

Use of McIDAS-X at NASA SPoRT

Kevin McGrath

Jacobs Technology
Short-term Prediction Research and
Transition Center (SPoRT)

Marshall Space Flight Center
Huntsville, Alabama

McIDAS Users' Group Meeting
May 22, 2018

SPoRT Mission

Transition unique NASA and NOAA observations and research capabilities to the operational weather community to improve short-term weather forecasts on a regional and local scale

- ◆ Prepares end users and mission scientists for next generation satellite missions and capabilities through an interactive R2O/O2R paradigm
- ◆ Primary end users: NWS WFOs and National Centers

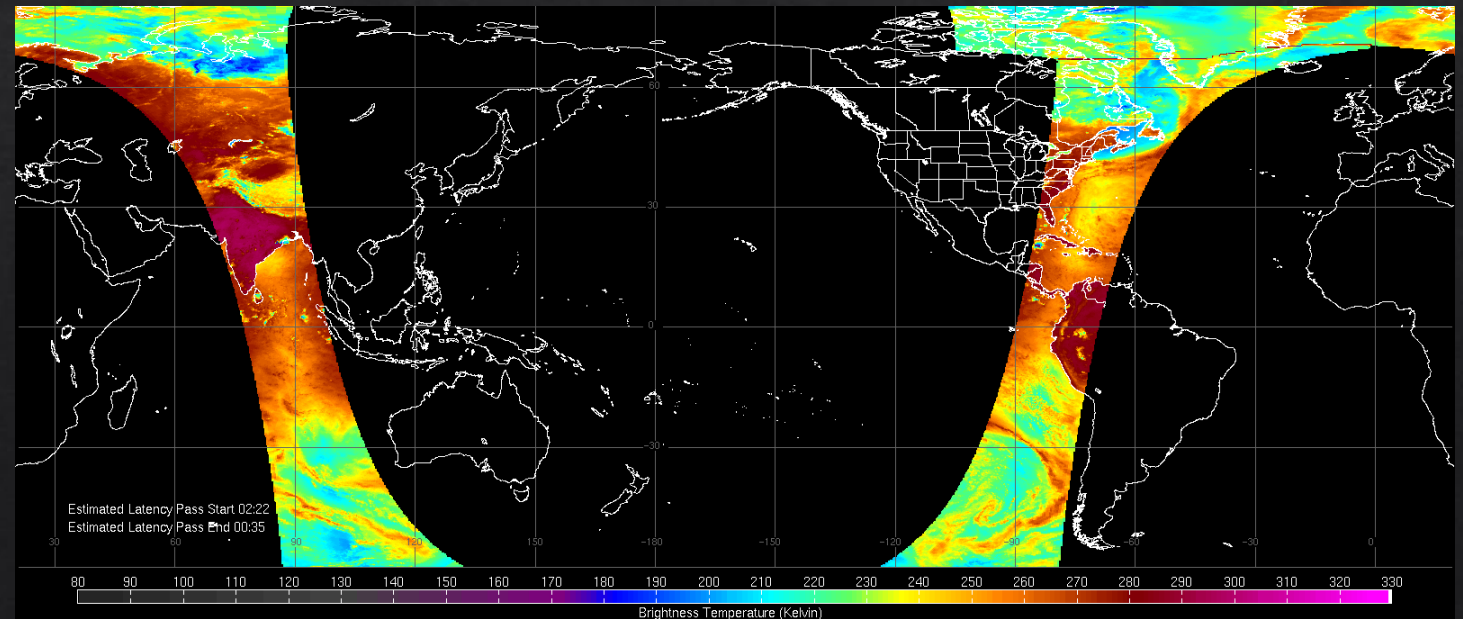


Typical Uses of McIDAS-X

- ◆ ABI, AHI, MODIS, VIIRS, AVHRR, SEVIRI
- ◆ Communicate with remote ADDE servers
- ◆ Many NRT datasets that SPoRT disseminates to end users are delivered in Area format from university and government partners (NASA, NESDIS, UAH, CIRA)
- ◆ Custom FORTRAN/C programs for manipulating data and outputting to Area
- ◆ Application Support:
 - ◆ AWIPS II (netCDF3)
 - ◆ GIS (geoTIFFs)
 - ◆ N-AWIPS (Area)
 - ◆ Web Graphics
- ◆ Most processing is scripted with *mcenv* and commonly use IMGREMAP, IMGCOPY, IMGOPER, and FRMSAVE

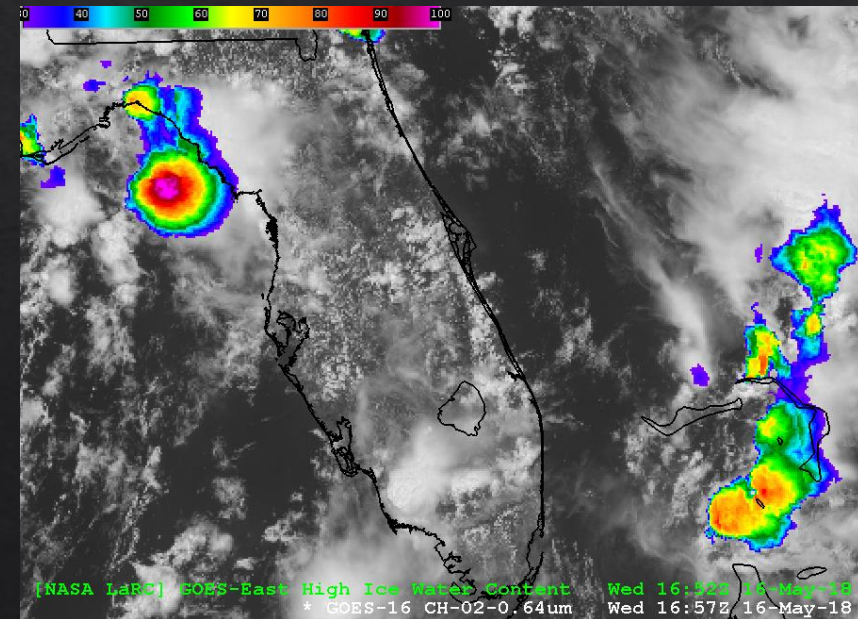
Custom Servers

- ◆ Utilize custom *dir.c, *get.c, and *put.c servers to read data in non-standard formats, provide calibration, and generate Area files
- ◆ Example datasets:
 - ◆ Global Precipitation Measurement Passive Microwave
 - ◆ AIRS, CrIS/ATMS, and IASI
 - ◆ MODIS
 - ◆ NESDIS Snowfall Rate
 - ◆ OMPS
 - ◆ VIIRS with bowtie correction



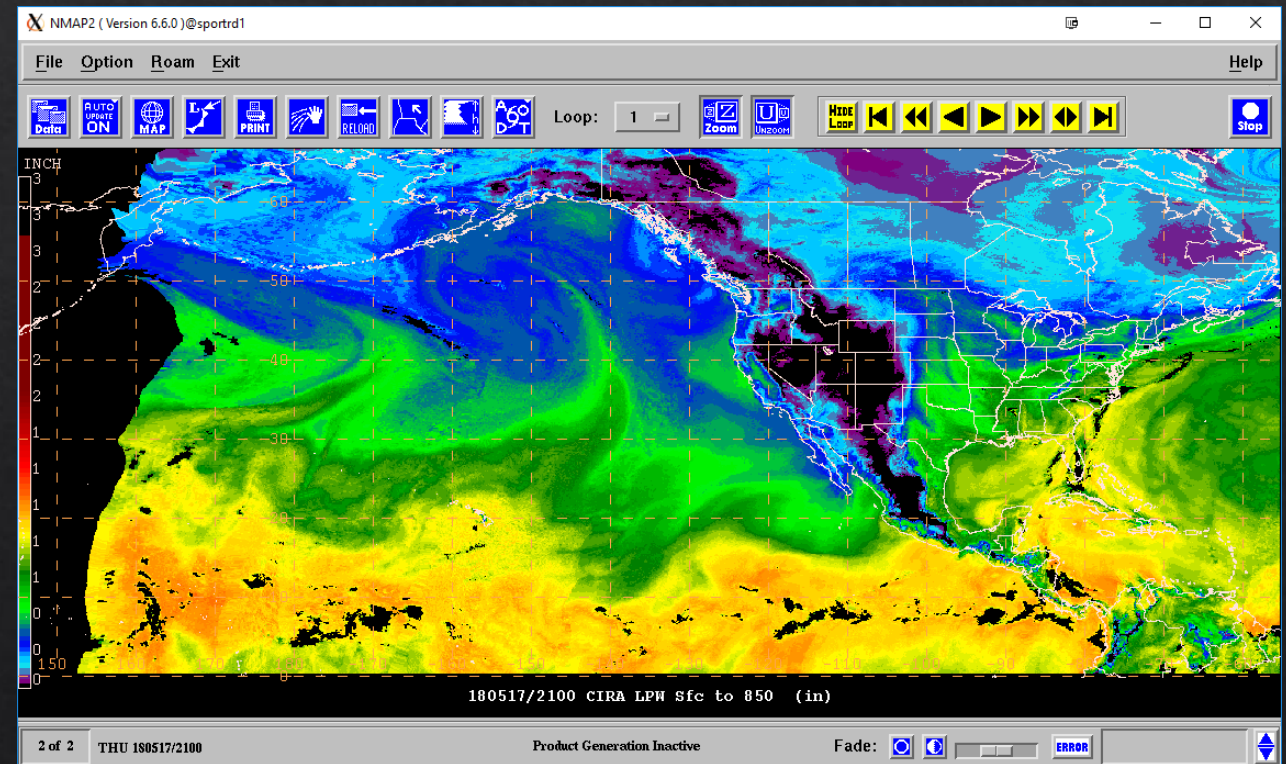
AWIPS II Support

- ◇ The AWIPS II regionalSat plugin ingests 8-bit sat imagery in netCDF3
- ◇ The awipaput -X server (XRD) generates nearly regionalSat-compatible netCDF3
- ◇ Generated by IMGCOPY with K=AWIP in RESOLV.SRV
- ◇ SPoRT has modified the 2015 version of awipaput:
 - ◇ Removed lat/lon values (not needed by regionalSat)
 - ◇ Negate *centralLon* values
 - ◇ Modified *projName* strings
- ◇ Use *ncatted* (part of NCO Toolset) to add/modify netCDF global attributes

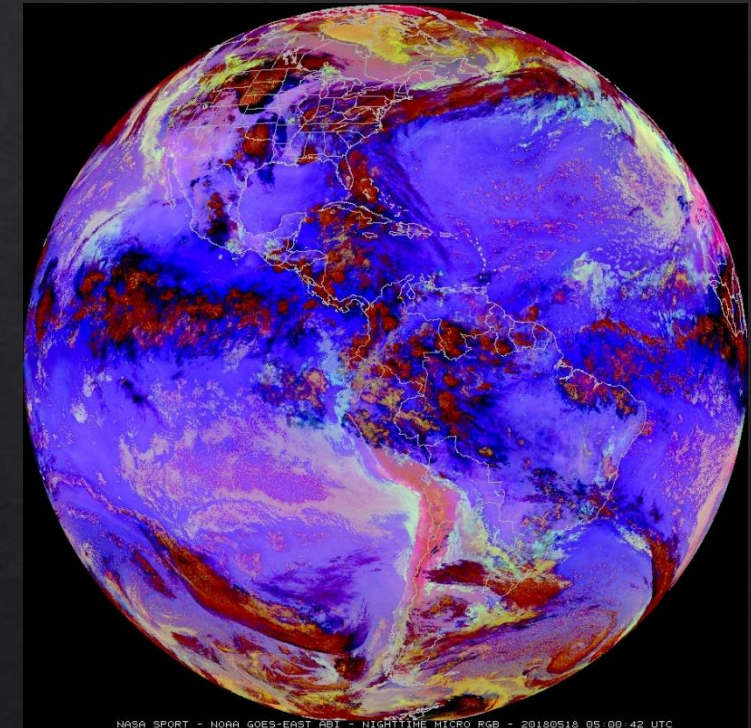
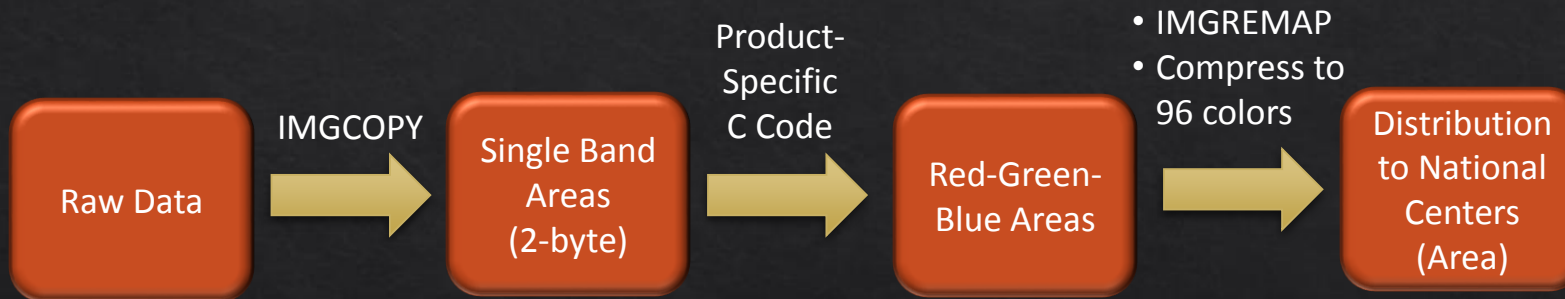
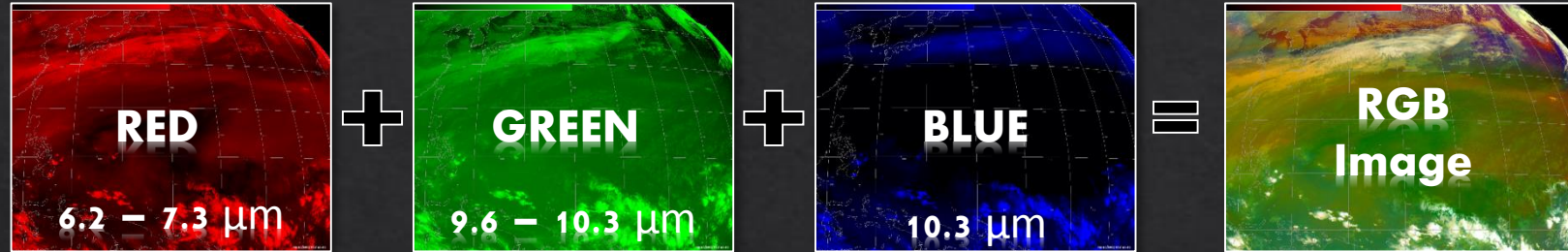


N-AWIPS Support

- ◇ Still the primary decision support system used by NWS National Centers
- ◇ Imagery is provided in Area format
- ◇ Always use IMGREMAP due to corner point sensitivity
- ◇ Only supports 96 colors
- ◇ Quantitative data:
 - ◇ Sampling not supported by N-AWIPS
 - ◇ Embed calibration tables with the PRDUTIL command. Honored by Unidata version of Gempak/N-AWIPS, but not the NWS version.



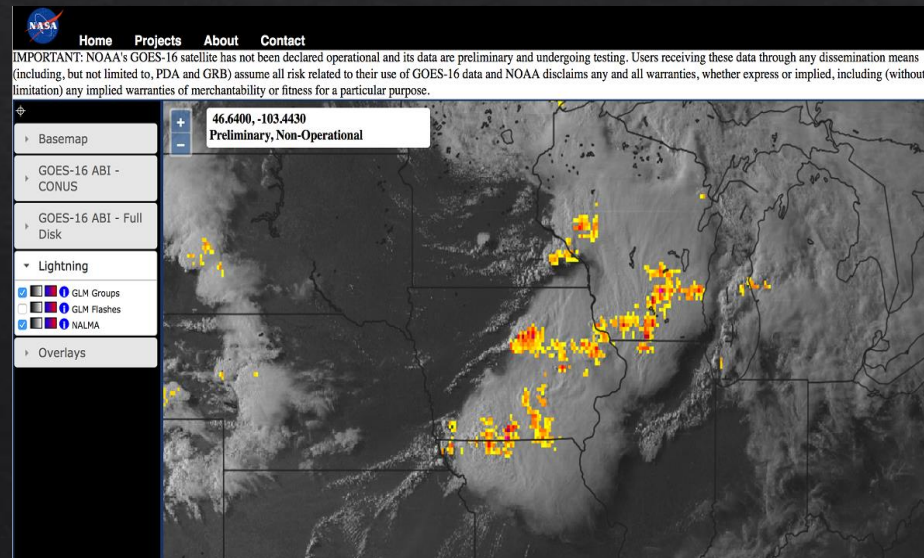
RGB Product Generation



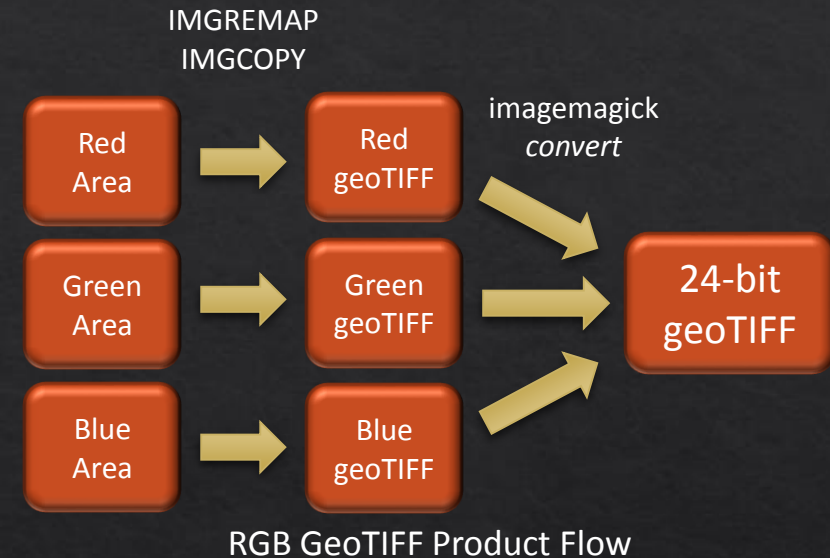
GeoTIFFs

- ◆ IMGCOPY (K=GEOT) used to generate grayscale geoTIFFs
- ◆ *Convert* merges R-G-B TIFFs into 24-bit TIFF
- ◆ Gdalwarp converts to WGS84
- ◆ Deliver via WMS and web viewer
- ◆ Support:

- ◆ EMAs
- ◆ National Guard

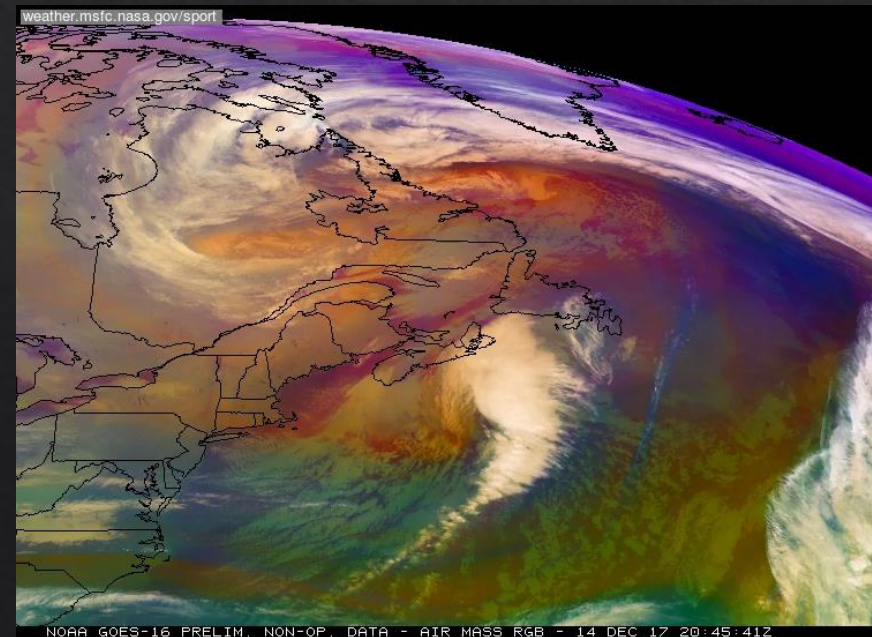
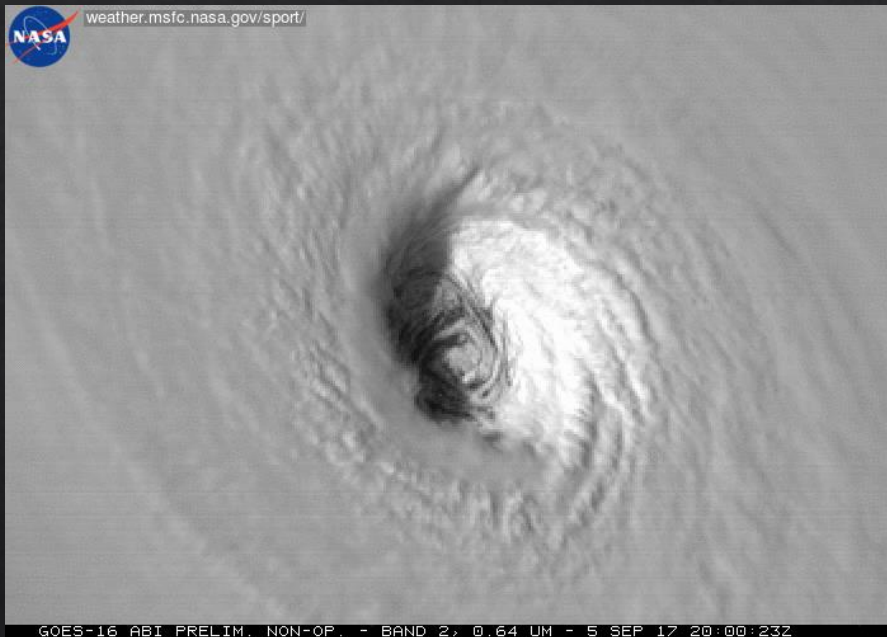


GLM 2-Minute Groups Overlaid on ABI 0.64μm in WMS Web Interface



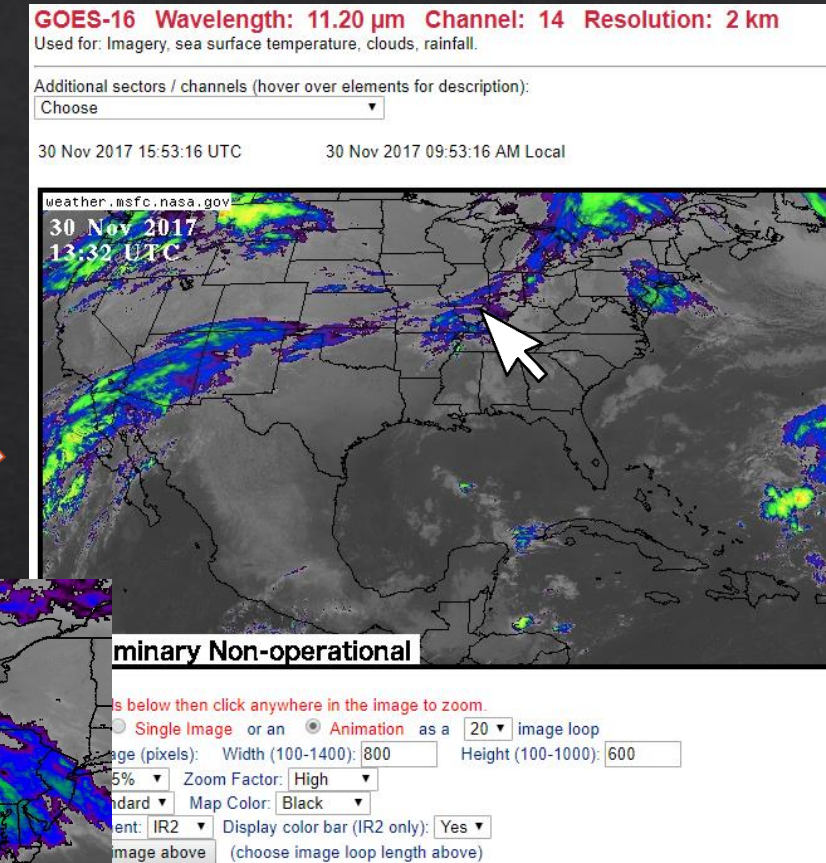
Social Media Animations

- ◆ Developed scripts utilizing McIDAS-X to generate frames of single channel and RGB products
- ◆ Generate animations with *ffmpeg* (MP4) and *imagemagick* (GIF)
- ◆ Useful for those within SPoRT that lack McIDAS-X experience



Interactive Online GOES Viewer

- ◆ Developed in 1997; ~50M visits/month
- ◆ Based upon Area files
- ◆ Benefits: flexibility, speed, accessibility
 - ◆ Users define area of interest to display
 - ◆ Animations are **very quick to load**
- ◆ Multiple options:
 - Color palettes
 - Map overlays
 - Quality
 - Resolution
 - Width/height
 - Static or animated
- ◆ Scriptable with API



<https://weather.msfc.nasa.gov/GOES/>

Summary

- ◆ McIDAS-X is still SPoRT's tool-of-choice for reading and calibrating data from a wide range of sensors
- ◆ Appreciate how easy it is to display and interrogate data
- ◆ Utilize custom servers to accommodate non-standard datasets
- ◆ Looking forward to trying new RGBDISP command
- ◆ Wish item: Ability to embed enhancement tables into geoTIFFs

kevin.m.mcgrath@nasa.gov

 @kevinmmcgrath

<https://weather.msfc.nasa.gov/sport/>

 @NASA_SPoRT