

2017 Unidata Community Equipment Award  
Final Report

**Eyes in the Sky: Installation of a GOES-16 Data Server at College of DuPage**

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**A. Project Summary**

The College of DuPage received a 2017 Unidata Community Equipment Award of \$19,793.28 to purchase a server to ingest, process and visualize GOES-16 data. This server provides the ability to offer detailed imagery from the Advanced Baseline Imager (ABI) onboard the GOES-R series of satellites, including multispectral imagery and L2 derived products. In addition to the ABI data, the server will process data from other instruments, including the Geostationary Lightning Mapper (GLM). We are already processing data from GOES-16, and we expect to process GOES-S/17 data on this server when it becomes available.

**B. Equipment Purchased**

This award has allowed us to purchase a HPE DL380 Gen9 rack server, which was installed during the fall of 2017. This server contains two Intel Xeon E5-2697 processors for a total of 72 logical processing cores, 256GB RAM, two 400GB solid state drives and four 600GB 15K SAS hard drives (detailed specifications shown in Table 1). The server is located in the college's climate-controlled server room, which uses redundant generator-backed power, and is staffed & monitored 24/7 by the college's IT department.



Figure 1. The server in the rack shortly after it had arrived at the college

| <i>Table 1. System Specifications</i> |  |
|---------------------------------------|--|
| <b>HPE DL380 Gen9 2U Rack Server</b>  |  |
| <b>Chassis</b>                        |  |
| HD Bays                               | 8 – 2.5 inch   |
| Power Supply                          | 2 – 800W Redundant Power                                   |
| <b>System Configuration</b>           |  |
| CPU                                   | 2 – Intel Xeon E5-2697v4 2.3GHz 18 Core (72 threads total) |
| RAM                                   | 16 – 16G PC4-2400T-R (256GB)                               |
| SSD                                   | 2 – HPE 400GB SAS SSD, RAID-1                              |

### C. Project Description

The server has been vital to visualize GOES-16 data. Most of this data arrives via NOAAPort, although Unidata offers additional data via an LDM feed, as well as McIDAS ADDE servers. As the server processes ABI data, it passes through Unidata's goes-restitch.py to combine data tiles into one file per set. A McIDAS-X v2017 assists in visualization of this data, while the batch processing is managed with custom Python scripting. Once visualized, the imagery is publicly available on our Experimental Satellite Viewer / GOES-16 Page (<http://weather.cod.edu/satrad/exper>). In addition, the imagery is sent to Iowa State University via LDM where it is archived (courtesy of Mr. Daryl Herzmann).

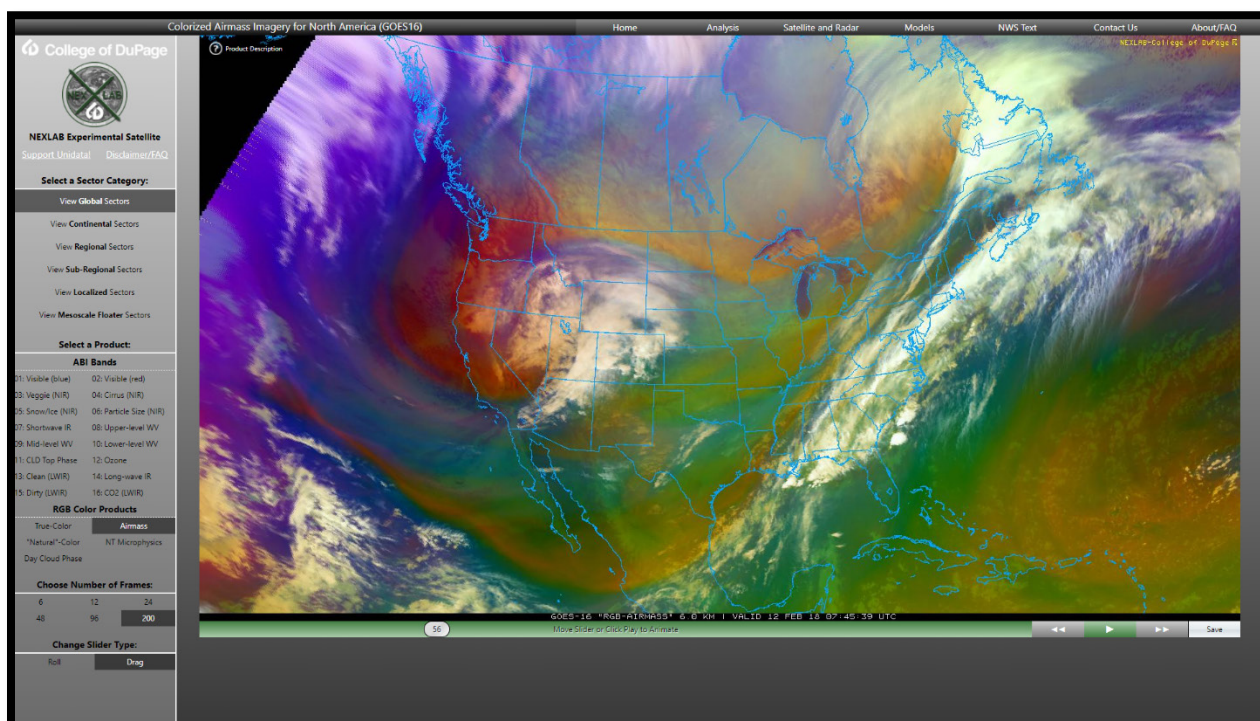
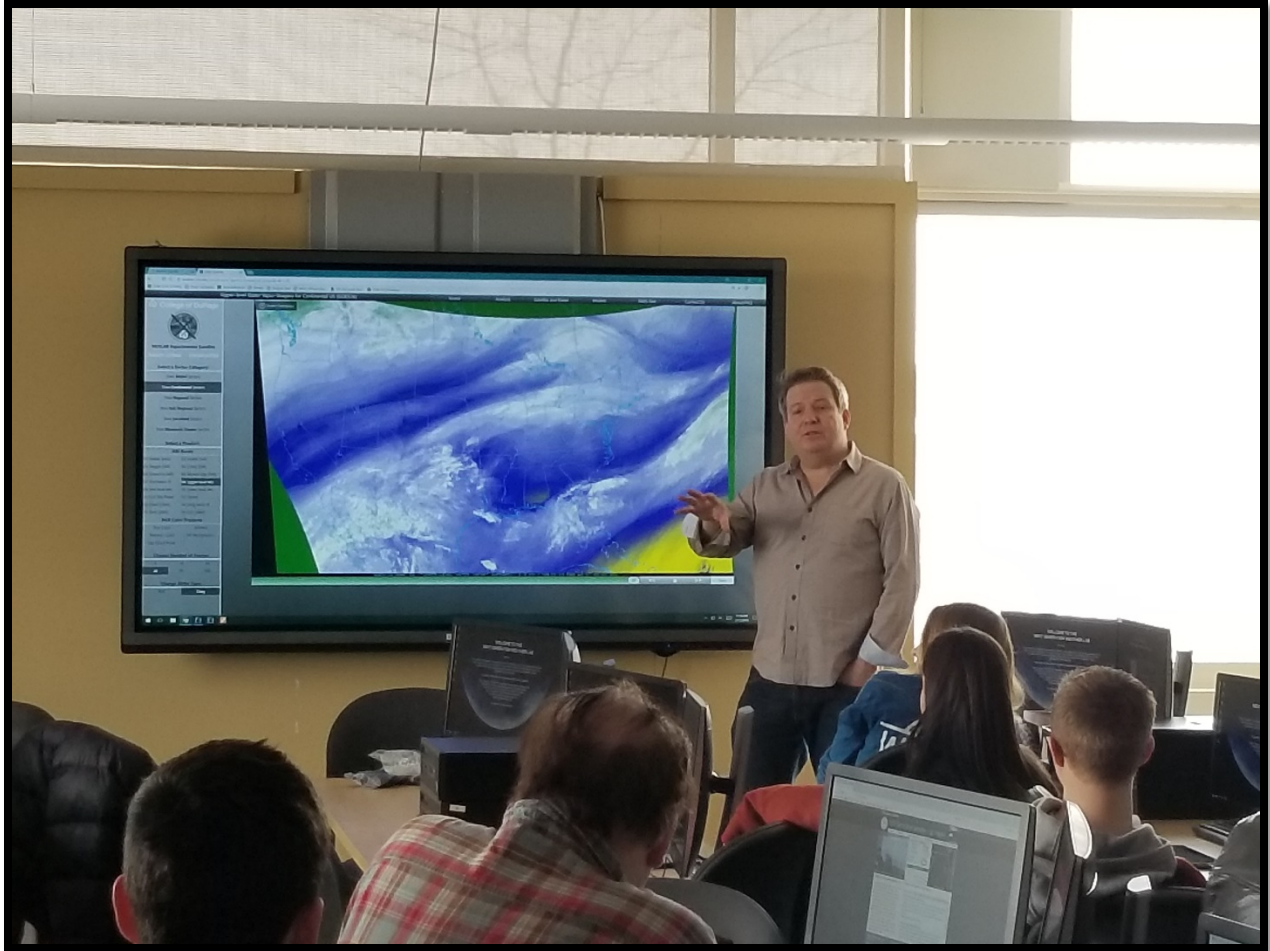


Figure 2. Our Experimental Satellite Viewer / GOES-16 page showing the Airmass RGB product

Currently, we offer imagery from all 16 ABI channels, as well as five multispectral (RGB) products. This includes 165 separate image domains, or sectors, consisting of data from CONUS, Full-Disk and Mesoscale data sets. Visualization of GLM data is currently in development.



*Figure 3. Prof. Sirvatka demonstrating the use of water vapor imagery to his forecasting class*

Moving forward, we plan on visualizing and offering as much data from GOES-16 and GOES-17 as possible, including L2 derived products and data from other instruments. We are also continuously working to improve how this data is presented. We will soon offer user-selectable color enhancements and toggle-enabled mapping and data overlays.

#### **D. Project Impacts**

Prior to GOES-16, we have only ever offered visible, infrared and water vapor satellite imagery to our students and on our website. However, far more data is now available to us with this new generation of satellites. When GOES-16 data first became available, we were only able to visualize a small subset of products over very few regions due to limited computing resources. Since the installation of this new server, lack of computing power is no longer a concern. We can now bring all this new imagery to our classroom, continue to teach our students with cutting-edge technology, and train them how to use these new tools to observe and forecast the atmosphere. They will remain up to date and competitive as they advance in their educational and professional careers.

The new data is now shared in our classrooms, the meteorology community and the world. Professional meteorologists are now using this imagery as part of their daily operations. Other academic institutions are using our page as part of their curricula and users from all over are sharing our imagery across social media. Our ability to visualize so much data from the GOES-R series of satellites is entirely thanks to the Equipment Award, as well as a variety of software and tools Unidata provides to the community. Without these resources, we would not have been able to undertake an operation of this magnitude.