

# 2013 MUG Meeting McIDAS-V Demonstration Outline

*Presented 10 September 2013 by Bob Carp and Jay Heinzelman, SSEC*

Note: The data files referenced in this document can be found at:

*[ftp://ftp.ssec.wisc.edu/pub/mug/mug\\_meeting/2013/presentations/2013\\_McIDAS-V\\_demo.zip](ftp://ftp.ssec.wisc.edu/pub/mug/mug_meeting/2013/presentations/2013_McIDAS-V_demo.zip)*

## 1. Intro:

- New functionality added to McV since last MUG meeting (version 1.3 and upcoming version 1.4)
  - o New satellite mask formulas
  - o NPP data
    - Data from CLASS with geolocation and data together as well as multi-banded files
    - Can now work with VIIRS Cloud Mask products
    - Can work with VIIRS EDR data
    - Aggregate granules together regardless of size
    - Can save data in both zipped and unzipped bundles
    - Created NPP Tutorial
  - o Work with the polar orbit track chooser to make it easier to load local files
  - o New 'Common Gama' button in RGB Composite display
  - o Gridded trajectories
  - o New THREDDS server and netCDF package
  - o Ability to display latitude/longitude labels as part of the wireframe box and as part of the Default Map Background
  - o Ability to add a display unit to the color scale
  - o New state projections
  - o Minor change to dialog when saving a zipped bundle
  - o A lot of development with Jython scripting in McIDAS-V
    - Seen in other talks (Mike Hiley)
- Will also demo some functionality that's been around for a while, but some might not be familiar with it

## 2. New mask formulas

- 2 new formulas, one to set a particular value to mask out as well as a data range
- Use the Satellite>Imagery chooser with [adde.ucar.edu/RTIMAGES](http://adde.ucar.edu/RTIMAGES) for the data
- useNan=0, values not included in masked range will probe as 0
- useNan=1, values not included in masked range will not probe
  - o Mask Function formula
    - Example where only 3.9um Brightness values greater than 80 displayed
    - Example where 3.9um Brightness values greater than 80 masked, but display 10.7um at those locations
    - Example where only 3.9um Temperatures less than 273 were displayed
  - o Mask Within Range formula
    - Example where only 10.7um Temperatures between 250 and 270 were displayed to show the presence of low clouds.

### 3. Sandy NPP overlaid with polar track

- /VIIRS-SVM-Sandy/GMOD0-SVM03-SVM04-SVM05\_npp\_d20121029\*.h5
  - o File is from NOAA CLASS; GMODO = geolocation
  - o SVM03, SVM04, and SVM05 parts are the moderate resolution imagery bands (data)
- Without subsetting a region, McV displays data at a reduced resolution to save on memory.
- Notice bowtie deletion and low resolution display
- Polar track chooser
  - o New Local part of chooser makes it easier to choose local files. Set up like General>Files/Directories chooser. Reads in TLE files.
  - o /VIIRS-SVM-Sandy/SatelliteTracks.txt
  - o Begin: 17:20:00 Oct 29,2012; End: 17:40:00; Oct 29,2012
  - o Swath Width in Layer Controls should be 3000km

### 4. VIIRS RGB

- /VIIRS-SVM-IICMO/GMOD0-SVM03-SVM04-SVM05\_npp\_d20130811\*.h5
  - o File from NOAA CLASS; GMODO = geolocation
  - o SVM03, SVM04, and SVM05 parts are the moderate resolution imagery bands (data)
- Install VIIRS Formulas plugin from the Miscellaneous tree in the Plugin Manager
  - o Plugin gives two new formulas: swathToGrid and VIIRS\_M\_RGB(M5,M4,M3) that are both designed to get rid of the bowtie deletion
- Use VIIRS\_M\_RGB(M5,M4,M3) formula to create a RGB display without the bowtie deletion
  - o Recommends M5, M4, M3 to create a true-color RGB, but you can also use M10, M7, M5 to create a natural-colored RGB as well
  - o Subset area over the Great Lakes
  - o Data displays at full resolution over subsetted region without the bowtie deletion
- New button in Layer Controls for Common Gamma to set red green and blue to use same gamma. Set this to 0.4. Gamma controls the intensities of each color

### 5. VIIRS Cloud Mask

- Overlay on the previous display
- /VIIRS-SVM-IICMO/ GMODO-IICMO\*.h5
  - o File from NOAA CLASS; GMODO = geolocation; IICMO = data
- McV looks at different quality flags included with the data to determine which cloud mask products can be displayed
- Display the QF\_Cirrus field over the Great Lakes
  - o Use the Color Table Editor to make values less than 0.95 to be 100% transparent so only the Cirrus will be displayed.
  - o Save this color table
  - o Set a parameter default for the QF\_Cirrus field to always default to the color table that was just created.
- Working on an improvement to the Image Display to make you probe relevant values such as “water cloud”, “ice cloud”, etc.

## 6. VIIRS EDR

- /VIIRS-SST-EDR/ GMTCO-VSSTO\_npp\_d20130829\*.h5
  - o File from NOAA CLASS; GMTCO = geolocation; VSSTO = data
- Use swathToGrid formula to display the VIIRS-SST-EDR\_All/BulkSST field over the entire region
  - o Change the color enhancement to System > Temperature
- Overlay with SVM01 data
  - o /SST-VIIRS-EDR/ GMODO-SVM01\_npp\_d20130829\*.h5
  - o Display with the swathToGrid formula over the entire region
  - o Adjust color table for SVM01 data so values less than 0.35 are 100% transparent

## 7. New THREDDS server and netCDF package

- Updating the netCDF version to version 4.3 includes changes to the way that GRIB 1 and GRIB 2 files are handled. One major outcome of this change is that GRIB variable names will now be generated in a very general way. While variable names have changed from previous versions of McIDAS-V, most of this change won't be noticed by users because the old variable names are mapped to the new variable names for datasets served on the Unidata THREDDS Data Server. Therefore, bundles created in old versions of McIDAS-V should still work.
- Change to the way the GRIB files are served on the Unidata THREDDS server. GRIB THREDDS server is now [thredds.ucar.edu](http://thredds.ucar.edu), not [motherlode.ucar.edu](http://motherlode.ucar.edu).

## 8. Trajectories

- There are 2D and 3D formulas, but as long as the data you are working with has standard field names that McIDAS-V recognizes, then the formulas themselves aren't necessary and trajectories will be listed as derived fields
- Created 2D trajectories colored by Relative Humidity from GFS 80km CONUS data

## 9. Adjust Contour Label Frequency

- Display the MSLP field from GFS 80km CONUS data.
- In Layer Controls, open the Contour Properties Editor
  - o Change Align to Horizontal, and change Frequency to High. Click Apply
  - o Now there are more contour labels drawn in the display

## 10. Add a Unit to the Color Scale in the Main Display

- Display Speed at 250hPa from GFS 80km CONUS data
- From the Layer Controls, go to the layer's Properties window
- In the Color Scale tab, turn on Visible, turn on Show Unit, and set Font Size to 24. Click OK.
- Now there is a color table in the Main Display that includes the display unit

### 11. Add Lat/Lon Labeling as Part of the Wireframe Box

- Set the projection in the Main Display to Pennsylvania
  - o Note that all states now have their own projections
- Turn on Lat/Lon Labeling on the Wireframe Box
  - o Go to the View > Properties menu.
  - o In the Properties window, turn on 'Show Display Scales'. Hit Apply
    - Main Display Window now has lat/lon labels on the wireframe box
  - o In the Properties window, go to the Horizontal Scale tab. Change the following for Latitude
    - Label: Lat; Major Increment: 2; Minor Division: 5. Hit Apply
  - o The latitude scale on the wireframe now has labels every 2 degrees from the Major Increment field. There are 4 tick marks between each major label, making 5 minor divisions between labels

### 12. Add Lat/Lon Labeling as Part of the Default Map Background

- In the Layer Controls for the Default Map Background, navigate to the Lat/Lon tab
- Turn on the visibility of lines and labels
  - o By default, lines and labels are spaced 15 degrees apart, and the labels are drawn at the equator and at 0 degrees longitude.
- Change the projection in the Main Display to Wisconsin, and note that the lat/lon labels aren't visible
  - o In the Lat/Lon tab of the Layer Controls, change the following:
    - Change the Line and Label intervals to be 2 for latitude and longitude
    - For latitude labels, change the At Longitudes field to: -88
    - For longitude labels, change the At Latitudes field to: 42
  - o In the Main Display, labels are now visible, but the labels intersect over Chicago
    - To fix this, unlink the labels, and change the latitude Alignment field to NW
    - Change the longitude Alignment field to NE
      - Now, the display should list out the labeling in the form (LAT LON)
  - o Add more labels to the display
    - For latitude labels, change the At Longitudes field to: -88; -90; -92 (hit Enter)
    - For longitude labels, change the At Latitudes field to: 42; 44; 46 (hit Enter)
    - Now there are more lat/lon labels in the Main Display

### 13. Zipped bundles

- Save All Displayed Data is a new option
- Makes it easier to save what you have displayed w/o having to go through extra dialogs

## 14. Bundles

- /Misc-Bundles/GFS4PanelChart.mcv
  - o 4 panel chart GFS model data for forecasting
  - o 200hPa winds
  - o 500hPa vorticity, winds
  - o 700hPa relative humidity, winds
  - o 850hPa temperatures, precip, winds
- /Misc-Bundles/MSLPSpeed.mcvz
  - o Created from GFS model data
  - o Hurricane Sandy
  - o MSLP at the surface
  - o 3 cross sections of wind speed that roughly follow track of storm
- /Misc-Bundles/Sandy1000hPaHeights.mcvz
  - o Created from GFS model data
  - o Hurricane Sandy
  - o 1000hPa Geopotential Heights drawn as topography
  - o Map raised to just over 1000hPa
  - o High values = peaks; Low values = valleys
- /Misc-Bundles/WindGustsAndPressureTrajectory.mcvz
  - o Created from GFS model data
  - o Hurricane Sandy
  - o Wind gusts drawn at the surface with a transparency added
  - o Track of Hurricane Sandy colored by MSLP
    - Track is created from the Track2.txt file in the Misc-Bundles directory
- /Misc-Bundles/BaroclinicLeaf.mcvz
  - o Created from GOES-East Water Vapor data
  - o The display is Temperature data using the Color-Shaded Parameter As Topography display type
  - o This baroclinic leaf represents a region of ascending air that originates at low levels on the warm side of the primary surface cold front
  - o Bundle displays GOES East water vapor brightness temperatures as a topographical surface. Shows the descending intrusion of dry air (which exhibited warm brightness temperatures, yellow to orange colors) and ascending streams of moist air (blue and white colors) within the warm conveyor belt and baroclinic leaf structures