Cloud & Visibility Improving Aviation Services Together

Clinton Wallace, Deputy Director
NOAA Aviation Weather Center

Friends and Partners in Aviation Weather July 12-13, 2017

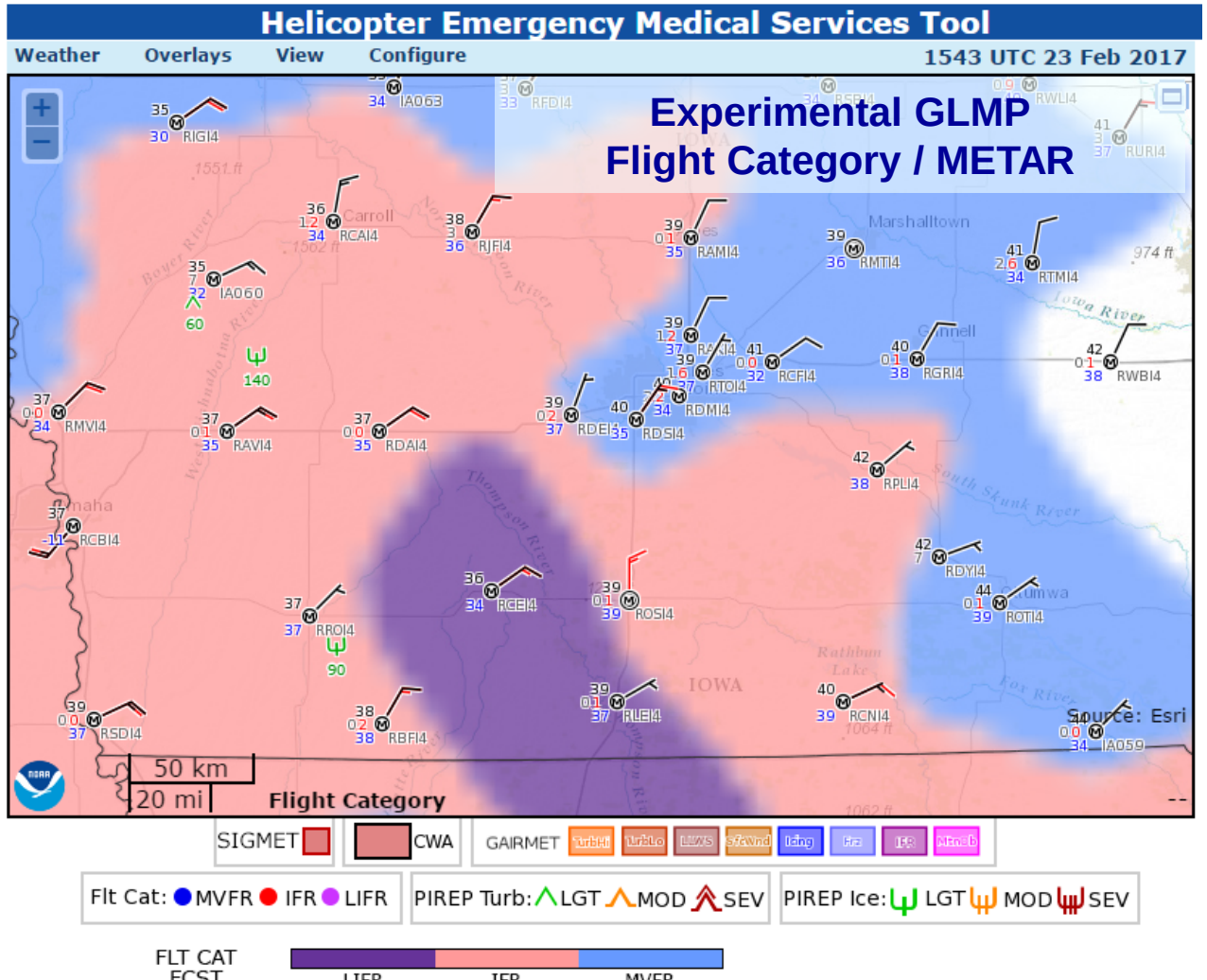
With Many Contributions

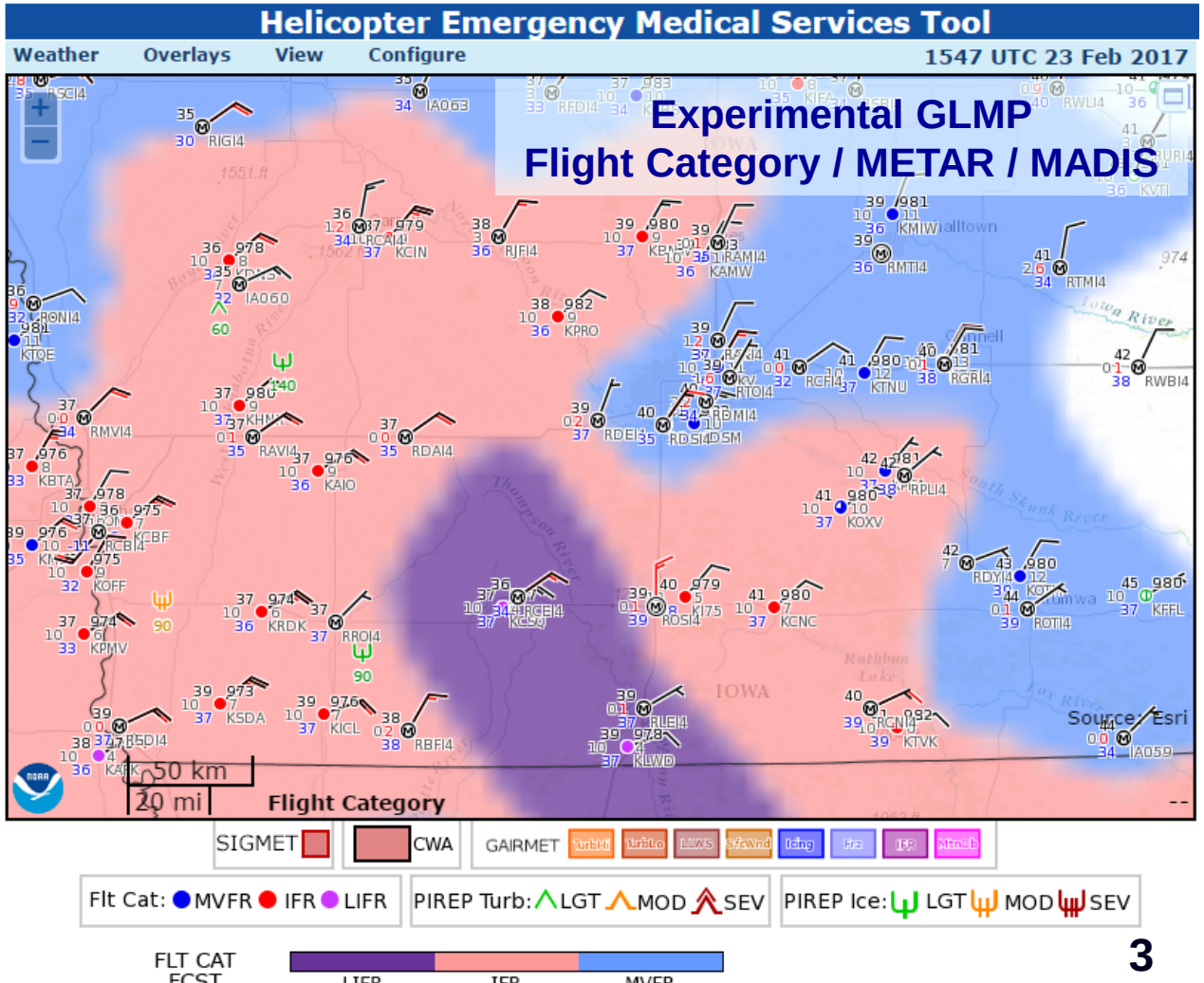
- FAA Aviation Weather Research Program (AWRP)
- FAA/WJHTC Aviation Weather Demonstration and Evaluation (AWDE) Services
- NOAA/NWS Aviation Weather Center (AWC)
  Aviation Weather Testbed (AWT)
- NOAA/NWS Meteorological Development Lab (MDL)
- NOAA/NWS Environmental Modeling Center (EMC)
- NOAA/OAR Earth Systems Research Lab (ESRL)
  Global Systems Division (GSD)

"This material is based upon work supported by the Federal Aviation Administration. Any opinions, findings, conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the Federal Aviation Administration."

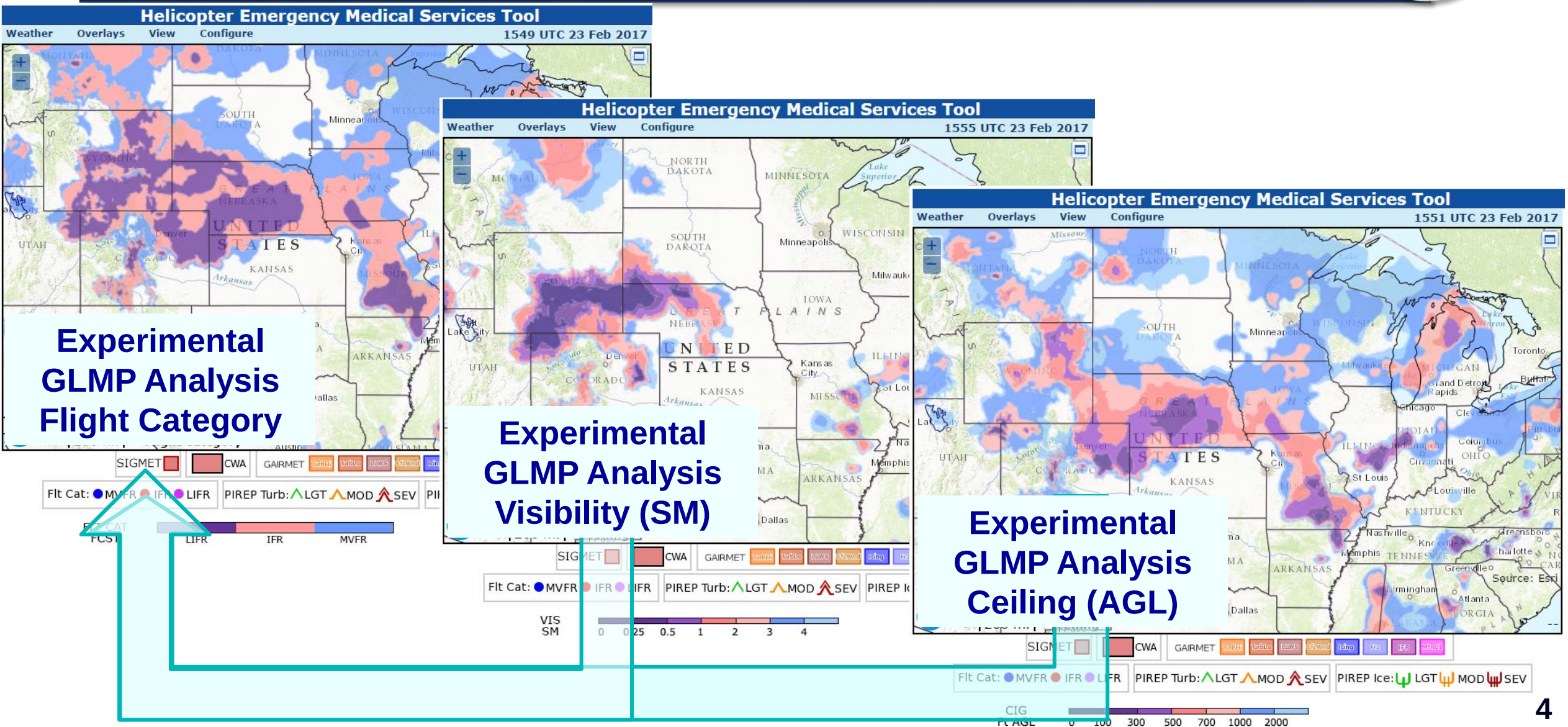
Including MADIS Observations

Meteorological Assimilation Data Ingest System



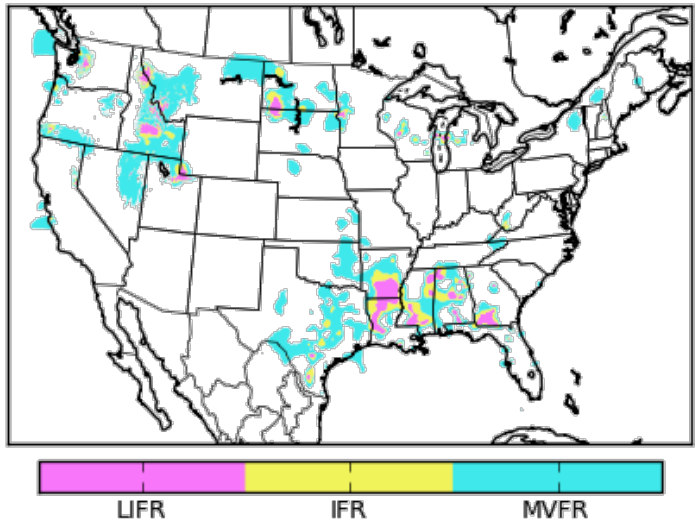


Experimental HEMS in Aviation Weather Testbed

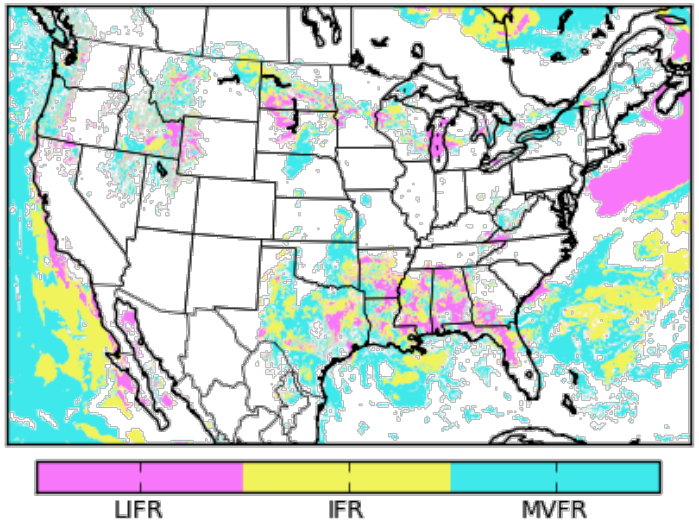


HEMS Evaluation

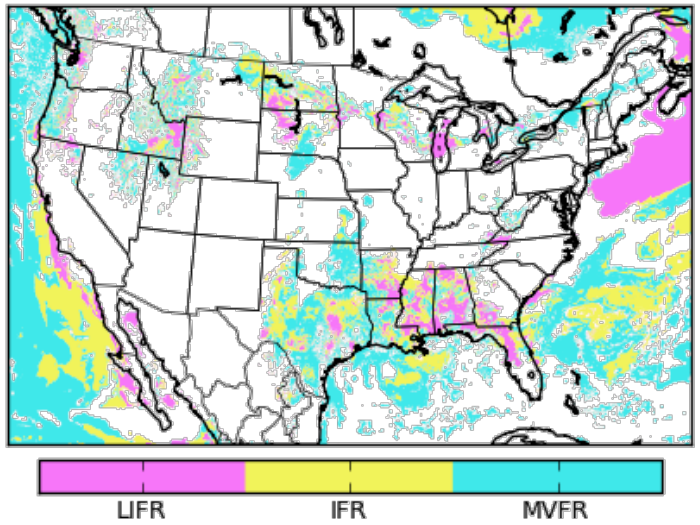
LAMP Analysis Flight Rule



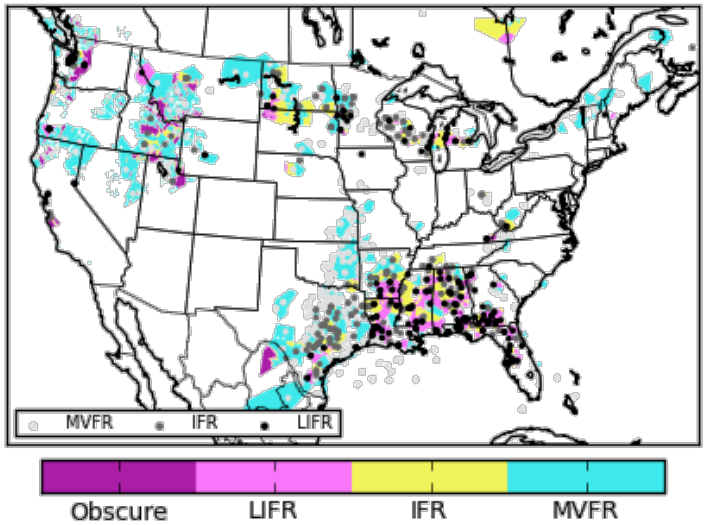
Ru-RTMA Analysis Flight Rule



RTMA-Para Analysis Flight Rule



NCVA Flight Rule



2017 AWT Summer Experiment

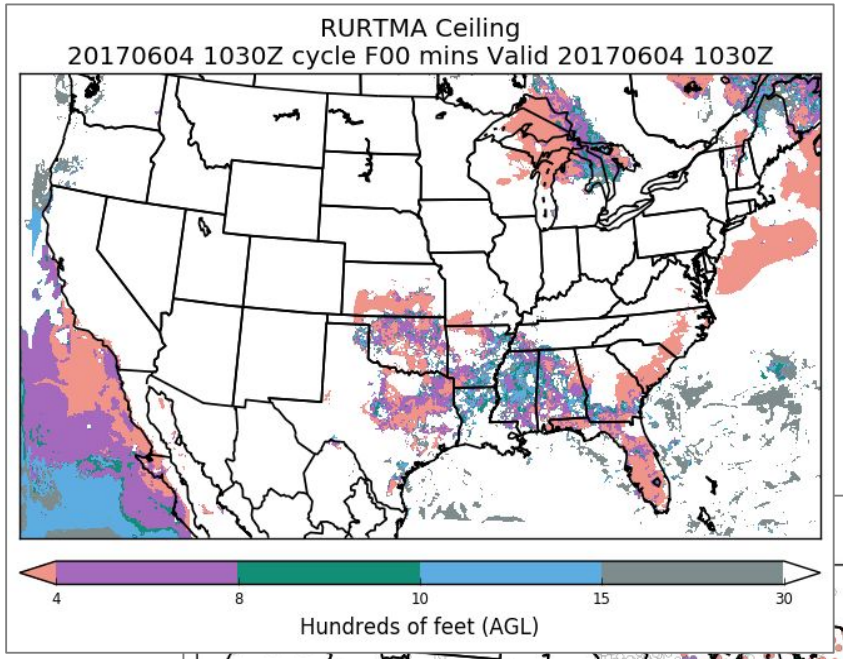
Evaluate replacement options for NCVA in HEMS

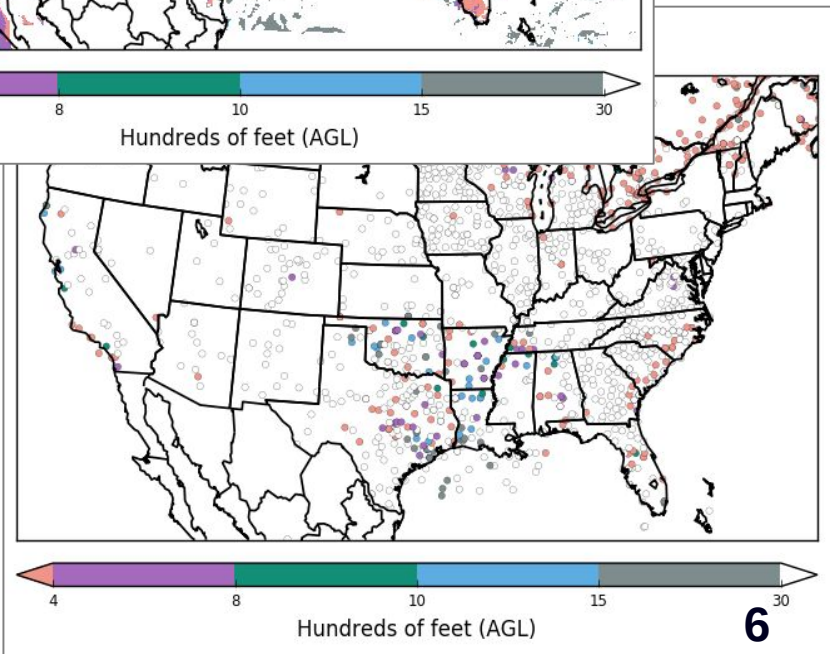
NCVA

- High update rate
- Low latency
- Analysis accuracy diminishes with distance from observation
- No off-shore coverage

15 Min RU-RTMA Status

- Evaluated Jan-Jun 2017
- Planned Implementation Oct 2017
- Provided every 15 minutes
- Uses 15 min output from HRRR to compensate for latency
- Closer fit to data
- Off-shore coverage

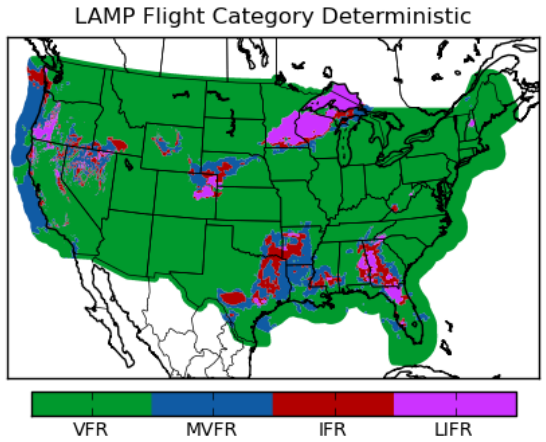


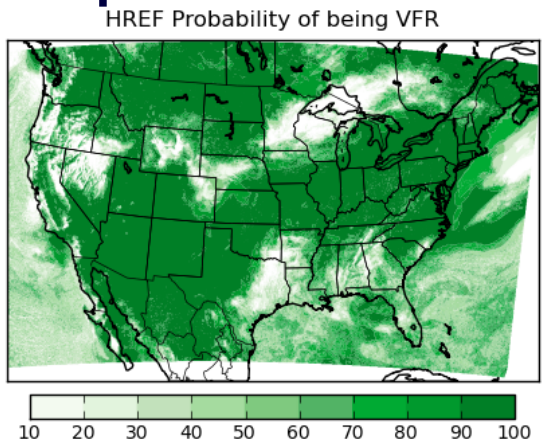


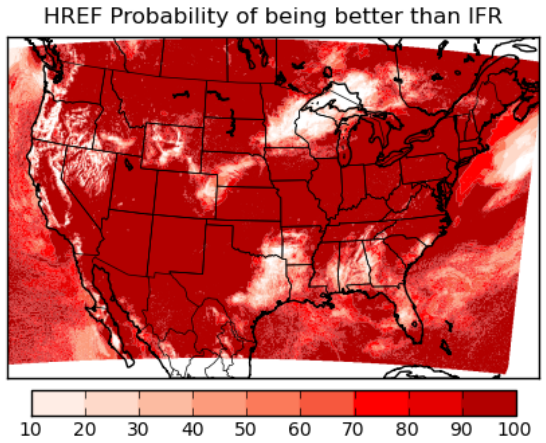
HREF/LAMP Probabilistic Flight Rule Comparison

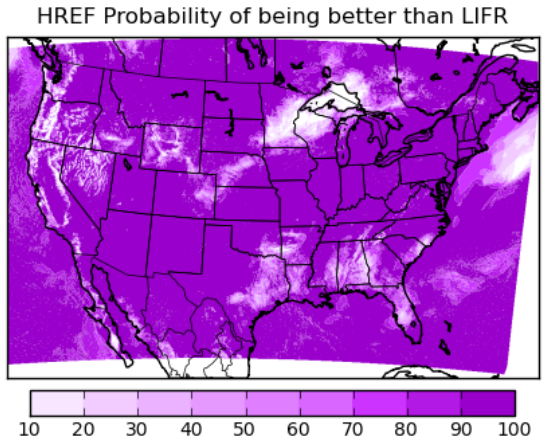
How would aviators use probabilistic C&V information?

Partnership with AWDE may lead to answer.

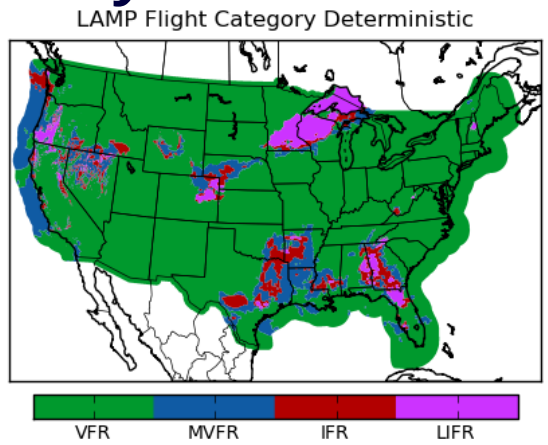


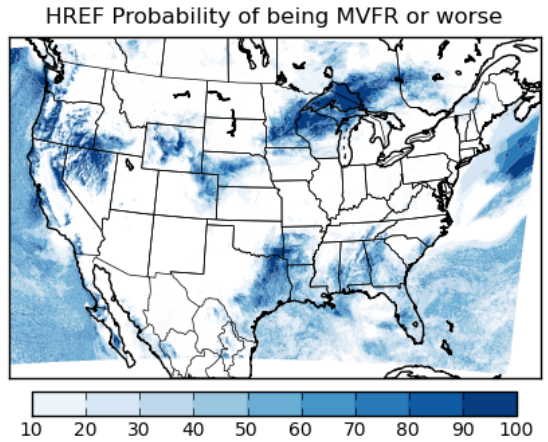


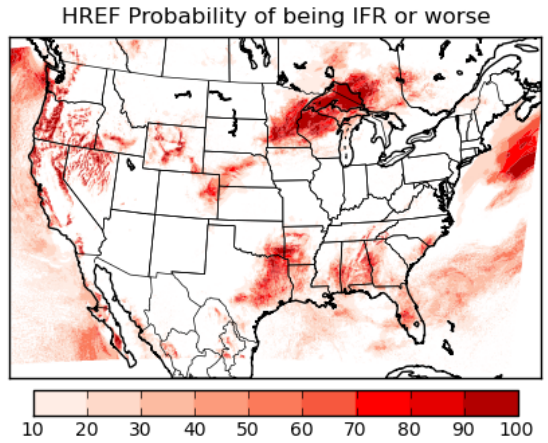


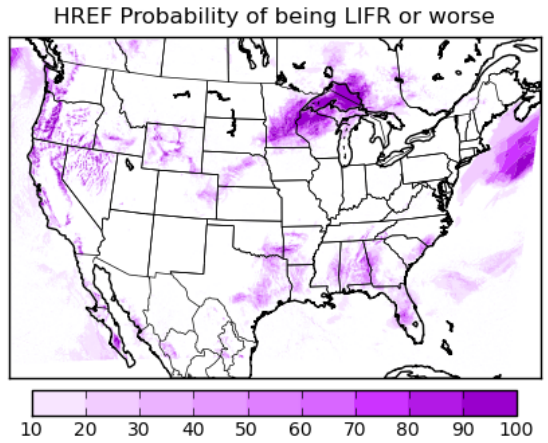


Optimistic







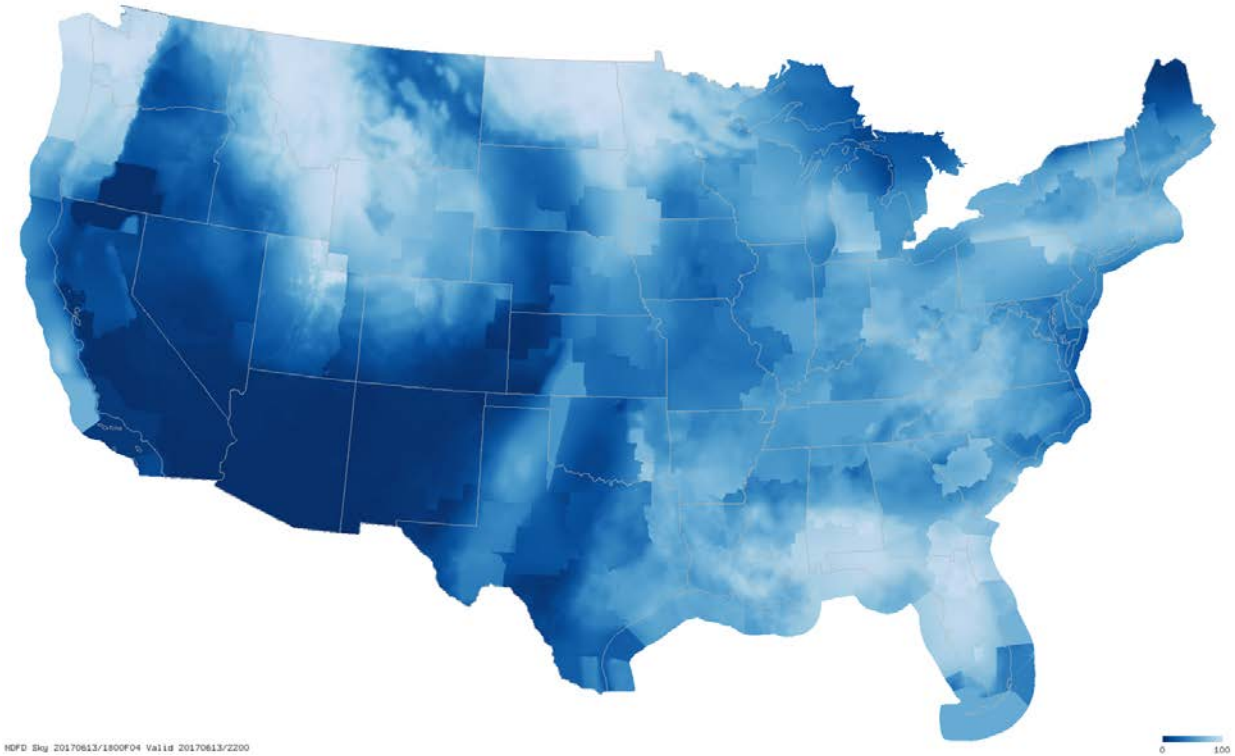


Pessimistic

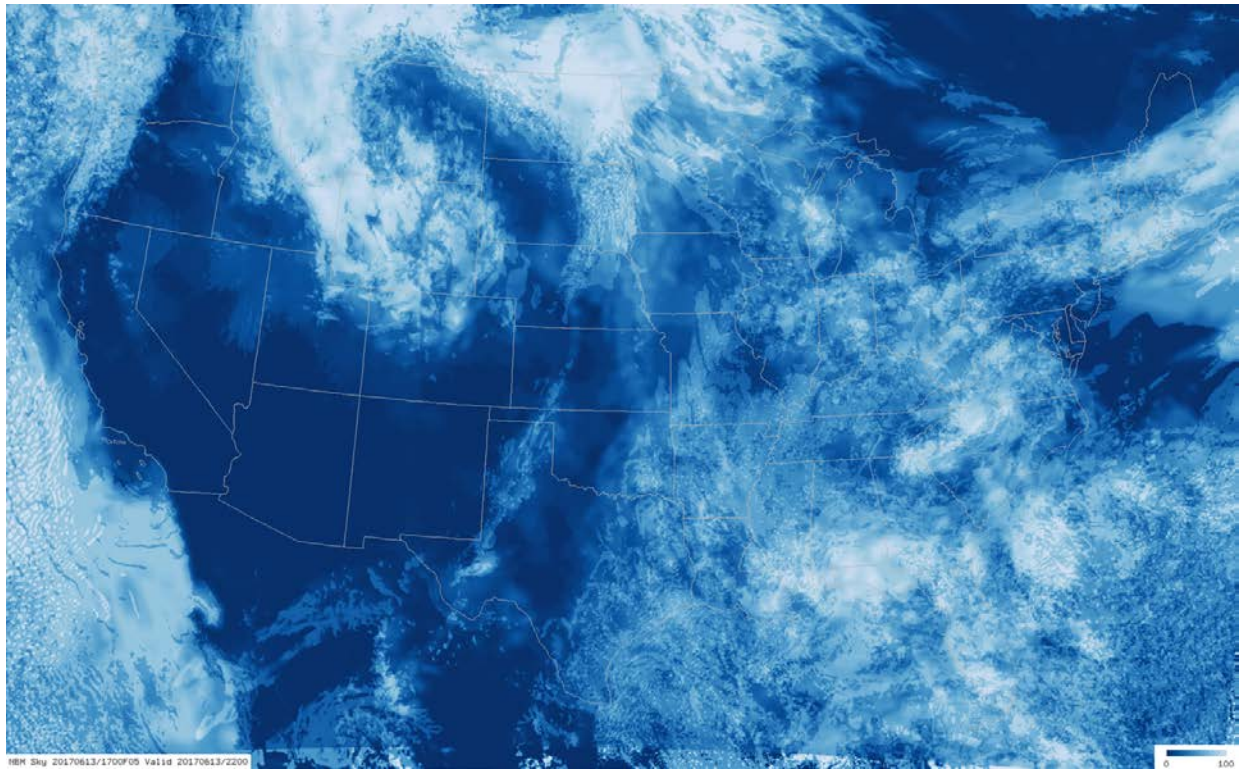
Common Operating Picture (COP)

2017 AWT Summer Experiment – Model Evaluation

Sample NDFD Sky Cover Forecast



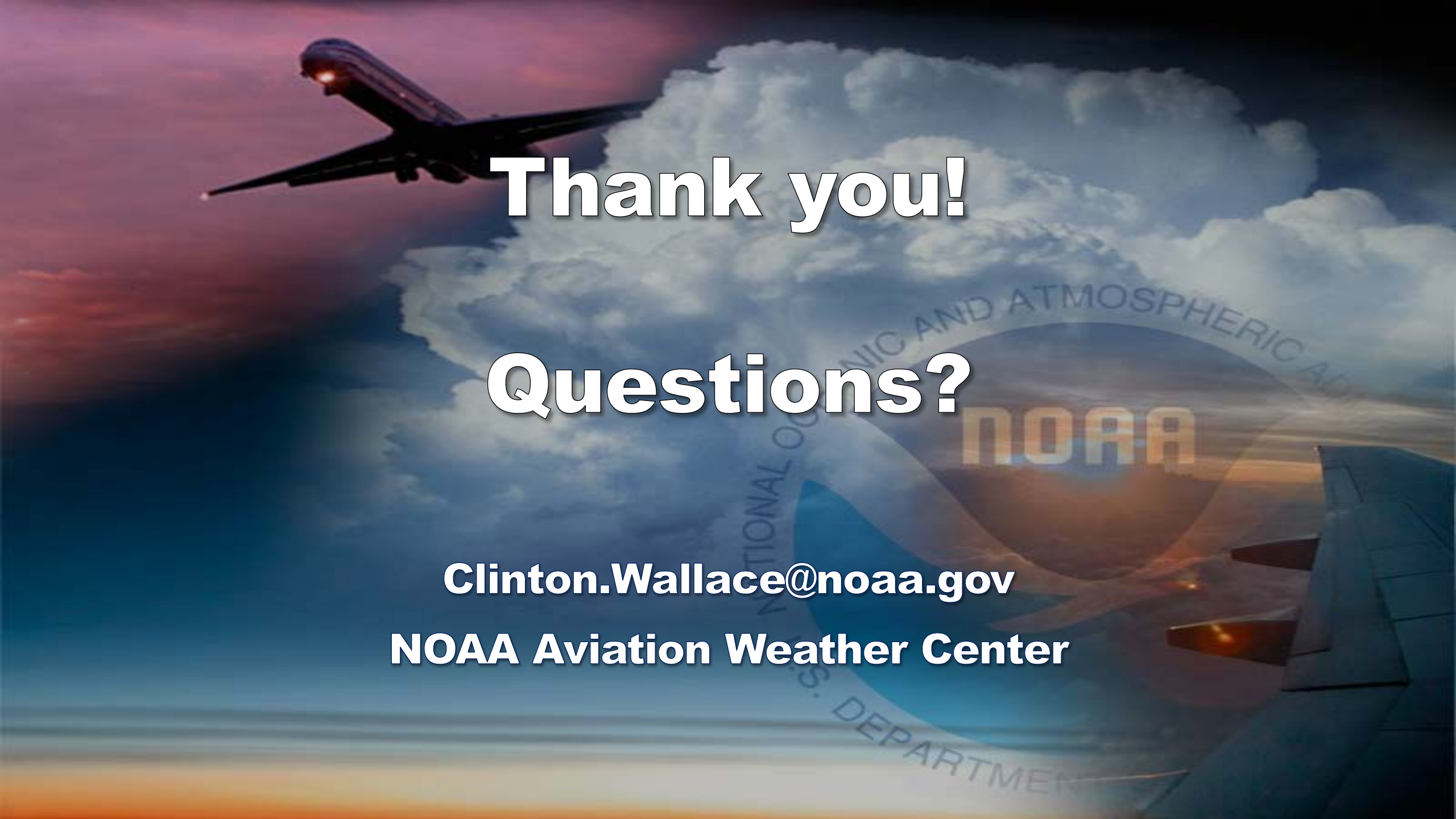
Sample NBM Sky Cover Forecast



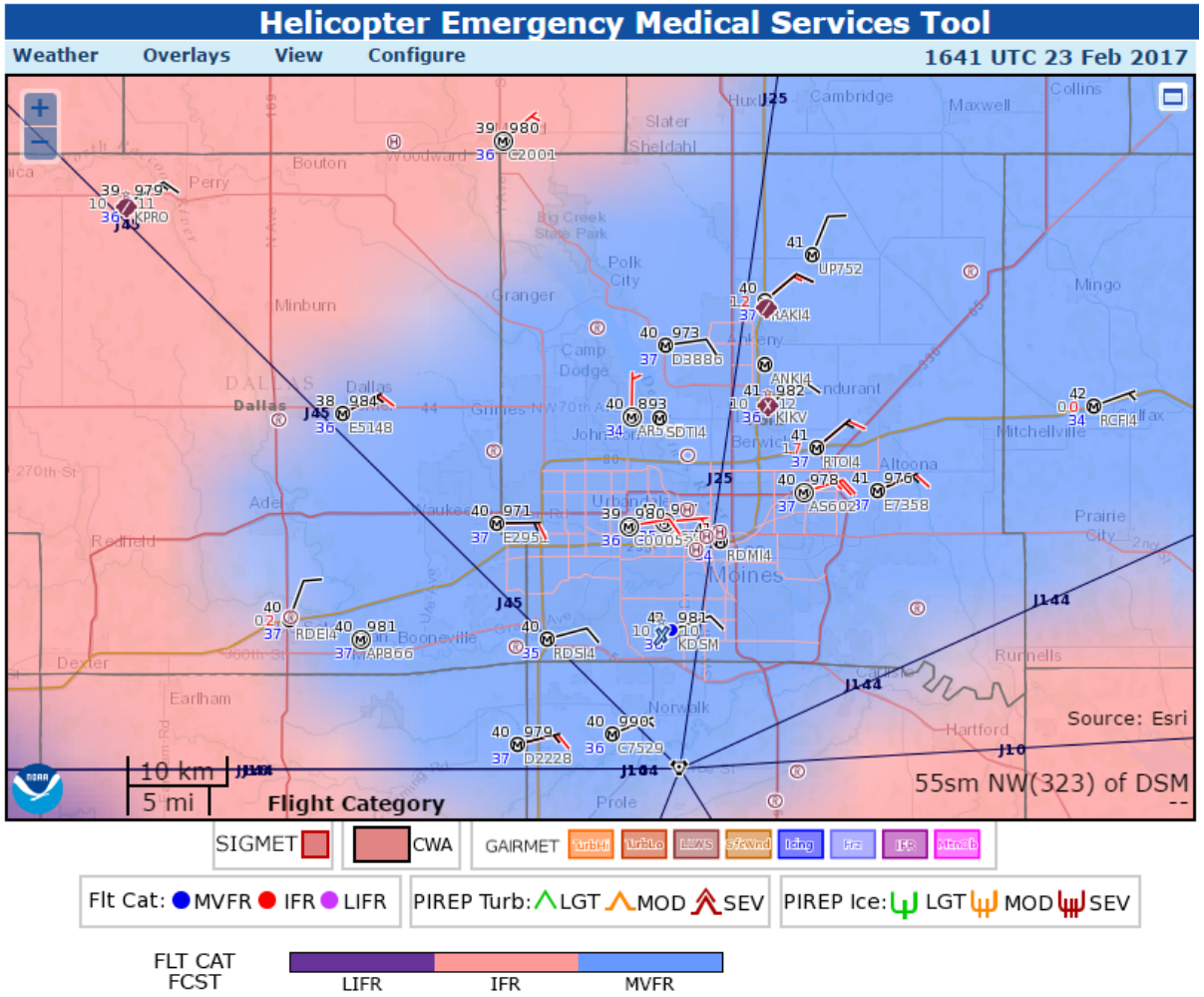
Participants will evaluate TAF generation techniques using NBM v3.0 and 3D Cloud Fraction Model guidance

Key Takeaways

- Collaboration among Multiple Organizations
- Second Year of a Multi-Year Project
- One consistent forecast: Common Operating Picture
- Simultaneously improving Observations, Analyses, Forecasts, and Dissemination
- Benefits TAFs, GFA, HEMS, and many NWS programs


Thank you!
Questions?
Clinton.Wallace@noaa.gov
NOAA Aviation Weather Center

Improved Overlays

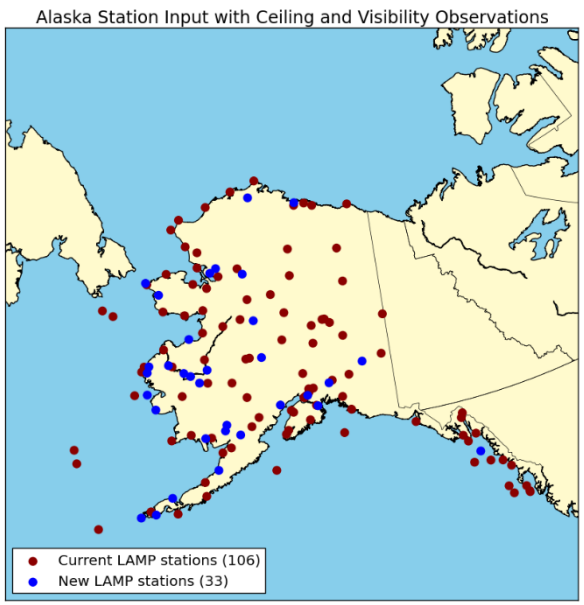


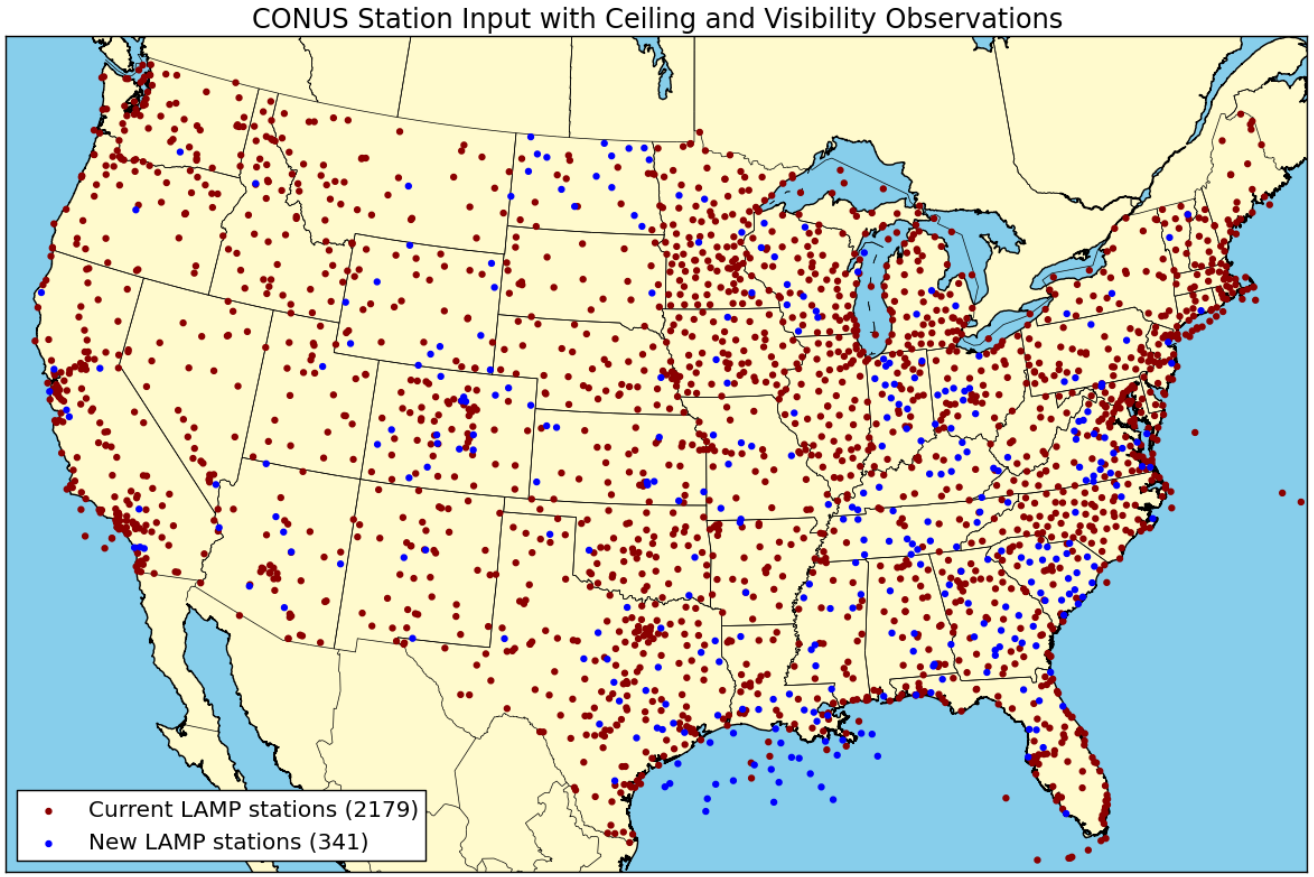
- **Gridded LAMP Analysis for Flight Category over Des Moines, Iowa**
- **METAR and MADIS**
- **Additional features such as airport locations and jet routes**

Better Analysis of LAMP and GLMP

GOAL

Use the most recent METAR or SPECI observation in place of the “top of the hour” METAR observation for LAMP system analyses every 15 minutes for HEMS implementation



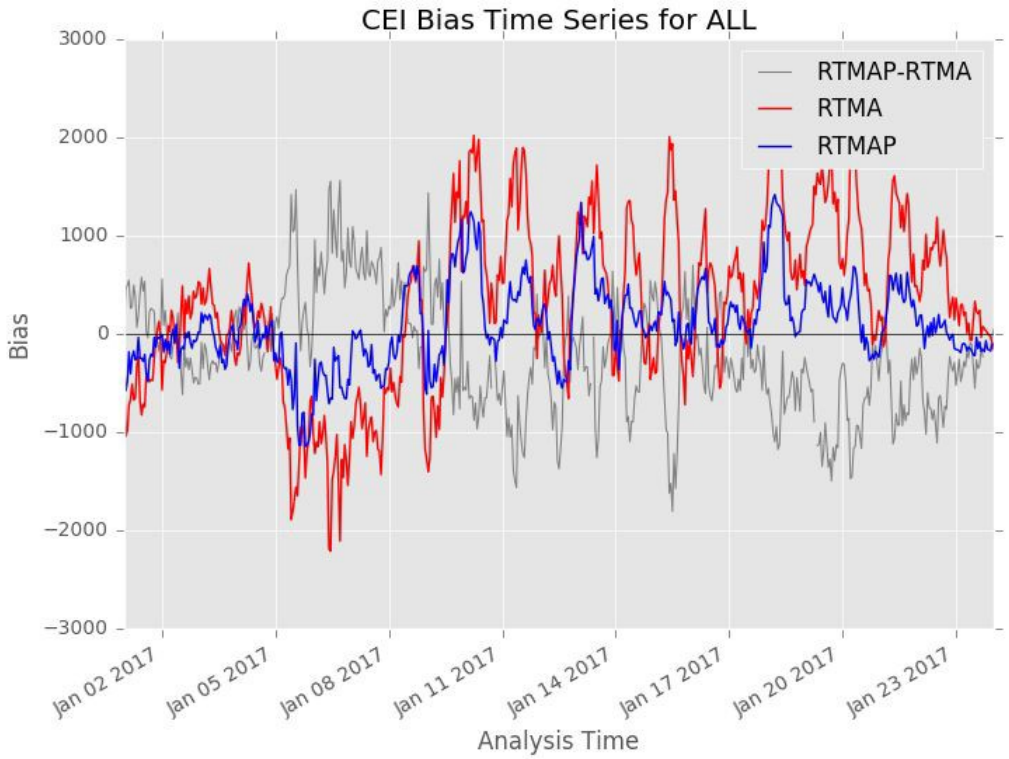


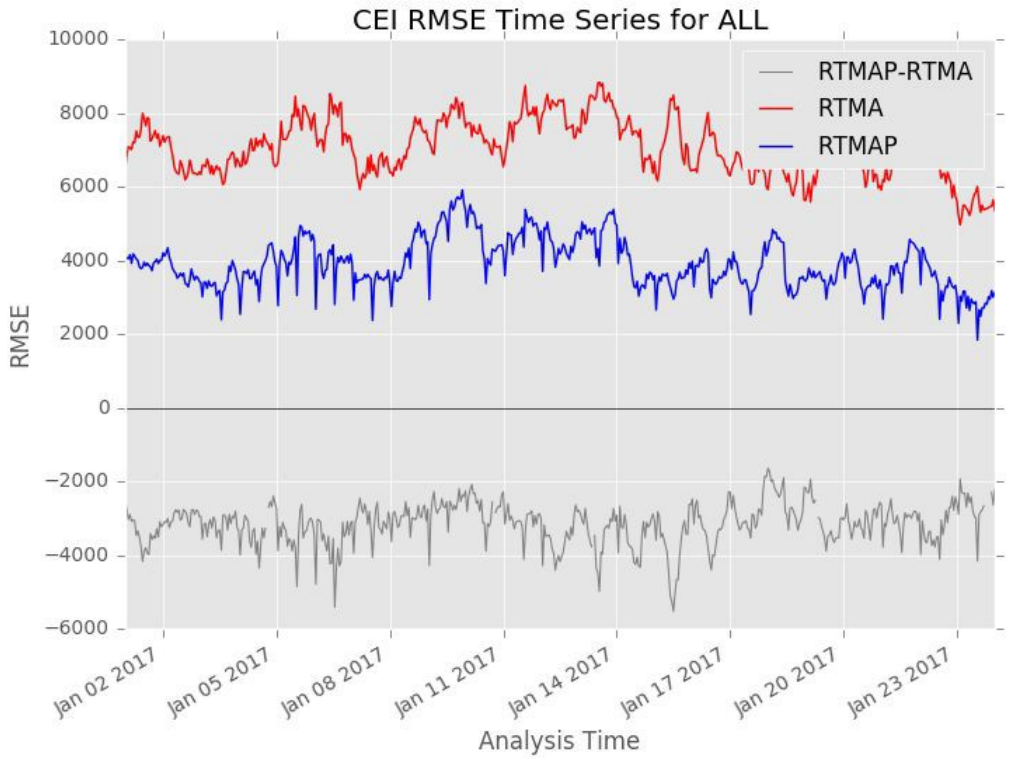
Will add to the LAMP Ceiling and Visibility Guidance:

- 33 stations in Alaska
- 341 stations in CONUS

Reduced Bias and RMSE in RTMA/URMA Ceiling Analysis

Background fits to the observations much better with HRRR ceiling in **v2.5 RTMA/URMA**



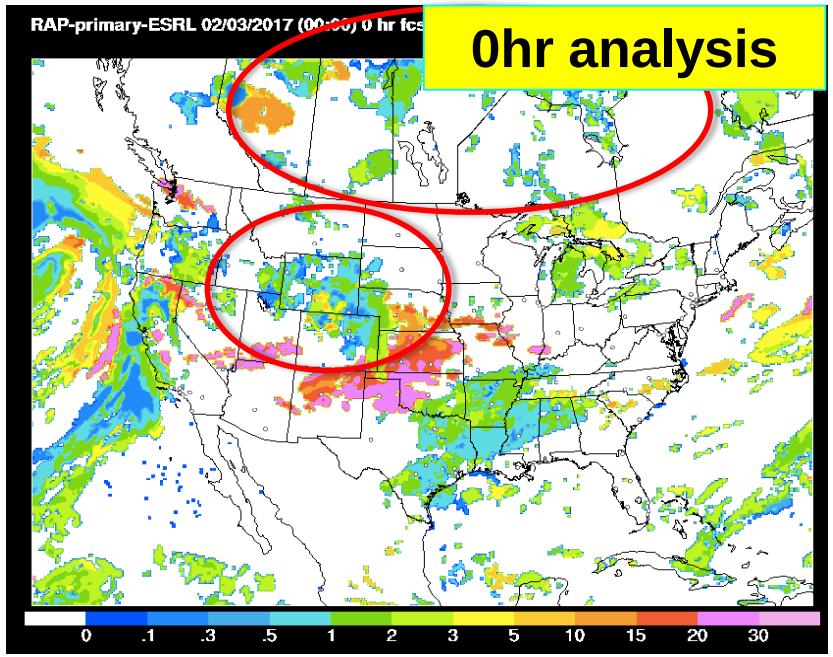


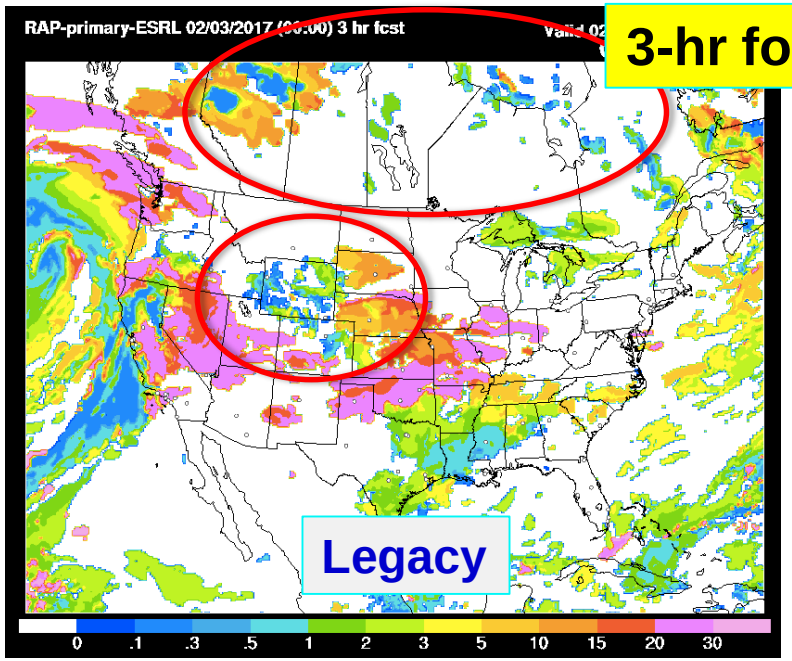
Improved Cloud Forecasts

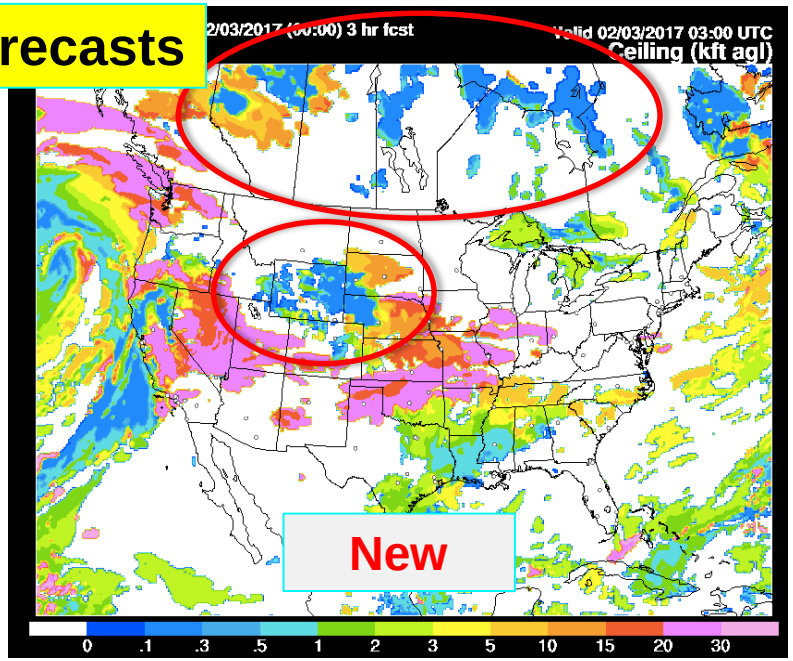
Changed method of building clouds in model to allow for greater retention in forecast

Experimental time-lagged HRRR ensemble-based probabilistic ceiling/visibility grids sent to AWC

Example: Improved retention of assimilated low clouds over Colorado-Wyoming and Canadian Midwest

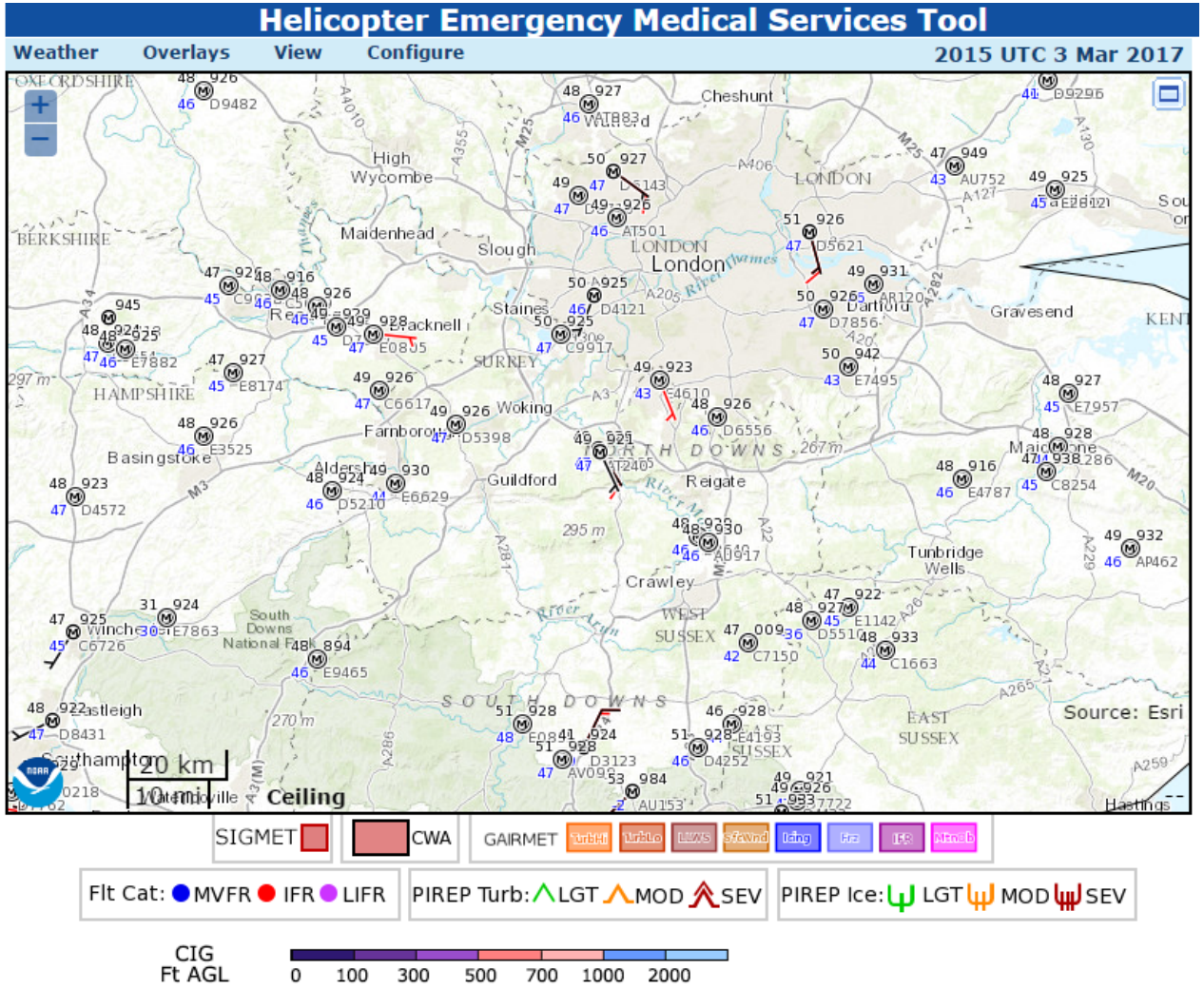






Global Implications

MesoNet observations from MADIS located over London, UK



Web Display for Experimental 15-min RTMA / RUA

U.S. Department of Commerce | National Oceanic & Atmospheric Administration | NOAA Research

Earth System Research Laboratory
High Resolution Rapid Refresh (HRRR)

Earth Modeling Branch (EMB) Projects GSD Home ESRL Home

HRRR Home Info Page

Current and Forecast Graphics

NCEP HRRR Now Operational
Effective 30 Sept 2014
NCEP HRRR Hourly
NCEP HRRR Subhourly
Experimental HRRR:
HRRR Hourly
HRRR Subhourly
HRRR (alternative)
HRRR-TLE-Time-Lagged Ens
Exp HRRR-Alaska
Exp HRRRE
HRRR-Aviation Hourly
HRRR-Aviation Subhourly
HRRR Soundings
HRRR-Smoke
HRRR Reflectivity Matrix
HRRR-oper prods fm NCEP
HRRRv2 exp prods fm NCEP
COD HRRR-NCEP graphics
SPC HRRR matrix

HRRR Configuration Info

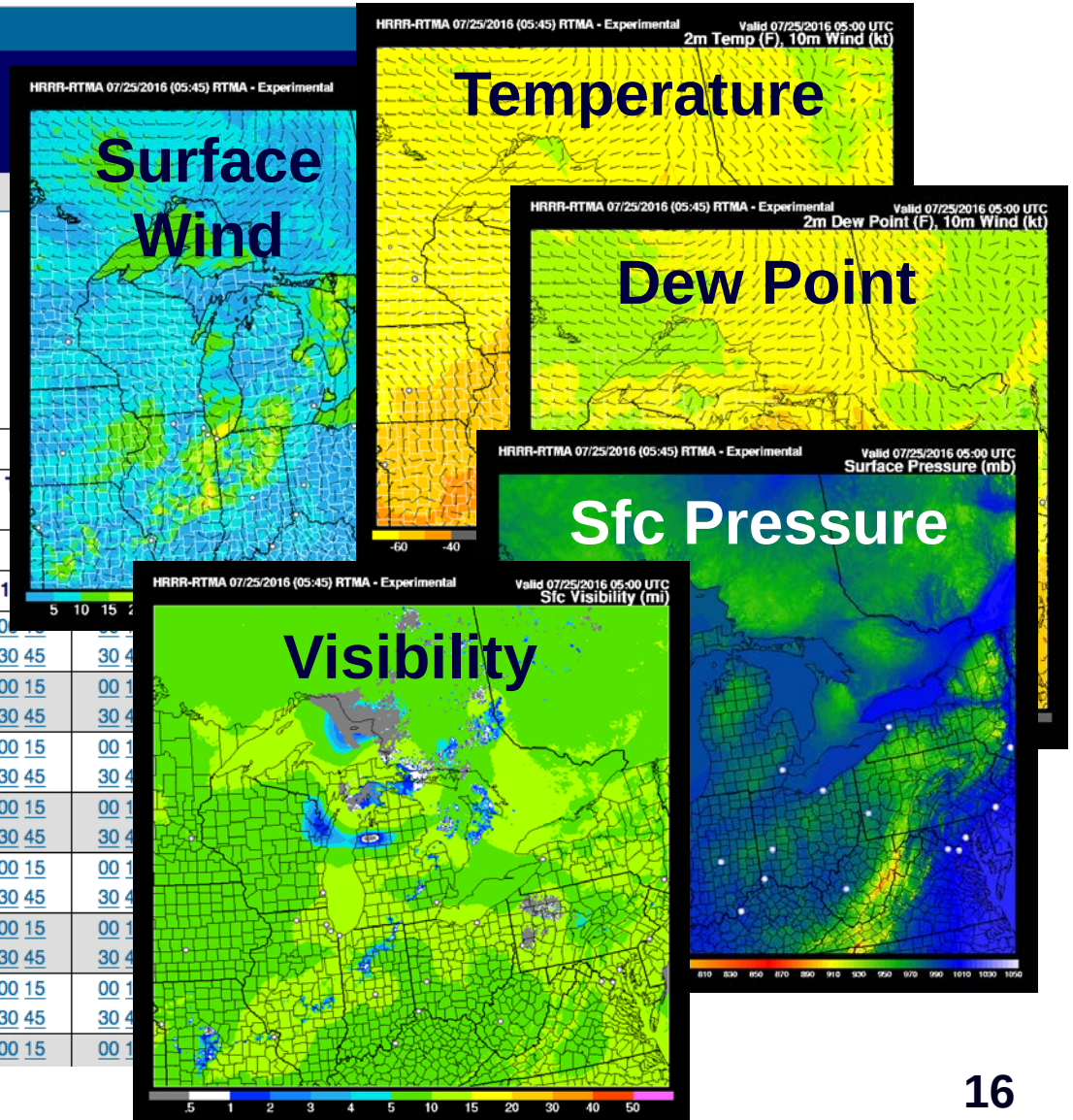
CONUS-HRRR domain parms
HRRR static fields inc lat/lon (NetCDF-952 MB)
WFIP-HRRR domain
CONUS-HRRR terrain info
HRRR WPS Namelist
HRRR WRF Namelist
HRRR GRIB2 Table 2-0 Hourly

HRRR Model Fields - Experimental

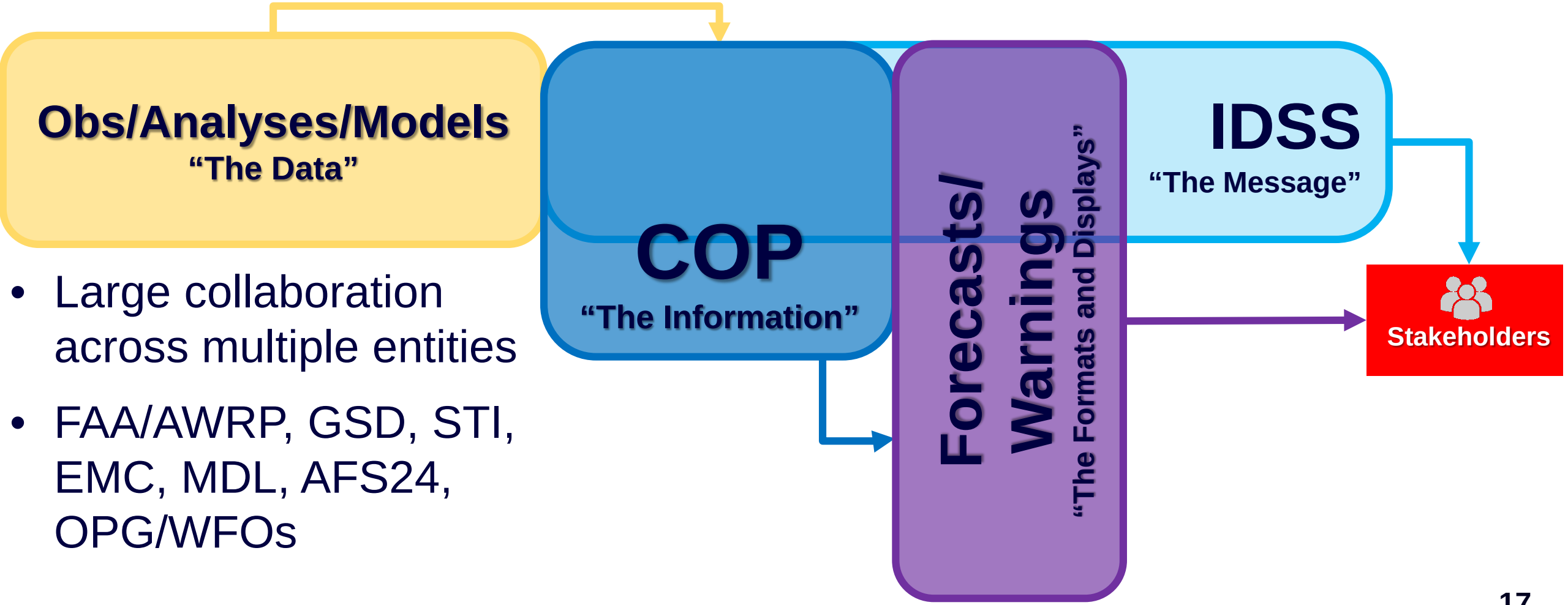
Model: HRRR RUA Area: Full Date: 19 Jul 2016 - 15Z

Model: HRRR RUA **Domain:** Full **Date:** 19 Jul 2016 - 15Z

	All times	Loop	Tue 15	Tue 14	Tue 13
			1800	1700	1600
all fields			00 15 30 45	00 15 30 45	00 15 30 45
1 km agl reflectivity	✓	✓	00 15 30 45	00 15 30 45	00 15 30 45
composite reflectivity	✓	✓	00 15 30 45	00 15 30 45	00 15 30 45
ensemble comp reflectivity	✓	✓	00 15 30 45	00 15 30 45	00 15 30 45
GOES-W water vapor	✓	✓	00 15 30 45	00 15 30 45	00 15 30 45
GOES-E water vapor	✓	✓	00 15 30 45	00 15 30 45	00 15 30 45
GOES-W infrared	✓	✓	00 15 30 45	00 15 30 45	00 15 30 45
GOES-E infrared	✓	✓	00 15	00 15	00 15

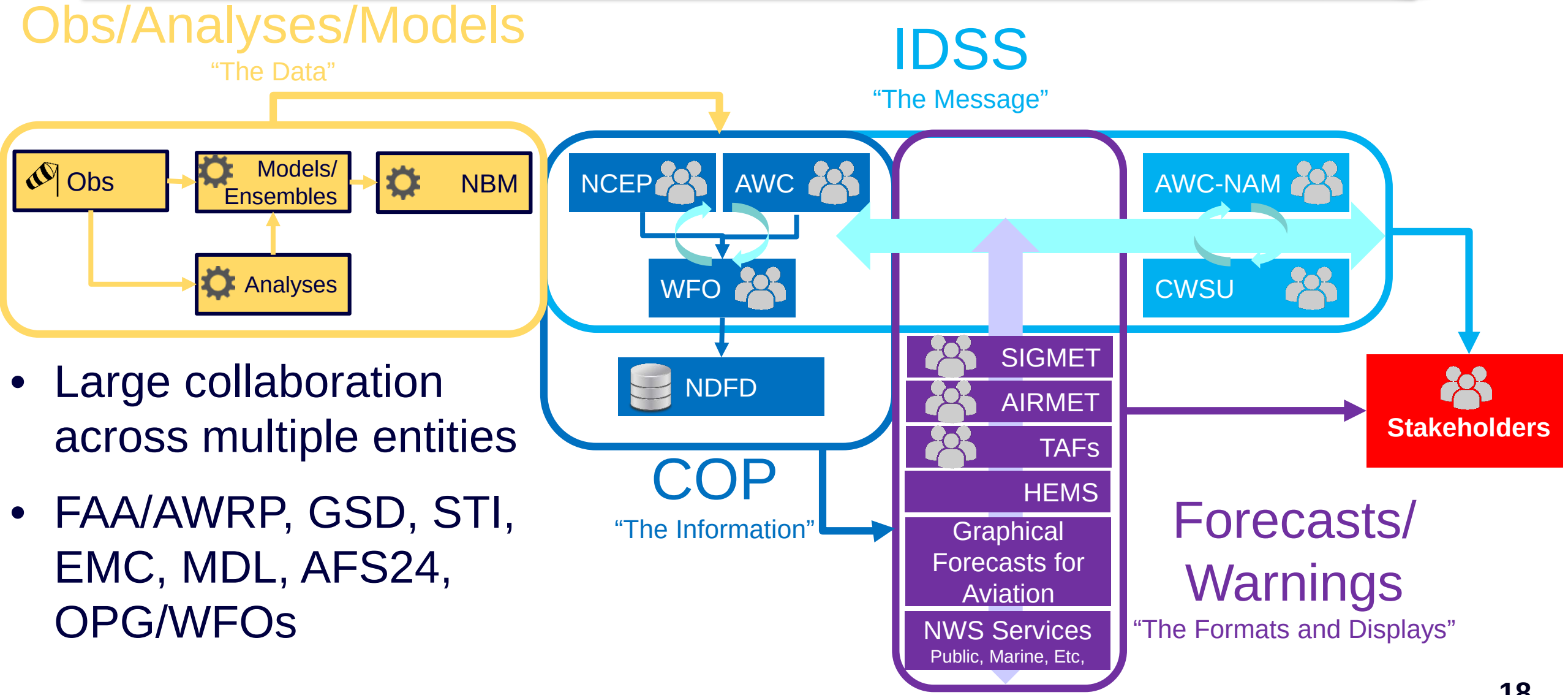


FAA-NOAA Cloud and Visibility



- Large collaboration across multiple entities
- FAA/AWRP, GSD, STI, EMC, MDL, AFS24, OPG/WFOs

FAA-NOAA Cloud and Visibility



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