

# **AFPS Quarterly Report (95Q4)**

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AFPS Quarterly Report FY95 Q4: July - September 1995

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The FSL AFPS Team

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## 1. Introduction

The AWIPS Forecast Preparation System (AFPS) is being developed jointly by the Enhanced Forecaster Tools Branch of the Forecast Systems Laboratory (FSL) Modernization Division and some of the staff of the NWS Office of Systems Development Techniques Development Laboratory (TDL).

Most of this report covers FSL work; "we" here generally refers to FSL. The TDL Activities section is based on information provided by Matt Peroutka of TDL.

At the end of the quarter we were poised to provide our prototype software to AFWG members, to allow them to more closely follow and comment on our development work. We expect that this new level of interaction will accelerate and focus our development of an effective user-oriented system.

## 2. Accomplishments

In our third-quarter report, we outlined the following development schedule:

- Level 1d (7/95): spatial visualization and editing for all data types, interpolation, map backgrounds. [This was completed on schedule.]
- Level 2a (10/95): temporal editor, derivation server, initialization, formatters, user and training documentation. [This work has been partially completed. The only significant missing piece is the derivation server, which was primarily intended to generate agriculture weather elements. Although we have other reasons to need a derivation server, its omission is not critical at this time.]
- Level 2b (2/96): point database; TAF worksheet, editors, initialization, and formatter. [This is still planned.]

As discussed in that report, we continue to emphasize the design segment of our development cycle. To add the temporal editor to the AFPS prototype, we initially planned two weeks of design plus three of coding, then changed to three and two, respectively. In retrospect, four and one might have been more appropriate. (The nature of our C++ design process is that the

framework of the code is developed during design. Relatively little work is then required to flesh out this frame, followed by a quick review of the initial code and debugging.)

The highlight of this quarter was the fifth meeting of the AFPS Forecaster Working Group (AFWG) during the first week of September. As usual, this was an excellent meeting, and it also featured near-full attendance. We were happy that Al Moller (FTW) was able to attend his first meeting, and also welcome Barry Kercher (NCEP) to the AFWG. In addition, we appreciated the interactive forecast preparation experience of Megan Terry (OUN).

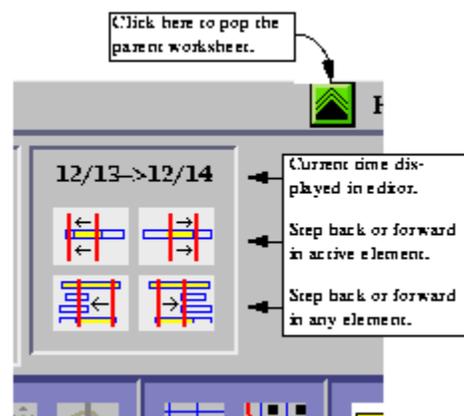
To support group members' familiarization with AFPS development activities in preparation for this meeting, Level 1d demonstration programs (no temporal editors or text generators) were installed at NWS offices in Denver, Taunton, Ft. Worth, and Norman (Mathewson, Howard).

The principal activity at this meeting was a series of hands-on sessions with the current AFPS software (LeFebvre). The items noted above under Level 1d and Level 2a were completed in time for the meeting. Since the last AFWG meeting in March, an end-to-end system has been assembled, including initialization of forecast weather elements by MOS (running at TDL twice a day, with output written to FSL databases) and RUC (running at FSL every three hours), and the ability to generate text forecasts from the contents of the AFPS database, using TDL's ICWF software.



(Click to see a full-size (31k) version of this temporal editor picture, showing data initialized from MOS.)

AFWG members provided valuable feedback to FSL developers, suggesting a number of improvements in the user interface and flow of system operation. A number of changes were effected during the meeting, with several more completed in the few weeks between the end of the AFWG visit and the beginning of the October/November WFO-Advanced exercise. These include adding a find-parent button to windows, to locate the worksheet to which an editor belongs, for example (Mayer and Romberg);



improving the flexibility of the interpolation interface (Mathewson); and adding time-stepper icons to the spatial editor (Mathewson). Other suggestions will require more extensive consideration and redesign. For example, it was recommended that legends be moved into the data display, rather than occupying separate windows. Another key set of recommendations have to do with the need for consistency checking and the ability to gang together related weather elements such as clouds, precipitation, visibility, temperature, and dew point.

As suggested in the introduction, we plan to place test versions of AFPS in AFWG members' hands, to allow them to provide frequent feedback as our development continues. Among the group's recommendations at this meeting is that the NWS plan for extensive training on AFPS when it comes time to field the system. We found that it took two or three days for forecasters to begin to feel comfortable with AFPS; considerable additional use would be required to become proficient in its use. From a developer's standpoint, it is not until the latter stage is reached that the most telling feedback can be received from users.

Several additional ease-of-use items have also been added to the Level 2a software, including:

- a one-step copy process to move model-initialized grids to the Forecast database (Mathewson);
- split and interpolate options, allowing more flexibility in managing database contents (Mathewson);
- an improved means of identifying the time period displayed in a spatial editor (Romberg).

Other activities:

- Work continued on RUC initialization, working with members of FSL's Forecast Research Division (FRD). Verification of RUC-derived surface forecasts, using hourly obs from 25 stations, helped FRD developers identify a deficiency in the model's handling of subsurface temperature; a new version of RUC is just now running at FSL.
- At the end of the quarter, the first NGM initialization was made available to AFPS (Wier). Using the same approach as RUC, this provides forecasters another view of the 2-day forecast. Initial tests show that the diurnal temperature cycle and winds are not handled well. A description of the RUC initialization and verification process is included in an IIPS paper by Wier and Wakefield. Preliminary results of FSL's initialization work (RUC and NGM, possibly eta) will be presented at the conference.
- Three facilities currently receive "live" AFPS initialization (MOS, RUC, and NGM): NWS headquarters, FSL's development facility, and FSL "operations" (for daily weather briefings and WFO-Advanced exercises).
- With various initialization methods running routinely, it's necessary to delete old databases to keep disk usage in line (Bacco). Also, for operations testing, a copy of the forecast database is kept when it's used to generate text forecasts (Mathewson).
- Improvements were made in the efficiency of AFPS graphics (Romberg).
- Mapping code was developed to allow changing map projection as necessary when copying (Wier). This allows forecasters to use LAPS grids as first guess.
- A prototype Pencil tool provides a contour-drawing capability (LeFebvre).

- For tracking use of features and tools, a use logging mechanism is in place (Howard, Longstaff, Mathewson).
- Considerable work was done to improve the interpolation software (Wier).
- Training exercises and manuals were prepared, for using AFPS as a viewer during the August WFO-Advanced exercise, for the AFWG meeting, and for the October/November WFO-Advanced exercise (LeFebvre, Wakefield).
- A new set of forecast zones will be implemented in Colorado on 3 October. Todd Dankers provided information on these zones to TDL, for ZFP-generator support, and FSL prepared a new zones map for AFPS.
- Mark Mathewson has written an updated AFPS descriptive paper for the 12th IIPS conference.

### **3. Presentations/Visitors/Travel**

Numerous visitors stopped by FSL this quarter. Those listed here received AFPS demos, many as part of WFO-Advanced presentations:

- Neil Gordon, General Manager of National Weather Services for the Meteorological Service of New Zealand Limited, 24 July;
- Jon Mittelstadt, NWS Western Region, 7 August;
- Air Force Brig. Gen. Thomas Lennon and party, 9 August;
- Dave Andra, NWS Norman, OK, a participant in the August WFO-Advanced exercise, 14-15 August;
- Hugh Hutchison, Australian weather forecaster, 17 August;
- a group of Congressional staffers, 25 August;
- Simon Bevan, U.K. Royal Navy, 25 August;
- Ron Olson (NMC Aviation Weather Center, Kansas City) and Danny Simms (FAA Tech Center), 31 August;
- Ralph Petersen, NCEP, 20 September, on a survey of interactive systems as part of an assessment of NCEP's workstation requirements;
- COMET visitors Dave Himes, Jim Cowie, Steve Drake, and Susan Jesuroga, 20 September, becoming familiar with AFPS regarding future NWS training requirements.

Travel and presentations:

- Mike Romberg attended SIGGRAPH in August.
- Carl Bullock assisted EFT staff by presenting AFPS status at August's AWIPS program review in Silver Spring.

### **4. TDL activities**

TDL's AFPS work focused on implementing an end-to-end system for the AFWG meeting, including preparation of MOS initialization and configuring text generation software to run in the AFPS environment.

To generate forecast products with AFPS, an Informix database was configured at FSL to manage zone-based data. Programs were installed which:

- summarize gridded forecasts into zone-based forecasts,
- recognize and combine forecasts for zones with similar weather,
- allow the forecaster to control product generation, and
- generate Zone Forecasts (ZFP), Coded Cities Forecasts (CCF), and verification (MEF) products.

TDL developers continue to work to incorporate an Agricultural Forecast (AGF) into AFPS as well as support the Aviation and Fire Weather programs.

## **5. Plans for the next quarter**

During the first half of the next quarter, we will be occupied with support for the WFO-Advanced RT-95 cool-season exercise. This will include training visiting forecasters on the use of AFPS, and significant on-call time to assist exercise participants with AFPS-related issues.

The format for the exercise includes three 6-hour forecast shifts per day, running from 6 a.m. to midnight, local time. AFPS will be used starting in the second week of each forecaster's visit, so there will be time to spin up on AFPS operation. A full day of training will be followed by additional short training sessions and practice time, during the 2-hour "off" times before or after each shift during the first week. Forecasts produced by AFPS (along with other products such as AFD, NOW, and FTs written in the traditional manner) will be for in-house use only.

Initialization work will continue, including improvements to the RUC and NGM software. We also plan to develop an eta model system.

Work has begun on an extensive reference manual for AFPS (Longstaff). We hope that this will be nearing completion by the end of the quarter.

As noted earlier, we plan to provide our prototype software to AFWG members for use on their office systems, including SACs. The resulting frequent review and comment on our work will be both more effective and cost-effective. (Unfortunately, we'll not be able to test the text generators at remote sites, because TDL's system requires use of Informix databases.)

Work will commence on the derivation server that was planned as part of Level 2a. The original target for this was agriculture forecast weather elements, but that part of AFPS is on hold pending Congressional budget decisions. However, the derivation server will also be used for creating fields such as max/min temperature from RUC and NGM.

AFPS may be installed at NWSFO DEN in the first half of 1996. Among the items critical for operations is support for TAF generation. We will be working on the TAF database and editor during this quarter.

We have been using our HP725 and 730 workstations now for about 18 months. As our software has grown more complex, memory and disk requirements for testing and debugging have grown. We hope to add both memory and disk this quarter. Also, new AWIPS-equivalent hardware has been ordered for WFO-Advanced development and Denver operations; much of this is due by the end of October. We plan to use one of the new J200s for performance testing, and will begin to look at the impacts of upgrading to HP/UX 10.

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