Western Region Technical Attachment
No. 90-10
March 13, 1990

AFOS SYSTEM Z FRONT-END PROCESSOR

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[Editor's Note: Western Region Headquarters (WRH) has just installed System Z hardware and software on our WSFO-configured AFOS system for testing. We still have the capability of swapping back to a standard AOD-12 configuration when necessary. Part of the current System Z testing includes the transmission of data across a 9600 baud line from SMC directly to WRH and the other non-critical sites which are participating in the tests. The WRH AFOS will maintain its current 2400 baud line to WSFO Salt Lake City during System Z testing.]

The System Z front-end processor (FEP) is the next major upgrade for AFOS. It consists of high-speed front-end processors for AFOS field sites, along with major changes to the Eclipse back-end processor (BEP) software to accommodate the FEPs. This upgrade, along with communications upgrades to the distribution circuits and at SMCC, will allow higher speed communications flow (perhaps a four-fold increase), which will eliminate the bottleneck on Regional Distribution Circuits (RDCs). The FEPs, replacing the DCU-50s, will remove the communications function from the AFOS Eclipse. The result will be a faster response to forecaster commands from an Alphanumeric Display Module (ADM) and added applications capability.

A WSFO AFOS system now is set up so that each Eclipse maintains its own data base, which is an exact duplicate of the other. Each Eclipse (BEP) stores data that it receives on its designated Winchester disk drive, then passes that data across the Multiprocessor Communications Adaptor (MCA) for storage by the other Eclipse on its drive. System Z will isolate each Eclipse; the MCA will not be utilized by AFOS (however it will still be available to RDOS for transfer of files). Redundancy will be achieved by having each FEP share data with the other. Each BEP will data base products only from its designated FEP. This is analogous to having two current WSO systems standing side-by-side. While ensuring backup and redundancy, these will not be exactly identical data bases.

Each FEP has a large global memory, which is used to buffer data for its own BEP, the other FEP in a WSFO system, and all communications lines it is handling. In addition, each FEP has its own Winchester disk for additional spooling of data. This means that the bypass switch will be thrown much less frequently at a WSFO. There will be no need to go into bypass for MODIFY or for most preventative maintenance on one system.

System Z will be a more complex system than the current AFOS. A WSO and an RFC will have essentially two computer systems operating (an FEP and a BEP) while a WSFO will have four. More complex trouble shooting will be needed to diagnose which component has "crashed" and needs rebooting. The FEPs reboot quite easily, however; just push the reset button. In a WSFO configuration, one FEP will keep track of which products have not yet been received by the other FEP, enabling the rebooted FEP to be restored to its pre-"crashed" state. Some AFOS system management functions, such as changes to the asynchronous schedule, will need to be done separately on each WSFO BEP.

The added complexity will be more than offset by increased capabilities. Higher speed communications should allow new data sets, such as NEXRAD and profiler data to be sent on the RDCs without fear of clogging the network. More asynchronous lines can eventually be handled by a WSO or WSFO. There will be no "degraded" mode at a WSFO -- one FEP/BEP system can handle all synchronous and asynchronous communications including support of all ADMs. Applications programs can be run on each BEP and each can access the AFOS data base. It is difficult to quantitatively assess system stability and response time, but recent field tests performed on WSFO and WSO System Z configurations did indicate improvement in both areas.

Figure 1 shows how a WSFO system will probably be configured when all components are working properly. The DPCM side, including the FEP and BEP on the right-hand half of Figure 1, will handle incoming and outgoing asynchronous traffic. It will also handle the ADMs and Graphic Display Modules (GDMs). The DCM side, including the FEP and BEP on the left-hand half of the figure, will handle synchronous traffic. When data from the regional distribution circuit comes in to AFOS, the DCM FEP will receive and send that traffic to the DPCM FEP over the parallel port connecting the two FEPs. Each FEP will examine the incoming data and send it to its own BEP, but only if the product is to be stored in the BEP data base. In other words, the data is filtered by the FEPs, reducing the workload for the BEPs.

When a product is sent from the DPCM BEP, for example by storing a product from message composition addressed locally or to ALL, that product goes to the DPCM FEP. It is then flooded to the DCM FEP, where it is transmitted on the RDC (unless locally addressed). It is also sent to the DCM BEP for data base storage, thus maintaining data base redundancy between DCM and DPCM.

Products created by applications programs are handled in the same way. Applications may be run on either BEP with output products stored in both the DCM and DPCM BEP data bases.

There is still a lot to be done before field implementation of the System Z front-end processor upgrade occurs. Acceptance testing, documentation, diagnostic testing and documenting, further field testing, etc., have yet to be accomplished. Current projections would put April of 1991 as a realistic target date. System Z should be a welcomed upgrade to AFOS, to carry field sites until AWIPS-90 comes on line.

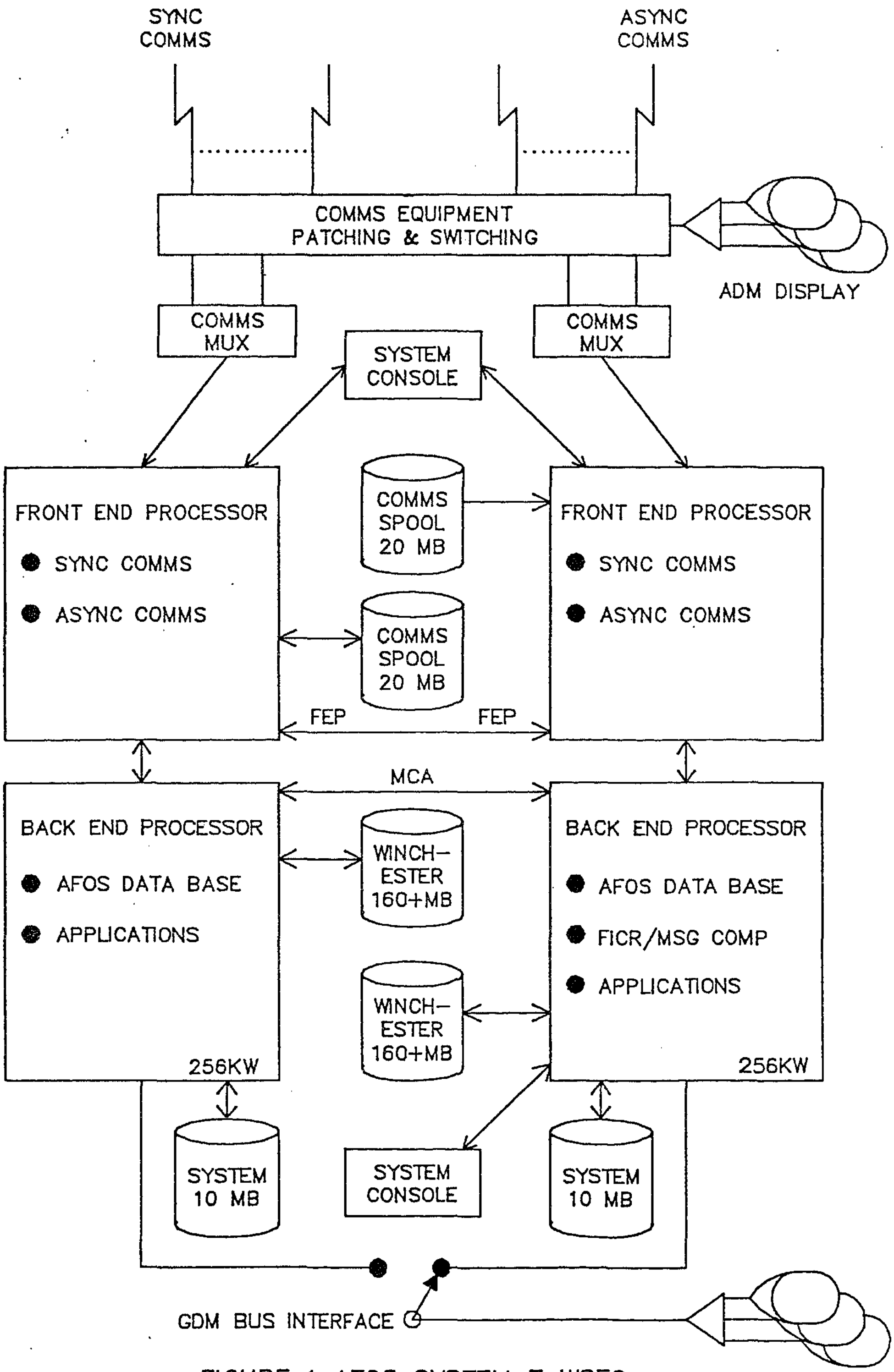

FIGURE 1 AFOS SYSTEM Z WSFO