Microphysics of precipitation

Topics:
- Phased array radar

Phased array radar

Mechanically scanning radars have the disadvantage of antenna inertia, which dictates relatively slow scan rates (5-6 minutes for a WSR-88D volume scan). Electronic scanning offers the advantage of instantaneous beam positioning, freedom from mechanical malfunctions, and being able to focus independently on multiple targets.

Phased array radars are composed of numerous radiating elements. By slightly altering the phase of the signal from one radar element to another, the antenna beam can be steered electronically or focussed.

The Norman weather community is at the center of the development of a phased array radar for meteorological purposes. Researchers are adapting the Lockheed Martin SPY-1 radar, long in use for tactical operations on U.S. Navy surface ships, for meteorological purposes. The SPY-1 radars are approximately 12 feet square, with 4080 separate elements. It has significant redundancies, such that 1/3 of the antenna can be damaged without significant performance loss.

Volume scan times for the phased array radar will be < 1 minute.