

Application Programming in AWIPS II

Matt Smith¹, Jason Burks²,
Kevin McGrath³

¹ University of Alabama in Huntsville

² NASA/Marshall Space Flight Center– Huntsville, AL

³ Jacobs Technology



transitioning unique NASA data and research technologies to operations



Outline

- What is SPoRT?
- AWIPS I
- AWIPS II
- Plugins
- Experiences
- Plans
- Summary



transitioning unique NASA data and research technologies to operations



SPoRT

- Short-term Prediction Research and Transition Center
- NASA / MSFC Huntsville, AL
- Paradigm: Problems → Solutions
 - NASA Data and Technology
 - Operational NWS Short-term Forecasts
 - Native Decision Support System
 - Feedback Loop with Forecasters for Improvement
- Began in 2003
 - Primarily Southern Region
 - 9 WFOs
- In 2012
 - Partners in 5 NWS Regions, National Centers
 - 23 WFOs



transitioning unique NASA data and research technologies to operations



Programming in AWIPS I

- Limited scope of programmers
- Most users could only modify
 - Data
 - Configuration
 - Menus
 - Shell/Perl scripts
 - Database mods



transitioning unique NASA data and research technologies to operations



Enter AWIPS II

- Raytheon Technical Services Co. (RTSC)
- NWS Technology Infusion (AWIPS follow-on)
- Open source, Java-based
- Service Oriented Architecture
- Extensible, Plugin-based

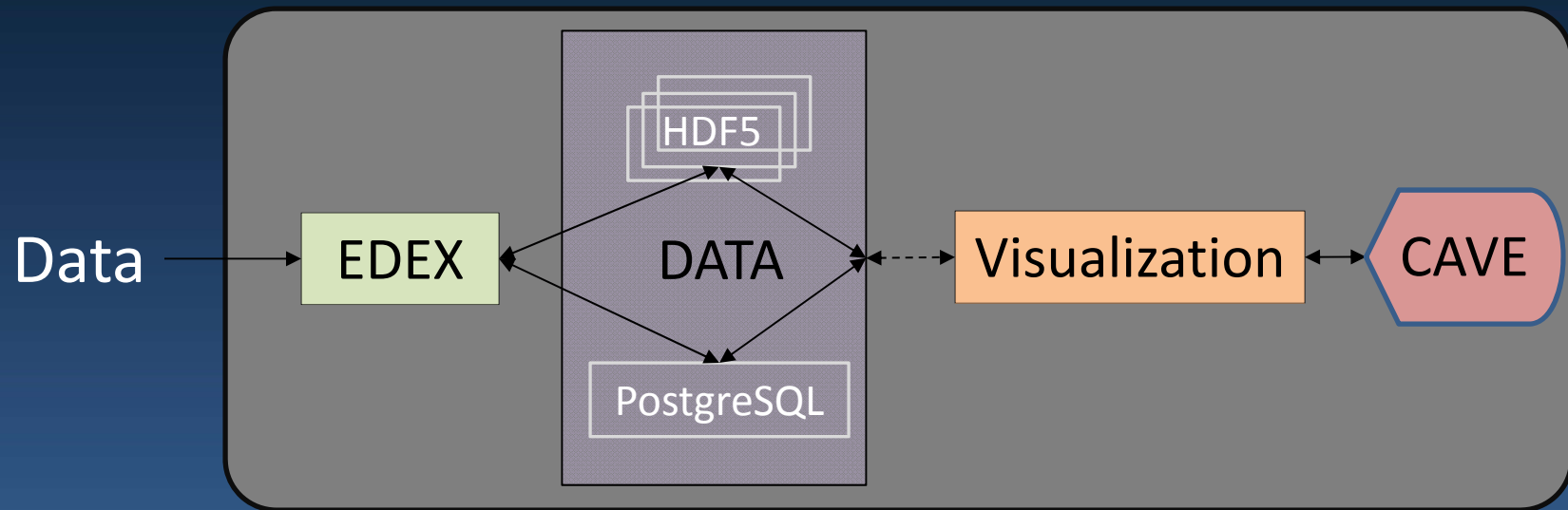
OBJECTIVE: **Collaborative development**



transitioning unique NASA data and research technologies to operations



AWIPS II Plugin Architecture



- EDEX plugin - handles data ingest; persists data in internal storage (HDF5 files) and writes metadata in the PostgreSQL database.
- DATA plugin - simply the container handling the data/metadata objects.
- VISUALIZATION plugin - communicates with the DATA plugin to retrieve data and write to CAVE resources.

What's needed for AWIPS II developers

- All Application Developers
 - Java; Python; Eclipse; XML; Subversion
- Application Integrators
 - JMS(ActiveMQ); ESB (Camel); MicroEngine
- Database Access Developers
 - Java DAO; Hibernate; Spring; EDEX; HDF5
- Graphical Interface Developers
 - CAVE; Eclipse RCP; SWT+Jface; SVG

-from the AWIPS II Software Development Guidelines document



transitioning unique NASA data and research technologies to operations

Wednesday, 9 January 2013 93rd Annual Meeting of the American Meteorological Society 7 of 16



SPoRT plugins

- Lightning Mapping Array
- Lightning Tracking Tool
- HMS Smoke & Fire
- Satellite
- Convective Initiation (UAHCI)



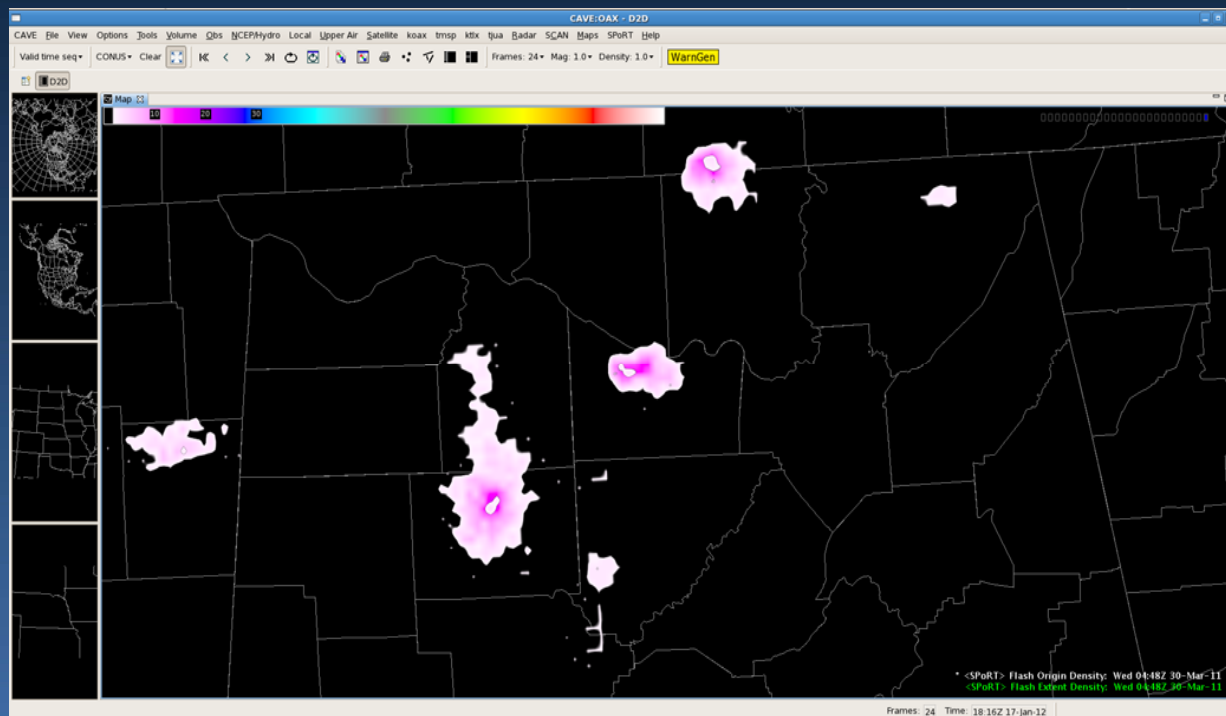
transitioning unique NASA data and research technologies to operations



Lightning Mapping Array

Total lightning data from Lightning Mapping Arrays (LMAs) is 3-Dimensional, unable to be brought into AWIPS I - except as model data. We expect to make use of future AWIPS II 3D capabilities.

LMA data is generated as ASCII, but we write as unique NetCDF – requiring a new EDEX plugin.



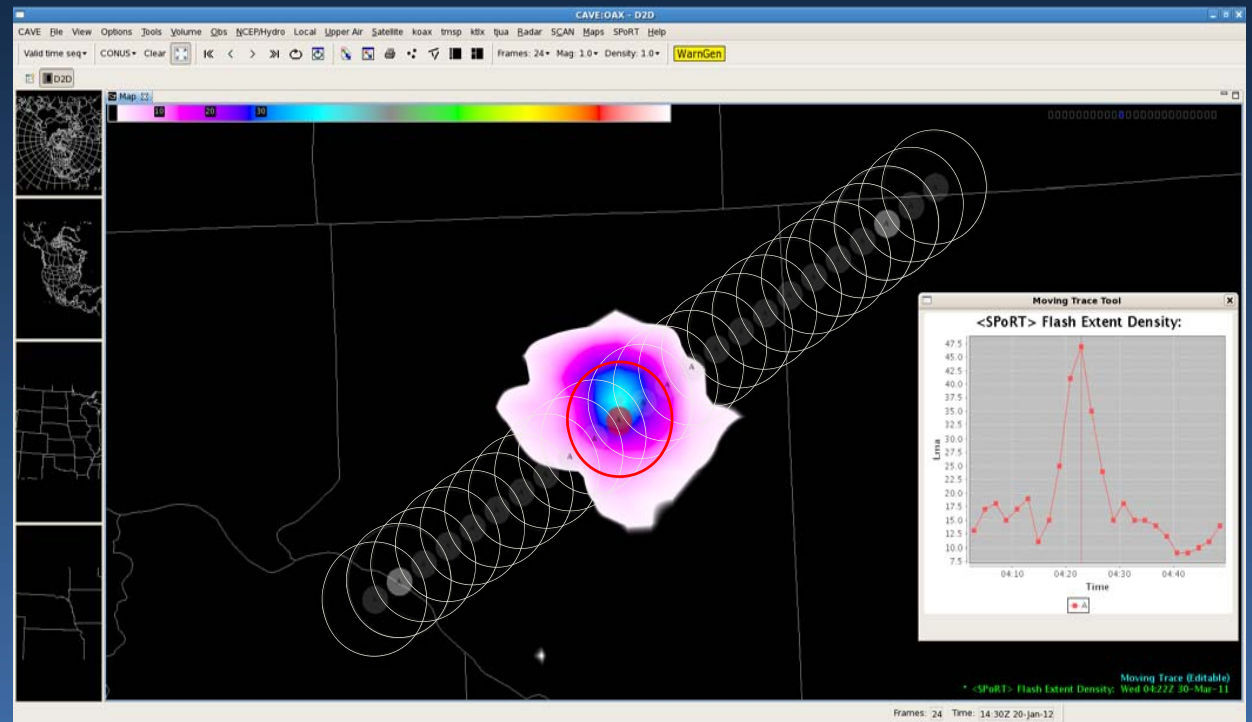
transitioning unique NASA data and research technologies to operations



Lightning Tracking Tool

Total lightning *jumps* are at times related to severe weather. Forecasters need to quickly track several storms separately, tracking their intensity.

- Track multiple cells
- Variable radii
- Adjustable storm tracking
- Color-coded chart for each data layer
- Extrapolation for new data (frames)



transitioning unique NASA data and research technologies to operations

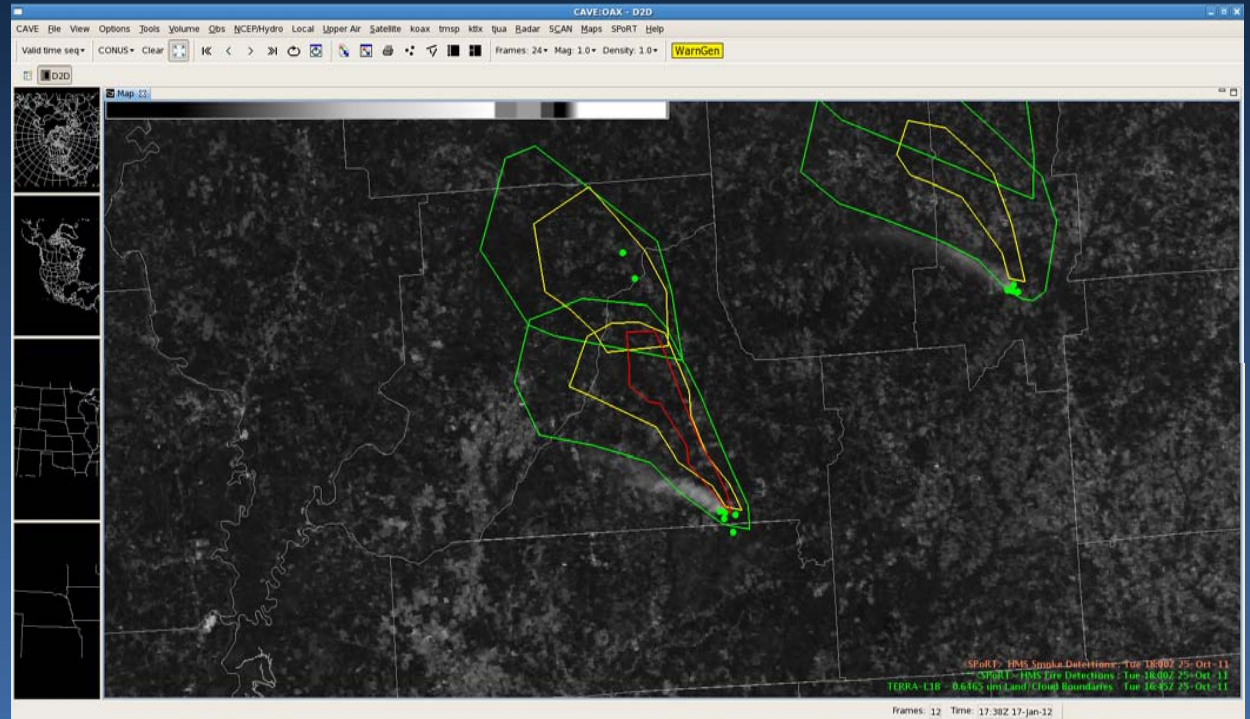
Wednesday, 9 January 2013 93rd Annual Meeting of the American Meteorological Society 10 of 16



NOAA HMS: Smoke & Fire

NOAA's Hazard Mapping System Hot Spot and Smoke data required new plugins because the hot spot point data needed special visualization (time-grouping) and the smoke regions needed special ingest code (KML).

DOM parser required



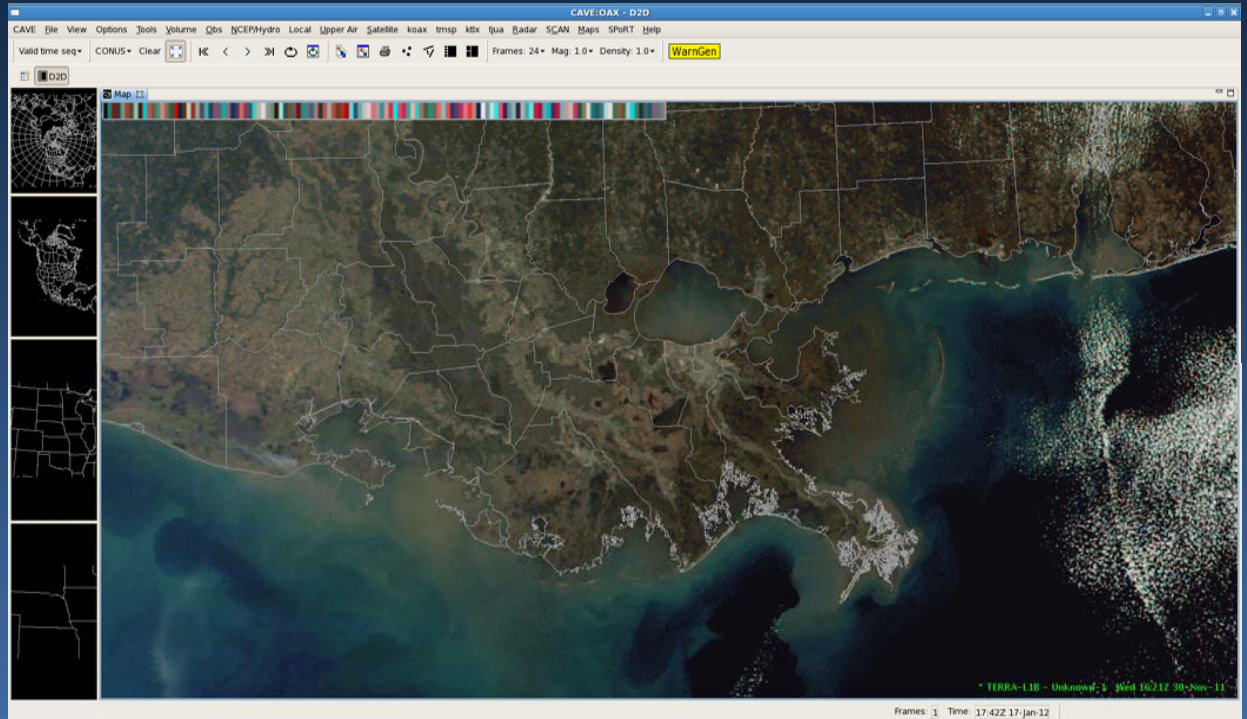
transitioning unique NASA data and research technologies to operations



Satellite / McIDAS AREA

We deal with a lot of data in McIDAS “AREA” format.

We’re using Raytheon’s extension of NCEP’s McIDAS plugin. We’re using the existing AWIPS II satellite plugin for visualization.



transitioning unique NASA data and research technologies to operations

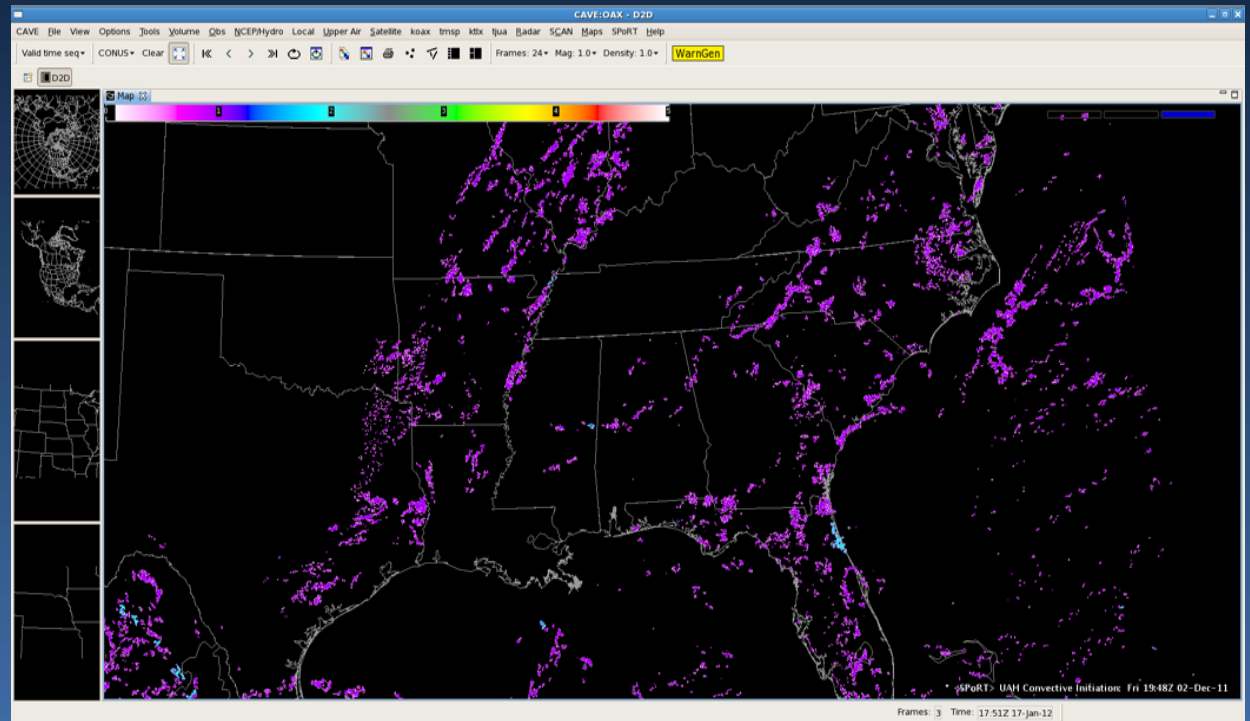
Wednesday, 9 January 2013 93rd Annual Meeting of the American Meteorological Society 12 of 16



Convective Initiation

GOES-based data set generated at UAHuntsville for short-term forecasts of convection.

Simple NetCDF format, but not natively read by AWIPS II. We wrote both EDEX and visualization plugins.



transitioning unique NASA data and research technologies to operations



Programming experiences

- Java and associated tools/parts are complex
- Frequent updates usually meant changing our plugins
- Lack of documentation made it harder
- We're beginning to need software management tools



transitioning unique NASA data and research technologies to operations



Plans

- Prepare plugins, colormaps, bundles for all current AWIPS I SPoRT products
- Create and/or extend plugins for upcoming datasets
 - Improve RGB with true 24-bit viz
 - Possible 3D viz efforts
 - Possible multi-byte datasets



transitioning unique NASA data and research technologies to operations



Summary

- SPoRT is preparing for AWIPS II
- AWIPS I offered *very* limited programming
- AWIPS II offers exciting opportunities for handling new data sets and visualization capabilities
- **Documentation is badly needed**



transitioning unique NASA data and research technologies to operations



Questions?

SPoRT: <http://weather.msfc.nasa.gov/sport/>



transitioning unique NASA data and research technologies to operations

Wednesday, 9 January 2013 93rd Annual Meeting of the American Meteorological Society 17 of 16

