# Using McIDAS-X to Support the NASA SEAC4RS Field Experiment

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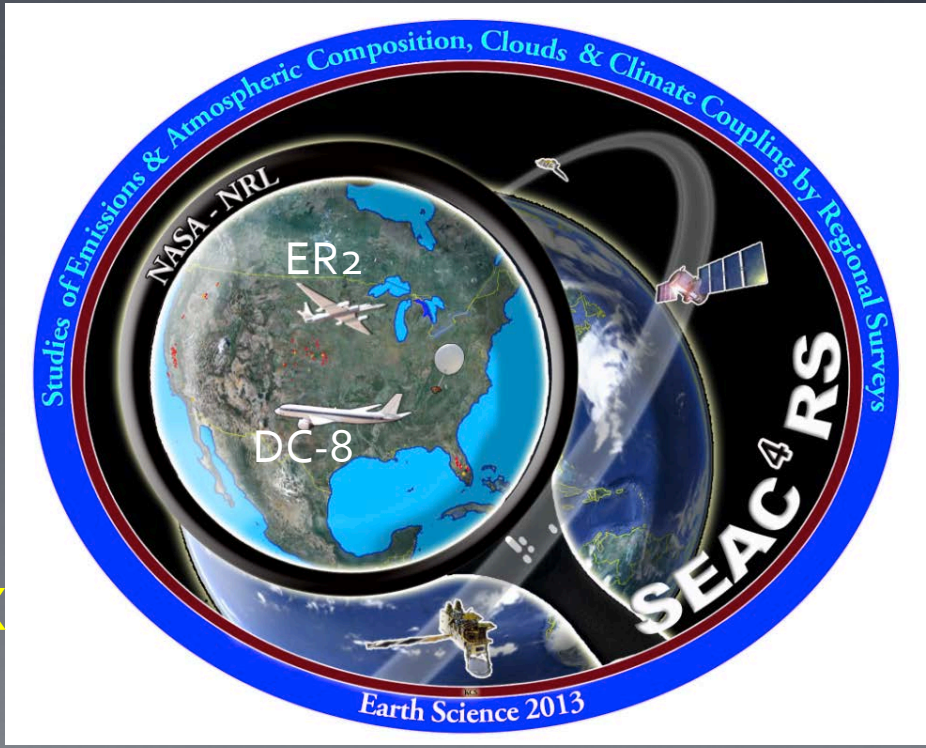
# Introduction

SEAC4RS: Studies of Emissions and Atmospheric Composition, Clouds, and Climate Coupling by Regional Surveys (Aug-Sep 2013)

*Interest in pollution, smoke, atmospheric chemistry, North American monsoon, convective cloud microphysics.

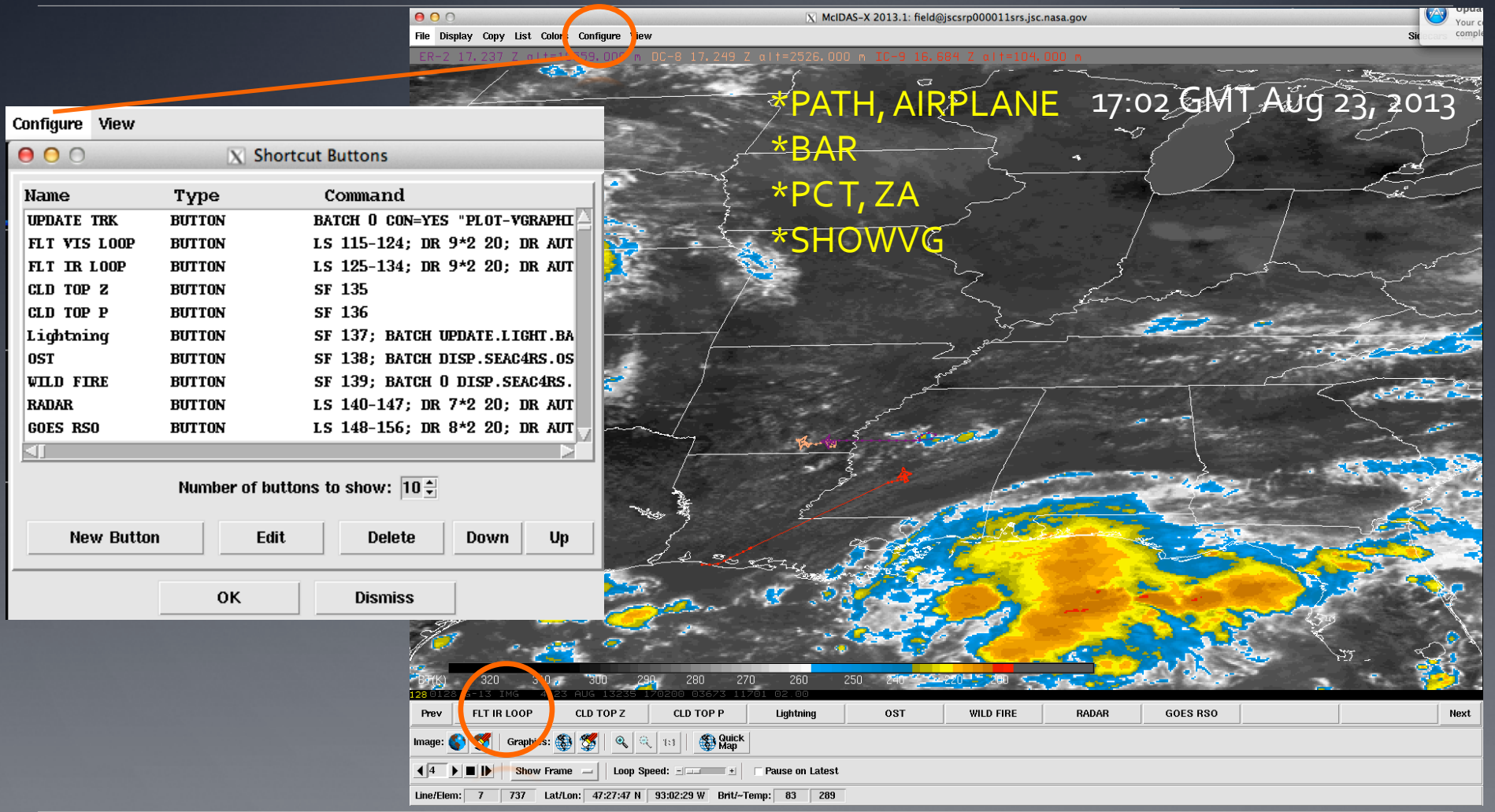
*NASA LaRC personnel on site at Ellington Field in Houston, TX running McIDAS-X on 2 Mac OS X computers.



# McIDAS-X Tasks

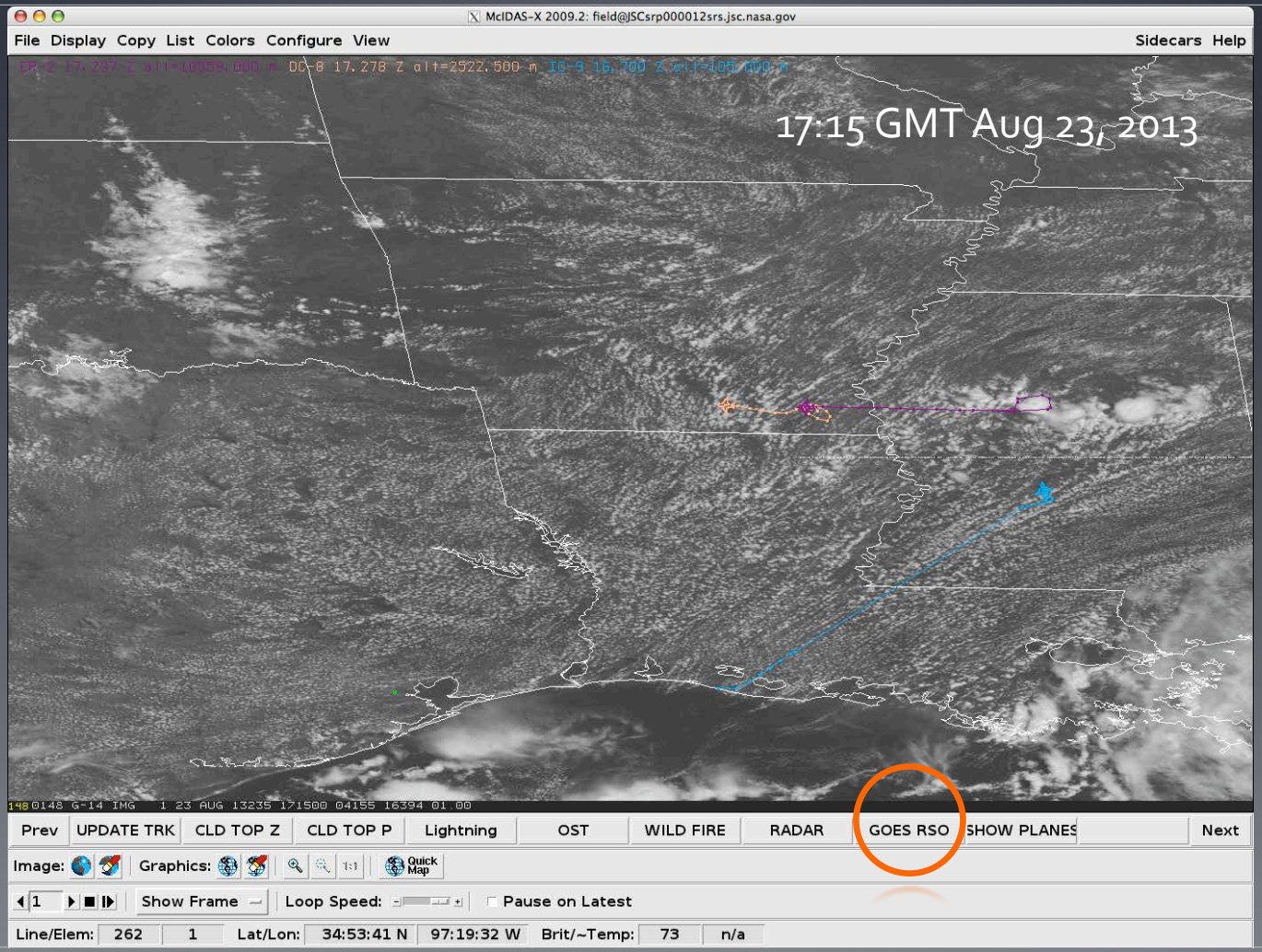
- GUI configured for 156-166 frames with specific frame sequences for each satellite channel and domain.
- Scheduler run to ingest GOES data and display imagery in loop sequences; runs BATCH files.
- Make and display virtual graphics of plane positions, tracks, and altitudes (ZA, PATH, AIRPLANE,VIRT=, SHOWVG).
- Make polar orbiting satellite track maps (NAVDISP) and data (NAVCALC).
- Overlay lightning, radar (SATOVERLAY2), overshooting tops on imagery.
- Use DIST command to find distance to points of interest.
- Obtain LAT/LON of points of interest to have the planes fly toward.
- Provide cloud-top height (IMGDISPCP, BARCP).

# GUI with GOES-13 Enhanced Channel 4 Image with Plane Tracks



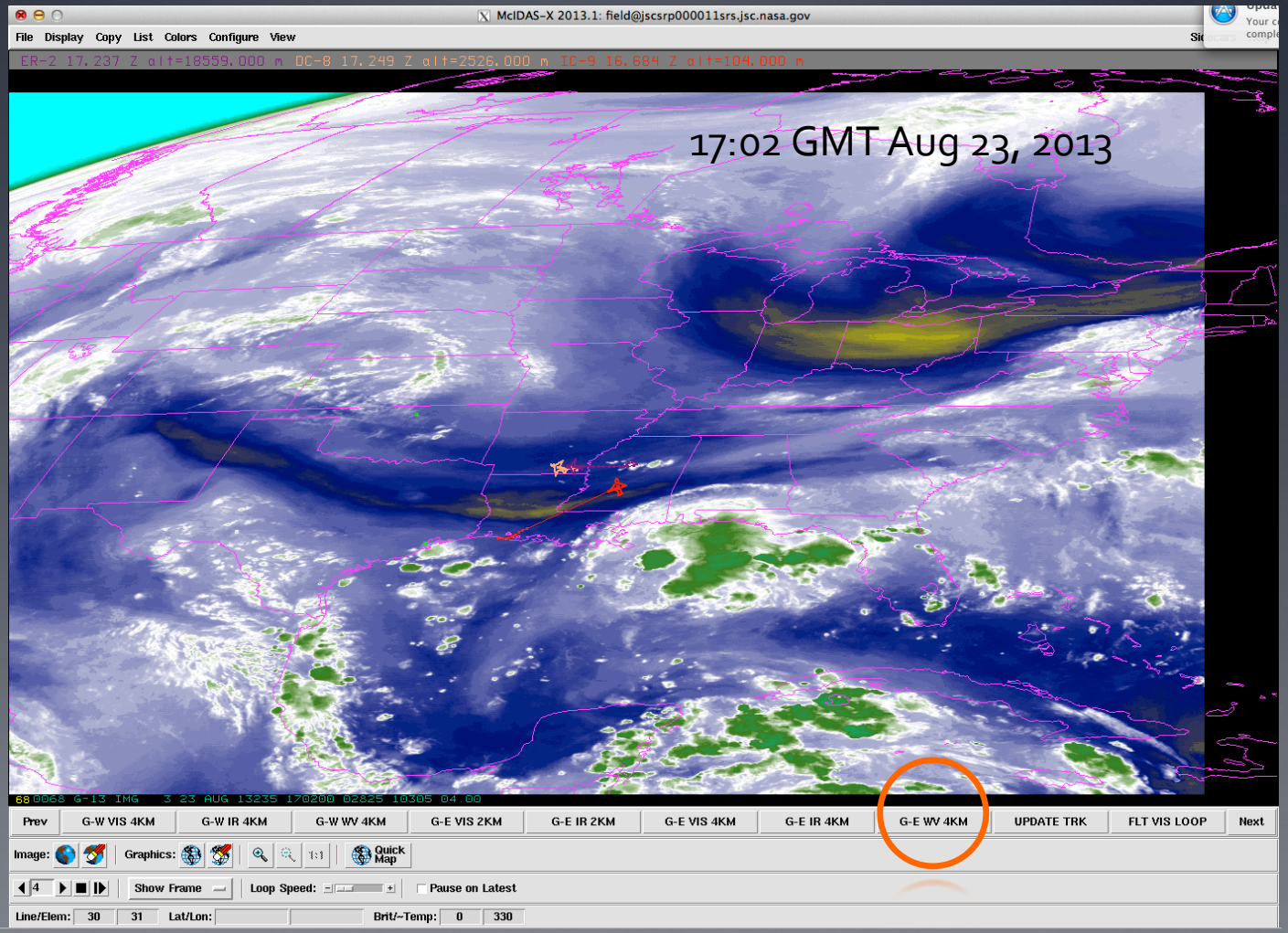
# GUI Showing 1-km VIS from GOES-14 SRSO with Plane Tracks

*PATH, AIRPLANE
*SHOWVG
*ZA



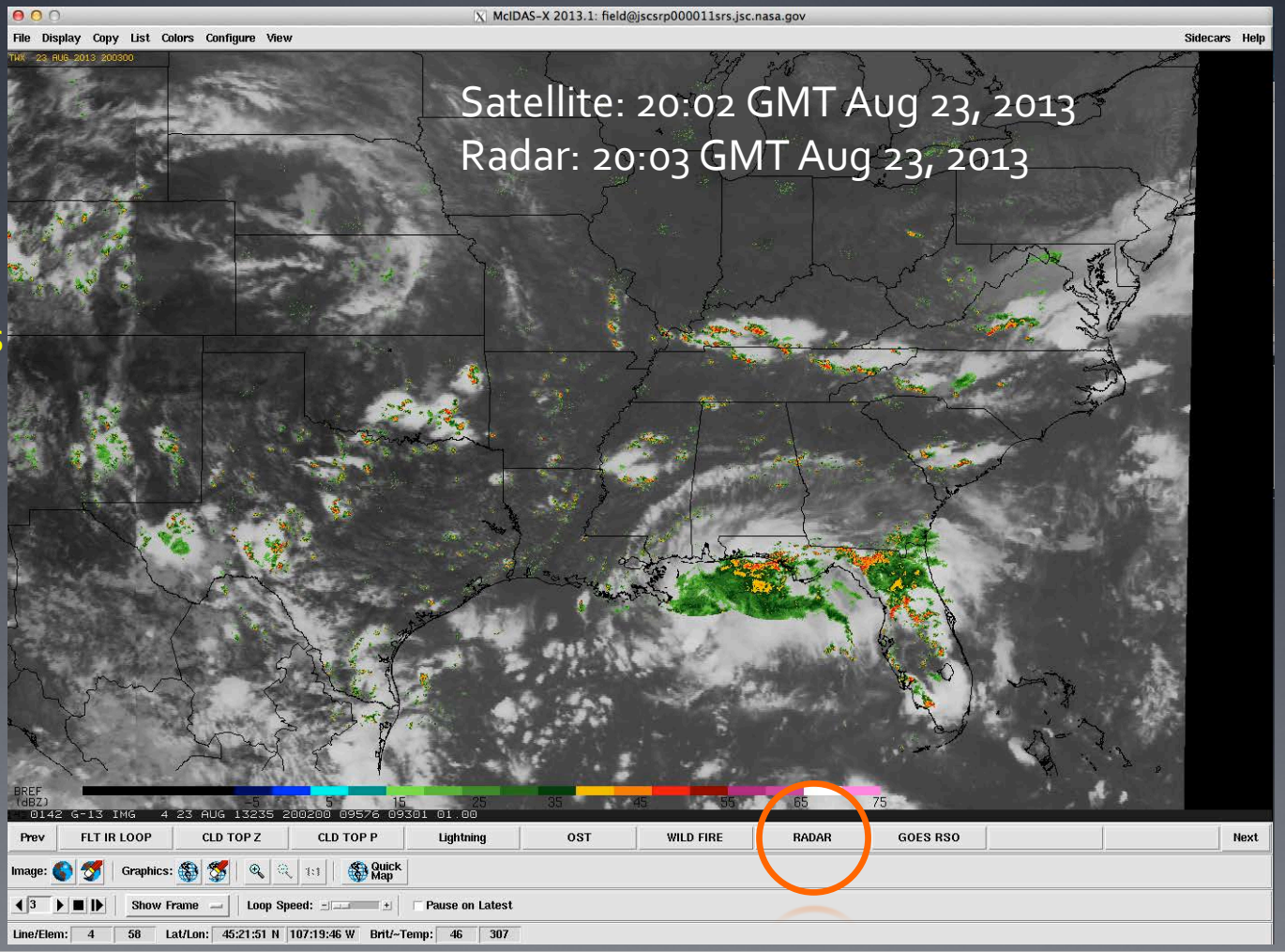
# GUI Showing 4km WV from GOES-13 with Plane Tracks

*PATH, AIRPLANE
*SHOWVG
*ZA



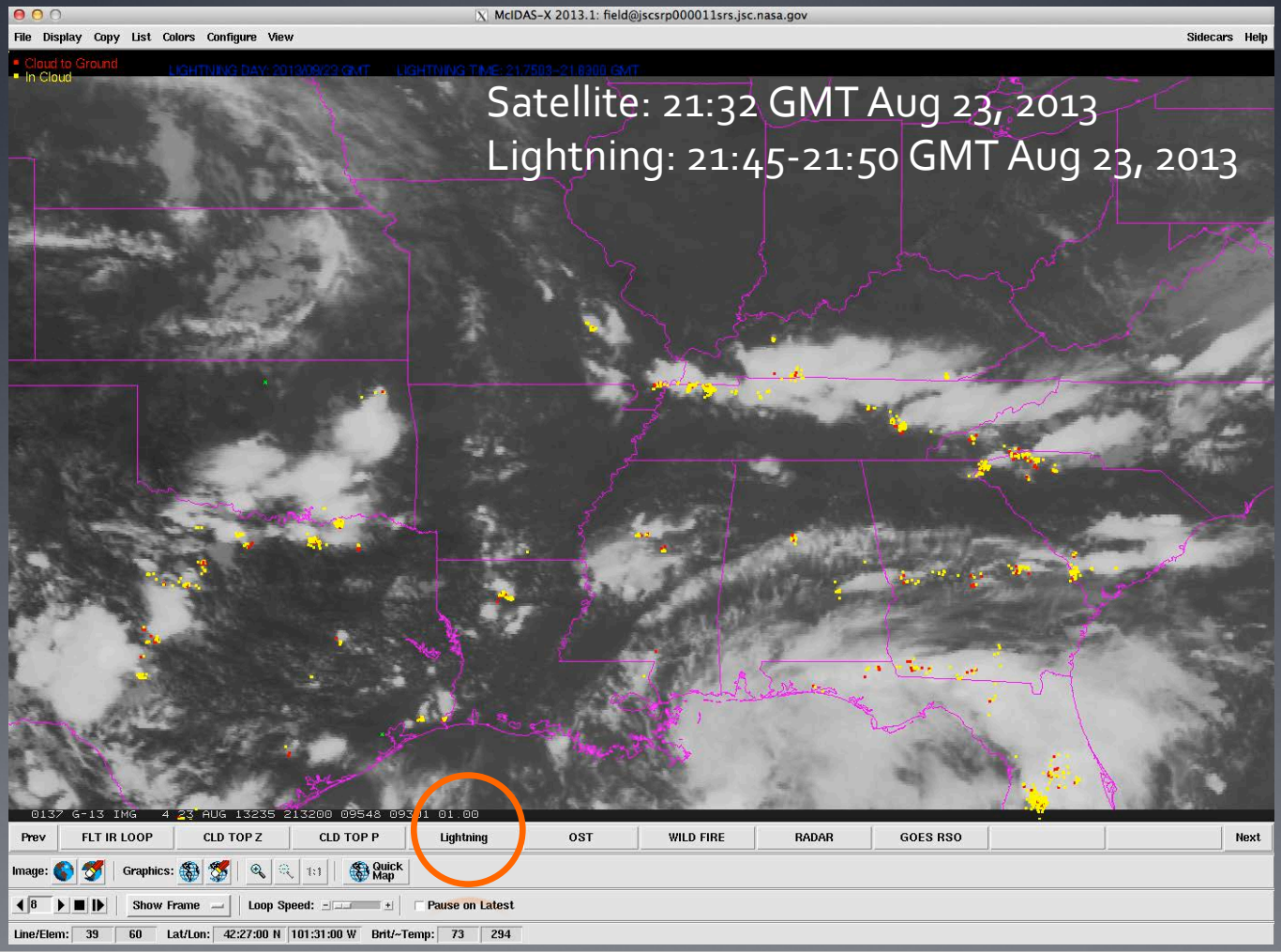
# GUI Showing 4-km IR from GOES-13, 15 with NEXRAD Overlay

*IMGREMAP
*SATOVERLAY2 (plot function)
*BAR
*PCT, ZA – BAR labels
*MERGE_GEO



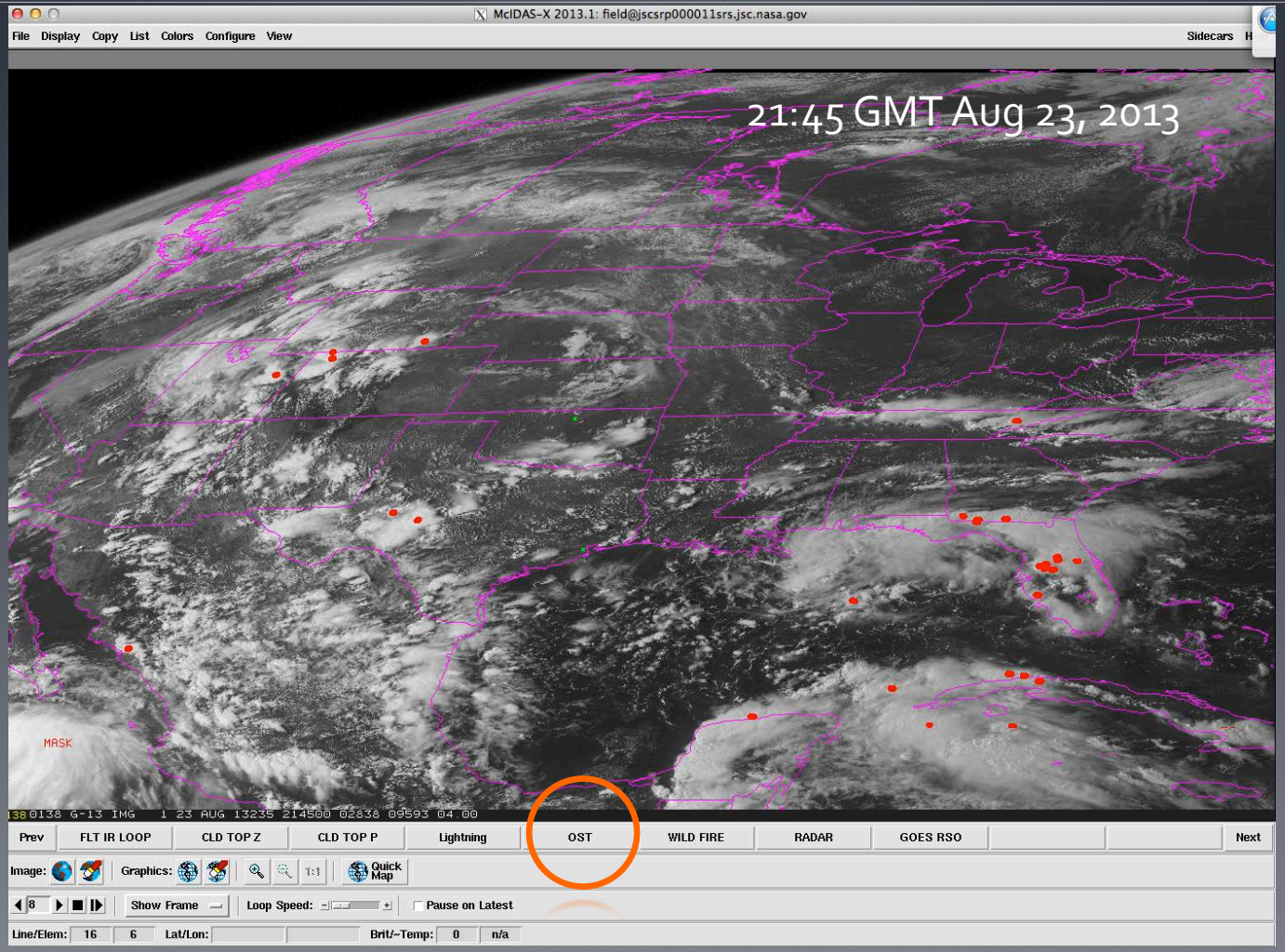
# GUI Showing 4-km IR from GOES-13 with Lightning Overlay

*IMGREMAP
*PC E
* ZLM FILL
*SHOWVG



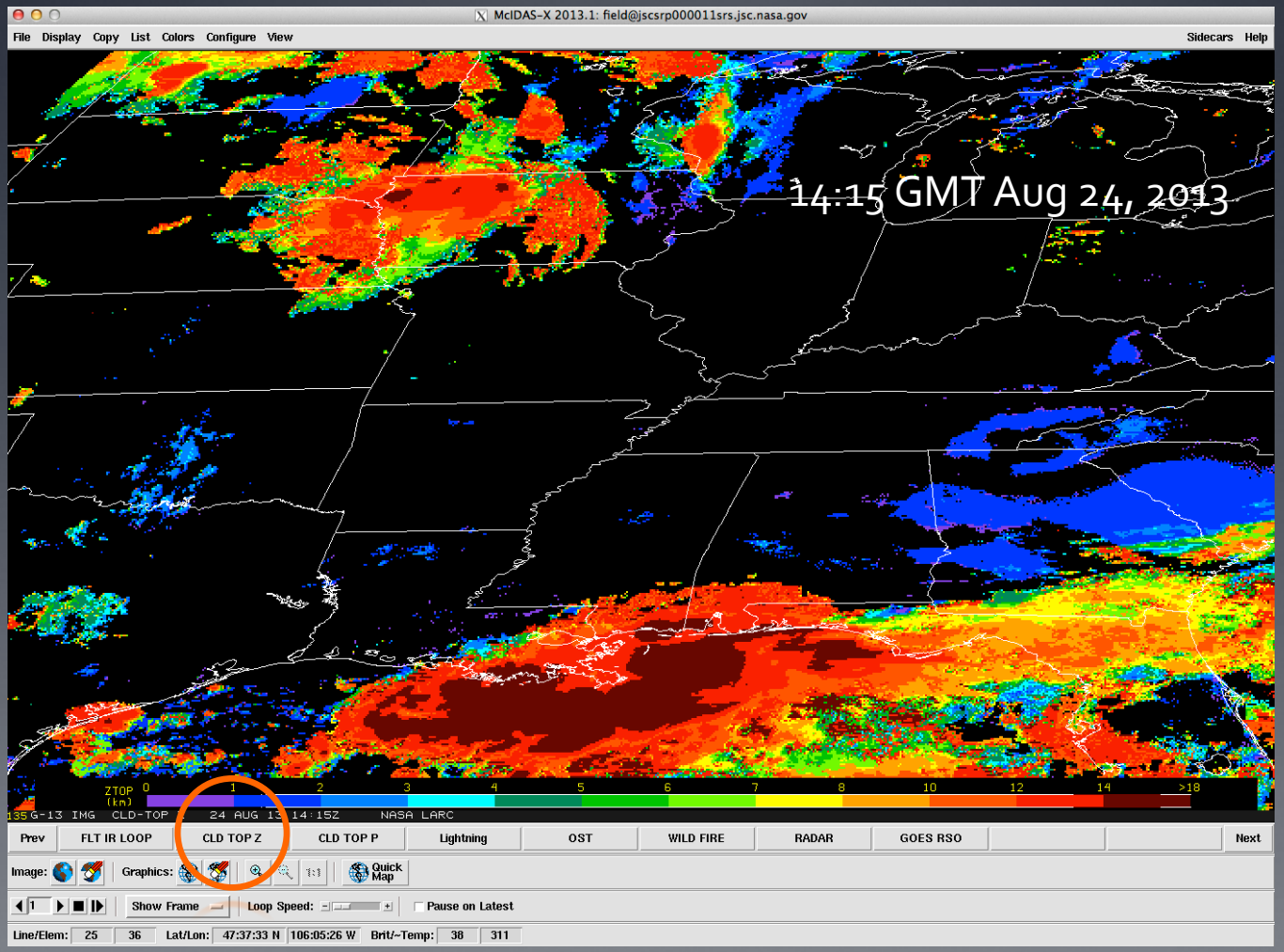
# GUI Showing 4-km VIS from GOES-13 with Overshooting Tops

*FRMLIST
*PTLIST
*PTDISP



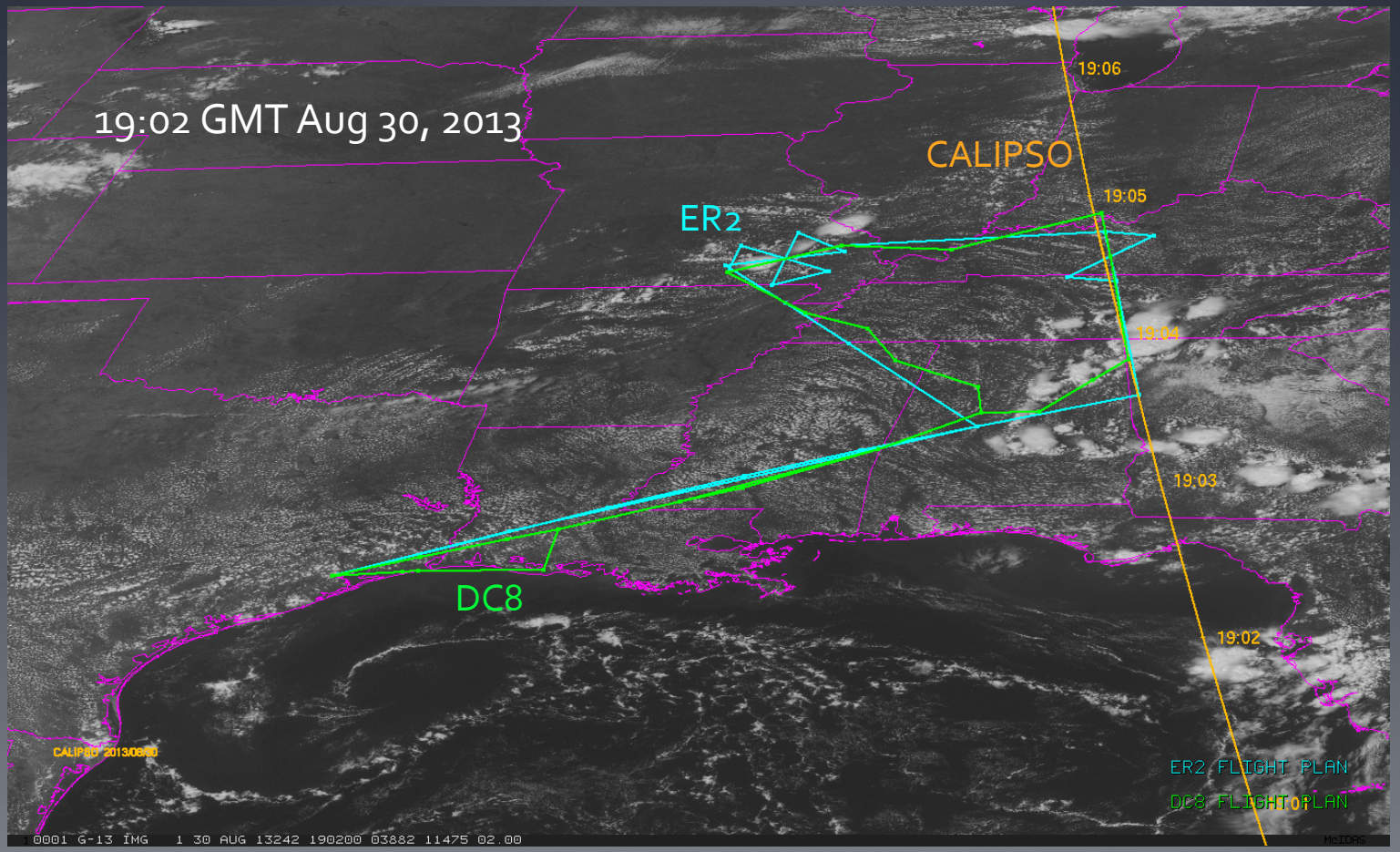
# GUI Showing 4-km Cloud Top from GOES-13

*IMGDISPCP
*BARCP



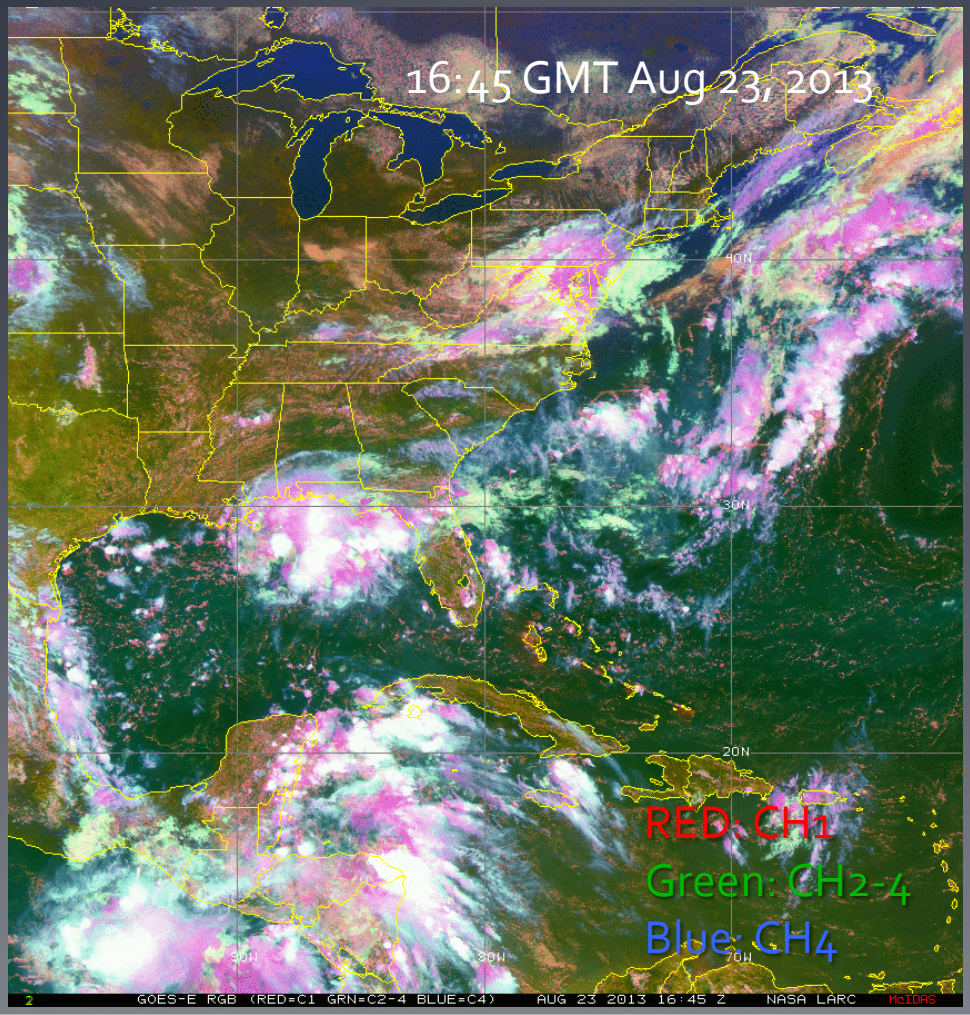
# GOES-13 Image with Flight Plan for Aug 30, 2013

*PATH
*NAVDISP
with TLE files



# GOES-13 5km Remapped RGB Image

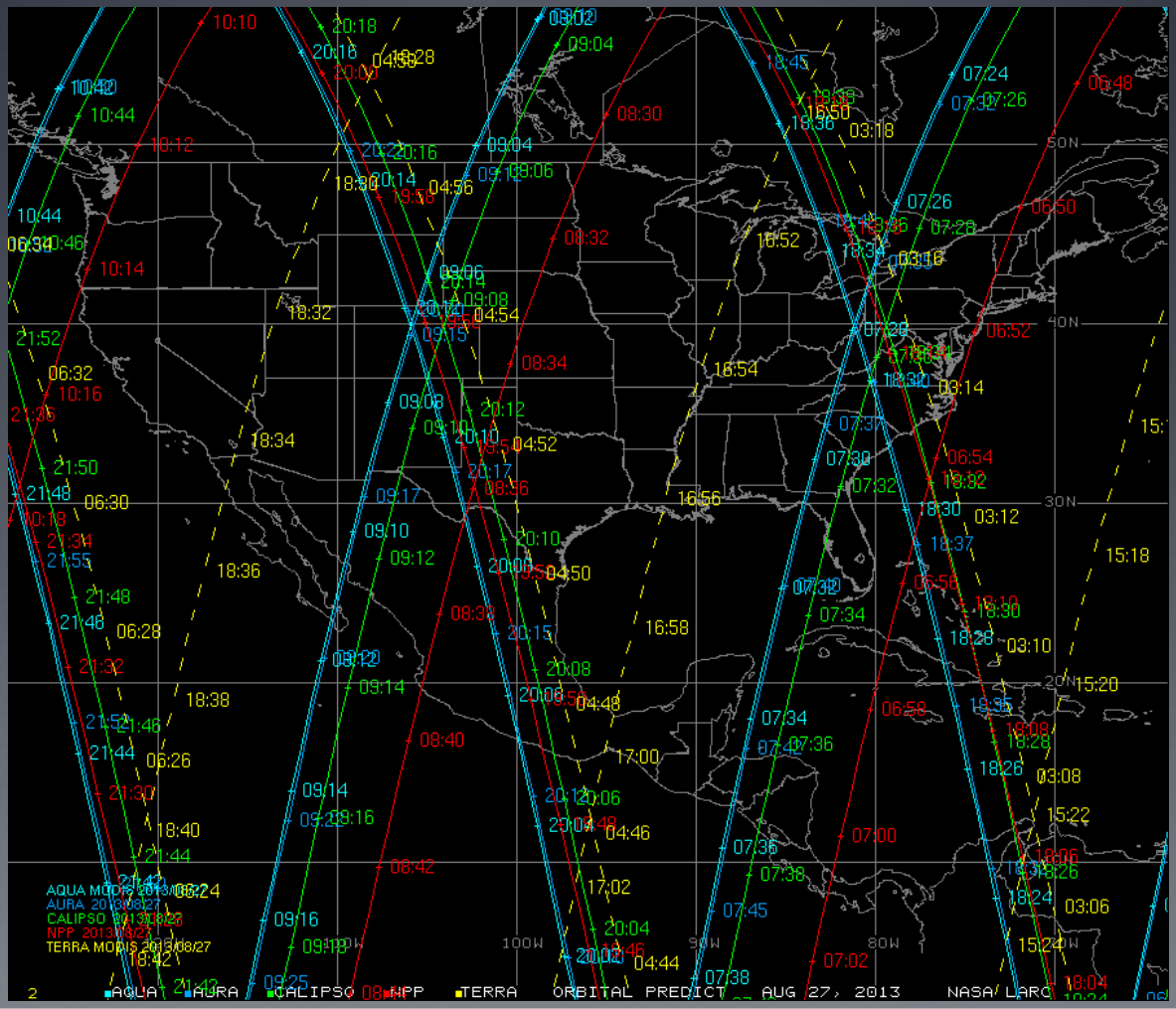
*IMGREMAP
*COMBINE



# Orbital Predict for Aug 27, 2013

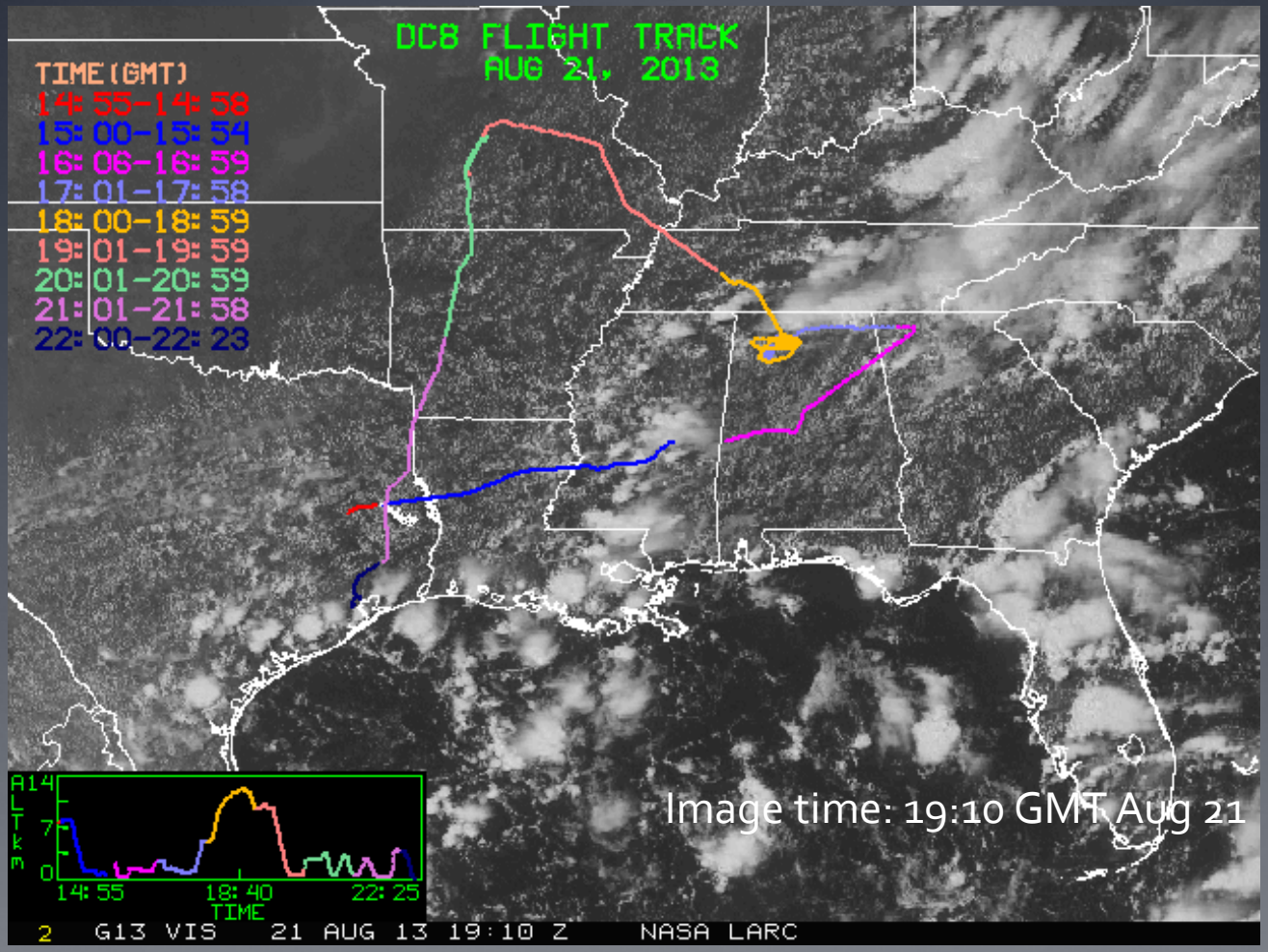
*NAVDISP with TLE files
*PCT, ZLM – Squares in frame's label

AQUA
AURA
CALIPSO
NPP
TERRA



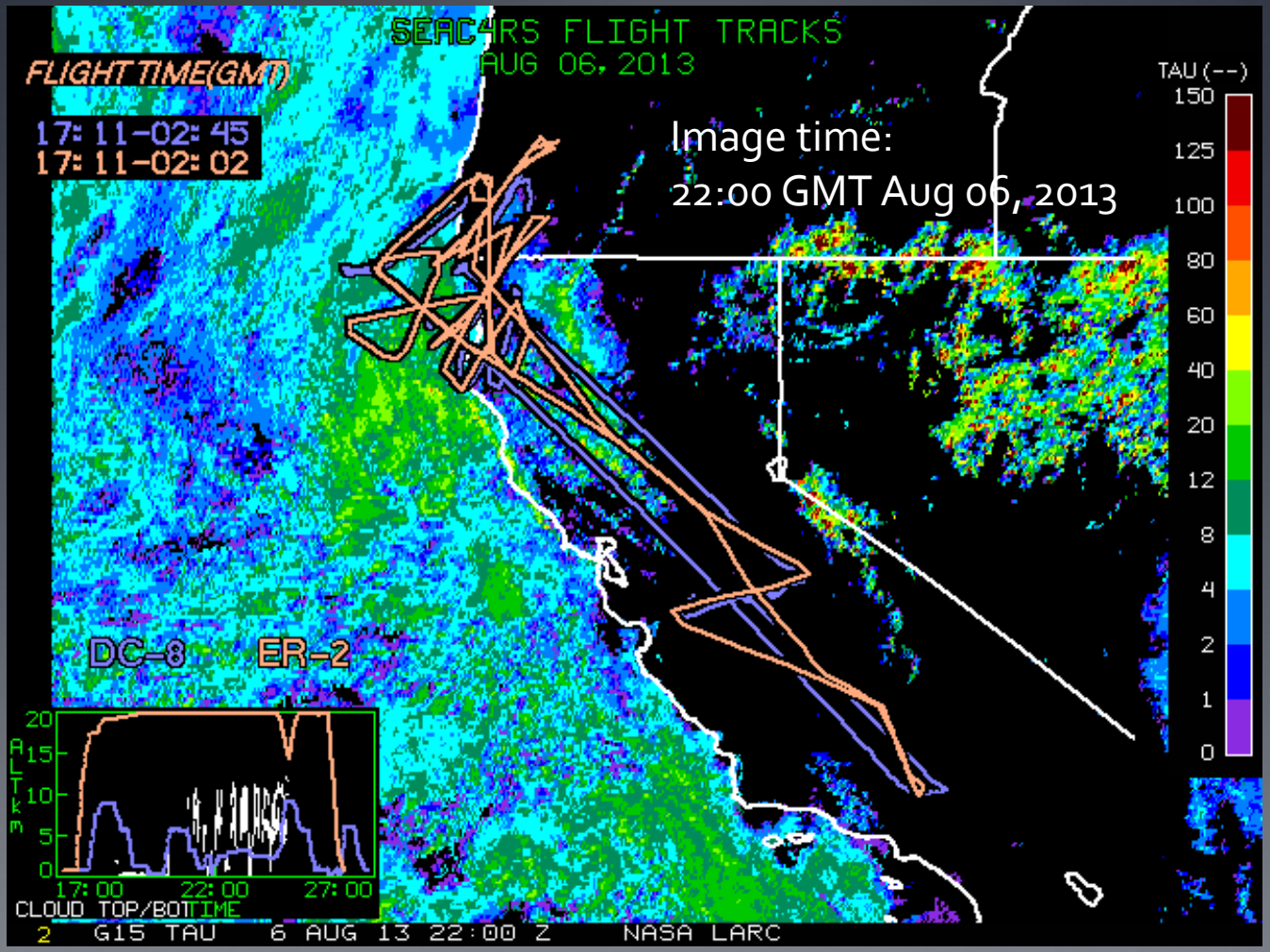
# DC-8 Flight Track on GOES-13 VIS Image

*IMGREMAP
*plot routine
*ZA



# Flight Tracks on GOES-15 Optical Depth Image

*IMGREMAP
*plot routine
*ZA
*IMGDISPCP
*BARCP



# Summary

- NASA LaRC cloud group in Houston, TX using McIDAS-X on 2 Mac OS X laptop computers to support SEAC4RS field experiment (Aug-Sep 2013) .
- Real-time flight positions and past 20-60 min of aircraft tracks shown on GOES VIS, IR, WV image loops.
- Image loops with current and projected airplane positions used to make course adjustments for studying convective clouds, smoke.
- Polar orbiting satellite tracks shown to mission planning for aircraft coordination with overpass.
- For takeoff and landing at Ellington Field, McIDAS IR image with NEXRAD and lightning overlay used.
- McIDAS-X helped NASA-Langley support previous field missions: ATTREX, MACPEX, TC4, CCVEX, AIRS-2, CRYSTAL-FACE.
- Need similar capabilities in McIDAS-V to support future field missions.