



EXPANDING THE LAMP SUITE OF AVIATION GUIDANCE TO SUPPORT THE NATIONAL WEATHER SERVICE'S NATIONAL BLEND OF MODELS



Judy E. Ghirardelli¹, Jerome P. Charba¹, Phillip E. Shafer¹, Bob Glahn¹, Frederick G. Samplatsky¹, Adam D. Schnapp², Andrew J. Kochenash², Chenjie Huang², Michael Allard¹, Gordana Sindic-Rancic¹, Felicia Guarriello², Aimee Gibbons³, Michele Masuda¹, and William Ahue¹

¹NOAA/NWS/OST/MDL ²NOAA affiliate, KBRwyle Science, Technology & Engineering Group ³NOAA affiliate, Ace Info Solutions

Background

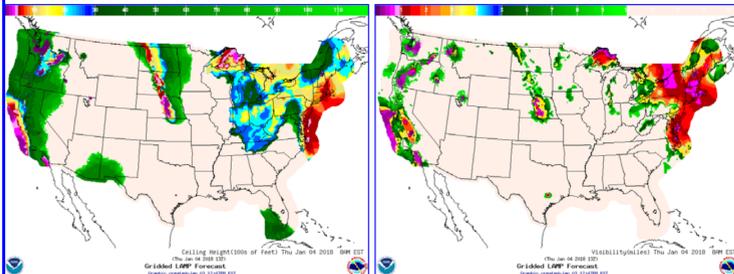
National Blend of Models:

- The National Blend of Models (NBM) provides a skillful and spatially consistent gridded starting point for making National Digital Forecast Database (NDFD) forecasts.
- The NBM is a key component to the NWS's efforts to evolve and build a Weather Ready Nation.
- In 2017, the NBM v3.0 began producing guidance for the 1- to 36-h period at hourly resolution and added ceiling height and visibility guidance to support NWS's digital aviation services.

Localized Aviation MOS Program:

- The Localized Aviation MOS Program (LAMP) provides skillful aviation forecast guidance and is a critical component of the NBM in the very short term period.
- LAMP currently provides hourly updates of station-based and Gridded LAMP (GLMP) guidance on the NDFD 2.5-km grid in hourly increments to 25 hours.

Examples of GLMP Guidance Elements:



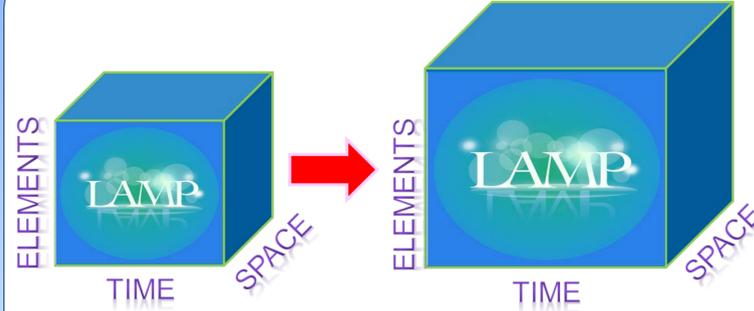
Ceiling Height

Visibility

Recent/future upgrades to LAMP are:

- Introduced GLMP "Meld" which statistically incorporates High Resolution Rapid Refresh (HRRR) model output to improve ceiling and visibility guidance (April 2017)
- Adding 1-h gridded convection and lightning guidance which statistically incorporates HRRR model output, Multi-Radar Multi-Sensor (MRMS) data, and total lightning data (**January 2018**)
- Modifying LAMP/GLMP to use the most-recent METAR and SPECI observations (**January 2018**)
- These upgrades result in improved GLMP guidance for aviation elements which benefits the NBM.

Overview: LAMP Expansion

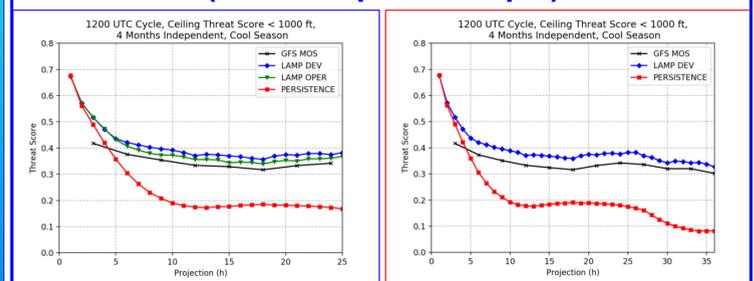


- In response to growing NBM requirements, GLMP guidance is being expanded in the following ways:
 - Redevelopment:** GLMP ceiling and visibility guidance elements will be redeveloped to utilize the upgraded HRRR and GFS MOS inputs
 - Time:** GLMP guidance will be extended to cover the 36-hour period at least 4 times daily
 - Space:** The GLMP domain will be expanded to be consistent with the NBM domain over the CONUS, and GLMP will be available for the NBM Alaska domain for select elements
 - Elements:** New elements will be added to the GLMP suite of guidance to provide additional inputs in support of the NBM.

1. Re-development and 2. Time Extension

- LAMP Meld ceiling and visibility is being re-developed:
 - Using new GFS MOS ceiling and visibility guidance
 - Using HRRRv3 model output (operational May 2018)
 - Extending the forecast projections out to **36 hours**

Base LAMP (re-development step 1) Verification

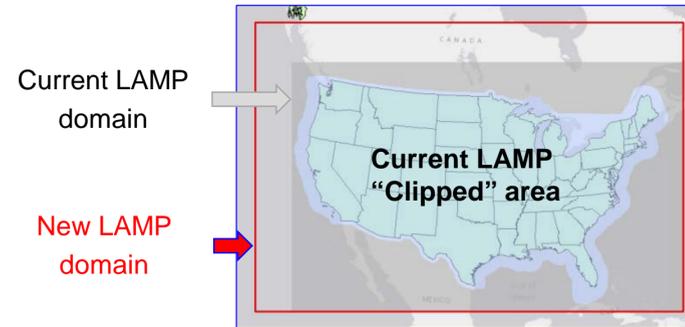


CIG < 1000 ft out to 25 h

CIG < 1000 ft out to 36 h

3. Gridded LAMP Domain Expansion

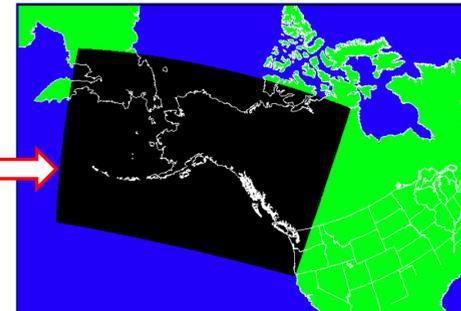
CONUS (Expanded):



Alaska (New):

- The Gridded LAMP system is being extended to Alaska to create gridded guidance for ceiling height, visibility, convection, and lightning (funding through the Office of Atmospheric Research's Joint Technology Transition Initiative).

LAMP Alaska Domain



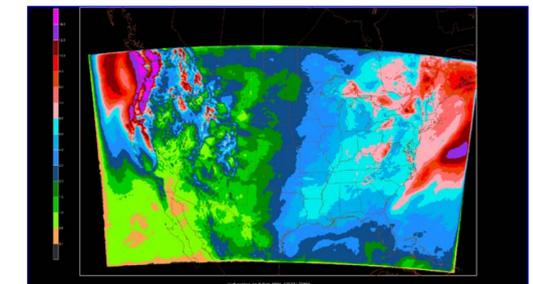
- Alaska Gridded LAMP will:
 - follow the existing paradigm for LAMP over CONUS
 - use Rapid Refresh (RAP) and/or HRRR model output

4. New LAMP Elements

- 1-h Probability of Precipitation (POP01)
- 1-h Quantitative Precipitation Forecasts (QPF01)
- Other new elements (e.g., cloud base, echo tops) to follow in time
- POP01/QPF01 guidance can aid in timing of precipitation and forecasting extreme events
- POP01/QPF01 data for predictands/predictors:
 - RAP/HRRR model output
 - MRMS data
 - Global Forecast System (GFS) and North American Mesoscale (NAM) MOS

4. New LAMP Elements (continued)

Example Predictors:



HRRR Relative Frequency
1-h QPF ≥ 0.01 "

HRRR 1-h
accumulated
precipitation amount



MRMS 1-h
reflectivity



Schedule

- CONUS redeveloped ceiling and visibility to 36 h, expanded domain, addition of POP01/QPF01 to 36 h:
 - Final development completed: March 2018
 - User evaluation: May – June 2018
 - Implementation: November 2018
- Alaska Gridded LAMP:
 - Ceiling and visibility: prototype evaluation 2019
 - Convection and lightning: prototype evaluation 2020

For more information

http://www.weather.gov/mdl/lamp_home

Contact: Judy.Ghirardelli@noaa.gov