9.1.2 DATA COMMUNICATIONS AND MONITOR FOR THE PENN STATE UNIVERSITY PROFILER NETWORK

Robert M. Peters

Department of Meteorology
The Pennsylvania State University
University Park, PA 16802

The profiler network to be installed by the Department of Meteorology at Penn State University (THOMSON et al., 1984) utilizes a microcomputer for network monitoring and control. When completed, the network will consist of two VHF and one UHF wind profiling Doppler radars. Additional measurement systems to be added to the network include temperature and humidity profiling radiometers, sodar for boundary layer wind profiling and selected surface-based baseline systems.

Experience gained at Penn State has shown that reliable unattended operation of automated instrumentation systems has been best achieved when the data base and communications/monitor functions are handled by separate computer systems. The data base, which is generally available to many student and faculty users, is incorporated on a large multiuser system with many other data types, sources and applications. The "port" to the large system, the communications controller, is a dedicated microcomputer optimized for failsafe and unattended operation. This approach frees the operation of the network from depending upon the use of a particular large, and usually maintenance intensive, system as the data base. The communications controller serves as a temporary archive if the on-line data base system is not available. The microcomputer controller is also cost effective. Capital costs, maintenance fees, and factors such as uninterruptable power supplies are small in comparison to those for "mini-mainframe" systems. Thus, if need be, the microcomputer can be considered a disposable and replacable component.

Alarms on the network monitor provide an indication of network component malfunctions. This is accomplished by monitoring data quality and transmitter electronic parameters. A large color graphics display driven by the microcomputer network controller also provides selected profiler output and status indicators.

Each wind profiler within the Penn State network is currently using the software and signal processing hardware developed by the NOAA/ERL Wave Propagation Laboratory (STRAUCH et al., 1984). Several new features not currently available on the earlier prototype systems are also available. The transmitters (Tycho Technology, Inc.) include an internal microprocessor control system. Each transmitter is linked via a serial line to the local radar control minicomputer. This link provides the capability for complete monitoring and control of the transmitters. The sodar systems, which are designed around a microcomputer, will also be linked to the local radar minicomputer. Uninterruptable power sources are only used with the radar control computer, the radar signal processor and the radar site modem. Thus, automatic and controlled restart of the transmitters is an essential feature in the radar control software given the temporary but regular power outages which occur on the service lines during thunderstorms.

Remote diagnostic capabilities are also being implemented in the Penn State network. It will be possible to remotely analyze many specific malfunctions of the transmitters or signal processor. Persons interested in specific technical details of any of these systems should contact the author here or at Penn State.

REFERENCES

Thomson, D., C. Fairall, and R. Peters (1984), Network ST radar and related measurements at Penn State University: a progress report, Handbook for MAP, Vol. 14, SCOSTEP Secretariat, Dep. Elec. Computer Eng., Univ. IL, 350-355.

Strauch, R., K. Earnshaw, D. Merritt, K. Moran, and D. Van de Kamp (1984), Performance of the Colorado wind-profiling network, Handbook for MAP, Vol. 14, SCOSTEP Secretariat, Dep. Elec. Computer Eng., Univ. IL, 38-48.