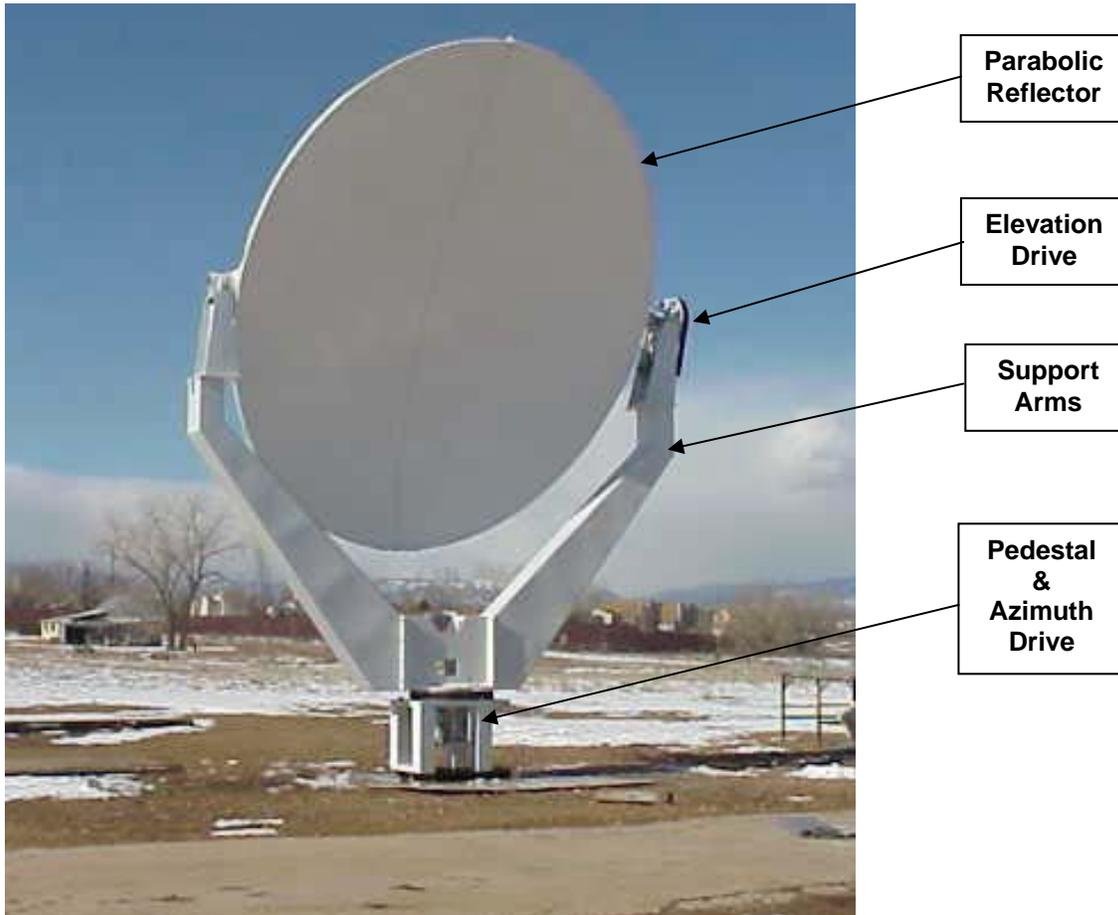


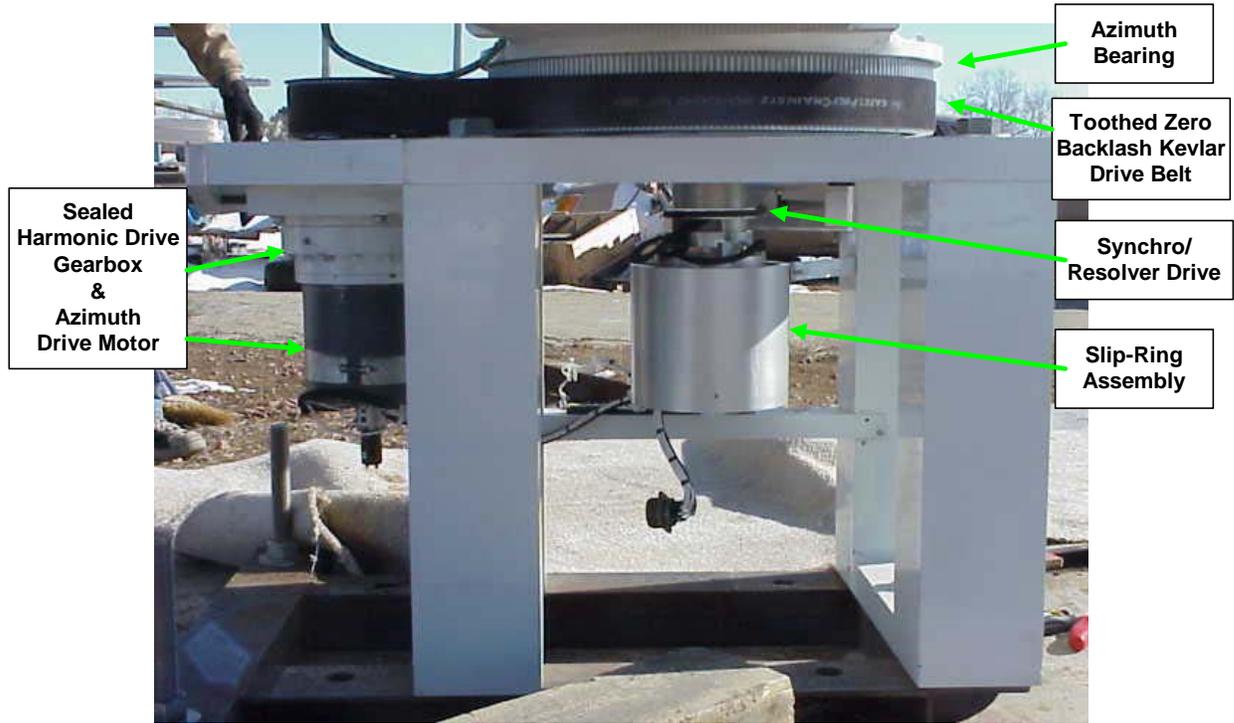
Radtec Offset Feed Antenna And Pedestal



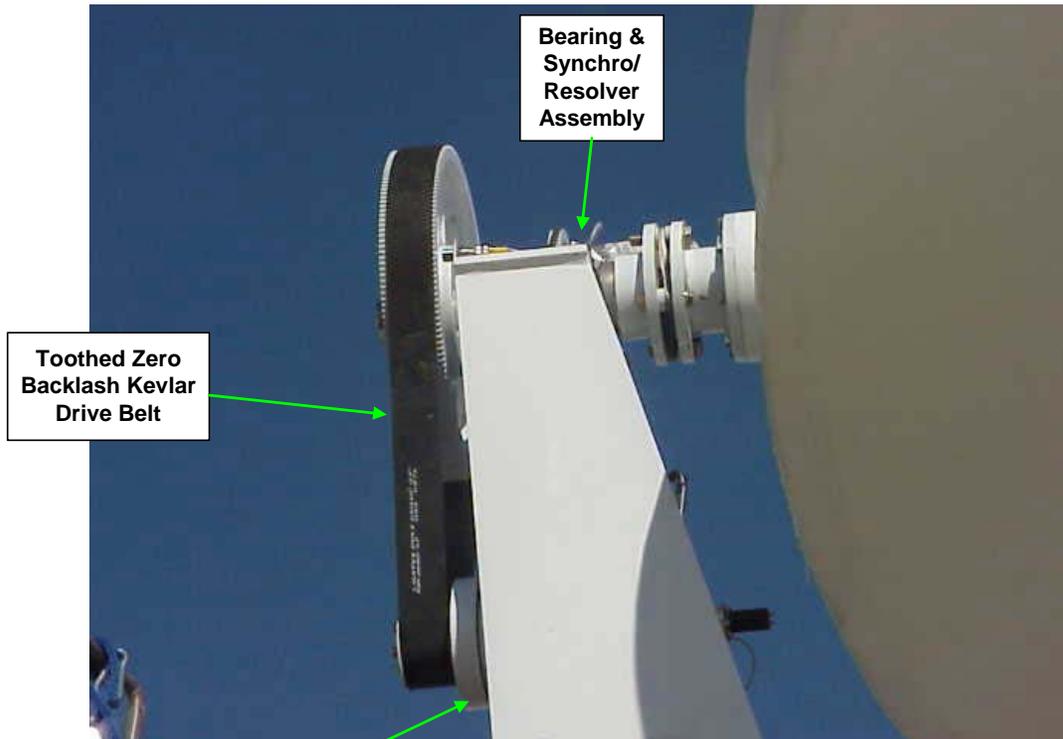
Exclusive Radtec features:

- Offset feed significantly reduces ground clutter; 70 dB (round trip) typical clutter suppression with REI offset feed, before filtering
- Simple robust design- Long life with easy access to all components when maintenance is required
- Design-level performance throughout the life of the system- Antenna reflector made from composite materials, maintains accurate shape of reflector, yoke mount eliminates need for mechanical stops
- Reliable, accurate pedestal performance with reduced maintenance- Antenna mounted with center of mass at center of rotation, no counterweights required, reduced moving mass, reduced inertia loads = dramatically reduced reduce stress on drive components
- High quality components- Sealed harmonic drive gearboxes, long-life DC servomotors, very conservatively loaded precision bearings, Kevlar toothed belt drives for lubrication-free operation with zero backlash

Azimuth Drive



Elevation Drive



Reduced Antenna Side Lobes And Ground Clutter

The antenna is a critical element in the overall performance of a weather radar system. The antenna performs two functions; forming the transmitted pulse into a very narrow beam, and aiming that beam in the desired direction. If a weather radar beam were visible, it would look very much like the beam of light from a lighthouse; a very powerful, narrowly focused beam sweeping around through the atmosphere.

Unfortunately, some of the transmitted pulse energy “leaks” out of the antenna at angles away from the main beam. These leaks are called side lobes. These side lobes cause reflections from buildings, trees, vehicles, etc.. These reflections are referred to as ground clutter. Reduced antenna side lobe energy avoids much ground clutter. The antenna’s “first side lobe” is usually the primary cause of ground clutter. Thus suppression of the side lobes is very important in reducing ground clutter.

The antenna’s side lobe suppression is related to the design and manufacturing precision of the antenna, not its size.

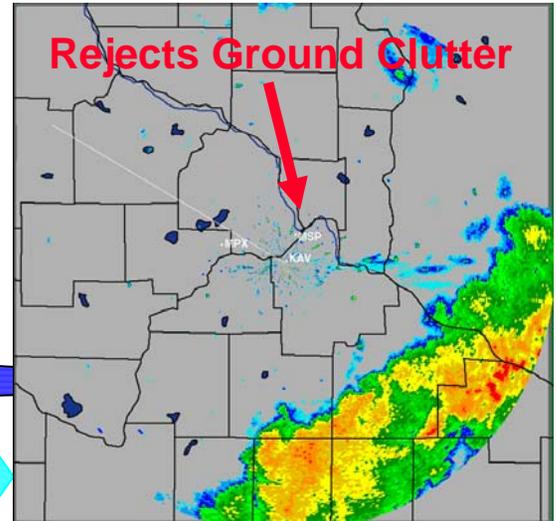
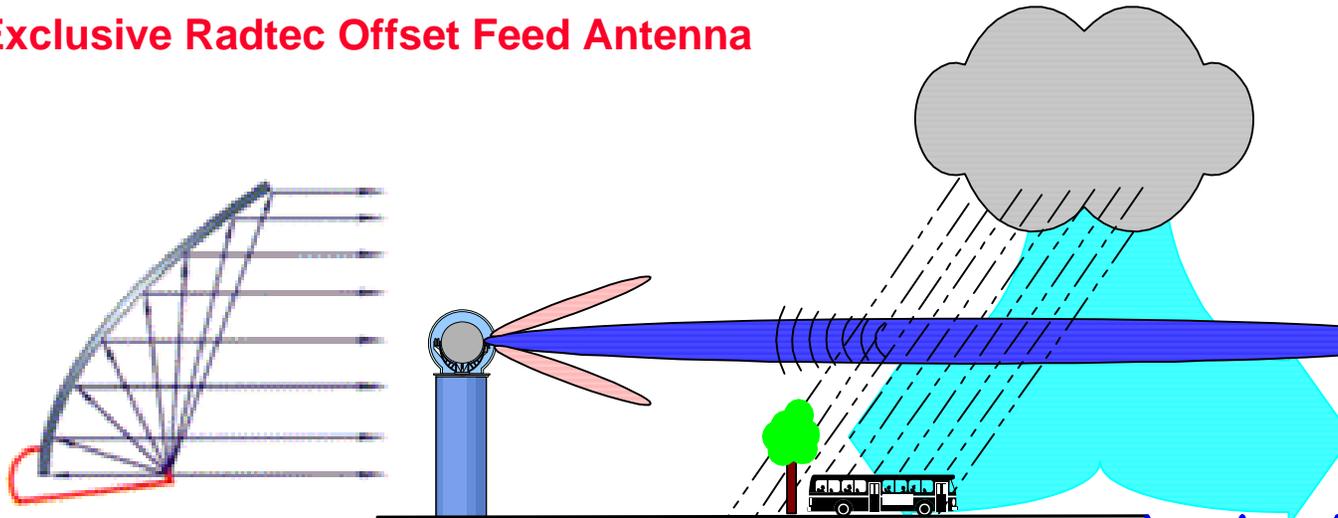
The only true test of side lobe performance is certified antenna test range data on the specific antenna being considered.

Side Lobe Suppression Is Not Related To Antenna Size Or Beam Width

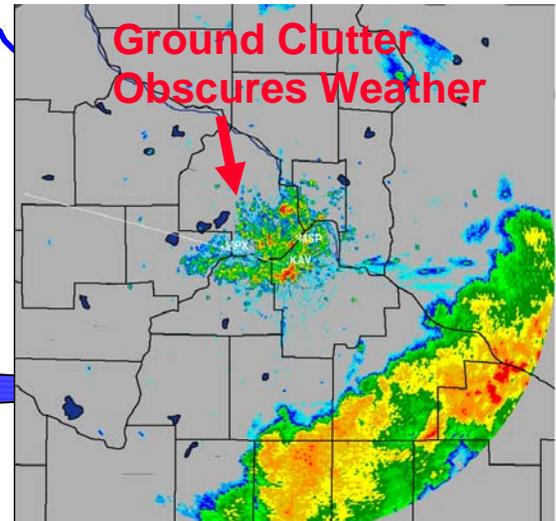
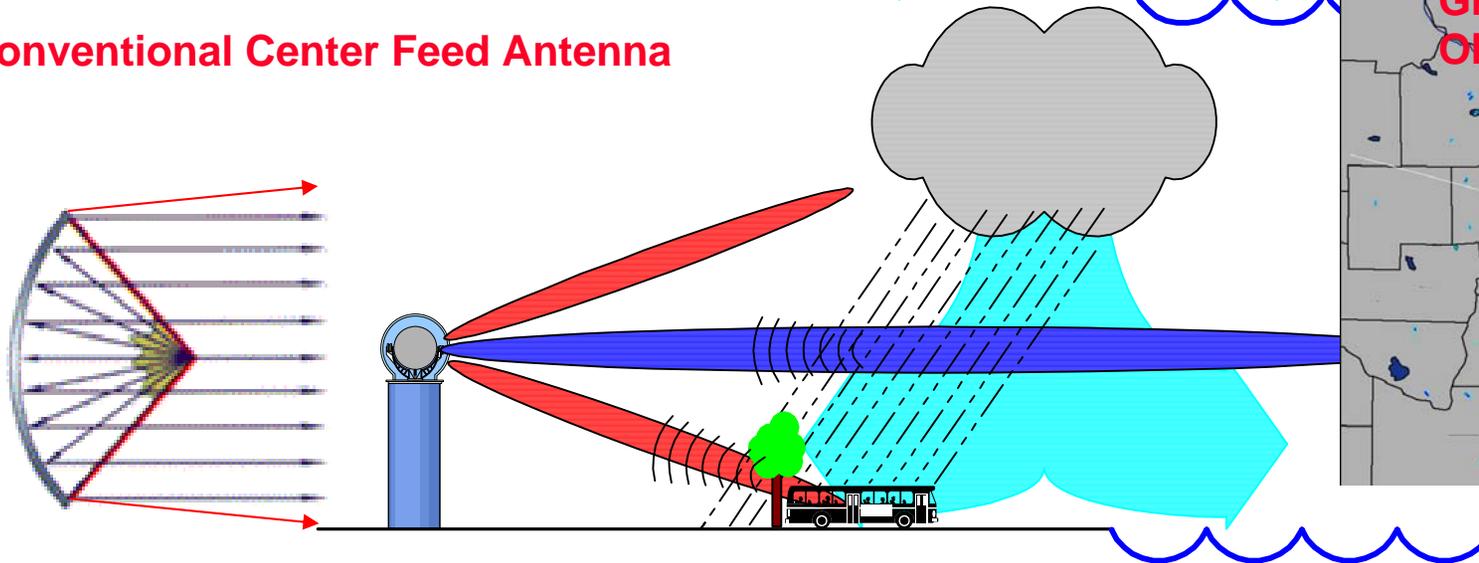
- Larger antennas do not necessarily have more or less side lobe suppression.
- A Radtec 2 m offset feed antenna has been verified to have -42 dBc (one way) side lobe suppression, Radtec 3 m and 4.3 m offset feed antennas have -35 dBc (one way) side lobe suppression.
- Typical center feed antennas have about -25 dBc (one way) side lobe suppression.
- The FAA’s TDWR radar has a 7.6 m antenna which has -27 dBc (one way) side lobe suppression (*Microwave Journal*, February, 1990). It has among the best side lobe suppression of all center feed antennas.
- Also note that the cost of the antenna, radome, tower, etc. increase dramatically as the antenna size increases.

The following images illustrate the ground clutter suppression capability of a high quality offset feed antenna. These images were made using a Radtec 4.3m offset feed antenna.

Exclusive Radtec Offset Feed Antenna



Conventional Center Feed Antenna



Moving Ground Clutter Is A Severe Problem

- There is no known technique to filter out rapidly moving ground clutter.
- The only effective way to suppress moving ground clutter is with a low side lobe antenna which substantially reduces reflections from that clutter.
- Clutter mapping can remove clutter that is in a fixed location (buildings, hills, etc.)
- Doppler velocity based clutter filters can remove clutter at any location if the clutter has zero or near zero velocity. Up to 50 dB of clutter suppression is possible with these filters. Vehicles, sea surface waves, etc. moving at more than 3 to 5 km/hr cannot be filtered out without losing significant weather data.
- Reflections from vehicles, sea surface waves, etc. moving at more than 3 to 5 km/hr are likely to mask the velocity of reflections from important weather data (microbursts and low level wind shear).

Traffic Near An Airport Or Large City Produces Much Moving Ground Clutter

- The airport itself and an area approximately 5 km wide around the airport are of primary interest for wind shear detection.
- Within the airport, taxiing aircraft, ground service vehicles (baggage, fuel, etc.), and parking facilities have large numbers of moving vehicles that produce large amounts of strong moving ground clutter reflections.
- Within 5 km of the airport, highway traffic to and from the airport, rail service, etc. also produces large amounts of strong, moving ground clutter reflections.
- Over a period of years, hotels and various other service facilities, which produce much ground clutter, both moving and fixed, are almost certain to be built near the airport. The radar installed initially must anticipate, and be able to suppress, those new clutter sources.

Side lobes are caused by a combination of basic physics, and very small imperfections in the shape of the antenna. With a center feed antenna, the waveguide, support struts and feedhorn are located in front of the antenna where they interfere with the main beam. This interference increases the side lobes. A precision offset feed antenna avoids this problem because the feedhorn, struts, etc. are outside the main antenna beam.