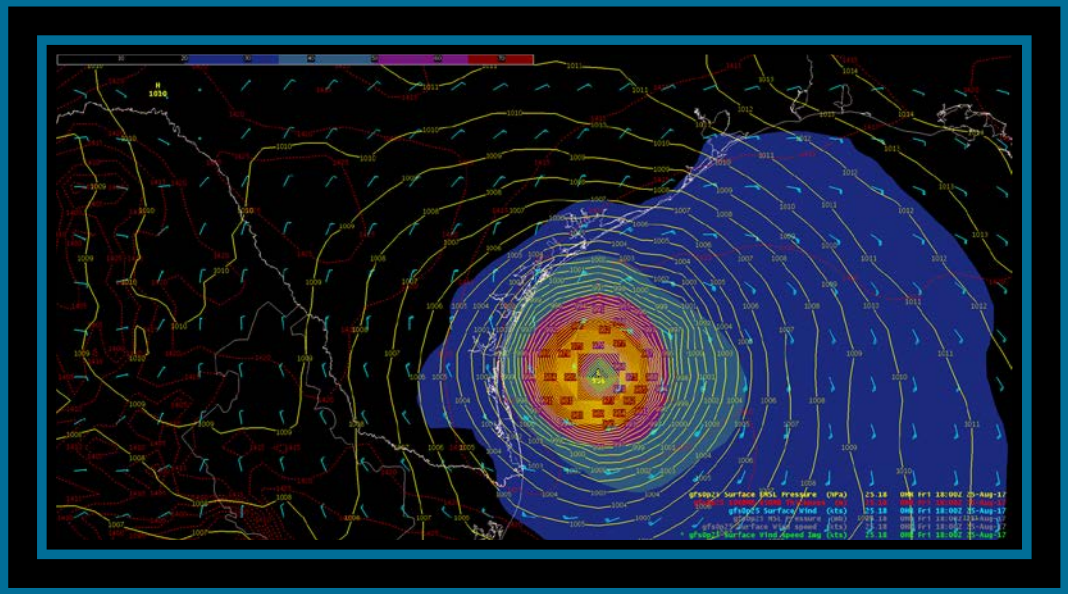
Evolution of AWIPS2 and the ATCF at NHC



Christopher Mello, Craig A. Mattocks, Mark DeMaria, Michael Brennan and Monica Bozeman
NOAA/NWS National Hurricane Center, Miami, FL

Charles R. Sampson and Michael Frost
Naval Research Laboratory, Monterey, CA

Status of ATCF, N-AWIPS and AWIPS2

- ATCF is the primary software tool for NHC, CPHC and JTWC tropical cyclone product generation
- NWS working to integrate ATCF functionality into AWIPS2 over the next 5 years
- NAWIPS and AWIPS2 are both used for satellite and model data display and product generation
- NAWIPS migration to AWIPS2 is a high priority for NWS

History of the Automated Tropical Cyclone Forecasting (ATCF) System

Prior to 1988: Grease pencils and acetate

1988: ATCF (MS-DOS PC version) to JTWC in Guam

1990: ATCF to NHC

1996: First Unix ATCF - C, Fortran, XVT toolkit, Unix/Python/Perl scripts

1998: ATCF and TC web page coupled, first forecast track consensus

2000: Y2K compliance, HP-Unix

2001: Unix ATCF to NHC - NRL manages C & GUI code, NHC manages site-specific "standalone" code

2002: Extended to 5-day forecast capability

2003: TC web page imagery on ATCF, Red Hat Enterprise Linux

2004: Consensus track forecast error estimates (GPCE)

2005: Intensity guidance, wind probabilities aids integrated

2007: Intensity forecast consensus aid integration for JTWC and NHC

2009: Intensity forecast error estimates (Intensity GPCE aid integration)

2010: Web-ATCF for training and home use

2012: Flat file database replaces relational database for grids and raw data

2014: Genesis probability forecasting

2016: Wind radii forecast consensus aid, 120-h wind radii forecasts

2017: Gale wind radii observations/estimates

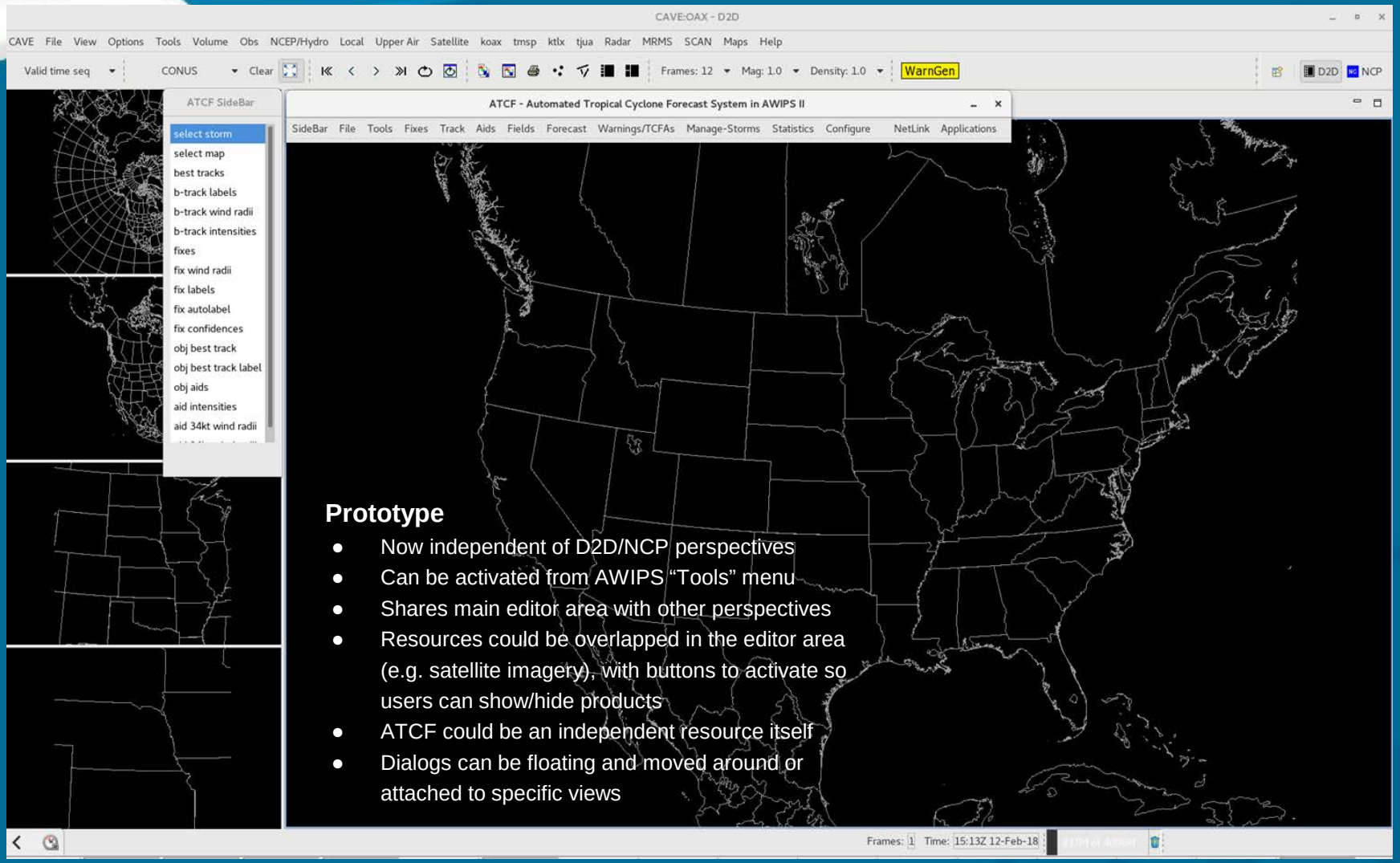
Highlights of 2018 ATCF Upgrades for NHC

- NRL
  - Improve performance of ATCF forecast dialog and display GUIs for systems with large a-decks
  - Add “Storm State” selections for “Tropical Cyclone” and “Potential Tropical Cyclone” to “Forecast Type” menu in Advisory Composition GUI
  - Enable dialog box to make 64-kt wind radii forecasts at 48 h
- NHC
  - Include 48-h forecast of 64-kt wind radii forecast in the TCM and other operational products
  - Modify NHC vortex message decoder to account for vortex message changes in 2018
  - Enable WPC issuance of TCPs for inland depressions in the ATCF

ATCF in AWIPS2 Status

- Development moved from NCEP/NCO to AWIPS Program Office (APO)
- One contractor effort for last 2 years
- Initial capabilities
  - A, B, E, F deck import/export
  - Model guidance plots
  - May be folded into AWIPS baseline by 2020
- NWS/Central Processing increasing support to 3 contractors in FY19
- Full capabilities still 4 to 5 years away

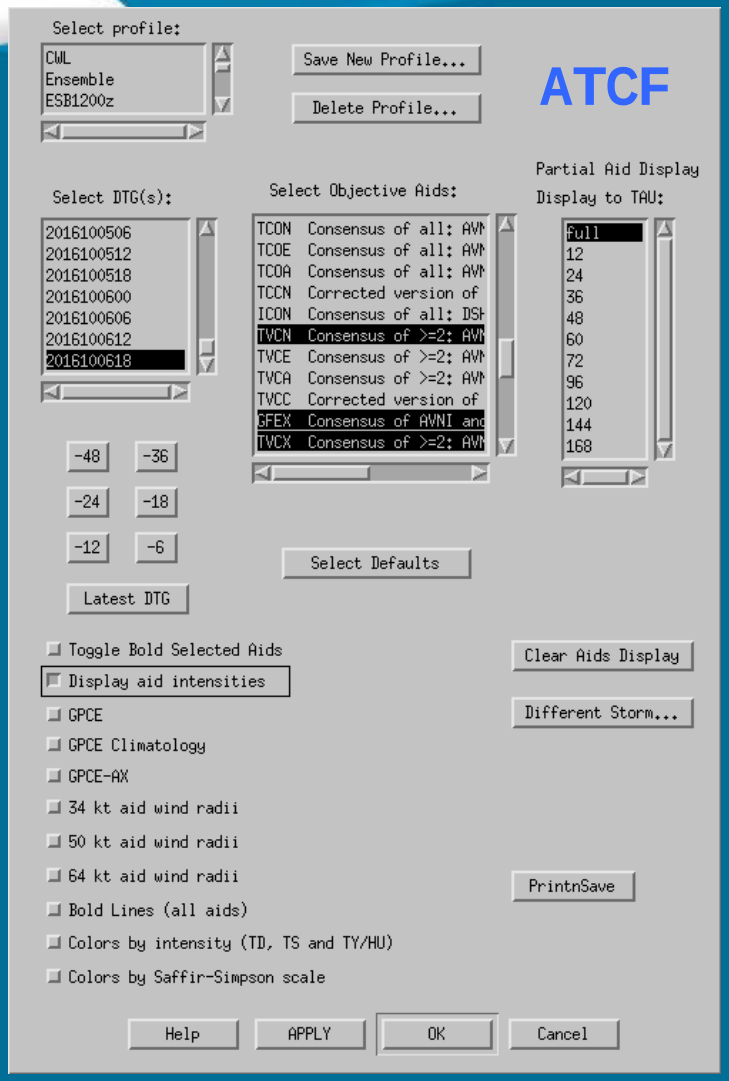
Future AWIPS2 Software
Ported ATCF with Sidebar

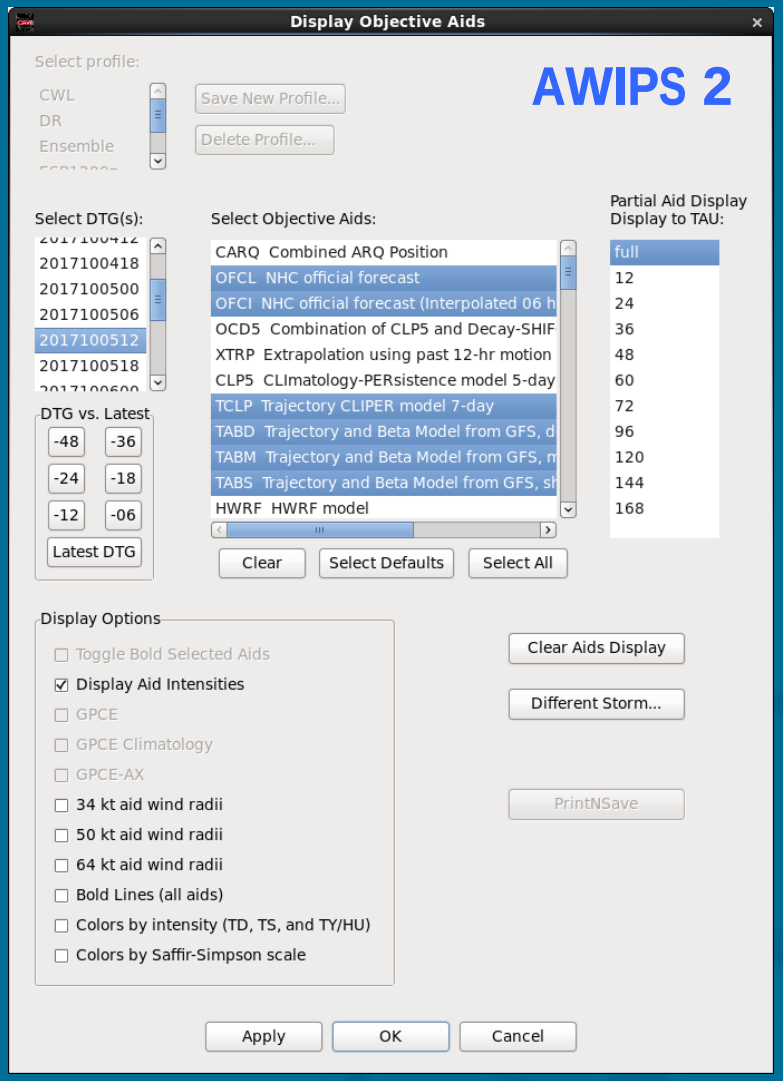


Prototype

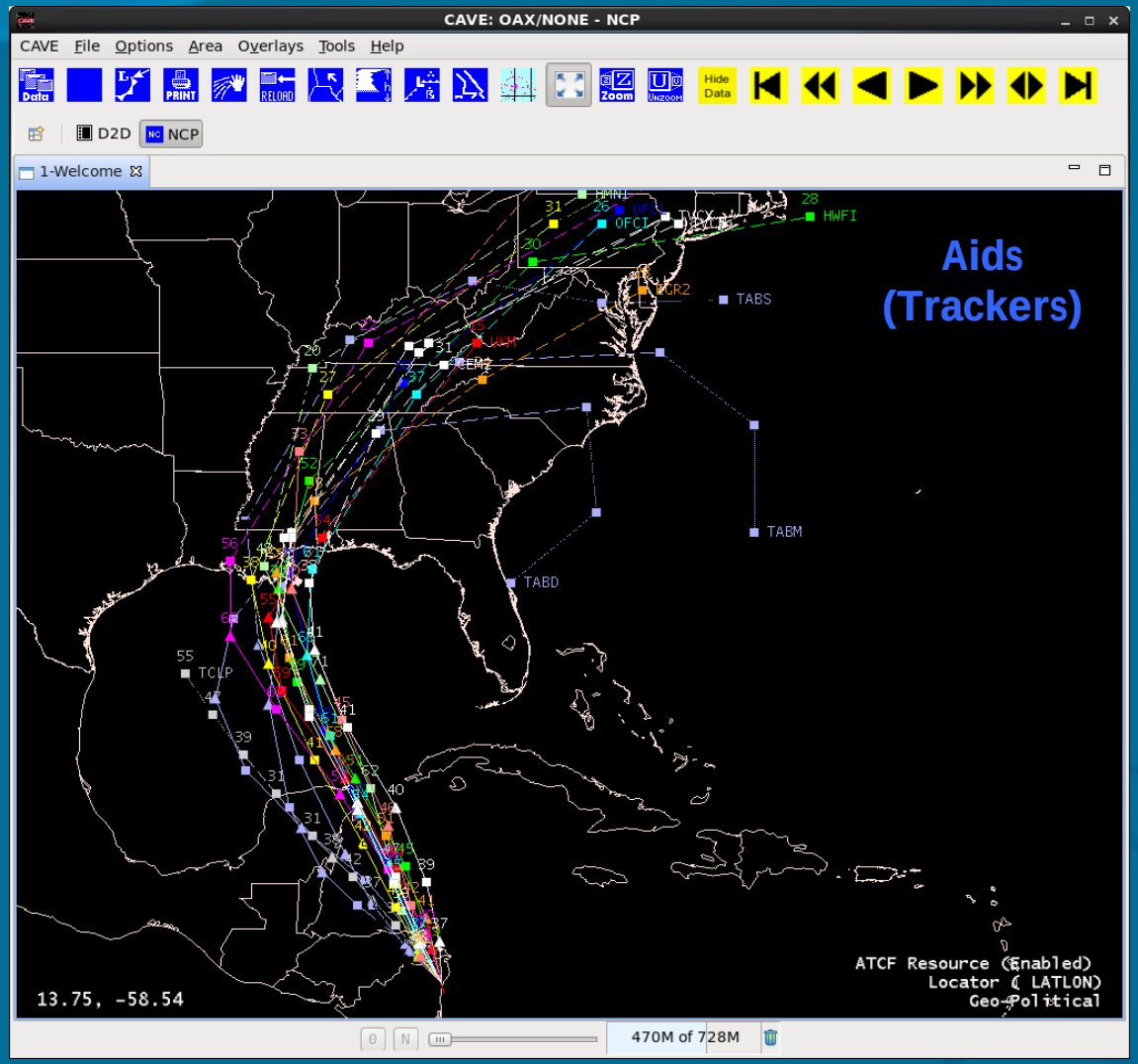
- Now independent of D2D/NCP perspectives
- Can be activated from AWIPS “Tools” menu
- Shares main editor area with other perspectives
- Resources could be overlapped in the editor area (e.g. satellite imagery), with buttons to activate so users can show/hide products
- ATCF could be an independent resource itself
- Dialogs can be floating and moved around or attached to specific views

ATCF Transition to AWIPS2
CAVE-NCP Graphical User Interface

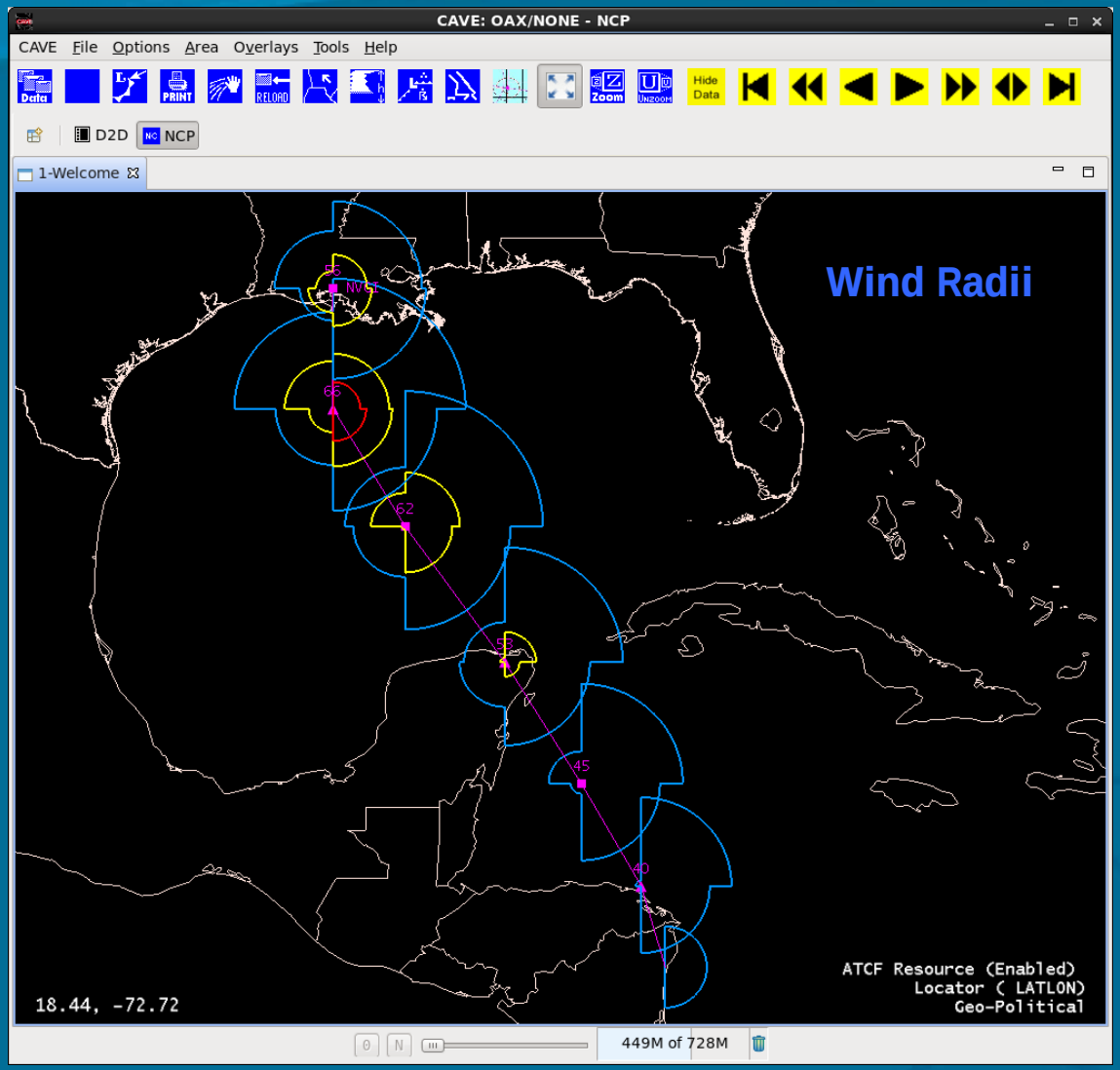




ATCF Transition to AWIPS2 CAVE-NCP Graphical User Interface



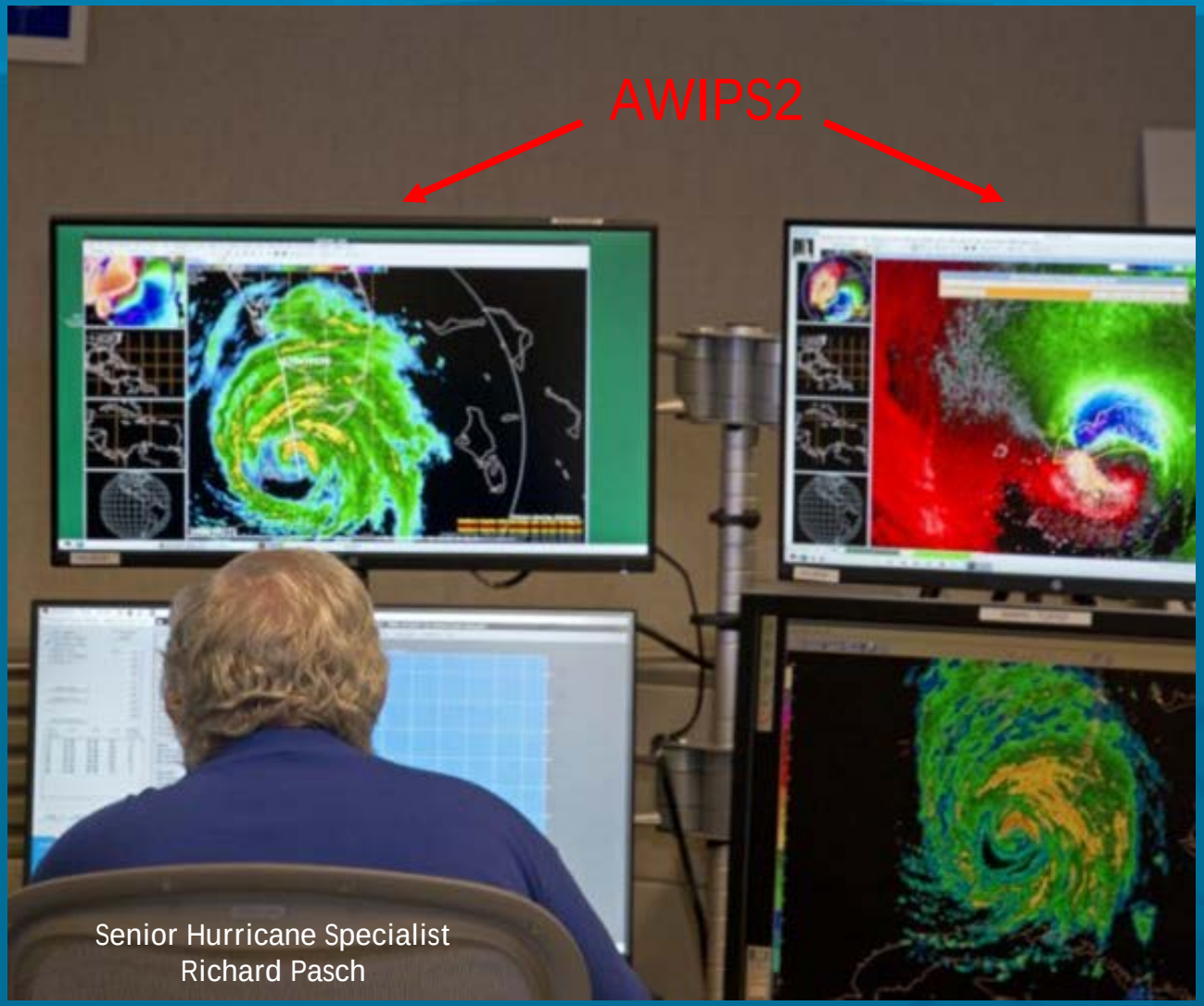
ATCF Transition to AWIPS2
CAVE-NCP Graphical User Interface



N-AWIPS to AWIPS2 Status

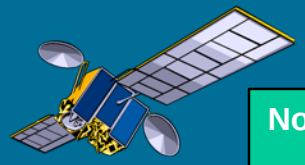
- AWIPS used by HSU in 2017 for GOES-16 data
- AWIPS workstations on all HSU operations desks in 2018
  - Will replace satellite N-AWIPS system
- NHC provided “use cases” to APO for hardware/software evaluation
- Migration will continue in 2018
  - Non-SBN data flow, product generation
- Possible completion of migration for 2020 hurricane season

AWIPS2 Workstation at NHC in 2017

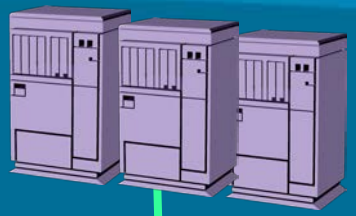


NHC AWIPS2 Data Flow

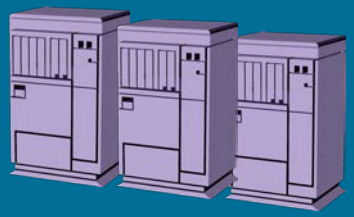
High resolution McIDAS/NetCDF4 data



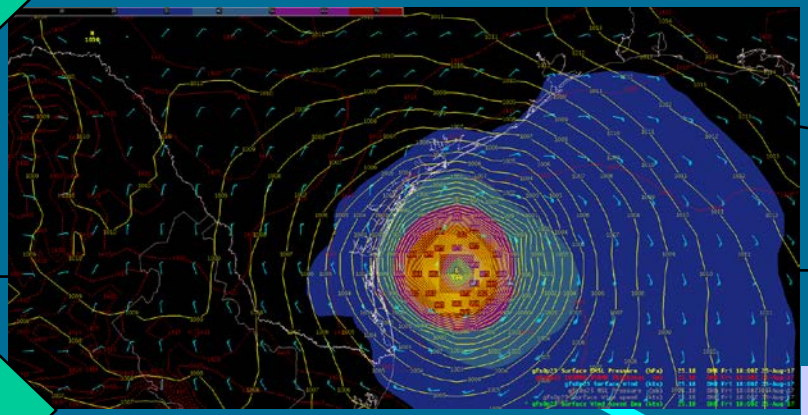
Non-SBN DBNet



Local NHC data sets
Hurricane Hunter
observations



Global high
resolution
NCEP models

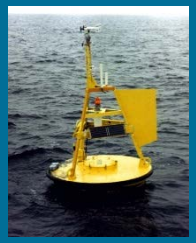


D2D Menus

GFE Menus

Text Editors

Products



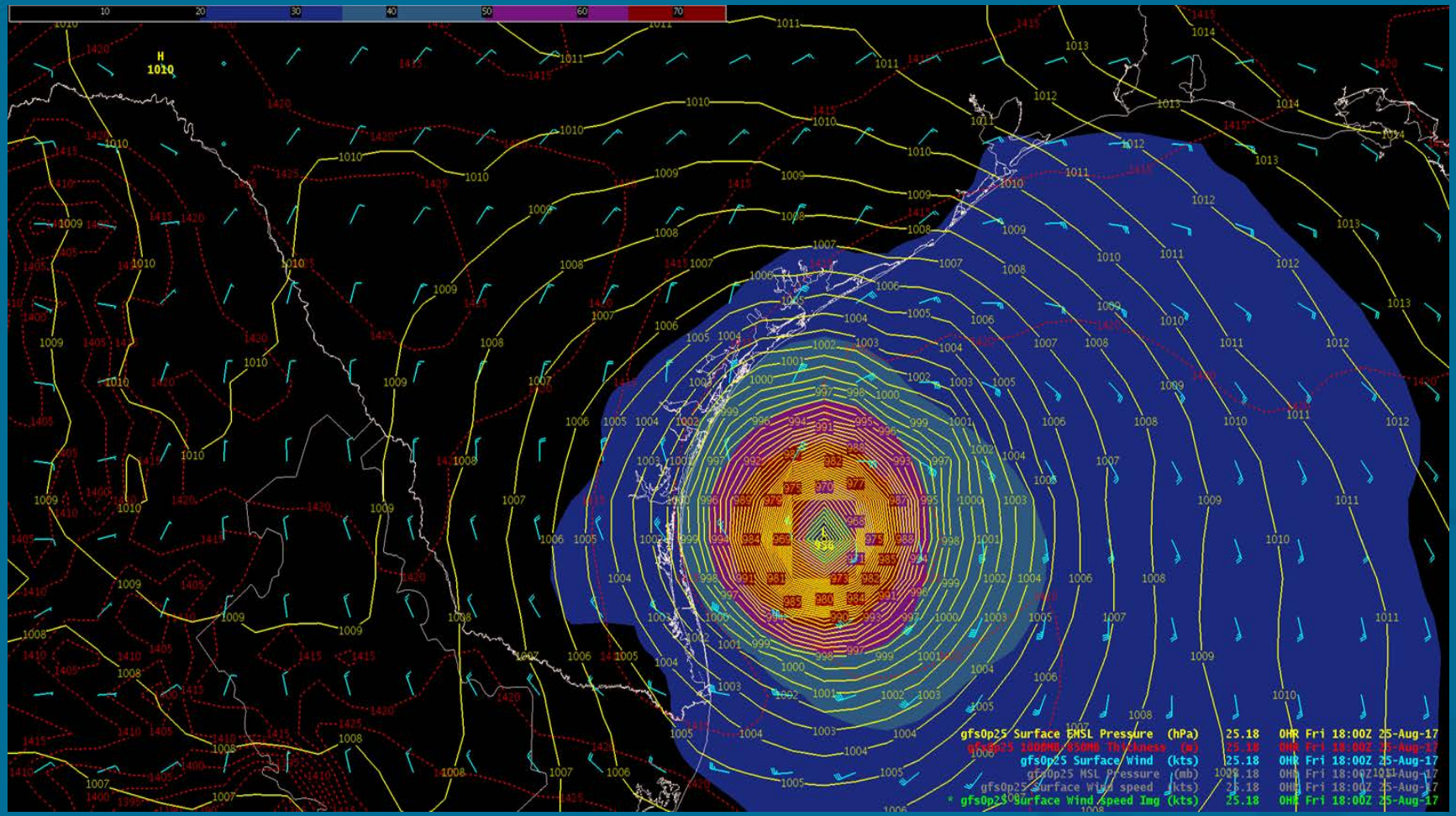
Buoys,
Ships

SBN LDM flow

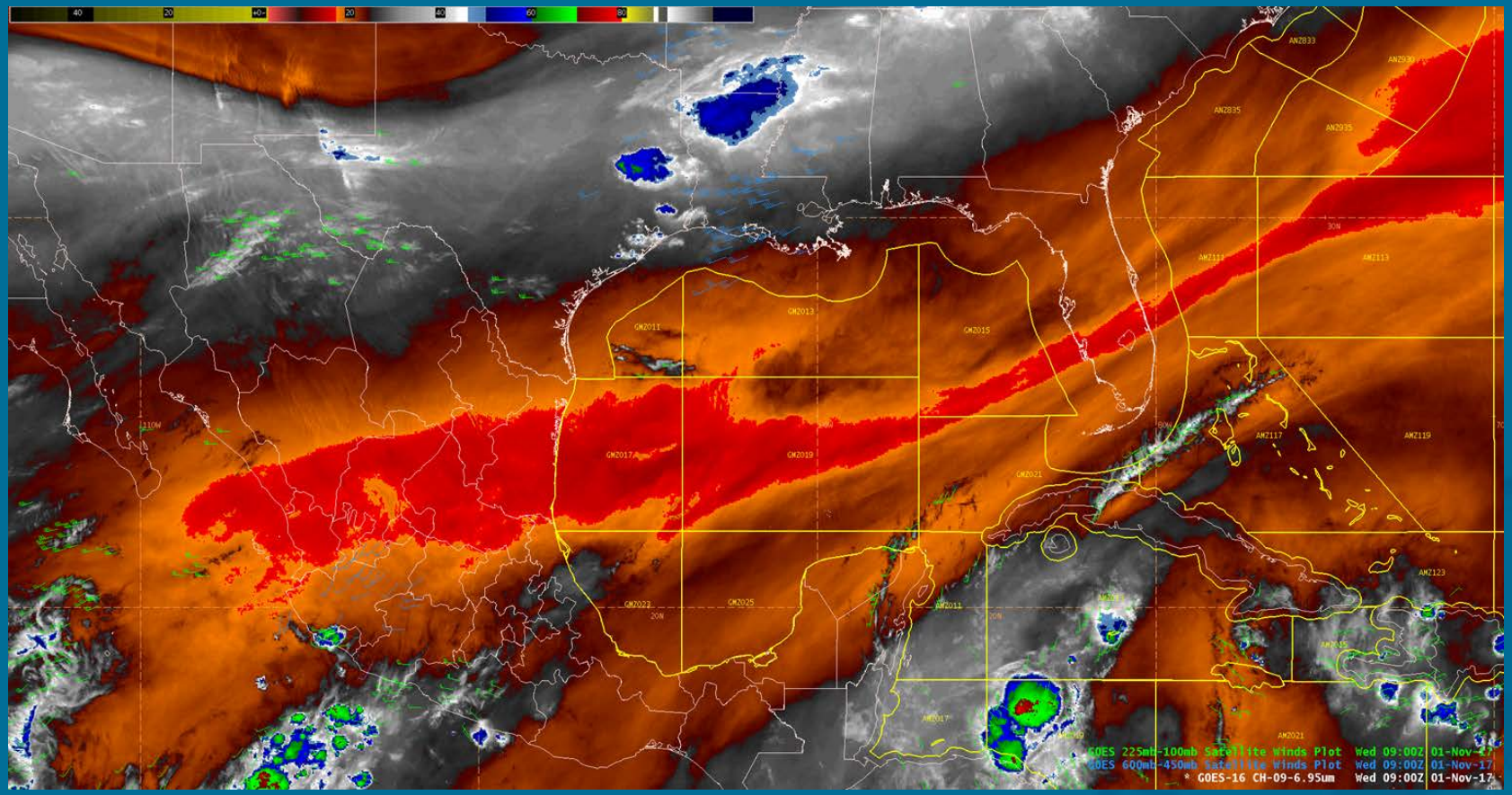
**18 AWIPS Workstations,
4 EDEX Servers**

**Service provided
24 hrs/day,
365 days/yr**

Model Data in AWIPS2
Hurricane Harvey Landfall



Satellite Data Displayed in AWIPS2



AWIPS2 and Collaboration with the Research Community

- Setting up operational AWIPS system is a difficult task
- Large hardware and support investments
- Unidata provides a simplified version for collaboration
  - Smaller hardware investment needed
  - Data flow via LDM
  - Supports two visualization frameworks
    - CAVE and Python Data Access Framework (Python-AWIPS)
  - Unidata provides user support
- Path for R2O collaboration
  - HRD, universities, etc.

Thank you!

References:

•Miller, R.J., A.J. Schrader, C.R. Sampson, and T.L. Tsui, 1990: The Automated Tropical Cyclone Forecasting System (ATCF), *Weather and Forecasting,* **5**, 653-660.

•Sampson, C.R. and A.J. Schrader, 2000: The Automated Tropical Cyclone Forecasting System (Version 3.2), *BAMS*, **81**, 1231-1240.

•NRL users manual for the ATCF:

http://www.nrlmry.navy.mil/atcf_web/docs/pdf/ATCF_User%27s_Manual_10192010.pdf

•NRL documentation on the ATCF:

http://www.nrlmry.navy.mil/atcf_web/docs/