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2020 Unidata Community Equipment Award
"Advancing Weather Visualization at Mississippi State University through a Dedicated AWIPS Server"

Final Report, 28 May 2021

I was honored to receive a Unidata Community Equipment Award during the 2020 funding cycle. I'm now thrilled to share what I've learned from this experience with the broader community, and I'd like to encourage anyone reading this to consider submitting a proposal to this program in the future. Remember that it isn't necessary to be a member of UCAR or involved with Unidata to apply!

This funded project had two goals: 1) install an AWIPS instance on a machine procured with funds from the Unidata Community Equipment Awards program for use within and outside the classroom and 2) provide a Jupyterhub server on that machine to support teaching and graduate student training. Many meteorology students in the Department of Geosciences at Mississippi State University aspire to work for the National Weather Service (NWS) after graduation, and AWIPS is a critical NWS evaluation tool. Unidata is actively working to improve AWIPS capabilities, most notably incorporating cutting-edge GOES Advanced Baseline Imager (ABI) imagery such as RGB products and fields from the Geostationary Lightning Mapper. This machine is thus a perfect fit for both lecture and lab in my Satellite Meteorology course which I teach every spring. The Jupyterhub component enables real-time demonstrations of Python programming and hands-on learning via browser (thus removing the need for software installation on their own devices).

In line with and building from the proposed goals, I successfully installed AWIPS (via Docker, which was easier than expected) and then added a Docker container to run a THREDDS server. I then crafted a guide for others to learn from my experience: click here for tips on installing Docker, AWIPS via Docker, and THREDDS via Docker. Those tips include links to documentation about installing Jupyterhub, which I installed "the hard way" to ensure multiple users can access the server. I also installed conda environments to run my own Python code for satellite data visualization and to be used by the Jupyterhub server. A sample animated GIF of 1-minute visible satellite imagery generated from the AWIPS Docker container can be found here.

Due to restrictions and delays related to the COVID-19 pandemic, the funded Linux machine did not arrive in time to be set up and running for integration into the curriculum for Satellite Meteorology prior to the start of the Spring 2021 semester. However, it was successfully deployed to generate satellite imagery via AWIPS and via Python (including RGB products) that were then shown in lecture and lab hosted by the PI's existing web server. Over the next few months, I will integrate these tools for use in Tropical Meteorology in Fall 2021 and Satellite Meteorology in Spring 2022. Sample datasets hosted on THREDDS and associated Jupyter notebooks will be made public during the fall semester, and I will write a follow-up blog entry summarizing these resources with web links by the end of 2021. URLs currently pointing to arashi.geosci.msstate.edu will redirect to the Unidata machine's web server once that is up and running. Also, multiple proposals recommended for funding from the 2021 Unidata Community Equipment Awards cycle plan to use THREDDS and/or Jupyterhub on their requested hardware; I hope my experience with both tools will support their efforts as they move forward!

As a preview of what the funded machine will offer in the next few months, click here for an overview of hurricane-centered satellite animations I've generated and the tools used to create them associated with a presentation given at the virtual AMS 34th Conference on Hurricanes and Tropical Meteorology in May 2021. Example snapshots generated via conda environments on the purchased hardware are shown below!