Unidata Community Equipment Grant
Cover Sheet

Proposal Title: A prototype AWIPS II EDEX server system for the Department of Geography and Meteorology at Valparaiso University

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Section B: Abstract

We propose to purchase a new server and storage system to support a prototype of the Advanced Weather Information Processing System (AWIPS II) Environmental Data Exchange (EDEX) server for implementation of using AWIPS II in our meteorology curriculum. The proposed system will be an integral part of the continually adapting computing systems within the Department of Geography and Meteorology. Additionally, we hope to show that implementation of an AWIPS II EDEX server and the Common AWIPS Visualization Environment (CAVE) at a smaller university is both possible and beneficial to the educational and research mission of the program. We would offer back to the community any information and assistance to allow more programs to achieve similar goals.

With the a dual-polarization 5-cm Doppler radar and radiosonde launching system housed with the Department of Geography and Meteorology at Valparaiso University, we continue to look for ways of sharing our unique data with the Northwest Indiana and the Unidata communities. The proposed system will allow us to make our radar and radiosonde data freely available to all.

Section C: Project Description

1. Intellectual merit

The Department of Geography and Meteorology at Valparaiso University has grown tremendously over the past 20 years. Since the addition of a Bachelors of Science in Meteorology in 1991, we have grown to over 100 meteorology majors and 30 geography majors. Recently, the Department of Geography and Meteorology wrote and was awarded two grants from the National Oceanic and Atmospheric Administration (NOAA) totaling more than $1 million dollars. A portion of this grant was used in acquiring the first replacement cycle of computers for our 20-workstation weather center. This has greatly improved our computing ability over the previous Sun Ultra-thin client network.

This proposal seeks funding for a new server system that will allow us to tie our existing departmental computing system with the upgrade to the new AWIPS II architecture and data display software. Additionally, this new server will allow for another outlet for our expanding C-band dual-polarization and radiosonde launch datasets.

From yearly updates at the American Meteorological Society annual meetings and in reviewing early versions of the AWIPS II system at this year's meeting, it is clearly evident that this new system would greatly contribute to the educational mission of any meteorology program. Our program is excited to lead the way in developing the educational opportunities inherent in the new AWIPS II platform. This grant would greatly contribute to the successful implementation of this new system at programs similar to Valparaiso University.

2. Contributions to Unidata community

The Department of Geography and Meteorology currently receives McIDAS and GEMPAK data via the Unidata IDD system. We hope to provide near real-time Doppler radar data to the Unidata network. Radiosonde data will also be provided to the Unidata

network as radiosondes are launched. We intend to make our data freely available to the general public and the Unidata community.

We intend for the Department of Geography and Meteorology at Valparaiso University to serve as an early test case for implementing the new AWIPS II EDEX server in conjunction with the AWIPS II upgrade and migration away from the GEMPAK suite our program could be used as a resource in helping identify issues during installation and spin-up of the new environment at other institutions, especially small liberal arts style universities like Valparaiso University.

3. Broader impacts

Currently we serve the community with local Weather Research and Forecasting (WRF) model runs twice daily via the web and offer archived data on request. The Doppler radar data we gather and radiosonde launches we conduct from a northwest Indiana site provides a broad source of data to the community. The data we collect from radiosonde launches are shared in real-time with local NWS offices and airlines via personal contacts. However, we are continuing to work on better methods for disseminating this data and hope that this new server will keep us advancing on that front. Our dual-polarization, 5-cm Doppler radar is located midway between the Romeoville, IL, and North Webster, IN, National Weather Service (NWS) Doppler radar sites. We are on the outer edges of both radar ranges and will be able to provide a lower-level view of severe storms and lake-effect snow in an area physically under the existing radar sights.

To our knowledge, no other entities currently conduct radiosonde launches in the state of Indiana. Our location at the base of Lake Michigan provides a valuable source of upper air data to forecasters and modelers.

We have already received positive feedback and eager anticipation from the meteorological, energy, communications, broadcasting, and education communities expressing interest in both the Doppler radar and radiosonde data.

4. Enhanced participation to the Internet Data Distribution (IDD) System

The proposed system will allow the Department of Geography and Meteorology to maintain a feed of our Doppler radar and radiosonde data for immediate distribution on the IDD, as well as redistribution at any time.

5. Contributes to the advancement of technology

The proposed server system will allow the students in the Department of Geography and Meteorology to train on a similar platform that is used by the National Weather Service for diagnosing current and future atmospheric conditions. Additionally, students will be able to continue to generate weather maps through similar programming efforts currently available through the GEMPAK suite of programs. The Department of Geography and Meteorology would lead efforts to further refine the capabilities of batch scripting for efficient map creation and dissemination to the broader Unidata and meteorological community.

6. Contribution to education

The department currently educates over 100 meteorology majors and over 30 geography majors. Our majors annually receive competitive Research Experiences for

Undergraduates (REU) at NASA and NSSL. We have had several AMS graduate fellowship recipients from our student body. In addition, we teach general education geography and natural science courses to the undergraduate student body. GEMPAK is already well incorporated into the curriculum of a number of our courses including dynamic and synoptic meteorology. Recently, a new course titled "Introduction to Weather Technology" has been offered, aimed at getting freshman meteorology majors into the computer lab and gaining a working knowledge of the technology they will utilize through the rest of their coursework. With increased access to GEMPAK and AWIPS II via the new server and our new computer system in the weather center, further use of these tools with real-time and archived data is eagerly anticipated. Whether our graduates go into graduate research, private industry, or government positions, familiarity and knowledge of multiple meteorological software packages using archived data from a wide variety of weather situations can only aid them in their endeavors.

The new server will provide students and faculty more flexibility in their assignments. Having access to a robust operational style weather visualization tool will allow for better integrated weather discussions and post-case analysis than is currently available. Our archive of Doppler radar data, radiosonde data, as well as the usual meteorological data will greatly enhance and expand the faculty's database of in-class examples, case study assignments and exam questions based on archived data.

7. Contribution to research

The weather in northwest Indiana provides many research opportunities. Lake Michigan influences our region in a multitude of ways, from lake effect snow in the winter, to lake breezes in the summer, delayed frost dates in the fall, and extended frost dates in the spring. Low-level baroclinic boundaries from the lake are often speculated to both inhibit and encourage severe weather. Our location midway between the Romeoville, IL, and the North Webster, IN, NWS Doppler radars will bridge a gap in radar data during weather events and is ideal for field projects.

Live and archived radiosonde and Doppler radar data will ensure a rich source of research potential for students and the research community. The ability to access the latest meteorological research tools such as AWIPS II Common AWIPS Visualization Environment (CAVE) from any computer will increase the opportunity for more students to become involved in research activities under the guidance of faculty. Independent study and honors thesis work for our undergraduate student body will become a feasible option during the summer months and the school year. Currently, the best opportunity for our students to explore research comes through competitive REUs at other educational and government institutions. Our hope is to be able to offer more in-house opportunities.

8. Requested equipment

We propose to purchase a HP DL 360 G7 Server, with 8 terabytes of storage from disks, and 128 GB of memory. The server specifications chosen are based on conversations with Unidata personnel who are familiar with the requirements of the AWIPS II EDEX system. Additionally, we would buy a desktop computer to use as a testing platform for integrating this server with our existing computer technology. The total cost of the system is $15,251. We are asking for up to $20,000 from the Unidata Equipment Grant. The full grant amount is requested since there is not a final set of

requirements available for the AWIPS II EDEX server. A final determination on finalized hardware purchases would occur in consultation with Unidata personnel involved in AWIPS II development. It is not anticipated that costs would run in excess of the maximum amount.

A detailed list of the equipment requested is attached with the budget section.

9. Relationship to existing department computing facilities

This new AWIPS II EDEX server would add to the 20-workstation system deployed in our Weather Center system and allow for a seamless transition to the new AWIPS II environment for faculty and students. This new server would allow for our collection of radar and radiosonde data to be actively distributed to the community. This server would run in conjunction with our current LDM server.

Currently, the department uses a server to run the LDM, which provides data to our 20-workstation weather center in which students regularly use GEMPAK and IDV to access and display meteorological data. Students use the weather center computers to complete GEMPAK based assignments and conduct weekly weather briefings, which often use Unidata resources. Our hope would be to transition the current LDM server to be another AWIPS II EDEX server for use as a case study server.

10. System management competence

Valparaiso University provides system management support through two channels. The Office of Information Technology (IT) at Valparaiso University supports the community needs of the entire campus community by maintaining servers, upgrading PCs, and answering technological questions. IT has assisted the department by planning for the recently upgraded technology and new computing system for our facility's classrooms, labs, and weather center. In addition to IT, the Department of Geography and Meteorology shares a dedicated technical support person, Mr. Wen Lu, with the physics department. Mr. Lu has maintained and upgraded the department software needs for meteorological applications for the past eight years. Mr. Lu diagnoses problems and works with IT to upgrade and solve any problems in the meteorological software.

With the addition of the new computing system, the Department's software and data requirements will continue to move to a more independent (of the University) structure. This will allow Mr. Lu to maintain control of the data flow and software upgrades for the department, but still have easy access to the experience and support of the IT staff.

Section D: Budget and justification

We propose to purchase a HP DL 360 G7 Server, with 8 Terabytes of storage from disks, and 128 GB of memory. The total cost of the system is $15,251. We are asking for $20,000 from the Unidata Equipment Grant as these are estimates based on general specifications for what would be needed to run an AWIPS II EDEX server. Faculty and staff time for implementation is covered at no cost.

HP DL 360 G7 Server

- 2 Six-Core Intel® Xeon® Processor 3.06GHz processor
- 8TB storage raw

- 128GB memory

HP Pavilion HPE h8m series

- Desktop computer
- AMD FX-8150 eight-core processor [3.6GHz, 8MB L2/8MB L3 Cache]
- HP 16 GB DDR3-1333MHz SDRAM [4 DIMMs]

An estimate from HP for the proposed server system and desktop computer is given below.



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Items/description	Part no	Unit price	Qty	Ext price
HP ProLiant DL360 G7 Server	**Base**	**$14,061.01** $14,061.01	1	$14,061.01
HP ProLiant DL360 G7 Server	**579237-B21**			
Six-Core Intel® Xeon® Processor X5675 (3.06GHz, 12M L3 Cache, 95 Watts)	**633781-L21**			
HP 64GB PC3-8500R 4x16GB 4Rank Memory	**500666-64G**			
Six-Core Intel® Xeon® Processor X5675 (3.06GHz, 12M L3 Cache, 95 Watts)	**633781-B21**			
HP 64GB PC3-8500R 4x16GB 4Rank Memory	**500666-64G**			
Storage controller				
HP P410i/ZM (SAS Array Controller)				
HP Smart Array Advanced Pack including 1yr 24x7 Technical Support and Updates Single Server License	**516471-B21**			
Drive cage				
HP 4-Bay Small Form Factor Drive Cage				
HP 1TB 6G Hot Plug 2.5 SAS 7.2K MDL Hard Drive	**605835-B21**			
HP 1TB 6G Hot Plug 2.5 SAS 7.2K MDL Hard Drive	**605835-B21**			
HP 1TB 6G Hot Plug 2.5 SAS 7.2K MDL Hard Drive	**605835-B21**			
HP 1TB 6G Hot Plug 2.5 SAS 7.2K MDL Hard Drive	**605835-B21**			
HP 4-Bay Small Form Factor Drive Cage	**516966-B21**			
HP 1TB 6G Hot Plug 2.5 SAS 7.2K MDL Hard Drive	**605835-B21**			
HP 1TB 6G Hot Plug 2.5 SAS 7.2K MDL Hard Drive	**605835-B21**			
HP 1TB 6G Hot Plug 2.5 SAS 7.2K MDL Hard Drive	**605835-B21**			
HP 1TB 6G Hot Plug 2.5 SAS 7.2K MDL Hard Drive	**605835-B21**			
RAID 5 drive set with online spare (requires matching 4 hard drives)	**339780-B21**			
Network card				
2 Embedded HP NC382i Dual Port Multifunction Gigabit Server Adapters (4-Ports)				
2 HP 460W Common Slot Gold Hot Plug Power Supplies	**503296-2PS**			
Server management				
Integrated Lights Out 3 (iLO 3)				

Management
Warranty
HP Standard Limited Warranty - 3 Years
Parts and on-site Labor, Next Business
Day

Subtotal: $14,061.01

Estimated Lease Cost: $455.44

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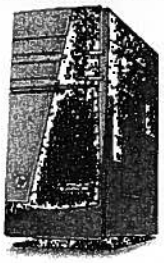
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Processor	AMD FX-8150 eight-core processor [3.6GHz, 8MB L2/8MB L3 Cache]	edit
Memory	16GB DDR3-1333MHz SDRAM [4 DIMMs]	edit
Hard drive	1TB 7200 rpm SATA hard drive	edit
Office software	Microsoft(R) Office Starter: reduced-functionality Word & Excel w/ ads. No PowerPoint or Outlook	edit
Security software	FREE upgrade to Norton Internet Security(TM) 2012 - 15 month	edit
Graphics card	2GB AMD Radeon HD 7570 [DVI, HDMI, DP, VGA adapter]	edit
Power Supply	460W Power supply	edit
Primary optical drive	SuperMulti DVD Burner	edit
Networking	Integrated Ethernet port, No wireless LAN	edit
Productivity ports	15-in-1 memory card reader, 2 USB 2.0 (front), audio, 2 USB (top rear-facing)	edit
TV & entertainment experience	No TV Tuner	edit
Sound Card	Beats Audio (tm) -- integrated studio quality sound	edit
Keyboard and Mouse	Premium HP keyboard and optical mouse	edit

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† Based on Passmark Report www.norton.com/passmark2011 and Dennis Technology Labs www.norton.com/dennislabs2011

‡ Intel's numbering is not a measurement of higher performance.

§ Actual formatted capacity is less. A portion of the hard drive is reserved for system recovery software: for notebooks, up to 40GB (Windows 7); for desktops, up to 26GB (Windows 7). For hard drives, 1GB=1 billion bytes.

This PC is preloaded with reduced-functionality versions of Word and Excel with advertising. NOT INCLUDED: PowerPoint, Outlook, OneNote, Access and Publisher.

¶ In-home warranty is available only on select customizable HP desktop PCs. Need for in-home service is determined by HP support representative. Customer may be required to run system self-test programs or correct reported faults by following advice given over phone. On-site services provided only if issue can't be corrected remotely. Service not available holidays and weekends.

§§ HD (High Definition) content required to view HD images

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*** AMD's model numbering is not a measurement of clock speed. Dual/Quad/Triple Core is a new technology designed to improve performance of multithreaded software products and hardware-aware multitasking operating systems and may require appropriate operating system software for full benefit. Not all customers or software applications will necessarily benefit from use of this technology.

††† Battery life will vary depending on the product model, configuration, loaded applications, features, use, wireless functionality (including the wireless functionality) and power management settings. The maximum capacity of the battery will naturally decrease with time and usage. See MobileMark07 battery benchmark www.bapco.com/products/mobilemark2007 for additional details.

§§§ This system may require upgraded and/or separately purchased hardware and/or a DVD drive to install the Windows 7 software and take full advantage of

E: Project milestones

If this proposal is funded we will promptly order and install the proposed server system. Assuming an early summer purchase and delivery, the server system should be on-line and ready to install the AWIPS II EDEX server by fall semester 2012. Installation of the server software would happen sometime in Spring 2013 or as soon as the software became available. The proposed server system will be merged with the existing computing system, by installing the CAVE soon after the server is running and stable.