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PREPARING FOR AWIPS-90 APPLICATIONS

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[Editor's Note: This writeup is an excerpt from the February 1989 issue of the AFOS Applications Quarterly Report as compiled by the Working Group for AFOS Applications, Harry Lebowitz, Editor. There are plans to continue providing useful information, such as that contained in this attachment, in future issues of the Quarterly Report.]

Believe it or not, AFOS is not going to be the primary computer that forecast offices will be using forever to run applications programs. At Weather Service National and Regional Offices, at selected forecast offices, and at the Environmental Research Laboratories, there are a lot of people working to develop and procure a whole new computer, communications, and display system. Within the next two to three years, prototype Advanced Weather Interactive Processing System for the 1990's (AWIPS-90) computers will be installed in selected forecast offices in the central part of the country. Installation for the remainder of the country will occur over the next three to four years. This will hail a new era for applications.

As everyone knows, AFOS wasn't conceived with applications in mind. It wasn't delivered with applications and there are those who blame applications programs for many of AFOS's instability problems. If it weren't for the tremendous ingenuity of forecasters and applications programmers, AFOS still would not be running applications programs to support meteorological operations. In fact, such programs have overcome many of AFOS's early shortcomings. It only takes a few minutes of reading other sections of this "Report" to realize just how useful AFOS applications have become.

AWIPS-90 is being designed from the ground up with applications in mind. How they will be implemented is yet to be determined. However, there are two contractor teams working on AWIPS designs in what is called the Definition Phase of AWIPS. At the end of the Definition Phase, 22 months from November 1988, one team will be chosen to develop the AWIPS design and deliver prototypes during a 24 month Development Phrase.

Initially, there will not be radically different applications running on AWIPS from what we know of today. Nor are the programs going to differ greatly from what is being developed at the Techniques Development Laboratory (TDL) or the Prototype Regional Operational Forecasting System (PROFS). You're not going to see sophisticated artificial intelligence applications or complex mesoscale models because these technologies are not ready. Rather, the focus will be on doing current capabilities better. For example, local objective analysis programs will run faster

and produce better results. They will allow the forecaster to analyze many different fields using more user friendly interface techniques than are available on AFOS. Local guidance programs will give better short term forecasts. The warning programs, like GWARN, will have graphical interfaces. They will permit the forecaster to enter the counties to be warned by drawing boxes interactively on the screen. The warning products themselves will automatically be formatted with the proper headers, lists of counties, and warning information. These are capabilities in use at the Denver forecast office today and are being run to allow the Weather Service to gain experience with them. AWIPS will, however, be capable of evolving as new and more sophisticated applications are introduced and old ones mature.

In 1984, a team of people was assembled to define Weather Service requirements for AWIPS. After a series of requirements documents were produced, the System Requirements Specification (SRS) was written. This became part of the AWIPS Request for Proposal (RFP) package which was distributed to potential bidders. At the same time, the method to be used to specify Weather Service applications requirements was established. Thirteen classes of applications were defined and a catalog of existing applications programs was assembled. Programs in use on AFOS, at PROFS, and other agencies were included in the catalog. The classes of applications are:

1. Decoding
2. Quality Control
3. Parameter Derivation
4. Display Generation
5. Image Processing
6. Objective Analysis and Interpolation
7. Numerical Forecast Models
8. Statistical Forecast Models
9. Man-Machine Interaction
10. Decision Assistance
11. Product Formatting and Routing
12. Forecast Monitoring
13. Forecast Verification

In addition, estimates were made of the volume of data to be processed, how many meteorological fields would be computed and analyzed, and how many forecasts would be prepared. From these estimates arose the so called Worst Case Hour (WCH) processing requirements. These numbers give the contractors our best estimate of the processing load to be place on the new machines.

To tie all these requirements together, a Requirements Model was prepared. This model is a comprehensive, multilevel Data Flow Diagram system. It depicts all of the data flowing between the input and output and transformations specified in the AWIPS requirements documents.

In the procurement of AWIPS-90, the approach is to have the winning vendor implement the principal applications used by all sites. Individual offices will be able to install additional applications as well. Most likely, there will be special use routines tailored for the local area. We also anticipate users will develop other application to take advantage

of AWIPS power to improve operations similar to what has happened on AFOS. Development tools such as compilers for several languages will be available.

For the applications that we intend for the AWIPS contractor to assemble and install, we are now preparing specification packages which include plain language descriptions with related code. The written portions of the specifications describe how the programs will be used. It also gives algorithms used in the program, the inputs and outputs, the acceptable program run and response times, and a description of the related code. It references the requirements model so the AWIPS contractors will know where this techniques will fall into the grand scheme.

The applications programs provided as part of the specification packages were identified when the catalog of techniques was prepared. Before a program is included as part of the specification, it is scrutinized for how well it is written and documented. If the code is either so poorly written or little is to be gained by including the code, it is rejected. Likewise, the internal and hard copy documentation are evaluated. In some cases, the contractor will simply adapt or enhance existing code and documentation. Clearly some programs will be more helpful to the contractor than others. Straightforward decoding of data or the computation of parameters can be implemented with minor modifications to the code. Those programs that are system or hardware dependent such as graphic generation programs may be totally useless and will have to be rewritten by the AWIPS-90 contractor. The AWIPS contractor will be responsible for delivering well written and well documented programs.

TDL, with the help of a support contractor, General Science Corporation, has now prepared over forty-five of these specification packages. These documents are being reviewed by subject specialists and by some 25 people who make up the AWIPS Task Team. Usually the specifications are reviewed, revised, then reviewed again. It's been no small job for members of the review team to review all of these documents. The whole process is summarized in Figure 1.

The two contractor teams selected for the Definition Phrase have been given three of the applications specifications which they are required to implement on their machine as part of the Definition Phase competition. Current plans call for the Weather Service to give the contractors additional specifications to allow them to better understand the Weather Service's total requirements.

In future issues of the Quarterly Report, we will discuss specific aspects of the AWIPS-90 applications program concept. We will also keep you informed on the progress of the procurement itself. If you have any questions, drop us a line either directly or through your representative on the Working Group. We'll try to answer you and perhaps clear up any misconceptions that may exist. If you are contacted by one of the competing teams of contractors with specific questions related to AWIPS, refer the individual or individuals to the contracting officer, Gary Rice (FTS 427-7351 or Commercial 301-427-7351). Do not answer the questions yourself. This will help avoid legal contests when the selection of the winning team is made.

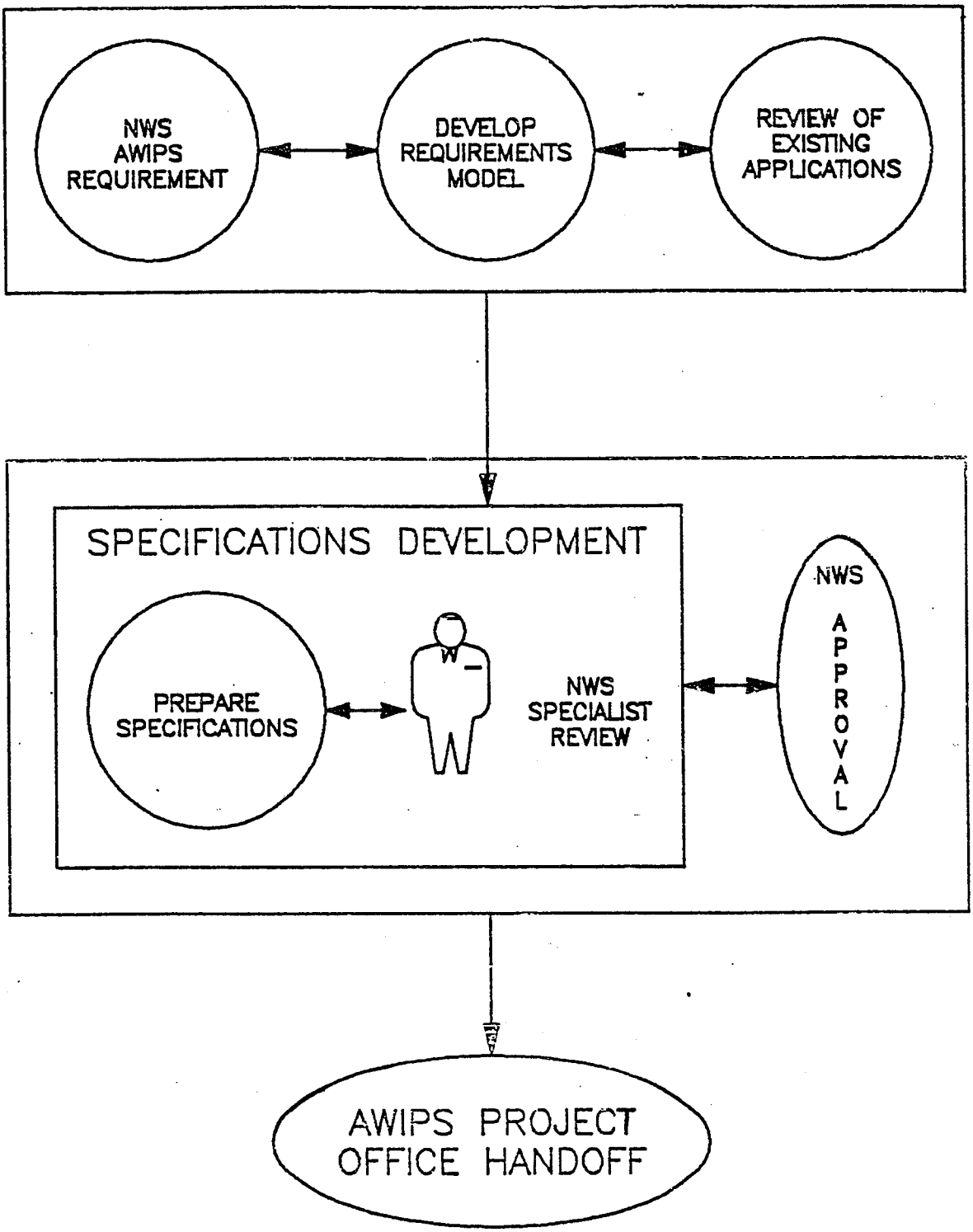

Figure 1. The process of preparing applications specifications for AWIPS-90.