

**National Weather Service
Statement of Need**

Gridded Model Output Statistics (MOS) Guidance

Approved: _____
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Date:

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Statement of Need

1. Title: Gridded Model Output Statistics (MOS) Guidance

2. SON Number: SON-04-009

3. IWT Lead: Kathryn Hughes, Statistical Modeling Branch, W/OST22, (301) 713-0023 x130

4. Description:

To support the National Digital Forecast Database (NDFD), National Weather Service (NWS) forecasters must produce accurate forecasts on a high-resolution grid in an optimal manner, using guidance available on a grid at a resolution comparable to that used in the WFO forecast process.

5. Strategic Plan Element:

Guidance on a grid will provide NWS forecasters with more probabilistic and high resolution forecast information as part of the NOAA mission strategy to assess and predict with greater accuracy as weather forecast capabilities are improved. In addition, the proposed gridded MOS system will increase the application and accessibility of weather information and provide measures of uncertainty applicable to the forecasts.

6. Mission Need Statement

a. Identify NWS authority over the need

The corporate board has authority over this need. Their recommendations are based on input from the Science and Technology committee and the Interactive Forecast Preparation System (IFPS) Science Steering Team

b. Identify and describe the NWS mission need, deficiency or lack of capability

Forecasters need the highest quality gridded guidance to populate the official forecast grids, ideally available at a resolution equivalent to those grids issued operationally. The current MOS system is only available at specific sites, and the direct numerical model output is not available at the desired grid resolution.

c. Provide details on the description of the user need or scientific technological opportunity identified in section 4 Description

The benefit of the MOS approach is its ability to reduce the bias and quantify the uncertainty of the numerical prediction model as well as to calibrate numerical model output to station observations. An established verification record documents that the MOS guidance adds

value to the raw output from the numerical models and is often comparable in skill to the forecasts produced by the human forecaster. The objective of the proposed gridded MOS system is to generate gridded guidance with accuracy comparable to that of the station-oriented guidance. By providing the forecasters with statistically post-processed guidance on the desired grids, we will enable the forecasters to spend less time on manual edits, and more time on the forecasting and warning process. This will potentially reduce the workload for forecasters, particularly for grids for days 4 - 7. This new guidance system will enhance the quality of the final forecasts produced for the NDFD and transmitted to NWS customers and partners.

d. Identify limitations of existing capabilities (or systems) meeting identified requirement(s)

Forecasters may use direct model output to initialize the grids, but the direct model output has biases inherent in all operational model output, and the resolution of the models currently available is coarser than the NDFD grids. The current MOS system, which does correct for model bias and provides additional interpretive information, is only available at specific observational sites. Forecasters at the WFOs have Smart Tools available, which will interpolate the station-based MOS guidance to a grid, but these simple interpolation tools do not account for geoclimatic differences between MOS stations, and optimizing this interpolation requires additional effort from the forecasters.

e. Identify current capabilities

Forecasters currently have direct model output from NCEP numerical models, and other higher resolution local models, most available at a coarser resolution than desired for IFPS/NDFD. Statistical guidance adds value to the direct model output by objectively interpreting the model, and predicting needed sensible weather elements not available in raw model output. The current MOS guidance system is available for approximately 1700 traditional hourly observation stations, and another 6000 limited observing sites in the contiguous United States, Alaska, Hawaii, and Puerto Rico.

f. Identify mission need(s) accomplished by current capabilities

The current MOS system produces skillful guidance. It corrects model bias and provides forecasts for public and aviation weather elements at specific sites. This guidance is used extensively by forecasters in the public and private sector.

g. Identify schedule

A gridded statistically-based guidance system at a resolution comparable to the grids used in the NWS forecasting process is needed as soon as possible. IFPS became operational September 30, 2003. Portions of the NDFD grids will be operational December 1, 2004. The parameters in the gridded MOS system will be implemented operationally after they are shown to be skillful.

h. Identify Mission Importance/Priority

Medium. This will be an addition to the current forecast guidance techniques and capabilities.

7. Non-Program Alternatives:

The need for gridded guidance cannot be satisfied through policy changes or training efforts.

8. Constraints:

The group responsible for developing and maintaining the traditional station-based MOS guidance is the same group tasked with creating the gridded MOS guidance. No additional resources, human or otherwise, have been allocated for this task. The development and implementation of the new gridded MOS system must fit in the existing computing environment and implementation schedule instituted by NCEP. In addition, there will be AWIPS software, bandwidth, disk storage, and local processing impacts associated with producing additional guidance at a higher resolution. Finally, the products generated must be output in a standard gridded format.

9. Cross Line Office Potential Designator:

Independent -- No potential for other Line Office use of systems interface or for cross-LO development or procurement.

10. Review and Analyses Statement: (to be completed by OCWWS)

This section identifies a SON analyst, participating offices and a summary of the review and analysis of the SON performed by the SON analyst.

11. Signature Block: (to be completed by OCWWS).

OCWWS Director has approval authority of the SON.

12. Status: (to be completed by OCWWS). This section indicates the status of the SON.

13. Attachments:

No attachments have been included.