A. COVER PAGE

UNIDATA COMMUNITY EQUIPMENT REQUEST

TITLE: EYES IN THE SKY: INSTALLATION OF A GOES-16 DATA SERVER AT COLLEGE OF DUPAGE

by

Dr. Vittorio (Victor) A. Gensini
Associate Professor of Meteorology
College of DuPage
425 Fawell Boulevard
Berg Instructional Center (BIC) 3500
Glen Ellyn, IL 60137
Email: gensiniv@cod.edu
Phone: (630)-942-3496

[redacted]

email=vgensini@gmail.com,

[redacted]

Mr. Tom Schrader
Dean
Math and Physical Science
Email: schrader@cod.edu
Phone: (630)-942-33[redacted]

[redacted]

B. PROJECT SUMMARY

We propose to purchase, install, and operate a server for purposes of examining, disseminating, and displaying GOES-16 satellite data at College of DuPage (COD). With GOES-16 satellite data now nearly operational, we feel it is vital that our community have access to the most up-to-date observational datasets for education and research. COD Meteorology has been a leader in the dissemination of satellite data for over a decade through our popular user interface (http://weather.cod.edu/satrad), but current server workload does not allow for the ability to fully utilize the expected wealth of data available from GOES-16.

With the implementation of a new physical server on campus, we will be able to continue expanding our online repository of satellite data while meeting the demands of 21st century education and data analysis. COD has been very supportive of our operations in the past, and continues to provide the infrastructure necessary for being a leader in meteorological data distribution (e.g., server room, power, IT support). We propose that this server be a clearinghouse for GOES-16 data for our community. Specifically, we would like to capture, analyze, display, and archive all 16 spectral bands from the GOES-16 ABI sensor. The archival of imagery will be done in conjunction with Mr. Daryl Herzmann at Iowa State University using Unidata's LDM software.

C. PROJECT DESCRIPTION

i. The College of DuPage Meteorology Program

COD is a community college located in Glen Ellyn, Illinois, a western suburb on the doorstep of the Chicago metropolitan area. With nearly 30,000 students, CoD is the largest community college in the state of Illinois and ranks in the top 100 nationally by enrollment. In fall semester 2015, CoD had an enrollment of 29,476 with a student to faculty ratio of 24 to 1. Among all students, 55% are white, 9% African-American, 22% Hispanic, 10% Asian, 1% Native American or Pacific Islander, and 3% unknown. Approximately 47% percent of students are male and 53% are female. 83% of CoD students are from community college district 502, 15.3% out of district, and 1.2% international students. CoD offers 9 different associate degrees in 62 program areas, 148 certificates, and 10 3+1 Bachelor's degree programs with neighboring Universities.

The COD Meteorology Laboratory (known widely as NEXLAB) has received much interest locally and nationally since its inception in 1989. Known widely for its commitment to improving first and second year undergraduate meteorology education, the program has received vast amounts of media attention, ranging from informational interviews on local television stations to full length newspaper articles. The program attracts students from various backgrounds wishing to study meteorology, with the personal attention only available in a community college setting. In addition to providing students a quality educational experience at an

affordable cost, students have access to a sophisticated computer network (powered by Unidata software) that supplies them with contemporary meteorological data from around world.

ii. Serving students and the community

The COD meteorology curriculum uses various Unidata software packages (McIDAS, GEMPAK, LDM, IDV, MetPy) that help students obtain a greater understanding of meteorological processes through data visualization. These Unidata software packages have also been the cornerstone of our popular online internet presence (http://weather.cod.edu) through shell scripting. In fact, COD's online web presence has grown into one of the most popular meteorological web sites in the U.S., averaging over 1,000,000 unique IP vists per month. With the addition of a dedicated GOES-16 server through Unidata's equipment grant program, we will be able to expand our online repository of information, while providing direct access to imagery to the community through our website.

iii. Support

After watching the program grow into what it is today, COD continues its support of the meteorology program through its recent agreement to purchase a new 3.8 meter satellite dish for better reception of data via NOAAPORT, and financial support for a part-time NEXLAB assistant. Showing further support, COD recently hired Mr. Mike Zuranski as a full-time meteorology support analyst. Mike brings a wealth of knowledge to COD, including many new product scripts, ideas for program development, and educational resources. COD has never been a recipient of a Unidata equipment grant, and instead has relied on user donations for funding over the past five years. With user donations, we have been able to send staff to Unidata workshops for professional development, and increase the breadth of data available on our website.

iv. Importance of this project

This proposal uniquely addresses Unidata's 2017 call for proposals by highlighting the data proximate analysis of large datasets (i.e., GOES-16). Students and community members will be able to directly access, display, and analyze GOES-16 data through support of this proposed project. In addition, there are currently no tools in place to archive GOES-16 imagery. We have agreed to work with another UNIDATA equipment grant funded institution (Iowa State University; Mr. Daryl Herzmann) to set up an ldm pqinsert process to begin archiving GOES-16 imagery for the community to access.

To ensure success of this project (given the vast scope of such a dataset), we have developed a temporary GOES-16 user interface for the display of a few spectral bands from GOES-16. COD has agreed to let us perform this testing on a non-operational virtual server (provided by the College) as a "proof-of-concept" for the

ingestion, processing, and display of data. The experimental website can be found at http://weather.cod.edu/satrad/exper. As of the writing of this proposal, the website has been operational for only four days, yet has received over 100,000 unique IP pageviews from .edu, .gov, .mil, and .com addresses. A sample of this experimental interface is shown in **Figure 1.**

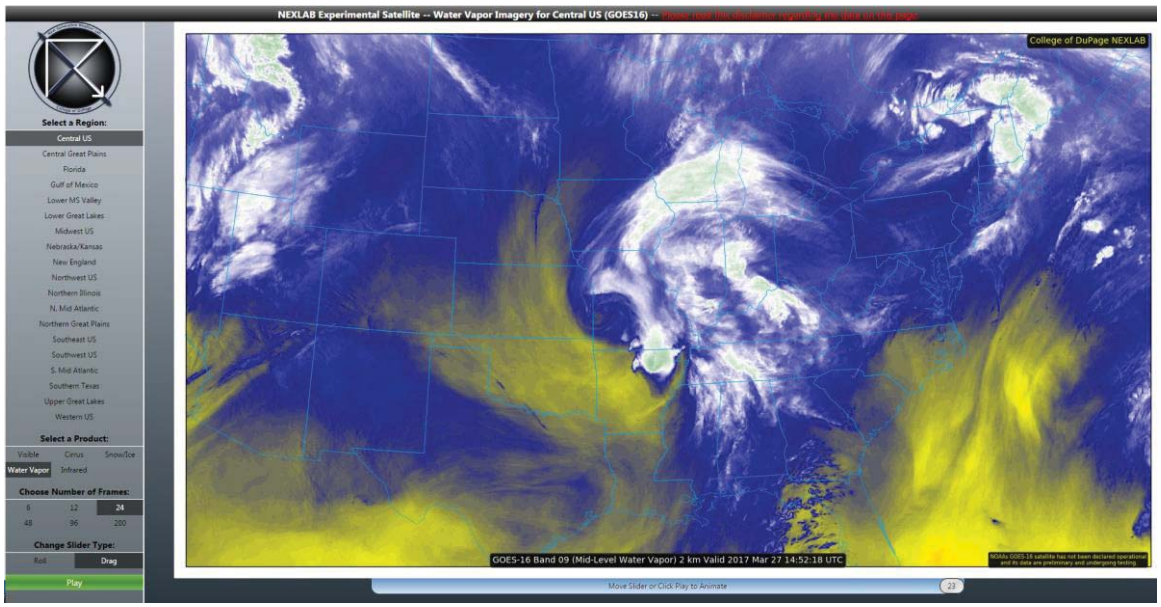


Figure 1. Experimental GOES-16 data viewer from College of DuPage NEXLAB.
http://weather.cod.edu/satrad/exper

We will not be able to continue serving this data to the community without an additional physical server. The specs of the server listed in section D were chosen in discussions with our College IT department for planned processing of full-disk imagery, 5-min CONUS domain imagery, and 1-min MESO sectors for all 16 GOES-16 spectral bands plus processing for a true-color product. In addition, we propose to create a github repository (https://github.com/CoDNEXLAB) for sharing of our Python scripts and a video tutorial on how to use the web interface with a description of all of the spectral bands to help educate users. We believe that maintaining the highest quality of tools and techniques prepares students with a better ability to transition into the work force with experience in software that will be used in their careers.

D. BUDGET

COD NEXLAB proposes the purchase of a HP DL 380 G9 Server and 128 GB of memory, based on discussions with College IT staff and initial testing of GOES-16 data processing. While no minimum specification was suggested, we feel that this particular server model will optimize cost and efficiency, while providing a high-end server capable of serving the unique needs of COD's NEXLAB network infrastructure. The total cost of the server system is $17,961.76 (see attached

quote). Full time faculty and staff time is covered by College of DuPage and recovered partially through indirect cost at 11% of the total estimated cost. While COD will not provide direct matching funds toward the purchase of the proposed equipment herein (in this instance), COD has recently purchased a new 3.8 meter NOAAPORT dish to support NEXLAB operations.

i. Itemized budget request

HP DL 380 G9 Server

- ✓ 2 Eighteen-Core Intel Xeon 3.60 GHz processors
- ✓ 2 x 400 GB SSD
- ✓ 4 x 600 GB HDD
- ✓ 8 x 16GB PCL3 2Rank Memory (128 GB Total Memory)

COST: $**17,961.76 based on recent attached quotes**

TOTAL ESTIMATED COST: **$17,961.76**

INDIRECT COST @ 11%: **$1,975.79**

TOTAL AMOUNT REQUESTED: **$19,937.55**

E. PROJECT MILESTONES

Vendor quotes have already been obtained, which will allow for immediate placement of purchase in late May or early June 2017. This will allow for project PI Gensini, COD NEXLAB staff, and IT personnel to install equipment early in summer semester while campus activity is at a minimum. Additionally, GOES-16 will be declared operational in the near future, and we'd like to make sure systems are online as soon as NOAA makes that declaration.

(Assuming the this proposal was funded by 1 June 2017)

Date	Task
1 Jun 2017	▪ Purchase of the new dedicated GOES-16 server
1 Jul 2017	▪ Delivery and installation of the new server begins
1 August 2017	▪ Providing data to students and community members for years to come

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RTI Account Mgr: **Todd McCabe**
Direct Tel: 866-804-4388 ext. 1007
Email: tmccabe@riversidetechnologies.com
Direct Fax **866-812-5370**

Name: **Tom Reis**
Contact: **College of DuPage**
Address: **425 22nd St**
City: **Glen Ellyn, IL 60137**
Phone:
E-mail: **reistom@cod.edu**

Quote #: CI-DL380-18Cstnd 12:00
Date Requested: **2/24/2017**

Quote Expires: **3/26/2017**

Qty	Part #	Description	Unit Price	Ext. Price
		DL380 Server w/SSDs		
1	**719064-B21**	HEWLETT PACKARD ENTERPRISE : HP DL380 Gen9 8SFF CTO Server	$ 1,689.84	**$ 1,689.84**
1	**719064-B21#ABA**	HEWLETT PACKARD ENTERPRISE : U.S. - English localization	$ -	**$ -**
1	**817963-L21**	HEWLETT PACKARD ENTERPRISE : HPE DL380 Gen9 E5-2697v4 FIO Kit	$ 3,149.22	**$ 3,149.22**
1	**817963-B21**	HEWLETT PACKARD ENTERPRISE : HPE DL380 Gen9 E5-2697v4 Kit	$ 2,924.28	**$ 2,924.28**
1	**817963-B21#0D1**	HEWLETT PACKARD ENTERPRISE : Factory integrated	$ -	**$ -**
8	**805349-B21**	HEWLETT PACKARD ENTERPRISE : HPE 16GB 1Rx4 PC4-2400T-R Kit	$ 197.92	**$ 1,583.36**
8	**805349-B21#0D1**	HEWLETT PACKARD ENTERPRISE : Factory integrated	$ -	**$ -**
1	**724865-B21**	HEWLETT PACKARD ENTERPRISE : HP DL380 Gen9 Universal Media Bay Kit	$ 80.92	**$ 80.92**
1	**724865-B21#0D1**	HEWLETT PACKARD ENTERPRISE : Factory integrated	$ -	**$ -**
2	**779168-B21**	HEWLETT PACKARD ENTERPRISE : HP 400GB 12G SAS ME 2.5in EM SC H2 SSD	$ 1,622.98	**$ 3,245.96**
2	**779168-B21#0D1**	HEWLETT PACKARD ENTERPRISE : Factory integrated	$ -	**$ -**
4	**759212-B21**	HEWLETT PACKARD ENTERPRISE : HP 600GB 12G SAS 15K 2.5in SC ENT HDD	$ 640.76	**$ 2,563.04**
4	**759212-B21#0D1**	HEWLETT PACKARD ENTERPRISE : Factory integrated	$ -	**$ -**
1	**726536-B21**	HEWLETT PACKARD ENTERPRISE : HP 9.5mm SATA DVD-ROM Jb Gen9 Kit	$ 62.70	**$ 62.70**
1	**726536-B21#0D1**	HEWLETT PACKARD ENTERPRISE : Factory integrated	$ -	**$ -**
1	**719073-B21**	HEWLETT PACKARD ENTERPRISE : HP DL380 Gen9 Secondary 3 Slot Riser Kit	$ 62.11	**$ 62.11**
1	**719073-B21#0D1**	HEWLETT PACKARD ENTERPRISE : Factory integrated	$ -	**$ -**
1	**749974-B21**	HEWLETT PACKARD ENTERPRISE : HP Smart Array P440ar/2GB FBWC 12Gb 2-ports Int FIO SAS Controller, includes the HP Smart Storage Battery.Provides support for up to 8 internal SAS/SATA drives without using a PCIe slot.	$ 591.31	**$ 591.31**
1	**733660-B21**	HEWLETT PACKARD ENTERPRISE : HP 2U SFF Easy Install Rail Kit	$ 63.33	**$ 63.33**
1	**733660-B21#0D1**	HEWLETT PACKARD ENTERPRISE : Factory integrated	$ -	**$ -**
2	**720482-B21**	HEWLETT PACKARD ENTERPRISE : HP 800W FS Ti Ht Plg Pwr Supply Kit	$ 259.03	**$ 518.06**
2	**720482-B21#0D1**	HEWLETT PACKARD ENTERPRISE : Factory integrated	$ -	**$ -**
1	**719079-B21**	HEWLETT PACKARD ENTERPRISE : HP DL380 Gen9 High Perf Temp Fan Kit	$ 149.93	**$ 149.93**
1	**719079-B21#0D1**	HEWLETT PACKARD ENTERPRISE : Factory integrated	$ -	**$ -**
1	**H7J32A5**	HEWLETT PACKARD ENTERPRISE : HP 5Yr Foundation Care NBD Service	$ -	**$ -**
1	**H7J32A5#TT3**	HEWLETT PACKARD ENTERPRISE : HP ProLiant DL380 Gen9 HW Supp	$ 1,277.70	**$ 1,277.70**

Sale Amount	**$17,961.76**
Sales Tax:	

NOTES: This quote does not include RTI services. They can be provided upon request. Customer is responsible for all power and applicable taxes

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Shipping (if app)	
TOTAL	**$17,961.76**