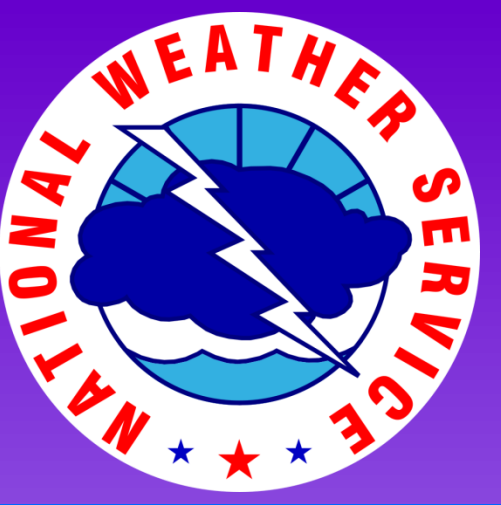


# CURRENT STATUS AND PLANS FOR THE LOCALIZED AVIATION MOS PROGRAM (LAMP)



## FOR AVIATION FORECASTING\*

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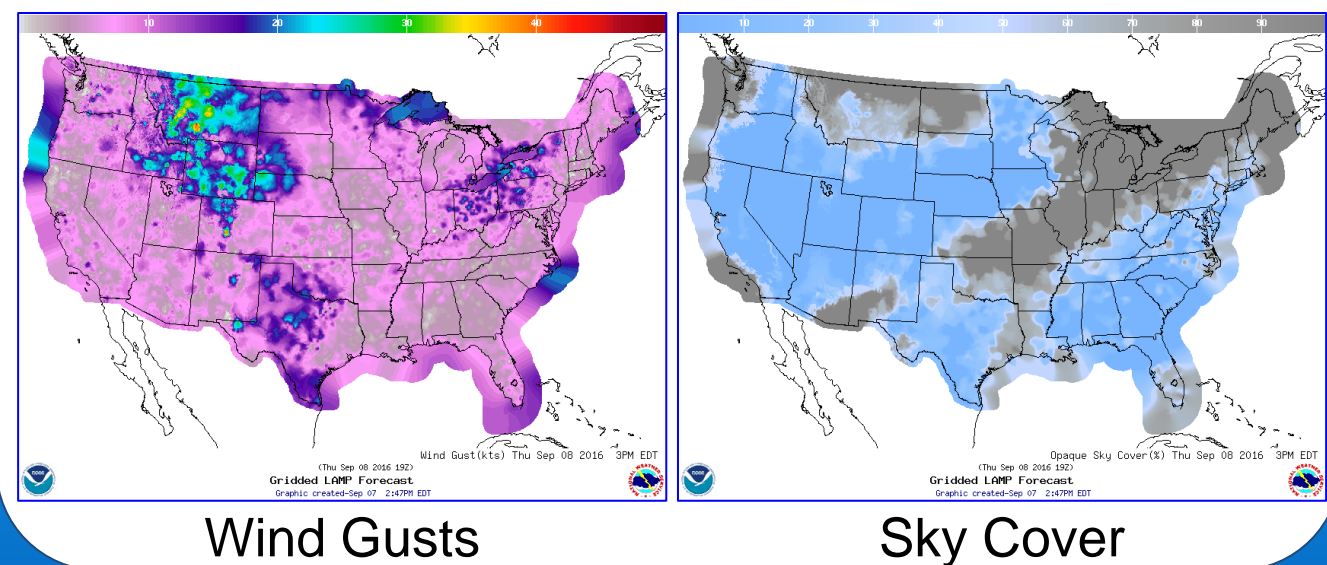
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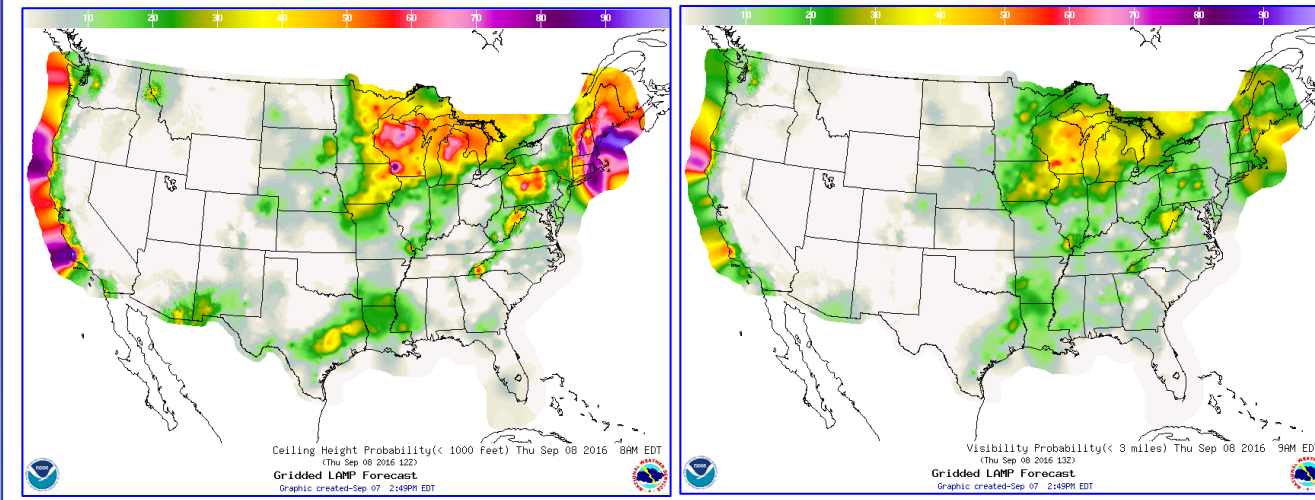
### Background

- LAMP provides objective forecast guidance for the aviation community
- LAMP is produced hourly in NWS operations
- LAMP uses the most recent surface observations to bridge the gap between the observations and the MOS forecast
- LAMP provides station-based guidance of sensible weather, including ceiling height and visibility, out 25 hours for 1678 stations in the CONUS, AK, HI, and Puerto Rico
- Gridded LAMP (GLMP) provides gridded guidance for:
  - Lightning (at least one CTG lgt strike)
  - Convection (at least one CTG strike and/or radar reflectivity of at least 40 dBZ)
  - 2-m Temperature
  - 2-m Dewpoint
  - Ceiling Height
  - Visibility
  - Sky Cover ← **New: Oct. 2015!!**
  - Wind Speed & Dir ← **New: Oct. 2015!!**
  - Wind Gusts ← **New: Jun. 2016!!**
  - Ceiling Probabilities ← **New: Jun. 2016!!**
  - Visibility Probabilities ← **New: Jun. 2016!!**
- Improvements to LAMP/GLMP have been achieved via incorporation of data from the High Resolution Rapid Refresh (HRRR) model, Multi-Radar/Multi-Sensor System (MRMS) data, and Total Lightning (TL) data from Earth Networks, Inc. (ENI)

### Examples of New GLMP Guidance Elements:



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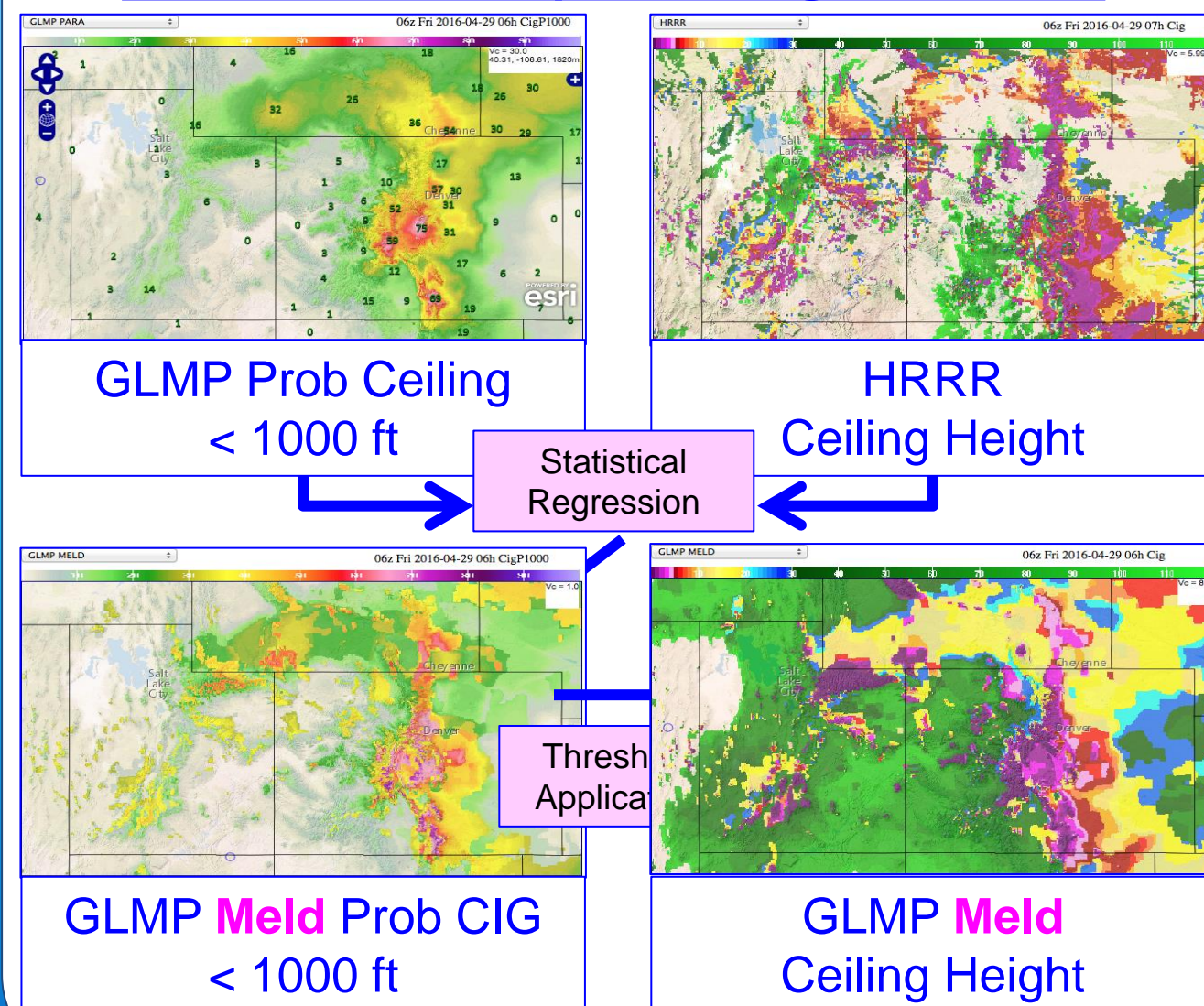


### LAMP Ceiling & Visibility (C&V)

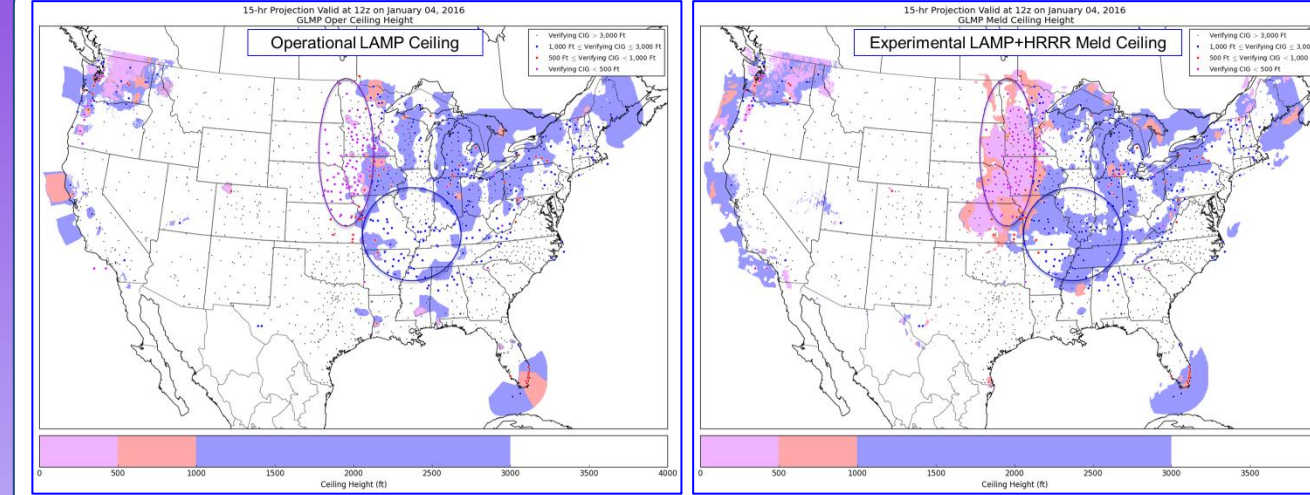
#### Improvement Approach

- Statistically Blending LAMP data with HRRR data → LAMP+HRRR Meld
- Regression Analysis:
  - Predictand Data: METAR Observations
  - Predictor Data:
    - LAMP Cumulative C&V Probabilities
    - Computed probabilities from previous 3 HRRR runs
    - Observations
  - Generalized Operator Approach → many cases

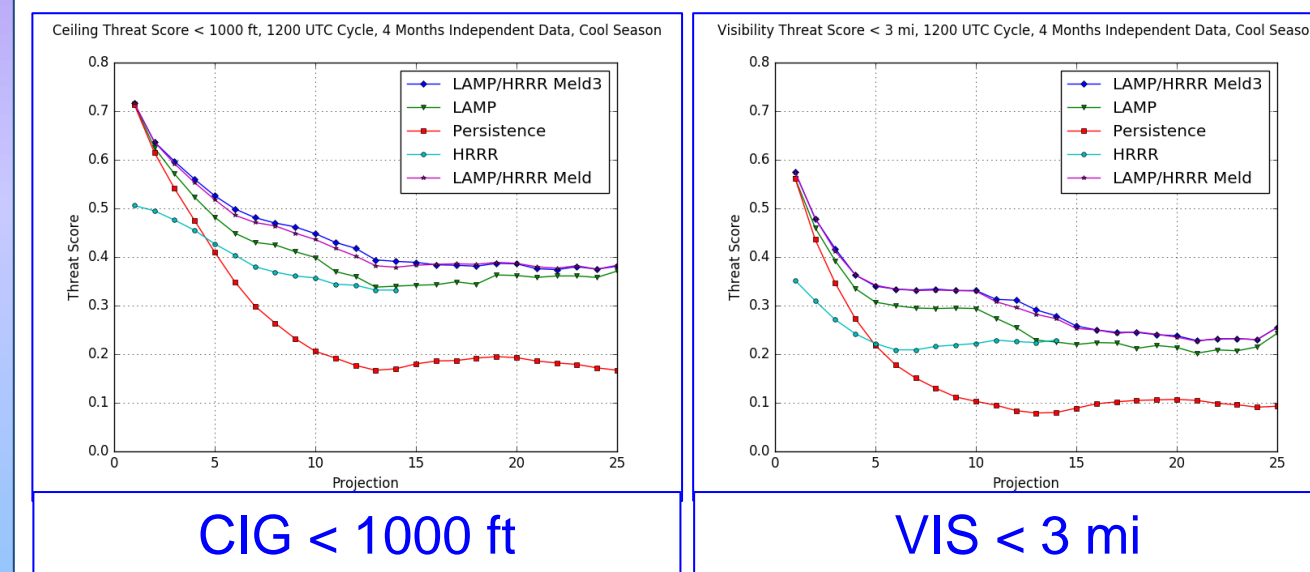
### GLMP Meld Example: Ceiling < 1000 feet



### Meld Case Example for Ceiling



### Verification



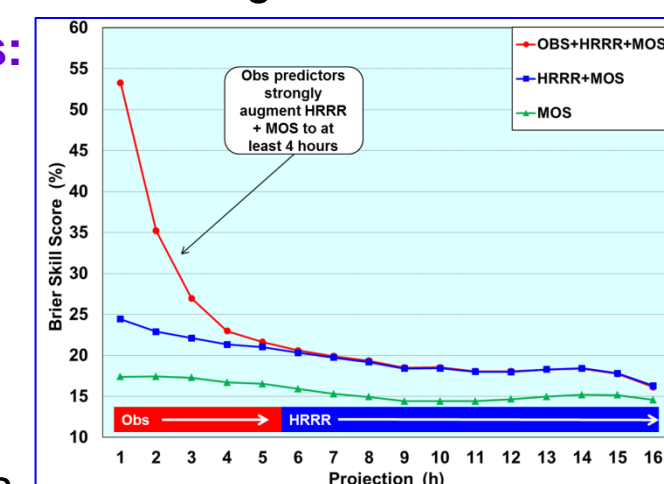
### LAMP Convection & Lightning\*

#### Improvement Approach

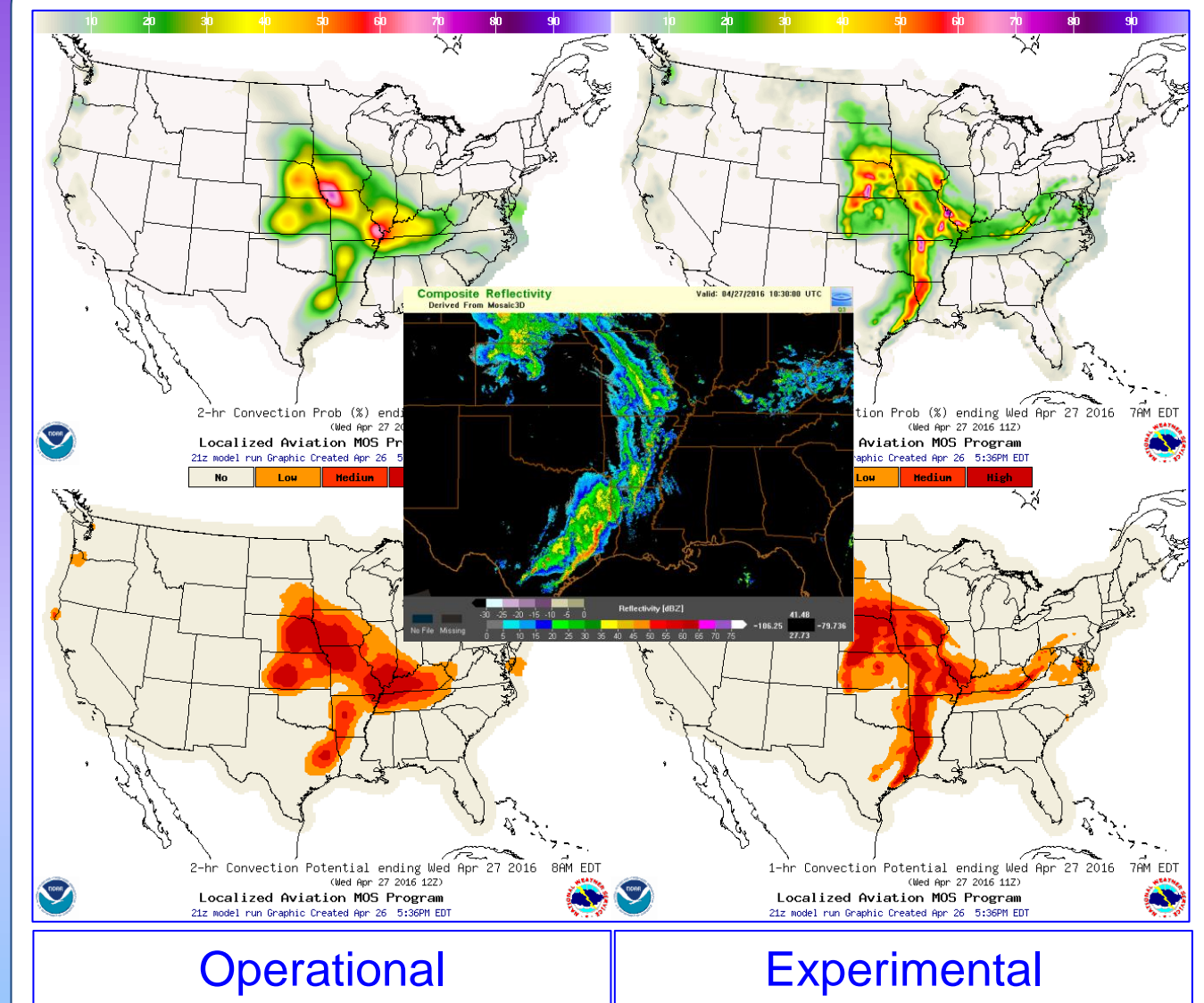
- Predictand Definitions:
  - Lightning: One or more total lightning (TL) flashes
  - Convection: MRMS reflectivity 40 dBZ or higher and/or one or more total lightning (TL) flashes
- Statistically Blending:
  - MRMS observed and advected grids
  - Total Lightning observed and advected grids
  - HRRR Model Output
  - GFS MOS and NAM MOS
- Development details:
  - 1-h valid periods instead of 2-h periods
  - Probabilities produced on 10-km grid

#### Contribution of Predictors:

- Obs predictors dominate from 1 - 4 hrs
- HRRR predictors dominate from 4 - 17 hrs
- GFS and NAM MOS probability predictors dominate from 15 - 25 hrs



### Convection Case Example



### Future Work

- Update station lists to add new stations to LAMP
- Redevelop LAMP station-based T/D/Winds/Ceiling/Vis
- Produce LAMP rapidly updating C&V every 15 mins 0-2 hrs
- Develop GLMP via the "Meld" approach for additional elements such as 1-h PoPs and precipitation type
- GLMP Probabilistic C&V Grids: Added Jun. 2016
- LAMP/HRRR/MRMS C&V and Convection & Lightning implementation: Planned Mar. 2017
- LAMP rapidly updating C&V: Planned Jun. 2017
- Updating station list and redevelop LAMP station-based T/Td/W/C/V: Planned Dec. 2018

### Conclusions

- LAMP ceiling and visibility:
  - Post-processing HRRR and LAMP together yields improved guidance
  - Improvement expected at stations and on the grid from second order LAMP+HRRR Meld equations
- LAMP convection and lightning:
  - Improved via incorporation of HRRR, MRMS, TL
  - Increased spatial and temporal resolution