for Workshops, Spring and Fall Semesters

NSF Unidata is employing our Jetstream2 resource allocation for the benefit of students in the atmospheric science community by providing access to customized JupyterHub servers at a steady pace. NSF Unidata tailors these servers to the requirements of the instructors so they can accomplish their Earth Systems Science teaching objectives. Since the spring semester of 2025 encompassing the length of this status report , 411 students at 20 academic institutions and various workshops have used NSF Unidata JupyterHub servers running on Jetstream2.

Notably, we provided JupyterHub resources to:

- New Institutions:
    - University of Miami
    - Naval Postgraduate School
    - UNC Charlotte

LROSE Collaboration between Colorado State University and NSF NCAR EOL

The NSF Unidata Science Gateway team continues its collaboration with Professor Michael Bell’s group at Colorado State University and NSF NCAR's Earth Observing Laboratory (EOL) to enhance their science gateway for radar meteorology. This gateway features a JupyterHub environment integrated with LROSE (Lidar Radar Open Software Environment) to support advanced data analysis and visualization.

Recent efforts have focused on adapting SAMURAI (Spline Analysis at Mesoscale Utilizing Radar and Aircraft Instrumentation) for use within JupyterHub. Additionally, we are leveraging JupyterHub Virtual Desktop technology—the same approach used for Cloud IDV and Cloud CAVE—to integrate traditional LROSE tools such as HawkEye into this gateway, ensuring continued usability of established analysis workflows.

Our team brings expertise in JupyterHub, OpenStack, and Jetstream2 to support this initiative. As part of this collaboration, we presented the paper "Improved Accessibility and Community Knowledge of Lidar and Radar Data Analysis" at the UCAR Improving Scientific Software conference.

We are also collaborating with LROSE staff to ensure that gateway deployment workflows are codified, reproducible, and documented through the lrose-gateway GitHub repository. This repository serves as a resource for capturing deployment instructions, configuration files, and examples.

We are currently collaborating with the LROSE team to prepare a proposal for the NSF GEO OSE (Office of the Geosciences Open Science Ecosystem) program, which supports projects that advance open science practices and infrastructure in the geosciences. The proposal, due in November, aims to secure resources to further develop and sustain this effort.

NSF Unidata Science Gateway Re-Imagined

The Science Gateway Re-Imagined (SGRI) team—consisting of Ana Espinoza, Julien Chastang, and formerly Nicole Corbin with managerial support from Ethan Davis and Tanya Vance--has continued its efforts to transform our existing Science Gateway into a more collaborative space with increased accessibility to NSF Unidata products.

With the recent launch of the new NSF Unidata website, "Phase 1" of the SGRI is complete. This phase unified the Science Gateway with the main NSF Unidata website, allowing for increased visibility of the services we provide. Currently, these services are JupyterHub resources and an Education Hub, where gateway visitors can browse a catalog of educational resources.

Advancements made in virtual desktop streaming in JupyterHub (discussed elsewhere in this document) have caused us to reprioritize our phased approach to development; Phase 4 is in a beta phase where testers, both within and outside of NSF Unidata are currently using IDV and/or AWIPS CAVE on the gateway for regular class or workshop instruction.

Phase 2 (on-demand notebooks, data integration, and community forums) is underway, with particular attention being given to authentication and authorization mechanisms, i.e., "how can we best enable access to disparate gateway services for gateway visitors while still adhering to security best practices and access policies?"

With "on-demand notebooks" gateway visitors will be able to launch notebooks and cloud desktops for IDV and CAVE without the need for requesting dedicated JupyterHub resources. As part of this phase, we are planning an internal collaboration between the SGRI and NSF

Unidata Python teams to deliver a "dashboard". Here, users will launch notebooks from MetPy's example gallery and interact with the dashboard utilizing MetPy to create visualizations from data accessed via a THREDDS Data Server.

Expect the next beta period for these features to begin in early 2026.

Phased Approach to Development Summary

Phase 1 (Jan 2025 Release): Requests and Education – Users can request both compute resources (in the form of JupyterHubs) and educational resources (trainings, modules, etc.) and browse existing educational resources

Phase 2 (Apr 2026 Release): On-Demand Notebooks, Data Integration, and Community Forums – Users can interact with NSF Unidata curated “on-demand” notebooks without the need for a JupyterHub request, access data which is proximate to the computational environment, and share and develop ideas with colleagues in a community forum

Phase 3 (July 2026): Community Contributions – Users can contribute to the content (educational materials, notebooks, workflows, etc.) found on the Science Gateway according to written guidelines for the management and maintenance of this content

Phase 4 (Jul 2027 Release): App Streaming & Fully Re-Imagined Science Gateway – Users can “test-fire” NSF Unidata products such as the IDV or NSF Unidata’s version of AWIPS CAVE in their browser as a substitute for or prior to a local installation

Ongoing Activities

NOAA Big Data Program

- NSF Unidata continues to manage the NEXRAD level 2 archive in Amazon S3, ensuring that realtime data are successfully delivered to the noaa-nexrad-level2 bucket. LDM is employed to deliver these data.
- Public Bucket for level II NEXRAD: https://s3.amazonaws.com/noaa-nexrad-level2/index.html
- NSF Unidata also continues to deliver NEXRAD level 3 products to the NSF Unidata-nexrad-level3 bucket, part of the AWS public datasets program.
- TDS on Jetstream2 for level II NEXRAD: https://tds-nexrad.scigw.unidata.ucar.edu/thredds/catalog/catalog.html

University of Oklahoma REU Program Support

NSF Unidata Science Gateway staff collaborate each semester with Ben Schenkel (University of Oklahoma) to provide a JupyterHub environment for NSF Research Experience for

Undergraduates (REU) students. When needed, we also host datasets on the Science Gateway RAMADDA server, ensuring seamless access to data from within the students' JupyterHub environment.

Jetstream2 Allocation Management and Collaboration

NSF Unidata staff continue to actively manage our Jetstream2 allocation and collaborate with the Jetstream2 team. We closely monitor our allocation and decommission outdated resources to prevent allocation exhaustion.

Jetstream2 and Science Gateway Security

We continually work with NSF Unidata system administrator staff to ensure that our web-facing technologies and virtual machines on Jetstream2 adhere to the latest security standards. This effort involves such tasks as ensuring we are employing HTTPS , keeping cipher lists current, ensuring docker containers are up-to-date, limiting ssh access to systems, etc. It is a constantly evolving area that must be addressed frequently.

Collaboration with Andrea Zonca and Julian Pistorius on Jetstream2

Our collaboration with Andrea Zonca and Julian Pistorius on Jetstream2 has entered a new phase as we transition from the Kubespray workflow to the Magnum workflow. During the ISS conference Ana and Julien met with Julian Pistorius at the Mesa Lab to discuss using OpenStack Magnum for deploying scalable Kubernetes clusters and enabling IDV and CAVE desktop functionality. Frequent collaboration continues over the Jetstream2 Matrix channel, where we communicate with Andrea and Julian when issues arise. This long-standing partnership has been invaluable, providing ongoing expertise and guidance that has yielded many benefits for the Science Gateway.

Docker Containerization of NSF Unidata Technology

We continue to employ Docker container technology to streamline building, deploying, and running NSF Unidata technology offerings in cloud-based environments. Specifically, we are refining and improving Docker images for the LDM, RAMADDA, THREDDS (TDS), and the THREDDS Data Manager (TDM). Most recently, we released thredds-docker 5.6 in conjunction with the 5.6 release of the TDS. In addition, we also maintain a security-hardened NSF Unidata Tomcat container inherited by the RAMADDA and THREDDS containers. Independently, this Tomcat container has gained use in the geoscience community. To keep our containers up-to-date, especially with respect to security, we programmatically monitor and respond to upstream updates by automatically building and deploying the refreshed containers to DockerHub.

AWIPS EDEX in Jetstream2 Cloud

NSF Unidata continues to host our publicly accessible EDEX servers on the Jetstream2 cloud platform where we serve real-time AWIPS data to CAVE clients and the python-awips users. We've had upwards of 300 clients connecting to EDEX in a single day. The distributed architectural concepts of AWIPS allow us to scale EDEX in the cloud to account for the desired data feed (and size). We continue using Jetstream2 to develop cloud-deployable AWIPS instances as imaged virtual machines (VMI) available to users of OpenStack CLI.

Because we are needing to spin up new machines fairly often, we have simplified and streamlined this process by creating custom Rocky 8 images that can be used for deployment on Jetstream2. We have successfully created and launched a Rocky 8 EDEX system which the AWIPS team has been using to develop the latest version of AWIPS.

EDEX is designed so different components can be run across separate virtual machines (VMs) to improve efficiency and reduce latency. Our current design makes use of three VMs: one large instance to process most of the data and run all of the EDEX services including all requests, and two other ancillary machines which are smaller instances used to ingest and decode radar and satellite data individually.

We are currently supporting 2 sets of servers as described above: one set has been running our v23 production software, another running v23 development software. We may be looking to add an additional 2 back in the mix (running Rocky 8) for future development and beta builds. Having backup/development servers allows us to be able to patch, maintain, and develop our servers while still having a functional server for our users and to minimize any down time. In January we decommissioned the v18 and v20 systems since they were running CentOS7 which was end of life back in June 2024.

Nexrad AWS THREDDS Server on Jetstream2 Cloud

As part of the NOAA Big Data Project, NSF Unidata maintains a THREDDS data server on the Jetstream2 cloud serving Nexrad data from Amazon S3. This TDS server leverages Internet2 high bandwidth capability for serving the radar data from Amazon S3 data holdings. TDS team and science gateway staff collaborate to maintain this server.

NSF Unidata Science Gateway Website and GitHub Repository

Website

The NSF Unidata Science Gateway web site has been regularly updated to reflect the progress of what is available on the gateway. The news section has been refreshed from time-to-time for announcements concerning the gateway. The conference section and bibliography has also been maintained with new information. We are in the process of migrating the information found in this website to its new location. See "NSF Unidata Science Gateway Re-Imagined" section above.

Repository

All technical information on deploying and running NSF Unidata Science Gateway technologies is documented in the repository README. This document is constantly updated

to reflect the current state of the gateway.

Presentations/Publications/Posters

- J. DeHart, A. Espinoza, B. Javornik, and J. Chastang. Improved Accessibility and Community Knowledge of Lidar and Radar Data Analysis. In *Proceedings of the 2025 Improving Scientific Software Conference*, Boulder, CO USA & Virtual, April 7--10 2025.
- Julien Chastang and Ana Espinoza. Unidata Science Gateway: Integrating Atmospheric Science Desktop Applications with Modern Code-Driven Workflows in the Cloud. In *Proceedings, 42nd Conference on Environmental Information Processing Technologies, 106th AMS Annual Meeting*, Houston, Texas, USA, Jan 25--29 2026. AMS. Submitted to the 106th AMS Annual Meeting.
- Julien Chastang and Ana Espinoza. Integrating Scientific GUI Applications into Autoscaled Science Gateway Environments. In Proceedings of the Gateways 2025 Conference, Green Bay, Wisconsin, USA, Oct 28--30 2025. Accepted for presentation.
- A. Del Moral, J. DeHart, B. Javornik, T.-Y. Cha, A. J. DesRosiers, J. Chastang, A. Espinoza, M. Dixon, M. M. Bell, and W.-C. Lee. The Lidar Radar Open Software Environment (LROSE): An open-source community-based tool for the research and operational community. In *Proceedings of the First Joint Conference of the African Meteorological Society and the World Meteorological Organization*, Addis Ababa, Ethiopia, April 27--30 2025.

New Activities

Over the next three months, we plan to organize or take part in the following:

Forthcoming conference participation

- Gateways 2025
- AMS 2026

Over the next twelve months, we plan to organize or take part in the following:

- We are continuing to test Magnum autoscaling clusters in combination with virtual desktop technology to support traditional applications such as IDV and AWIPS CAVE, with multiple deployments currently underway for fall 2025.
- Seeking DockerHub (including on-prem) alternatives due to low download quotas.
- Gilbert Sebenste (College of DuPage) requested computing support for a Spring 2026 mesoscale class, including a PyAOS JupyterHub environment with the capability to run the CM1 model. We plan to explore this request further, as it represents an interesting use case.

Relevant Metrics

Spring 2025 / Fall 2025 JupyterHub Servers

Since spring of 2020, NSF Unidata has provided access to JupyterHub scientific computing resources to nearly 2600 researchers, educators, and students (including a few NSF REU students) at 29 universities, workshops (regional, AMS, online), and the UCAR SOARS program. Below are the latest metrics (institution, number of active users, point of contact) since the last status report.

Spring 2025		
CUNY	37	Bill Spencer
Florida Institute of Technology	11	Milla Costa
Florida State University	34	Christopher Homles
Millersville University	34	Greg Blumberg
Seoul National University	18	Duseong Jo
Southern Arkansas University	29	Keith Maull
University of Massachusetts Lowell	0	Mathew Barlow
University of Louisville	19	Jason Naylor
University of Northern Colorado	5	Wendilyn Flynn
University of Oklahoma	3	Ben Schenkel
SUNY Oswego	16	Scott Steiger
Naval Postgraduate School	2	Derek Podowitz
Cybertraining pilot MSU	21	Nicole Corbin, Thomas Martin, Keah Schuenemann
Cybertraining demo User Comm	13	Nicole Corbin, Thomas Martin
UCAR PDWS	31	Drew, Thomas
NCAR AI/ML	19	Drew
Fall 2025		
UNC Charlotte		Wesley Taylor
Florida Institute of Technology	32	Steve Lazarus
Millersville		Sepi

Spring 2025		
CUNY	37	Bill Spencer
Florida Institute of Technology	11	Milla Costa
University of Miami	10	Brian Mapes
Southern Arkansas University	41	Keith Maull
Seoul National University		Duseong Jo
University of Wisconsin	25	Hannah Zanowski
Vermont State University	11	Andrew Westgate

Note: Some entries in the table above indicate zero or one user. These are recently launched Hubs and the instructors have not yet had a chance to complete their setup and launch the coursework for students to access.

Jetstream2 Allocation Usage Overview

For the period between October 1, 2024 and September 30, 2025, NSF Unidata was granted an allocation on the NSF Jetstream2 (JS2) cloud valued at 8.6M+ CPU Service Units and 350k GPU Service Units (SUs), the unit of "currency" on JS2. NSF Unidata staff has been proactive in ensuring JS2 resources are being used effectively in a non-wasteful manner by automating SU usage data collection through interactions with the JS2 API. This data is extrapolated forward in time to predict future SU usage, allowing us to make meaningful decisions about the gateway's capabilities.

As of September 10, 2025, our allocation usage is as follows:

Resource	SUs Allocated	SUs Used	SUs Remaining	Daily Usage Rate (7 day avg)	Over/Under-Budget
CPU	8.66M SU	6.90M SU	1.76M SU	15.9 k SU/day	Under
GPU	350k SU	304k SU	46k SU	384 SU/day	Under

Github Statistics*

Repository	Watches	Stars	Forks	Open Issues	Closed Issues	Open PRs	Closed PRs
science-gateway	6	20 (+1)	13	6 (+1)	167	17 (-2)	860 (+41)
tomcat-docker	10	67	71 (+1)	0	42	0	97
thredds-docker	13 (+1)	40 (+2)	30(+1)	4	125 (+1)	0	188
ramadda-docker	3	0	2	1	10	0	38
ldm-docker	8	12	15 (+1)	2 (+1)	40	0	70
tdm-docker	4	4	7	0	10	0	29

* Numbers in parentheses denote change from last stat report

Prepared *September 2025*

Status Report: Community Services

March 2025 - September 2025

Doug Dirks ,Tanya Vance, and (Nicole Corbin March - May)

Executive Summary

The Community Services group has predominantly focused on the four major prioritized projects or initiatives: the Science Gateway Reimagined and Integrated Educational Hub Project; the three modules for the CyberTraining – Machine Learning in the Earth Systems Sciences Project; the Community Assessment Initiative – Communications Plan & Delivery, and Survey Execution, Analysis, and Reporting; the new NSF Unidata Website – Phase 1: Baseline Website Launch. While some of these initiatives have downstream activities, we are pleased to report that each project is complete.

We also drafted and submitted the interim and annual report to NSF and progressed additional reporting and community communications, facilitated the 2025 NSF Unidata Community Equipment Awards, participated in outreach to the Earth Systems Science community, and learning and development offerings such as AI/ML training at University of Northern Colorado, supported cross-program and cross-organizational collaborations and activities, and NSF Unidata Advisory Committee activities and communications, including progressing the final Committee Charter, New Committee Member Selection, Russell L. DeSouza Award, and Joint Meeting planning.

From May-early June, the NSF Unidata Community Services team was not in operation resulting in a reduction in activities over that time period. Additionally, on May 30th, Community Services lost a team member, Nicole Corbin, resulting in a reduction in scope for active instructional design activities.

Activities Since the Last Status Report

Community Outreach and Services

Community Communications:

- Posts to the News@Unidata blog appear regularly, but not on a specific schedule. Some highlights:
    - ESIP 2025 Meeting Report
    - Community Survey: Share your insights, support community progress
    - MetPy 1.7.0 Released
    - Running Pretrainined AI-NWP Models, Our Experience at NSF Unidata on Jetstream2
    - New eLearning: Supervised Machine Learning Readiness
    - NSF Unidata Pause in Most Operations

    - NSF Unidata Return to Operations
    - Welcome Summer Intern Linfeng Li
    - Welcome Summer Intern Jaye Norman
    - C++ Acceleration of MetPy's Thermodynamics Module for 3D Visualization and Analysis of Jupiter Thunderstorms
    - Benchmarking of NSF Unidata MetPy in a CI/CD Workflow
    - Summer 2025 Unidata Interns Wrap Up Their Projects
    - Important: Changes to NOAA NEXRAD AWS Archive
    - Offer: NSF Unidata Science Gateway JupyterHub Resources Available for Fall 2025 Courses
    - NSF Unidata Welcomes New Committee Members
    - Welcome to the New NSF Unidata Website
- Community meetings and other announcements
- Updates to NSF Unidata's social media channels (Facebook, Bluesky, LinkedIn) and UCAR communication channels
- Publishing short videos on the Unidata YouTube channel
- Writing support for conference papers, student intern materials, and proposals
- Developing and delivering extensive community communication plan and messages across Earth sciences channels for the Community Assessment Initiative

Outreach to the Earth System Science community at conferences, workshops, events, and working groups

- Facilitated UCAR Intern Development Session on Convergence Science (TV, June)
- Presented at Metropolitan State University of Denver (TV, April)
- Submitted Community Assessment Survey abstract to AMS (TV)
- Planning for UCAR Members Meeting and AMS / AGU outreach

NSF Unidata Community Awards

- Facilitated the 2025 Community Equipment Awards Selection Panel and process

2025 Awards Community Equipment Awards

- As of this report, awardees have been notified and the process is still in progress for dissemination

DeSouza Award

- Brian Blaylock from the U.S. Naval Research Laboratory was awarded the 2025 Russell L. DeSouza Award by the NSF Unidata Users committee and will be accepting the award at the Fall Joint Committee Meeting

Community Engagement Initiatives

Community Assessment Initiative

- Spearheaded NSF Unidata Community Assessment Initiative to develop a

comprehensive understanding of the Earth system science community's needs, interests, and challenges to guide NSF Unidata priorities, address gaps, and align tools, data, and services with community goals
- Coordinated Community Assessment Subcommittee
- Developed and executed extensive community engagement and communication plan
- Developed and delivered NSF Unidata survey to Earth sciences community with responses collected between 28 April 2025 - 20 June 2025 using ArcGIS Survey123 platform
- Conducted qualitative and quantitative analysis of survey results and compiled in report
- Presented to internal NSF Unidata staff and will present to community members at Joint Fall Meeting

Internal Engagement Resources

- Completed internal Strategic Engagement Plan
- Created resources for NSF Unidata learning and engagement event tracking and reporting

Supported Users and Strategic Advisory Committee activities and communications

- Facilitated Joint Fall Committee planning with members, representatives, and NSF Unidata staff
- Facilitated communications and documentation for the 2025 Joint Fall Committee Meeting actions including drafting and finalizing the proposed committee model Committee Charter, facilitating new committee member selections, and awards

Progressed NSF Unidata's NSF Reporting

- NSF Unidata Core Interim Report
- NSF #2403649 NSF Unidata core award Annual Report
- NSF #2319979 CyberTraining: Machine Learning in the Earth Systems Sciences Project Final Report

Cross-program and cross-organization collaborations and activities

- Instructional Design Consultant for President's Strategic Initiative Fund Award: AI/ML Training Assessment: Laying the Foundation for UCP-led Next Generation ML Workflow Training (NC)
- Provided oversight advice on UCAR's Strategic Plan and supported interview process for new UCP Director (TV)
- Support UCP Collaborative for Experiential Learning (TV)
- Ambassador on NSF NCAR Convergence Science Program Community of Practice (CoP) and active member of Convergence Science Data Outputs group (TV)
- Active Member on UCAR Community Engagement Group (TV)
- Active Member on UCAR Exhibit Working Group (TV)
- Active Member on UCAR Tutorials & Workshops CoP (TV)

- Active Member on UCAR Web Technical Governance Advisory Group (WeTAG) (DD)

Learning Services

Web presence

- Science Gateway Reimagined project – a community-directed virtual hub to enable learning and support research for current and future earth systems students, educators, and professionals.
    - Science Gateway with Integrated Educational Hub full version developed and launched with the release of the new NSF Unidata website (September)
    - Next phases: data catalogs, community forums
    - See Cloud Computing Activities report for more details

Learning offerings

- NSF #2319979 "Machine Learning Foundations and Applications in the Earth Systems Sciences" (Nicole Corbin, PI and Thomas Martin, Co-PI) in collaboration with Dr. Keah Schuenemann (MSU Denver) and Dr. Karen Kortz (Community College of Rhode Island)
    - Delivery (and final report) for all three Machine Learning in the Earth Systems Sciences learning modules - all available for public enrollment on NSF Unidata's eLearning site (and Education Hub)
        - Module 1: Machine Learning Foundations in ESS (No-code)
        - Module 2: Machine Learning Applications in the ESS (Low-code, Jupyter Notebook)
        - Module 3: Machine Learning Analysis in the ESS (Low-code, Jupyter Notebook)
- Support for University of Northern Colorado ML in the ESS Training Seminar and Module for the Introduction to Earth Science Data Analysis and Visualization course

Ongoing Activities

We plan to continue the following activities:

- Ongoing activities related to above (community communications, support for advisory committee activities, facilitating awards, outreach and engagement, supporting cross-program, cross-organization, and external collaborations, learning services, etc.)
- Participation in Working Groups noted above
- Delivering community learning and development
- Support the pursuit of funding and bringing greater public awareness to NSF Unidata

New Activities

Over the next three months, we plan to organize or take part in the following:

- Community outreach activities, including the UCAR Members Meeting and conferences
- Facilitate 2026 NSF Unidata Community Equipment Awards process
- Follow up proposals and collaborative activities
- Migrate phase two content for NSF Unidata's new website
- Use the insights from the 2025 Community Assessment Survey as a data point for program and Community Services prioritization planning and actions

Over the next twelve months, we plan to organize or take part in the following:

- Continued maintenance of the reimagined NSF Unidata Science Gateway, including community contributions and adding resources to the Education Hub
- Participate in outreach activities and present on the the Community Assessment Survey results at AMS
- Progress planning and implementation of the new committee model (if applicable)
- Work to broaden our awareness, applications, reach, and impact across Earth System Science communities

Relevant Metrics

Statistics from the Community pages on the NSF Unidata web site. Comparisons are made with statistics from the previous six-month period.

All community pages

Most recent six months (March 2025 - September 2025)::

- 66,995 unique pageviews (31,163 in previous period)
- 30.3% of total unique pageviews (19.6% in previous period)

Top community pages

1. All blog pages
   59683 unique pageviews (25930 in previous period)
   89% of total community pageviews (83% in previous period)
2. www.unidata.ucar.edu/community
   2856 unique pageviews (3061 in previous period)
   4% of total community pageviews (10% in previous period)
3. www.unidata.ucar.edu/about
   2944 unique pageviews (1259 in previous period)
   4% of total community pageviews (4% in previous period)
4. www.unidata.ucar.edu/events
   1067 unique pageviews (645 in previous period)
   1% of total community pageviews (2% in previous period)

Social media statistics, March 18, 2025

1. # of Bluesky followers: 459 (up from 225)

2. # of Twitter/X followers: 2020 (down from 1974) (not actively posting to X)
3. # of Facebook followers: 982 (up from 925)
4. # of YouTube subscribers: 4380 (up from 4178)
5. # of LinkedIn followers: 492 (up from 308)

Unidata eLearning statistics, September 9, 2025

1. Total unique users: 686 (up from 386)
2. Enrolled users in Machine Learning Foundations in the Earth Systems Sciences: 12 (up from 11, not including MSU participants)
3. Enrolled users in Learn AWIPS CAVE: 333 (up from 320)
4. Enrolled users in Learn Python-AIPS: 46 (up from 43)
    - Note that microlearning courses are available without an account and are unable to be tracked

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Prepared *August 2025*

Status Report: Support

March 2025 - September 2025

Jennifer Oxelson, UPC Staff

Executive Summary

- A new User Support Portal was launched with the new website.
- The online archive of previously answered support questions is no longer receiving updated information.
- Users can now subscribe, unsubscribe, and change their own mailing list subscription options via a web interface.
- Additional methods other than mailing lists for facilitating community-provided support are being sought.
- We are looking to address deficiencies in our software documentation to make the information they contain more user-friendly and discoverable.

Questions for Immediate Committee Feedback

What methods for seeking support or engaging in discussions within a community have you used and found particularly effective? E.g., Discourse? Forums? GitHub Issues or Discussions?

Activities Since the Last Status Report

Improving online self-support availability

1. **New User Support Portal**
   A new User Support Portal was launched with the new website. This will allow users to submit, track, and append support tickets online.

2. **Online Support Archive No Longer Receiving Updates**
   The online archive of previously answered support questions is no longer receiving updated information.

   This archive was notoriously voluminous, crufty, and practically unusable unless using a search engine or an LLM. In lieu of the archives (which will remain available online for historical purposes) *we are focusing on improving our documentation to be more accessible and useful as per the results of the 2025 Community Survey.*

3. **Mailing List User Management Improved & Alternatives Sought**
   Users can now subscribe, unsubscribe, and change their own mailing list subscription options via a web interface.

Unsurprisingly, mailing list usage as an aspect of community-provided support remains inconsistent across projects and target community users. Additional methods for facilitating community-provided support are being sought.

Alternatives actively used and/or suggested include:

- Project GitHub Issues
- Discord
- Discourse
- Gitter
- Zulip
- Matrix
- GitHub Discussions (Organizational level)

The endeavors of the Science Gateway will influence this effort.

4. **Software Documentation Improvement Underway**
   We are looking to address deficiencies in our software documentation to make the information they contain more user-friendly and discoverable.

Note: compiling of support metrics for staff is on hold while we conduct a comprehensive review of our metrics gathering process.

Training

Unidata training/workshop information can be found in the Community status report.

New Activities

In order to fulfill our objectives articulated in the Unidata 2018 Proposal, focused efforts are needed in two major areas:

- Enhance electronic support offerings
- Create instructional materials for online virtual training

Prepared *August 2025*