

A dark gray background featuring a faint, light-colored radar grid pattern. The grid consists of concentric circles and radial lines, typical of a weather radar display. The text is overlaid on this grid.

Quality Control Method and Application of Doppler Velocity

Presented to CIMO ET-ORS
and CB-ET-SBRSO

December 5 – 9, 2011

by Richard Ice

US/NOAA/National Weather Service
WSR-88D Radar Operations Center

Topics Covered in this Brief

- ◆ WSR-88D Doppler Quality History
 - Clutter Filtering
 - Clutter Identification
 - Range-Velocity Ambiguity Mitigation
 - ◆ Phase Coding (SZ2)
 - ◆ Staggered PRT
- ◆ Improvements, now and future

WSR-88D Quality History

◆ Clutter Filtering

- Original design featured an Infinite Impulse Response (IIR) hardwired filter
- Doppler Moments biased by the IIR filter
- Open RDA implemented an adaptive spectral filter (GMAP).
- GMAP can be “tuned” to minimize bias
- For further information:
http://www.roc.noaa.gov/WSR88D/PublicDocs/Publications/23rd_IIPS_Clutter_Filter_Optimize_Ice.pdf

WSR-88D Quality History

◆ Clutter Identification

- Original design relied on clutter maps
 - ◆ Off-line generated from SNR and clutter strength
 - ◆ User controlled censor zones
- Clutter Mitigation Decision (CMD)
 - ◆ Build 11.0
 - ◆ Fuzzy logic – real time identification for lowest elevation segments
- For further information:

http://www.roc.noaa.gov/WSR88D/PublicDocs/Publications/CMD_Design_Implement_and_Eval_Ice_34thRadar_Final.pdf

WSR-88D Quality History

- ◆ Range-Velocity Ambiguity Mitigation

- Original design featured simple unfolding from long PRT “truth”
- Implemented Phase Coding using Sachi and Zrnic 64 element coding (SZ2)
- An SZ2 Doppler scan is paired with a long PRT surveillance scan

- For further information:

http://www.roc.noaa.gov/WSR88D/PublicDocs/Publications/IIP_S21_P17_ROCSZ2_Saxion.pdf and

http://www.roc.noaa.gov/WSR88D/PublicDocs/Publications/IIP_S23_P2%209_SZ2MM_Saxion.pdf

WSR-88D Quality History

- ◆ Range Velocity Ambiguity Mitigation
 - Implementing Staggered PRT
 - Algorithm developed at NSSL
 - 2/3 PRT ratio initially, implemented on upper elevation scans
 - Spectral clutter filter (SACHI)
 - Currently engineering test mode only
- ◆ SPRT information:

http://cimms.ou.edu/rvamb/Documents/SPRT_Algo_2010.pdf

WSR-88D Quality History

- ◆ Other Improvements Past and Future
 - Range and azimuth resolution
 - 2D Velocity Dealiasing
 - Adaptive volume scans
 - Improved velocity-azimuth displays
- ◆ See white paper for extended references