

**Unidata Community Equipment Awards Cover Sheet**

**Proposal Title:**

**Acquisition of AWIPS II EDEX Server and CAVE Client in a Synoptic  
Weather and Analysis Classroom**

**Date: March 5, 2014**

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**Signature of PI:** \_\_\_\_\_



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## Project Summary

The primary goals of this project are to install the next generation Advanced Weather Interactive Processing System (AWIPS II) Environmental Data Exchange (EDEX) server and the Common AWIPS Visualization Environment (CAVE) clients, and to enhance the ability to project high definition graphics in a weather analysis and forecasting classroom settings.

The AWIPS II system will be widely used by forecasters at more than 130 weather forecast offices and river forecast centers across the nation in the near future. As one of the meteorology departments training our next generation forecasters, it is useful to have the AWIPS II system installed in our classroom. Students, therefore, will be able to utilize the state-of-the-art AWIPS II system for learning and conducting weather briefing as well as to better prepare themselves as future meteorologists in weather forecast offices or other agencies. Currently, the department of Meteorology and Climate Science at SJSU is running LDM and is also feeding data to the Naval Research Lab in Monterey and to the University of Alaska Fairbanks, School of Fisheries and Ocean Sciences. We also provide backup IDD service to the University of Arizona, Stanford University, Fleet Numerical Meteorology and Oceanography Center, and Naval Postgraduate School. A newer LDM server installed in 2011, which has sufficient power to create GEMPAK and IDV products used in our classes as well as for public access. Adding the AWIPS II server and client will enhance our capacity to better utilizing all different datasets from Unidata as well as local generated datasets (e.g., fire weather data and local high resolution modeling data) for our classes.

In addition to AWIPS II server and client, we would also want to upgrade our classroom projection system to accommodate high-resolution graphics created by Unidata products. Our current projector purchased in 2002 that has very limited capability. In a classroom setting, it would be needed to display graphics in full resolution for instructional purposes. In recent years, projection systems have improved so that they can better accommodate these high-resolution graphics tools such that the instructor should be able to demonstrate the full power of AWIPS II. This will also benefit all classes that display Unidata products and/or numerical model outputs. It will also enable instructors to project the full real estate of their laptops or iPads.

Overall, it is anticipated that adding the AWIPS II EDEX server, CAVE clients, and a new projector in our computer/multimedia classroom will enhance the learning environment for our undergrad and graduate meteorological education. The intended applications of the new equipment include the traditional meteorological curriculum, such as synoptic and weather analysis (METR 171), weather briefing (METR 170), mesoscale (METR 173), remote sensing (METR 155) and tropical meteorology (METR 165). Additionally, other government agencies in the Bay Area can also connect to the EDEX server in our department.

## **1. Project Description**

### **A. Goals of the project**

This proposal is aimed to install the next generation Advanced Weather Interactive Processing System (AWIPS II) standalone Environmental Data Exchange (EDEX) server and the Common AWIPS Visualization Environment (CAVE) clients, as well as to upgrade a projector to accommodate high-resolution Unidata graphic products in a weather analysis and forecasting classroom setting. Currently three refurbished PC Linux machines are employed as one EDEX server and two CAVE clients for teaching and weather briefing purposes. These machines are slower and freeze or stop responding frequently. Moreover, our current projector has very limited resolution capability. In a classroom setting, it will be needed to have better and stable EDEX server and CAVE clients, as well as to display graphics in full resolution for instructional purposes. It is anticipated that the new equipment will further enhance our capabilities, in teaching, research and in community participation.

### **B. Details of equipment required**

The proposed equipment consists of a single standalone EDEX server and 5 CAVE client workstations. The configuration of the server and client are based on the Unidata recommendation.

A Cybertron PC TSV CIA4341 is proposed for the EDEX server that includes:

- A Intel Xeon E3-1270 Processor (3.40GHz, 8M Cache, 80W, Max Mem 1066MHz)
- Centos Operating System
- 4 x 1TB Hard Drive, 7200 RPM, SATA
- 16 GB Memory (4x4GB), 1333MHz, DDR3, PC3
- 8X DVD RW Drive
- 400 Watt

The CAVE client is based on Asus Essentio Desktop standard base. It has:

- 4rd Gen Intel® Core™ i7-4770 Processor 3.40GHz, 8 MB cache
- 16GB, DDR3 UDIMM Memory, 1600MHz, non ECC (4 x 4GB DIMMs)
- ASUS 24" Monitors
- 2GB NVIDIA GeForce GT620
- 1 TB Hard Drive, 7200 RPM 3.5" SATA 6Gb/s Hard Drive

The projection display upgrade, we propose to purchase:

- BenQ W1070 1920x1080 DLP projector

### **C. Benefits to research and education**

The Department of Meteorology and Climate Science at San Jose State University (SJSU) is the only one of its kind in California offering an undergrad meteorology degree. We provide students with an in-depth knowledge of the atmosphere and prepare

them for careers in the atmospheric sciences. The department has been an active participant in the Unidata community for many years. The courses will be able to take advantage on AWIPS II include: Meteorology I and II (METR 60, 61), Aviation Meteorology (METR 110), Dynamic Meteorology (METR 121 A, B), Remote Sensing (METR 155), Weather Briefing (METR 170), Synoptic Weather and Analysis and Forecasting (METR 171A, B), Mesoscale Meteorology (METR 172) and our capstone course, senior thesis (METR 179).

Currently, we are using GEMPAK extensively for data analysis in classes (METR 121A, B and 171A, B) and are producing daily model and observation products on SJSU weather center site (<http://www.met.sjsu.edu/weather>). Students are also using IDV for weather briefing (METR 170) and case studies for synoptic meteorology (METR 171). Software such as GrADS, IDL and matlab are also employed in other classes. We are striving to incorporate all necessary weather related software in our curricula.

Since November 2013, we have been running one EDEX server and two CAVE clients using three refurbished PCs. Figure 1 shows the EDEX and CAVE system. Although those PCs are functioning properly, they are slower and freeze or stop responding frequently. The support from the Unidata Equipment Grant will make it possible to purchase new PC Linux machines as described in section B for EDEX server and CAVE client, as well as a high definition projector for instructional purpose. We are anticipating that the new equipment will further enhance our education/research environment, as well as community participation.

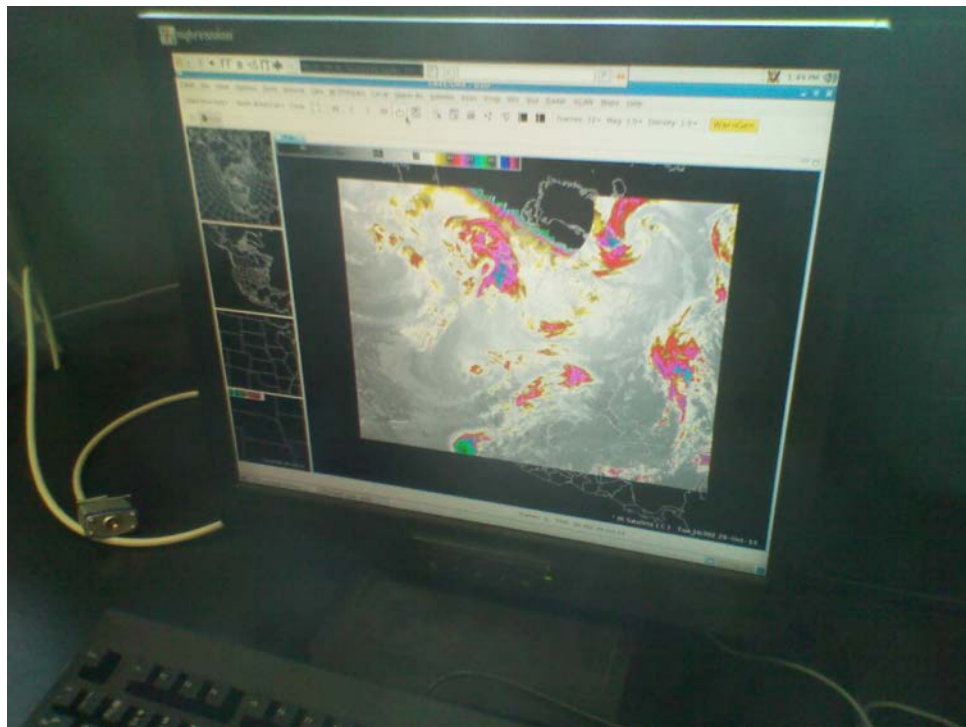


Figure 1: The first standalone EDEX and CAVE at SJSU Meteorology department.

#### **D. Added value to Unidata community at large**

The Department of Meteorology and Climate Science provides the comprehensive BS and MS degree. We are a unique department in that it integrates, meteorology, climate science and related academic concentrations focusing on vital contemporary issues through education, research and outreach. The AWIPS II system at SJSU will allow students and faculty to test and evaluate the software in a learning/research environment. We will also provide feedback and suggestions to the developers at NCEP or Raytheon which may help to improve the capacity of the system.

With the capacity to run state-of-the-art equipment, our students may carry a strong skill set of using these tools to their future careers in operational meteorology, research or teaching in K-12. Outreach activities conducted by our department, and the student chapter of AMS and their attendees will also benefit from the new system. The AWIPS II EDEX may also be a server for other government agencies such as the NASA Ames Research Center, the USGS Western Ecological Research Center, the Bay Area Air Quality Management District (BAAQMD), and Cal Fire.

#### **E. Relationship to existing computing facilities and resources, and departmental plan**

The existing weather analysis and forecasting classroom (Duncan Hall, Rm 614) is composed of 12 Dell PCs configured to Windows 7 and one HP Laser printer. These machines were purchased three years ago. A newer mapwall consists of eight 32-inch TVs that display the real-time weather information via LDM products (i.e., model, satellite, radar, upper air, surface obs and etc.). A newer LDM server controls all the data receiving, feeding to downstream sites as well as processing data using GEMPAK and publishing products on our department's website. Numerous outside users access our daily weather products at <http://www.met.sjsu.edu/weather/>. Currently all machines are maintained by the college of science Information Technology (IT) department and our own department IT (i.e., Dr. Sen Chiao) jointly. It is also anticipated that the new AWIPS II server and CAVE clients will be installed and maintained the same way. The proposed new AWIPS II server and CAVE clients will increase the number of terminals available for students. Products from AWIPS II can be also displayed on our mapwall and department's website.

The Meteorology department has submitted an internal proposal to renovate an old storage room (Duncan Hall, Rm 702) to be a multimedia classroom that also serves as a computer room. This room measures roughly 24' by 30'. Figure 2 shows the floor plans outline for the room to be renovated. The proposal has been ranked at the top going out of the college of science (cf. [http://www.sjsu.edu/provost/budget/aad\\_fundingrequests/](http://www.sjsu.edu/provost/budget/aad_fundingrequests/)). The total cost to renovate this room is estimated to be \$60,500. That proposal is available upon request.

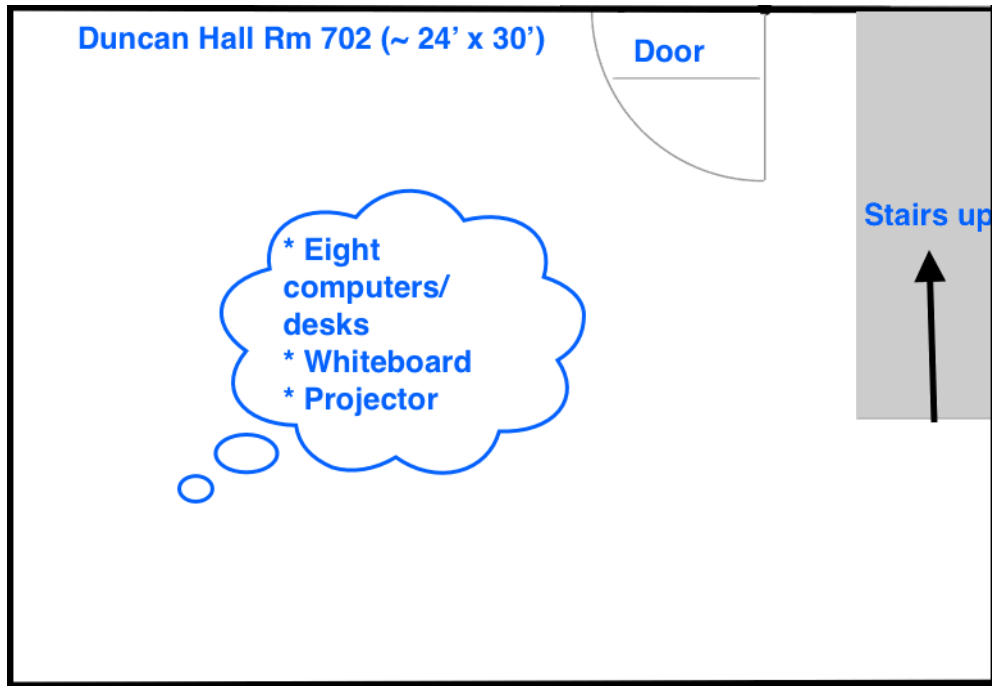


Figure 2: Duncan Hall Room 702 floor plan

## 2. Budget

University Contribution

PI In-Kind Time of One Person Month (Dr. Sen Chiao):

- a. Configuration/Installation/management of AWIPS II for the Meteorology and Climate Science department at SJSU.
- b. Training students/faculty on AWIPS II and other Unidata software use.
- c. Integration of AWIPS II into the Weather Analysis and Forecasting (METR 171) and Weather Briefing (METR 170) course curricula.

Requested Funding

Line Item Budget for Equipment Purchase:

1) 1 AWIPS II standalone server (Cybertron): 1 @	\$1470.00
2) 5 CAVE clients (ASUS Essentio): 5 @ \$879.99	\$4400.00
3) BenQ W1070 projector: 1 @ \$1086.41	\$1087.00
4) 5 ASUS LED 24" Display: 5 @ \$ 209.99	\$1050.00
Total Equipment including tax/shipping:	\$9107.00
Overhead/indirect costs 43.4%	\$3952.00
(Federal Cognizant Agency DHHS approved rate as of 7/3/2013)	

**Total Equipment and Overhead** **\$13059.00**

### **3. Project Milestones**

- a. The equipment will be ordered within one month of award (May 2014).
- b. Acquire and install equipment (July 2014).
- c. Configuration and testing (August 2014).
- d. Classes including METR 171 (Weather Analysis and Forecasting); METR 170 (Weather Briefing), and METR 61 (Intro to Meteorology) will be able to use the new equipment (September 2014).