Unidata Community Equipment Award:

Facilitating Education, Research, and Community Participation Using Unidata Resources

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Five-year (undergraduate?) student enrollment trends in the Department of Earth Sciences (DES) at Millersville University (MU) continue to exhibit significant increases. Since 1999, the DES has experienced a 30% increase in the number of majors: meteorology from 85 to 110, oceanography majors from 7 to 15, and BS in secondary education majors from 12 to 20. Consequently, overcrowding and inadequate computing resources characterized our programs, particularly in the meteorology classrooms where a significant number of introductory labs, and upper division courses are taught. MU-DES responded to this programmatic growth by reconfiguring classrooms designed initially for 18 students to accommodate 24 seats. This action necessitated a complete redesign of the student computer workspace.

The Unidata Community Equipment Award (combined with an MU 50% cost share) supported the purchase of 12 Dell OptiPlex GX270 Pentium 4 2.80 GHz PCs with 1.0 GB of memory, and dual bootable for Windows and Red Hat Linux. The new computers replaced nine Sun Ultra 5 workstations which were distributed within the DES to an oceanography lab, a remote sensing lab, and a groundwater-soils geology lab constituting a significant upgrade to those facilities. Thus, this Unidata award not only advanced teaching and research capabilities within the DES meteorology program, but also augmented the computing resources within the entire DES curricula.

The state-of-the-art technology classroom facilitated through this equipment award is a key component in an ongoing departmental initiative to create environments that better facilitate student-centered learning through group interactions and authentication of the scientific process of discovery, hypothesis testing, and problem solving. Students are exposed to the latest data, tools (e.g., IDV), and applications through this new technology, and demonstrate greater skills and proficiencies in the analysis and visualization of complex fields.

The DES computer equipment upgrades acquired through this Unidata award are handling the flood of data from very high resolution models, improved laboratory and experimental instrumentation, high resolution satellite data, Level II radar data, and data from thematic repositories. Visualizing the four-dimensionality of these high temporal and spatial resolution data sets is now possible through the application of sophisticated tools like IDV. For example, an entire suite of observations, satellite and radar imagery, and high resolution model data is available in house to investigate the strong F3 tornado of 14 July 2004 which destroyed 37 homes in a community just 35 miles north of Millersville.

One year ago, the potential for in-depth research of a significant weather event was significantly hindered by our inadequate computational resources. Today, students can visualize three-dimensional volume scans; interrogate satellite imagery, and cross-section iso-surfaces of relative vorticity or wind speed associated with real-time or archived data sets. In the near future,

we will use resources available from the NAVY (Navy?) and NOAA to develop research tools suitable to hindcast significant wave heights, storm surge, and the forecasting of toxic algal blooms. We will also develop techniques for visualizing ocean structure and circulation contained within the ARGO data set.

The development of a state-or-the-art technology classroom with high-end PCs enabled DES to serve the broader Unidata community by hosting a workshop on 6-8 June 2004 dedicated to the use of the Integrated Data Viewer (IDV). The June 2004 issue of the Unidata newsletter (http://my.unidata.ucar.edu/content/currentNL.htm) describes the success of this workshop. Similar workshops will provide an effective outreach opportunity for pre-college Earth Science teachers, and professional continuing education credits through the University.