

EXPERIMENTAL REPORT

(In Compliance with FCC Rules and
Regulations Section 5.204)

The Penn State Meteorology Department has completed construction of a mobil UHF radar system that measures vertical profiles of the horizontal wind in nearly all weather conditions and with a temporal resolution up to 360 times greater than the present National Weather Service upper-air systems.

The site for the radar, when it is not on a field project, is located approximately 1 kilometer west of the Blue Course on the Circleville Farms owned and operated by Penn State. Construction of the site started in January of 1988 and involved the extension of the West Penn power line by 2000 ft, the laying of a 300 ft stone roadway and platform, the antenna mounting, 40 ft equipment trailer, and utility hookup. The equipment trailer holds all the electronics including the transmitters, receivers, Doppler signal processor, and the computer for system control and signal processing.

The radar antenna consists of two super-imposed 7m by 7m dipole coaxial-collinear arrays pointing in two fixed orthogonal directions 15 degrees off zenith. One of the arrays is phased switched for zenith soundings. The transmitters were turned on in April, 1988. Since then the radar has been operated in a continuous mode sending hourly wind profile measurements back to the Meteorology Department's computer facility. At this time, two data archives are kept: one real time display for local forecasting needs, and the other for a variety of scientific research studies.

Insofar as possible the radar has been automated. Data are pre-processed on microcomputers at the site, and fed via

telephone line to a VAX 8350 at the Department of Meteorology. There the measurements are displayed in various formats such as vertical time sections and hydrographs. The data are also meshed with other meteorological data such as surface data, upper-air data, and the NMC forecast data in a variety of ways for diverse application.

In particular system performance is being evaluated for the National Oceanic and Atmospheric Administration for establishing specifications for both meteorological research and national operational networks. Measurements of wind profilers and variability are being used for U.S. Air Force supported studies of mesoscale weather systems and the forecastability of them. Research is also being done with the Weapons Lab of the U.S. Air Force to provide measurements of atmospheric structure relevant to the performance of earth-space optical systems. The U.S. Navy (Office of Naval Research) is supporting use of the radars in a major study of application of profilers to numerical weather prediction.