

Design Approach Review

DCS3231

(Ingest and display Gridded MOS)

Zihou Wang

RSIS/SEC

October 12, 2005

Outline

1. Background
2. Requirements
3. Design
4. How to implement
5. Test Procedure
6. Schedule
7. Discussions

1. Background

To support the NDFD, 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. The current MOS system is only available at specific sites, and the direct numerical model output is not available at the desired grid resolution. The IFPS ISST has recommended the development of MOS guidance in gridded format.

MDL will generate GFS-based MOS guidance on the 5-km NDFD CONUS grid twice daily (0000 and 1200 UTC model cycles) in GRIB2 format. Guidance will be available for projections of 6 to 192 hours after model run time. The initial implementation will consist of guidance for maximum and minimum temperature, 2-m spot temperatures and dew points, 6- and 12-h probability of precipitation (POP), wind direction and speed, 3-, 6- and 12-hr probability of thunderstorms, relative humidity, and 24-hr snowfall amount. More elements will follow, along with some OCONUS grids, as they become available. Although the grid encompasses the entire CONUS, initially some or all elements will only have forecast data for the Western third of the grid, with the rest of the grid containing missing values. We will populate the other 2/3rds of the CONUS grid as the guidance becomes available.

The GRIB2 products will be sent from the NCEP CCS via the SBN to AWIPS, decoded by the GRIB2 decoder, and then ingested into GFE and the volume browser. These products are slated for Application Release 6.1. We anticipate these products to add roughly 80 MB of data to the SBN twice per day.

2. Requirements:

- 1) AWIPS shall have the capability to decode the gridded MOS from its standard compressed format upon receipt
- 2) Decoded gridded MOS products shall be stored at the Forecast Office in a standard format (currently netCDF) for use in AWIPS applications
- 3) Forecast Offices shall have the capacity to store, retain, and retrieve a minimum of one day of gridded MOS guidance

- 4) Gridded MOS shall be displayable in D2D from the volume browser as another model data source
- 5) Decoding and display capability shall be included in the same AWIPS operational build, as prioritized by the SREC
- 6) AWIPS shall store and display gridded MOS over an area covering at least adjacent and backup CWAs
- 7) The gridded MOS shall be monitored in the same way as other grid sources through the Grid data monitor
- 8) The initial implementation will consist of guidance for maximum and minimum temperature, 2-m spot temperatures and dew points, 6- and 12-hr probability of precipitation (POP), wind direction and speed, 3-, 6- and 12-hr probability of thunderstorms, relative humidity, and 24-hr snowfall amount
- 9) AWIPS shall provide full capability for the operational gridded MOS products to display and interact in the GFE for use in applications
- 10) Software changes shall be incorporated into the GFE to include the gridded MOS into that processes and allow forecasters to interact with the grids
- 11) A GFE Smart Tool shall be developed to interpolate to hourly grids from the 3-h gridded fields

3. Design

- 1) Grib2Decoder will handle the decoding of the gridded MOS products (R-1)
- 2) netCDF directory: /data/fxa/Grid/SBN/netCDF/NDFD/MOSGuide (R-2)
- 3) 2 netCDF data files (00Z and 12Z) will be kept (R-3)
- 4) Grid source name in the volume browser will be GriddedMOS (R-4)

Some new field names will be added in a new sub menu under menu “Sfc/2D”:

Sfc/2D →

MDL MOS →

Max Temp

Min Temp

POP 6hr

POP 12hr

Tstorm Prob 3hr

Tstorm Prob 6hr

Tstorm Prob12hr

Snowfall 24hr

- 5) When storing and displaying the Gridded MOS product, the NDFD grid will be clipped from 1073 x 689 to 1000 x 689 grid points. Less than 8% grids in west-east direction are clipped out due to the display limit of current D2D. But this clipped area can meet requirement 2.6. And this new grid source can be displayed on scale North America, CONUS, Regional, States and WFO (R-6)
- 6) GriddedMOS will be monitored by AWIPS grid data monitor (R-7)
- 7) All specified elements will be included in mosGuideNDFD.cdl (R-8)
- 8) Requirement 9, 10 and 11 will be handled by FSL later

4. How to implement

1) Data Ingest

D-2D/src/comms (/awips/fxa/data/)

- acq_categories.txt Modify (add pattern for MOSGuide)

D-2D/src/localization/nationalData/ (/data/fxa/nationalData)

- acq_patterns.template Modify (add pattern for MOSGuide)
- gridPurgeInfo.txt Modify (add entry for MOSGuide)

Purge directory of MOSGuide (/data/fxa/Grid/SBN/netCDF/NDFD/MOSGuide) to keep 2 data file (00Z and 12Z) plus 1 template file.

2) CDL files

D-2D/src/dm/grid/ (/awips/fxa/data/)

- mosGuide231.cdl New

3) Configuration files

D-2D/src/localization/nationalData/ (/awips/fxa/data/localization/nationalData)

- gridSourceTable.template Modify (add grid MOSGuide)
- activeGridSources.txt Modify (add grid MOSGuide)
- virtualFieldTable.txt Modify

- dataFieldTable.txt Modify
D-2D/src/dm/grib2/ (/awips/fxa/data/)
- Grib2Patterns.txt Modify (add pattern for MOSGuide)
- grib2CodeTablesSect4.txt Modify (define new fields for total snow) ?
D-2D/src/applications/volumeBrowser (/awips/fxa/data/vb/)
- browserFieldMenu.txt Modify (add buttons for new fields)
- 4) Grib2Decoder
D-2D/src/dm/grib2/ (/awips/fxa/bin/Grib2Decoder)
- Grib2Handler.C Modify (handle POP and ThP)
- 5) Grid Data Monitor (Monitor GriddedMOS data)
D-2D/src/dataMon/
- Makefile Modify (add new HTML files)
- grid.cfg Modify (add MOSGuide)
- NDFDMOSGuide.html New

5. Test procedure

5.1 Test case 1: decoding and displaying of GriddedMOS

A. On DX1, PX1 and LX1: Copy new version of acq_patterns.template, gridSourceTable.template, activeGridSources.txt, virtualFieldTable.txt, dataFieldTable.txt, gridPurgeInfo.txt to /awips/fxa/data/localization/nationalData

B. On DX1, PX1 and LX1: Copy file mosGuideNDFD.cdl, acq_categories.txt, Grib2Patterns.txt, grib2CodeTablesSect4.txt to /awips/fxa/data.

C. On DX1, PX1 and LX1: Run localization
\$FXA_HOME/data/localization/scripts/mainScript.csh -clipSupps -grids -dirs -auxFiles -purge

D. On DX1: Copy new version of Grib2Decoder to /awips/fxa/bin. Run stop/startIngest.dx1

E. On DX1: Wait for gridded MOS coming from SBN or copy some sample data to /data/fxa/Grid/SBN/rawGrib2/

F. On DX1: Check logs of Grib2Decoder

G. On LX1: Restart D2D, GriddedMOS should be shown in the volume browser.

H. On PX1: Run stop/startPurgeProcess to purge the new MOSGuide directory

5.2 Test case 2: monitoring GriddedMOS

A. On PX1: Copy new version of grid.cfg to /awips/fxa/data/

B. On PX1 : Copy NDFDMOSGuide.html to /data/fxa/data/htdocs/dataMon/infoPages/

C. On LX1: Wait about 10 minutes to start Netscape. GriddedMOS should be monitored as Grid data.

6. Schedule

Milestone	Date	LoE (man-hour)
(RR) Requirement Review	10/17/05	2
(DAR) Design Approach Review	10/17/05	5
(TPR) Test Plan Review	10/17/05	3
(CR) Code Review	10/31/05	15
Total		25

7. Discussion

- 1) The volume browser menu change for grid source and fields (D-4) should be reviewed by UIWG.
- 2) FSL will modify GFE based on this design (D-2 and D-3) as required by R-9, R-10 and R-11.
- 3) Test data for wind direction and speed, 3-, 6-, 12-hr probability of thunderstorms, and snowfall amount are not available yet. Test data for maximum and minimum temperature, 2-m spot temperatures and dew points, 6- and 12-h probability of precipitation (POP) and relative humidity have been decoded successfully and can be displayed on D2Dcorrectly. More changes are expected to handle 24-hr snowfall amount when the sample data is ready.