

C BAND DUAL POLARIZATION WEATHER RADAR

The C band dual polarization full coherent weather radar is a new generation weather radar of China, which is a version with addition of dual polarization function based on the Doppler weather radar. It has two operation modes, one is the dual linear polarization transmit/receive mode, the other is the horizontal linear transmit and dual linear polarization receive mode.

The C band dual polarization weather radar can detect in real time not only the conventional Doppler weather parameters, such as echo intensity (dBz), radial velocity (v) and spectrum width (w), but also the dual polarization Doppler weather parameters, such as echo horizontal vertical differential reflectivity factor (ZDR), special differential phase (Kdp), zero delay correlation variable ρ_{hv} (0) and linear depolarization ratio (LDR). The radar can detect the shape, size, pointing angle and dielectric constant of relevant particles to realize the identification of echo characters, improve the accuracy of quantitative measurement on precipitation so as to do more accurate weather forecast. The radar is used for applications in weather, weather artificial intervention, water conservancy, aviation, military and scientific research sectors.

Main Technical Features

- ◆ H/V dual polarization transmit and horizontal single polarization transmit selectable;
- ◆ Dual channel simultaneous receive and processing of echo H/V polarization signal;
- ◆ Long range wireless remote control and data transmission.
- ◆ Advanced BITE function and on-line failure identification/help system;
- ◆ Dual channel large dynamic linear digital IF receiver and Doppler signal processor;
- ◆ Real time echo range unfolding and velocity unfolding;
- ◆ Real time dual channel on-line auto Doppler signal detection and calibration;
- ◆ Antenna azimuth positioning by sun track and automatic detection of pitch position;
- ◆ Network terminal and various dual polarization weather products;
- ◆ Multi-scan modes (PPI /RHI /volume scan), continuous operation.

Main Performance Specifications

Operation frequency 5300-5700MHZ
Intensity monitoring range $\geq 400\text{km}$
Intensity measuring range $\geq 200\text{km}$
Velocity monitoring range $\geq 150\text{km}$
Dual polarization monitoring range $\geq 200\text{km}$
Azimuth scanning $0^\circ \text{ -- } 360^\circ$
Elevation scanning $-2^\circ \text{ -- } +90^\circ$
Positioning accuracy 0.1° (azimuth and elevation)
Parameter measuring range
Intensity $-10 \sim +70\text{dBz}$
Velocity 141 m/s

Spectrum width 12m/s
Parameter measuring accuracy
Intensity 1dBz
Velocity 1 m/s
Spectrum width 1 m/s
Differential reflectivity factor (ZoR) 0.2dB
Differential spreading phase shift (Kdp) $0.2^\circ /\text{km}$
Correlation variable (phv) 0.01
Linear depolarization ratio (LDR) 1dB



C BAND DUAL POLARIZATION WEATHER RADAR

Main Performance Specifications

Radar system phase stability $\leq 0.3^\circ$ Clutter cancellation capability 30~50dB

Main Technical Specifications

Antenna

Diameter 4.3m

Beam width ≤ 0.950

Gain $\geq 45\text{dB}$

Side lobe level $\leq -29\text{dB}$

Polarization horizontal and vertical linear polarization

Linear polarization isolation $\geq 37\text{dB}$

Antenna servo scanning mode

PPI, RHI and volume scan

Antenna PPI speed $0-36^\circ / \text{s}$

Antenna RHI speed $0-12^\circ / \text{s}$

Transmitter

Pulse power 250kW

Pulse width $1 \mu\text{s}, 2 \mu\text{s}$

PRF 300-1300Hz ($1 \mu\text{s}$)/300--450Hz ($2 \mu\text{s}$)

Receiver

Linear dynamic range $\geq 92\text{dB}$

Minimum detectable sensitivity $\leq -107\text{dBm}$ ($1 \mu\text{s}$)
 $\leq -110\text{dBm}$ ($2 \mu\text{s}$)

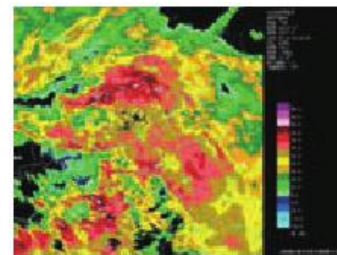


Signal processor

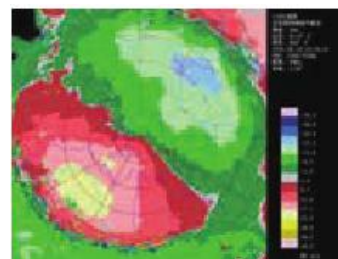
RVP8 digital IF signal processor, 14-bit A/D, 79MHz sampling frequency, PPP/FFT/DPRF velocity unfolding, random phase coding range unfolding

Terminal

Echo intensity (dBz), radial velocity (v), Spectrum width (w), differential reflectivity factor (ZDR), special differential phase (Kdp), correlation variable (phv), linear depolarization ratio (LDR). PPI/RHI/CAPPI basic data products/physical products/identification products/forecast products/wind shear products.



PPI echo reflectivity (16 layer)



PPI radial velocity (16 layer)