FINAL REPORT of "**Enhancing Education in Atmospheric Sciences using AWIPS II and CAVE at the University of Hawaii at Manoa**"

EFFECTIVE DATES: 6/1/2020-5/31/2021
AWARDED AMOUNT: $19,400

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1.   Project Summary

The Department of Atmospheric Sciences (AMTO) at the University of Hawaii at Manoa (UHM) received a 2020 Unidata Community Equipment Award in the amount of $19,400 to upgrade and expand the UHM VisionLab by bringing state-of-the-art workstations capable of running CAVE (Common AWIPS Visualization Environment) a Visualization Client for AWIPS (Advanced Weather Interactive Processing System) II to the Department of Atmospheric Sciences in the School of Ocean and Earth, Science and Technology (SOEST). The goals of the proposal were to:

i)   Allow the seamless use of the modified non-operational version of AWIPS at UHM using the CAVE visualization framework (an Eclipse-built Java application which runs on Linux, Mac, and Windows);
ii)   Provide a realistic, more responsive work-environment for CAVE and IDV;
iii)   Increase speed of calculations on large matrices in MATLAB and Python, which are both used in courses and research;
iv)   Facilitate the exploration of data science and deep learning as they pertain to geophysical science;
v)   Enhance research and teaching with deep learning capabilities

To achieve the goals outlined above and to remain a vibrant contributor to the Uidata community the funds were used to purchase new workstations. With access to the new workstations and the latest meteorological data sets and visualization methods students, faculty and researchers alike have an improved ability to analyze and plot meteorological data for educational and research purposes. A summary of the equipment purchased is listed below:

Item	Quantity
ThinkStation P330 Intel Core i9-9900 (3.10GHz, 16MB), Windows 10 Pro 64, 32.0 GB, 1x1 TB SSD PCIe, NVIDIA RTX2070	17
TUF VG27AQ 27" WQHD Gaming LCD Monitor 16:9 – Black – IN-plane Switching (IPS)_ Technology – 2560 x 1440 – 16.7 Million Colors – G-sync Compatible – 350 Nit – 1 ms MPRT – 2 Speaker(s) – HDMI – Display{ort 155HZ1440PIPS HDR EYECARE W DPHDMI	17

The computers were received on 10/16/2020 and installed by the end of December in the Fall 2020 semester. Initially, the workstations were to be used in the Spring 2021 semester for use in Tropical Analysis Lab course, a 4 credit synoptic course that teaches techniques of portraying and analyzing atmospheric structure and weather systems in tropical and equatorial regions; forecasting tropical systems. Unfortunately, due to COVID-19 pandemic procedures mandated by the State of Hawaii and the University of Hawaii no in-person classes were taught by ATMO and faculty, students and researchers were required or suggested to work from home when possible. Thus, the VisionLab was closed to faculty, students and researchers in Fall 2020 and Spring 2021 since social distancing measures could not be guaranteed VisionLab space. Thus, the workstations are currently operational, but have not been used for an in-person classroom setting or for research purposes.
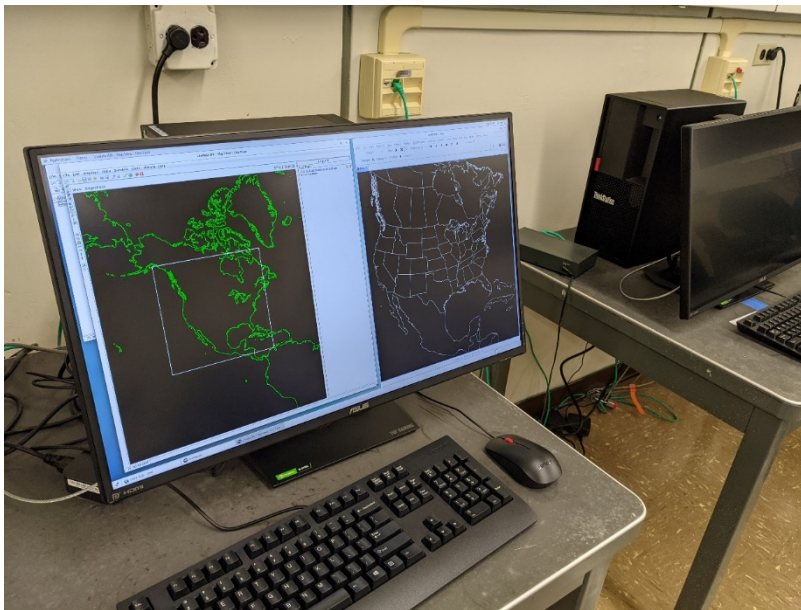
Figure 1: *New ThinkStation P330 computers and 27" WQHD Gaming LCD Monitor set up in the VisionLab showing CAVE and IDV, both Unidata products, running side by side.*

2. VisionLab Description

VisionLab is managed and housed by the ATMO and takes advantage of the Unidata program's data stream and other data resources from NOAA and NASA via the Internet and NOAAport to bring real-time weather data using state-of-the art visualization tools to UH. The new equipment acquired will facilitate both real-time data delivery and access, and greatly expand our ability to visualize, store and serve large geosciences data sets. With the workstations purchased through this proposal we are truly able to professionalize the learning experience at UHM for classes including, but not limited to, Meteorological Analysis Lab, Tropical Analysis Lab, Introduction to Weather and Climate Lab, Programming for Meteorologists, Satellite Meteorology, Satellite Data Analysis and for Undergraduate and Graduate Thesis projects. Faculty are eager to integrate AWIPS II and CAVE into their curriculum as we continue to modernize our program and incorporate real-world applications, issues and solutions into the classroom. Since the courses listed above are designed with laboratory and computing contact hours the use of AWIPS II data and the CAVE client can be integrated directly into our academic program starting in Fall 2021.