J12.3 APPLYING AWIPS TECHNOLOGY TO THE PROTOTYE AVIATION COLLABORATION EFFORT (PACE)

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1. INTRODUCTION

Adverse weather conditions, especially those associated with thunderstorms, contribute significantly to disruptions in air traffic operations. The effects extend to every sector of the flying community and take the form of delays, reroutes, trip cancellations, and a reduced margin of operating safety. Weather that adversely impacts aviation operations also increases demands on FAA Air Traffic resources.

In 1978, the FAA and NWS established the Center Weather Service Unit (CWSU) Program, placing NWS meteorologists in FAA Air Route Traffic Control Centers (ARTCCs). This NWS meteorological support is designed to improve aviation safety and enhance the efficient flow of air traffic by the continual forecasting and monitoring of adverse weather. The effectiveness of this meteorological support is dependent upon the CWSU forecaster maintaining a close coordination with traffic managers whose decisions affect the flow of traffic through the National Airspace System. FAA personnel need the best available weather information to facilitate their mission of supporting aviation operations. The CWSU program has developed slowly, and not until the latter quarter of the 90's did the CWSUs begin to receive newer technology that would enable the meteorologist to provide higher resolution forecasts and advisories to air traffic decision makers.

Further progress toward achieving a more weather-responsive air traffic system is reliant upon a joint FAA and NWS commitment that places increased emphasis on emerging science and technology applied to aviation weather forecasting. The FAA is actively working toward establishing a more definitive set of requirements for weather forecast information. Weather information needs of the ARTCC Traffic Management Unit (TMU) are described in a 1999 document (FAA, 1999), forming the basis for a formal requirements document anticipated to be completed by 2003. When completed and mutually agreed upon by the NWS and FAA, the resulting weather requirements document will provide a starting point from which the NWS can launch appropriate initiatives aimed at satisfying these requirements.

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2. PACE

The Prototype Aviation Collaboration Effort (PACE), located at the Fort Worth (TX) CWSU, is designed as an operational test bed for demonstrating the effective employment of developing science, technology, and computer communication interfaces in providing weather support for the TMU. Fort Worth ARTCC and FAA Southwest Region Headquarters officials have agreed to allow the use of their facility in the CWSU workspace to conduct PACE activities. PACE, initiated by NWS Southern Region Headquarters, is a coordinated interagency effort involving the Fort Worth CWSU, Fort Worth Warning Forecast Office, NWS Southern Region Headquarters, FAA Southwest Region Headquarters, and the Forecast Systems Laboratory. Additional participants may include adjacent CWSUs, and the Aviation Weather Center.

The primary goal of PACE is to establish procedures to generate automated guidance products, share common data sets among operational units, and demonstrate how the employment of collaborative forecasting methodologies can lead to improvements in aviation forecast products. This process will begin with the development of thunderstorm forecast products formatted for use by the TMU.

Initial PACE exploratory development will be directed to prototyping graphical thunderstorm forecast products combining the National Convective Weather Forecast (NCWF, Mueller, et. al., 2000), the Convective SIGMET, and the Collaborative Convection Forecast Product (CCFP, Phaneuf and Nestoros, 1999). The NCWF provides an analysis of convective hazards with a 1-h forecast of storm positions updated every 5 minutes; the Convective SIGMET is a 2-h forecast of significant thunderstorms updated hourly; and the CCFP produces forecasts of significant thunderstorms at 2, 4, and 6 hours, updated every 4 hours. By combining these products in a graphical display, the TMU could be provided with an automated, frequently updated 0-6 hour thunderstorm forecast.

3. FX Connect

FX Connect (FXC) is a real-time meteorological display system with collaborative capabilities, and is a main component of the PACE prototyping environment. A unique feature of FXC is that it can accommodate the interaction of forecasters at different locations through a graphical user interface. When connected to an AWIPS server, FXC allows the display of D2D data and imagery over which graphics may be created, manipulated, and viewed by remotely located collaboration participants. Although the AWIPS data base is the primary and most extensive source of data, FXC can also obtain data (in image form) from Web servers and integrate data from other sources. Details of FXC architecture may be obtained in Grote and Golden, 2002, in this volume.

FXC features include the conventional capabilities of:

- Display of diverse data sets (images, observations, and text);
- Interactive display manipulation (zoom, pan, toggle overlays, overlay color);
- Interactive display generation (cross sections, time series, time/height, model soundings); Extensive manual graphic and annotation tools;
- Display procedures.

Advanced capabilities of FXC include:

- Slide creation and presentation;
- Chat capability;
- Internet access to WWW products
- Display of radar data from any WSR-88D radar;
- Creation and display of JPEG images;
- Independent or collaborative mode of operation.

FXC will be used in PACE to explore methodologies for promoting an efficient exchange of meteorological information and collaboration in the development and production of new briefing products for TMU decision makers. One of the key features of FXC is the ability to annotate meteorological displays. This feature plays a crucial role in enhancing communications between collaborators also in supporting prototyping and routine briefing product generation.

4. References

Grote, U.H., and C. Golden, 2002: Extending AWIPS to Remote Collaboration. Preprints, Interactive Symposium on AWIPS, Amer. Meteor. Soc., Boston, MA, paper 7.3.

Mueller, C.K., C.B. Fidalego, D.W. McCann, D. Meganhart, N. Rehak, and T. Carty, 1999: National Convective Weather Forecast Product. Preprints, 8th Conference on Aviation Range, and Aerospace Meteorology, American Meteorological Society, Boston, 230-234.

Phaneuf, M.W. and D. Nestoros, 1999: Collaborative Convective Forecast Product: Evaluation for 1999. (Available from the author at CygnCom Solutions,Inc.)