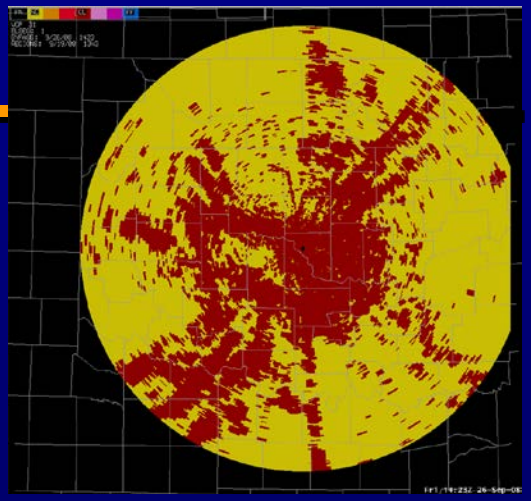
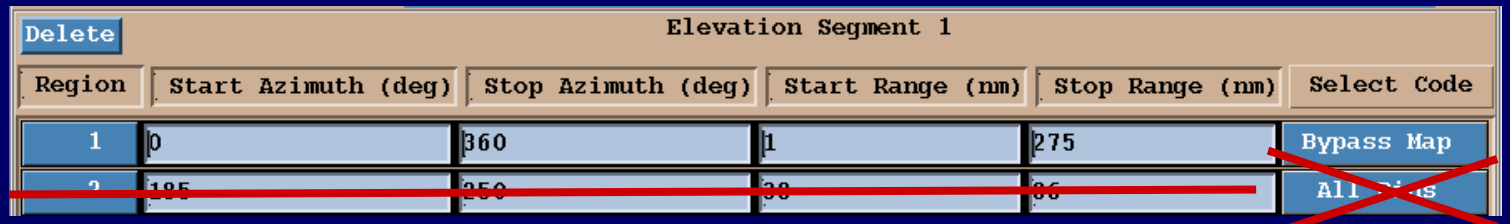
WSR-88D RDA/RPG Build 11.0 Training

Presented by the

Warning Decision Training Branch





RDA/RPG Build 11.0 Training Goal and Objectives

- Goal:
  - Familiarize NWS forecasters with operational changes of RDA/RPG Build 11.0
- Overview:
  - Clutter Mitigation Decision (CMD) Algorithm!
- Build 11.0 impacts on URC decision making

RDA/RPG Build 11.0 Objectives

1. Identify the clutter suppression management and data quality benefits that CMD provides.
2. Identify why the CMD clutter identification technique is better than the “SNR/Clutter Power Removed” technique.
3. Identify examples of moving ground targets that CMD cannot detect.
4. Identify why CMD is preferable to All Bins clutter suppression for the detection of AP clutter.
5. Identify why CMD is particularly beneficial for the SZ-2 VCPs.
6. Identify the Build 11.0 performance improvement for the MDA.

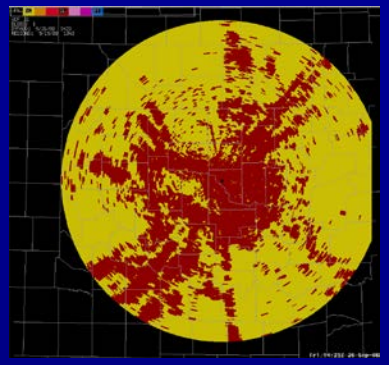
Levels of Detail

- “RDA/RPG Build 11.0 Training” more comprehensive
- Presentation more basic
- When more information is available in the document, you’ll see:

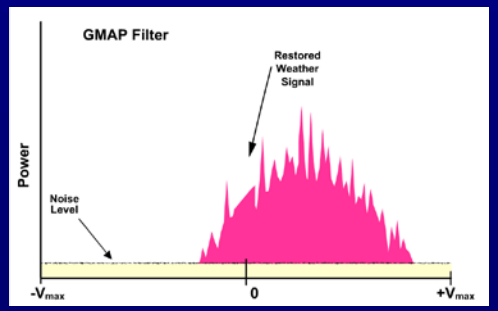
Techs, SOO, Radar Focal Point…

See document for more

Clutter Mitigation Decision (CMD)



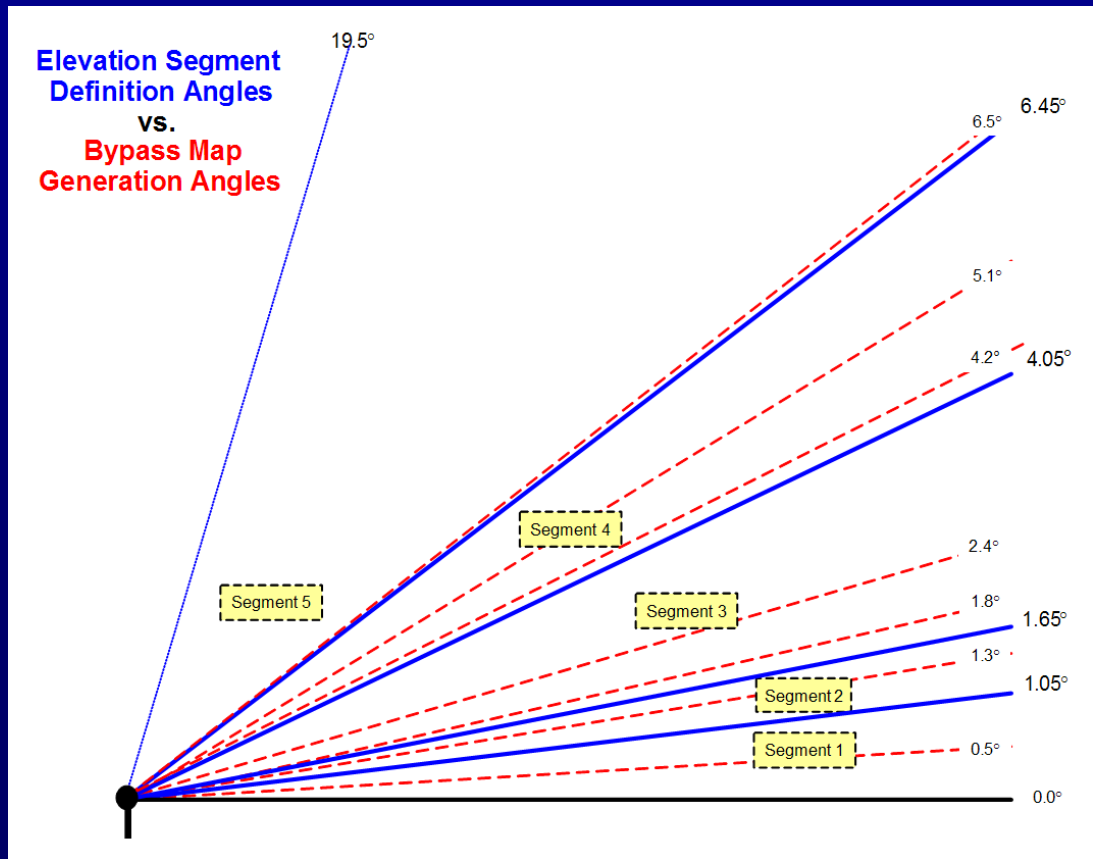
- CMD identifies clutter in real time
- GMAP performs the signal removal for bins identified by CMD



- CMD improves process of ***locating*** clutter
  - Does not change ***amount*** of removed power

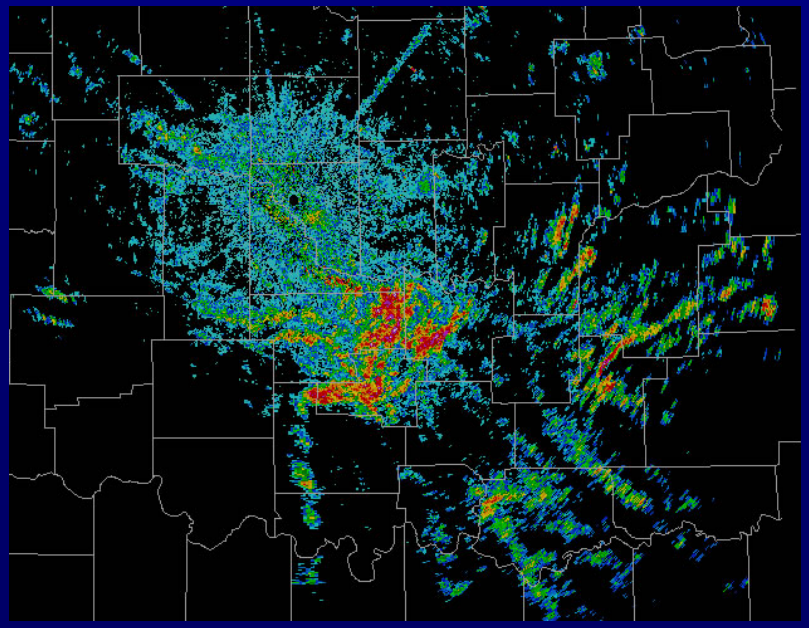
Pre-Build 11.0 Clutter Management
Normal Clutter

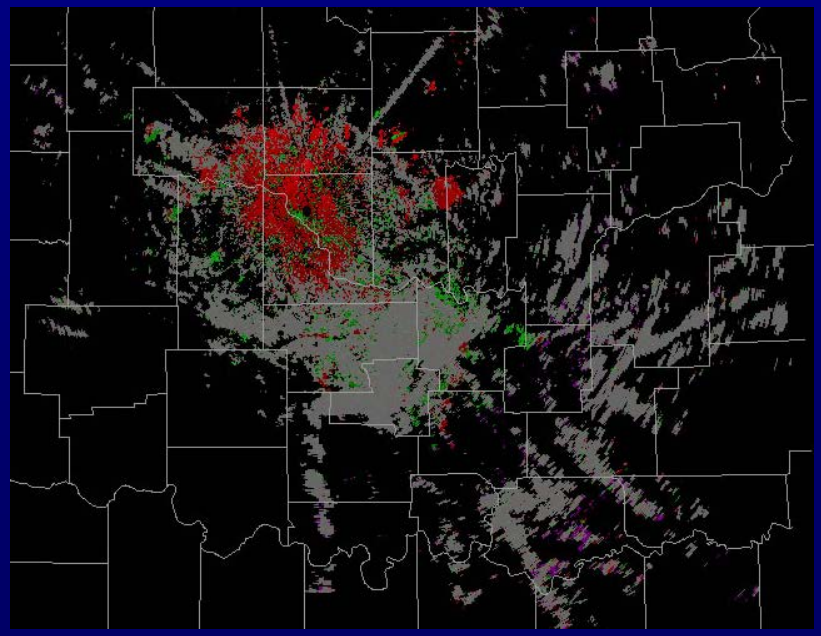
- Bypass Map for each elevation segment
  - Generated off-line and saved
  - Atmospheric conditions vary



Pre-Build 11.0 Clutter Management
AP Clutter

- All Bins for AP (transient) clutter
  - Manually select areas of AP clutter
  - Suppression applied to every bin in defined area
  - “Chasing the AP” hard to do!



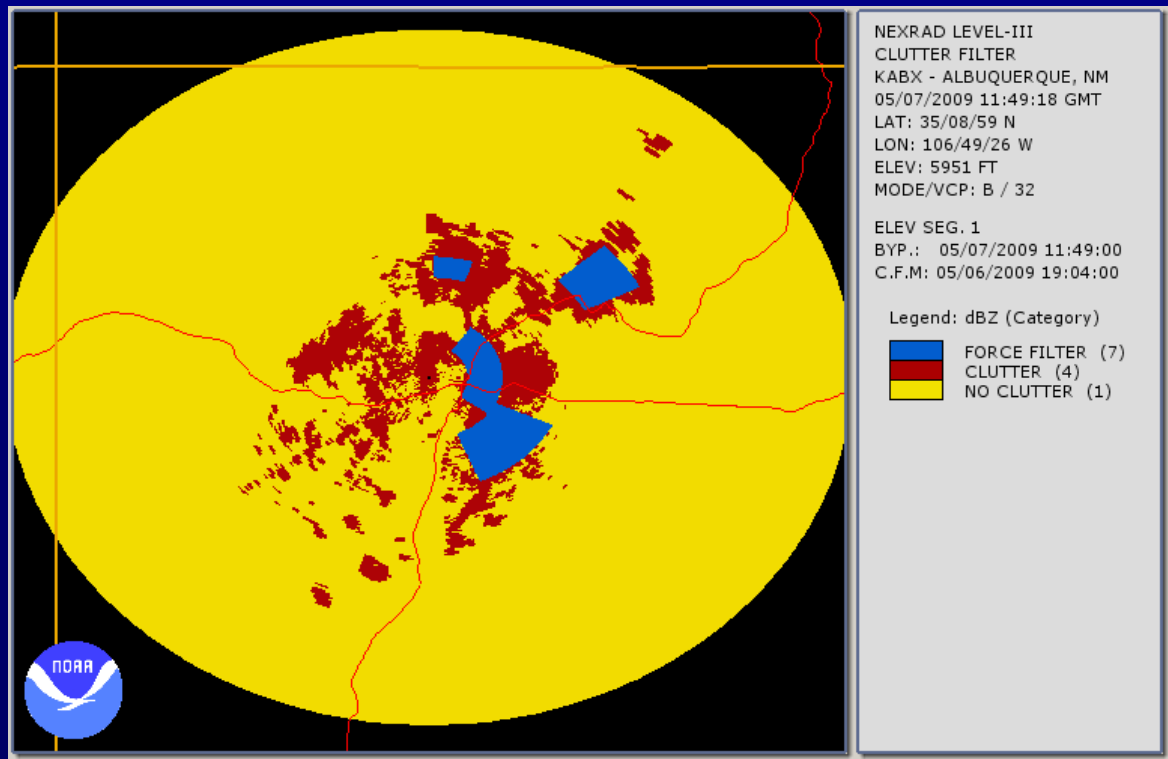


CMD Offers…

- Normal ***and*** AP Clutter targets identified automatically, bin-by-bin, ***in real time***
  - "Dynamic" Bypass Map generated ***every*** volume scan
- Better identification technique
  - Reflectivity and signal phase information used
- Reduces clutter management workload

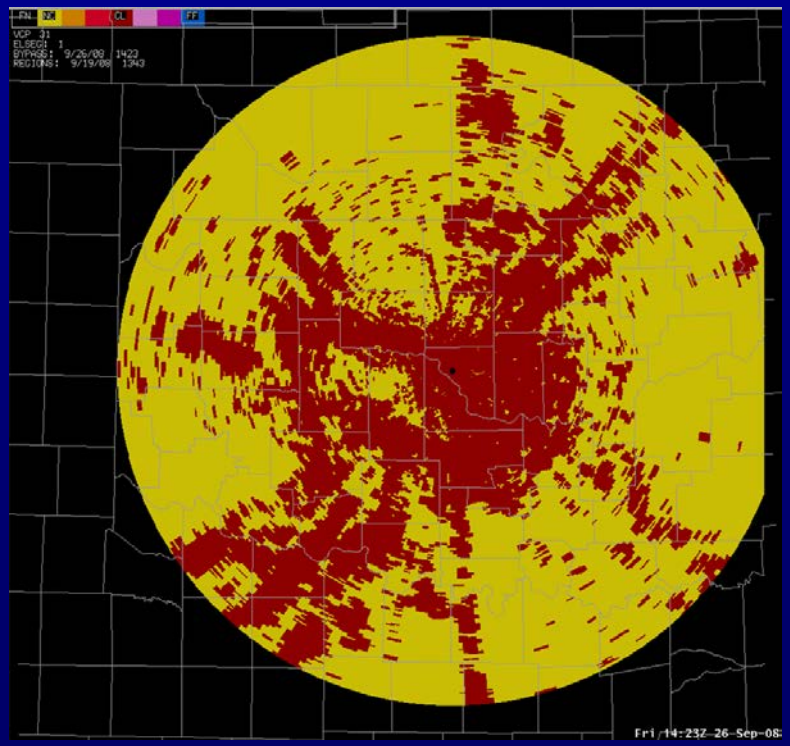
Remember the Clutter Filter Control (CFC) Product?

- Depicts clutter suppression invoked
  - Bypass Map vs. All Bins
- Good reference for CMD performance
- RMR for many volume scans

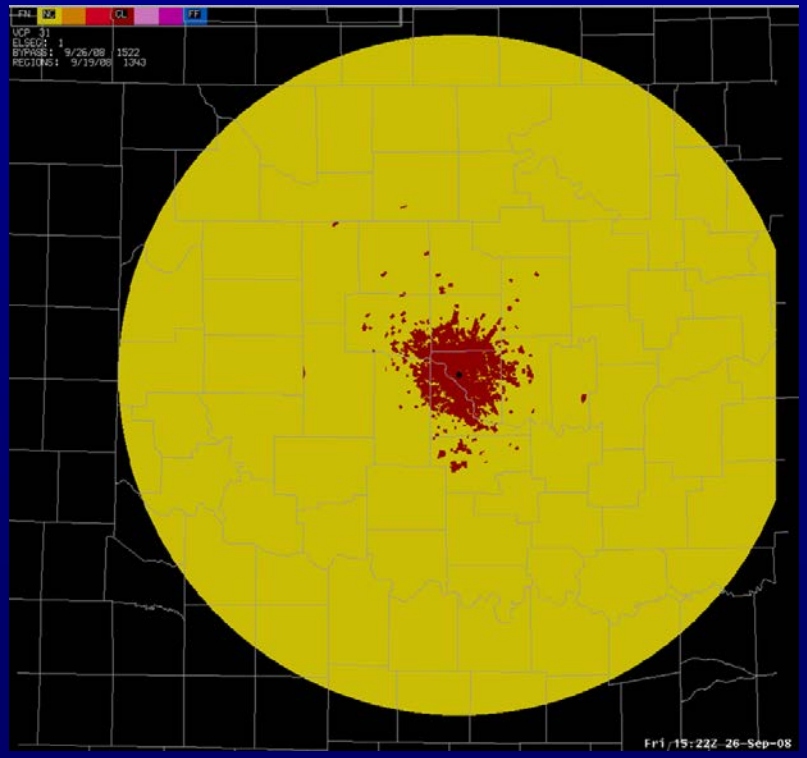


CMD Performance

- Weak inversion breaking; CFC products over one hour period



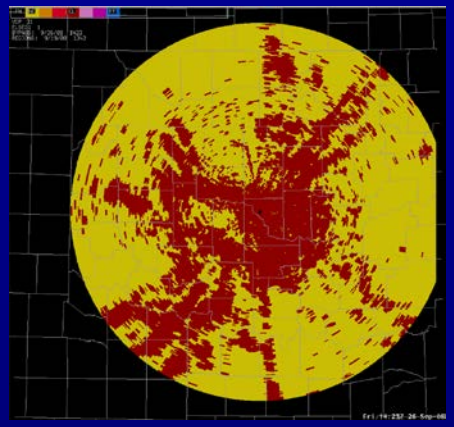
CMD finds normal and AP clutter



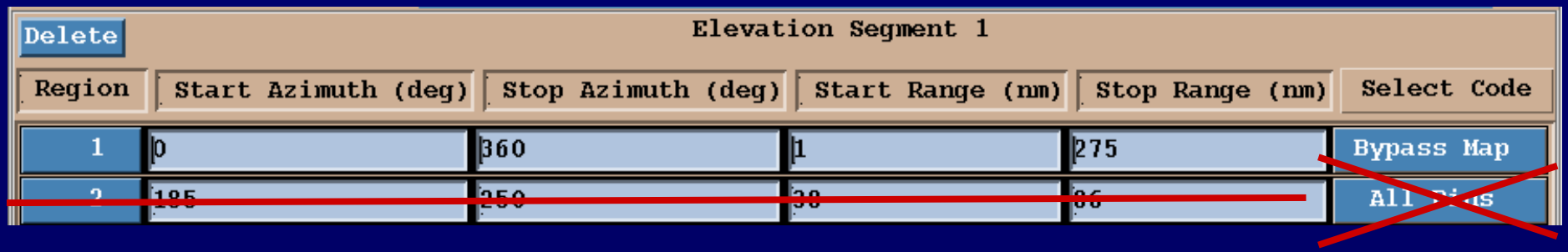
CMD finds normal clutter

CMD Identifies Normal and AP Clutter

- Could you manually identify this AP clutter?
- Would you even want to?

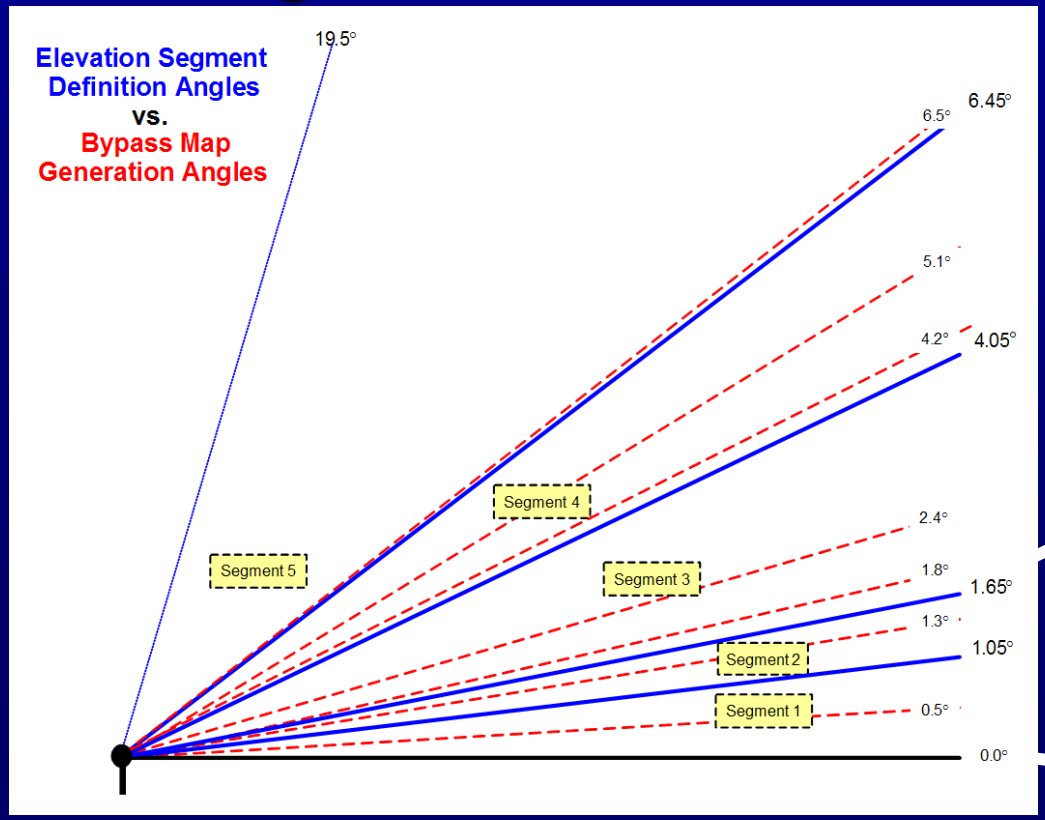


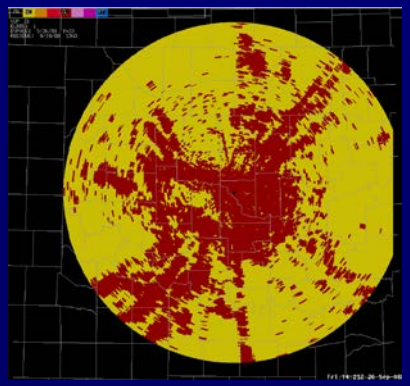
- “All Bins” not needed for AP clutter



CMD Only on Split Cut Elevations

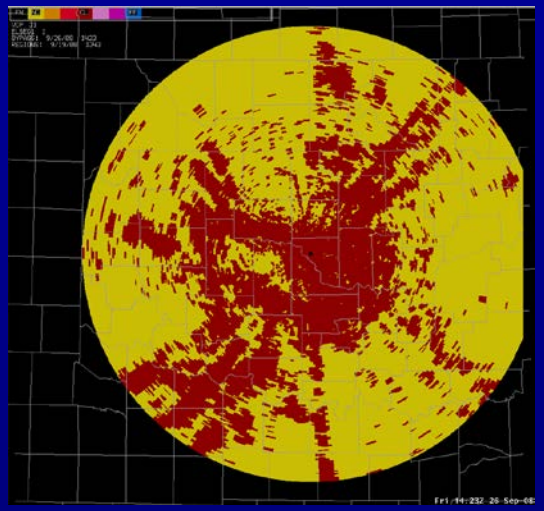
- Sufficient number of pulses for CMD processing in real time



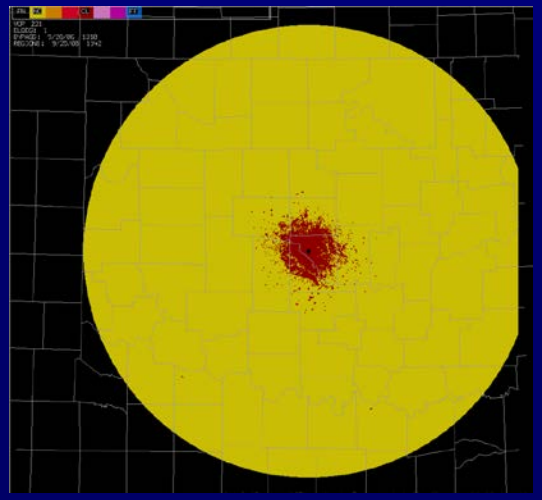


CMD and Bypass Maps

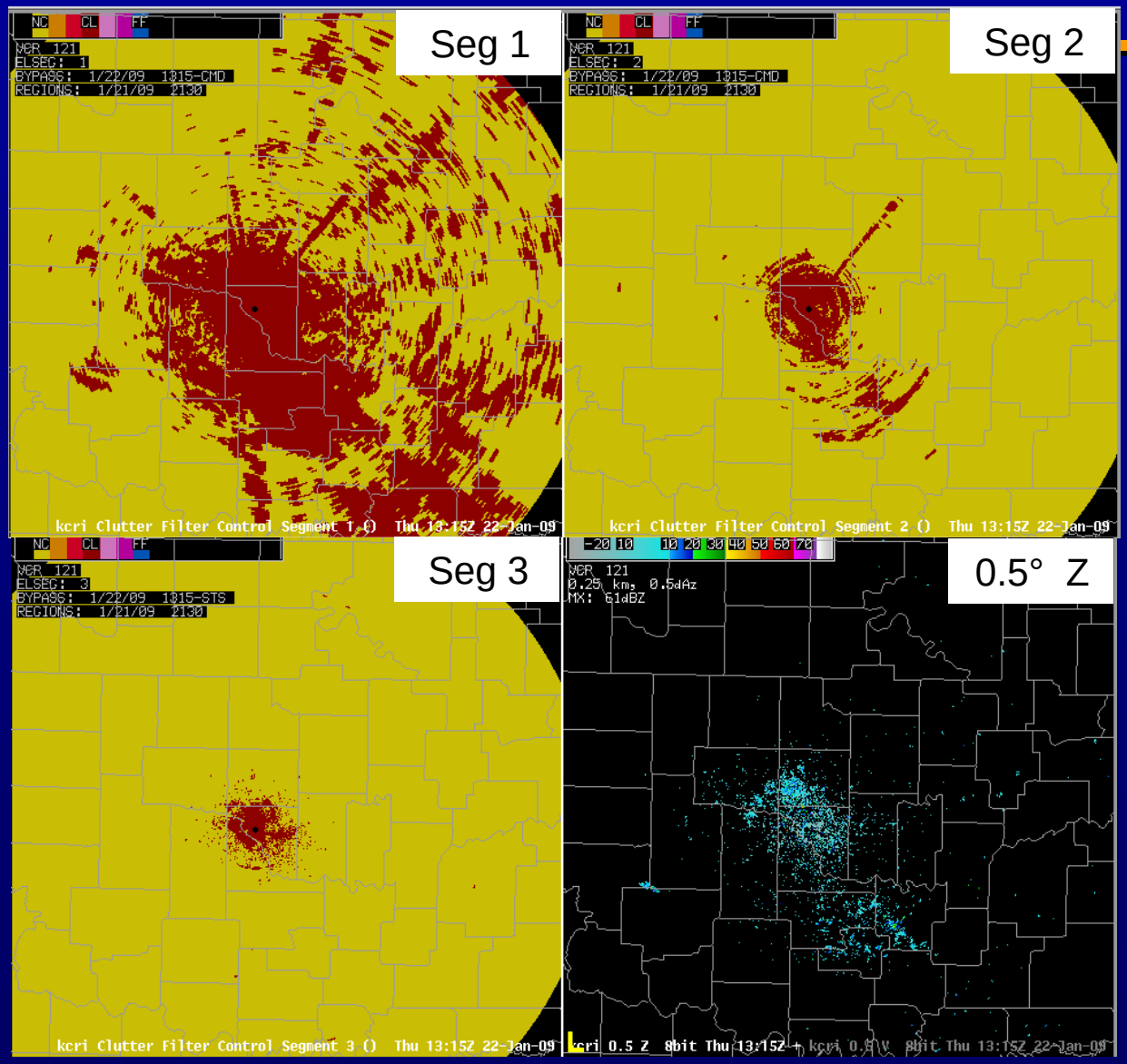
- CMD builds “Dynamic” Bypass Maps each volume scan for Split Cuts



- Previously built “Static” Bypass Maps applied to elevations ***above*** Split Cuts



Early Morning Inversion



- Seg 1 & 2 => Dynamic maps
- Seg 3 => Static map
- No AP clutter on 0.5° Z!

Split Cuts and Elevation Segments

- Split Cuts fall within segments 1 and 2 for all VCPs except 31
- Angles used by CMD to generate dynamic Bypass Maps are VCP dependent

Techs, SOO, Radar Focal Point…

See document for more

How CMD Identifies Clutter

(Better Than "SNR/Clutter Power Removed")

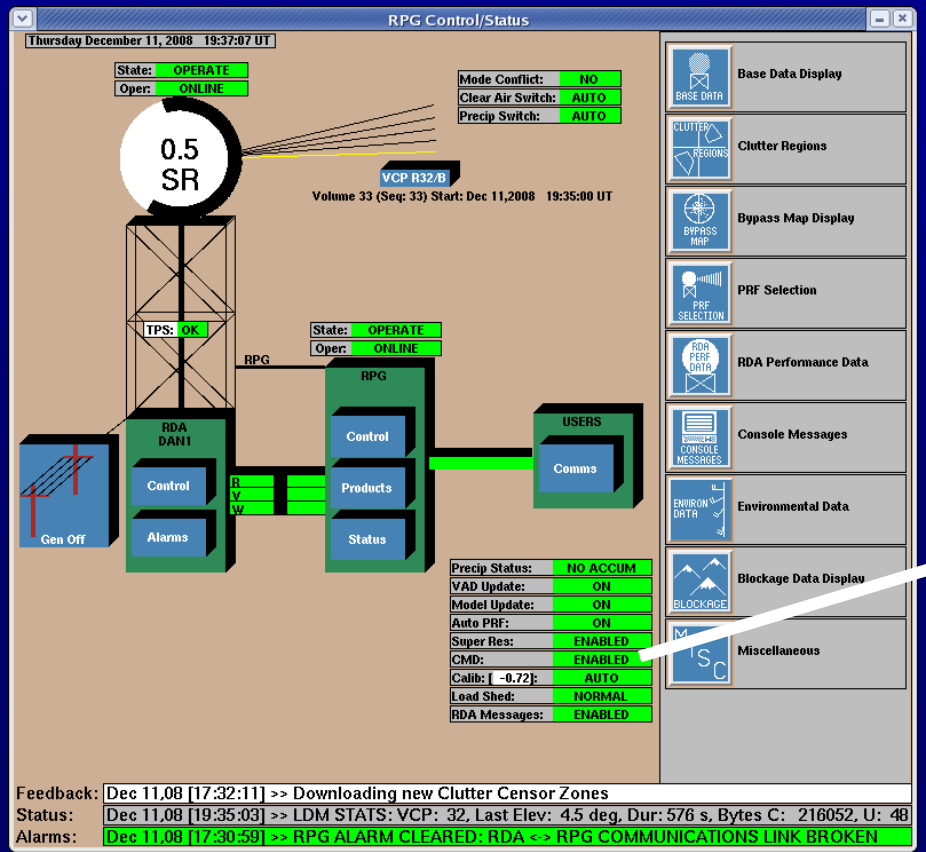
- Uses reflectivity ***and*** signal phase
  - Reflectivity Texture
  - Reflectivity Spin
  - Clutter Phase Alignment
- Very effective at preserving weather targets with low V and SW
  - Stratiform rain

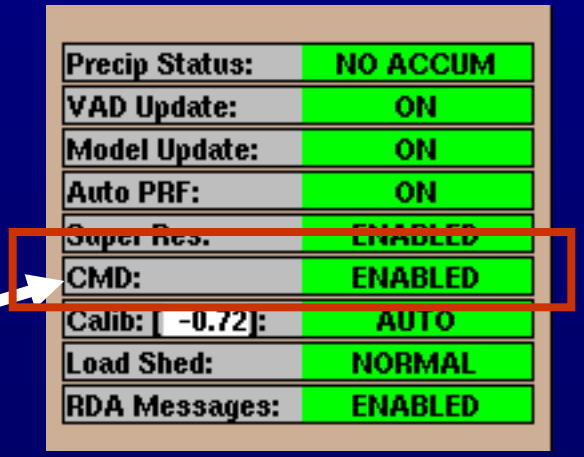
Techs, SOO, Radar Focal Point…

See document for more

CMD on RPG Main Page

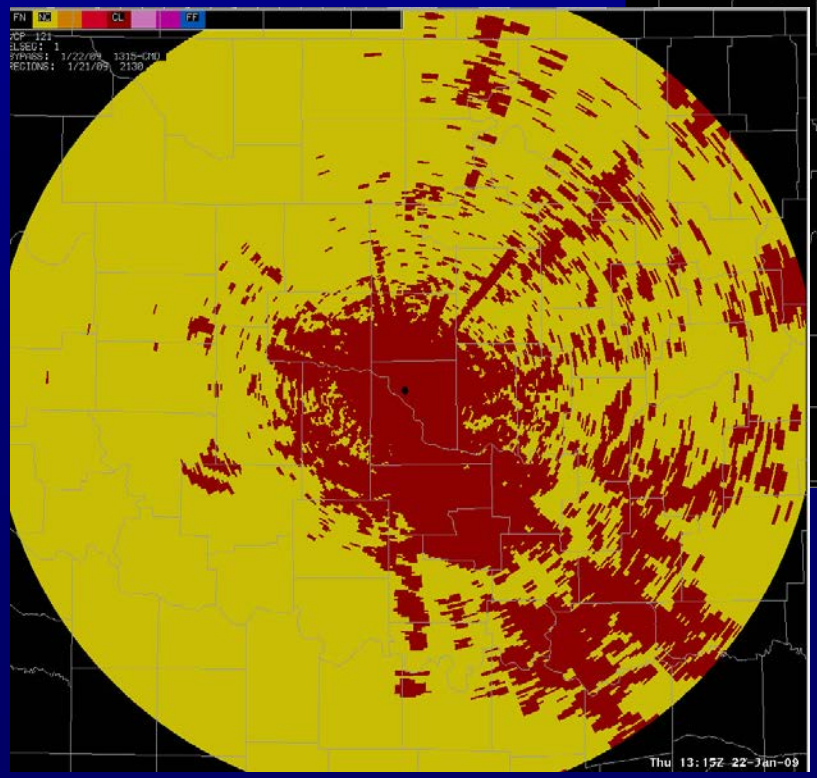
- CMD can be disabled
  - No expected operational reason to do so

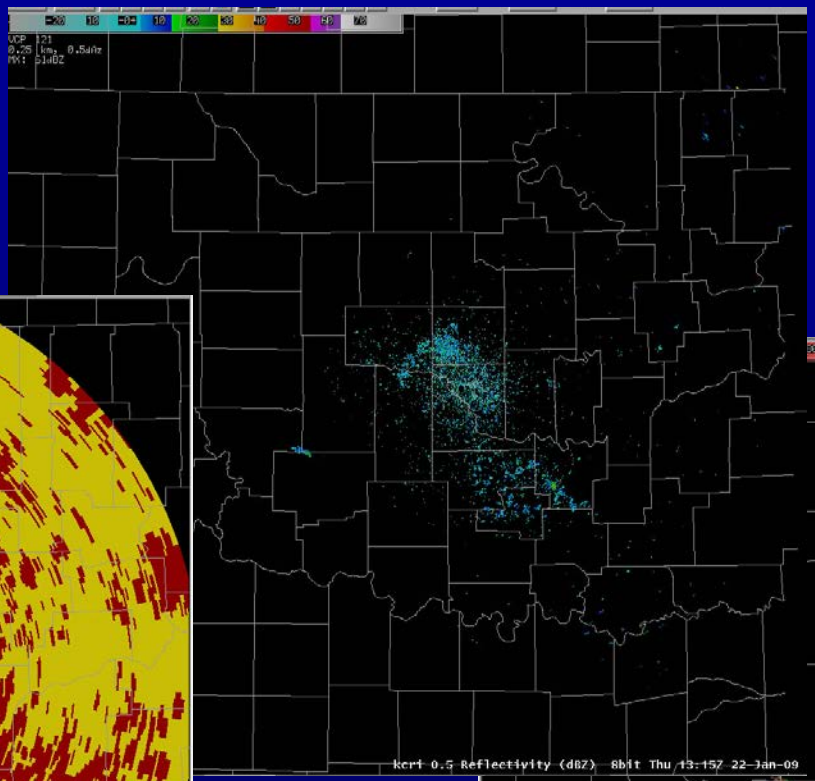


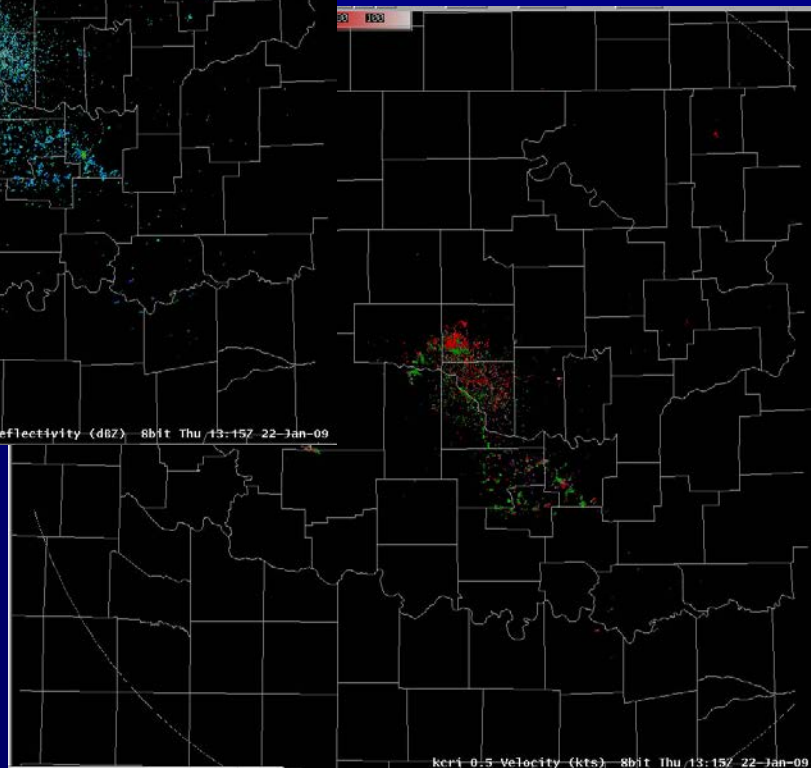


AP Clutter with CMD On

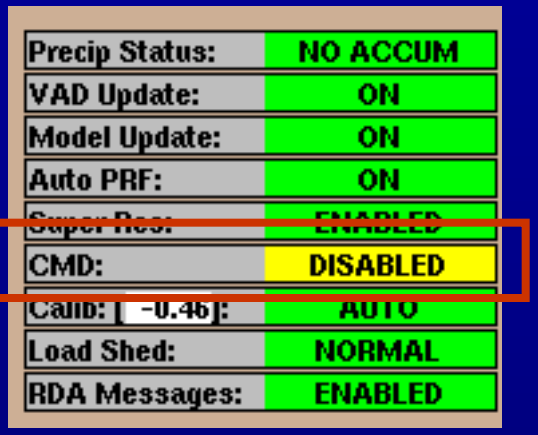
- CMD On







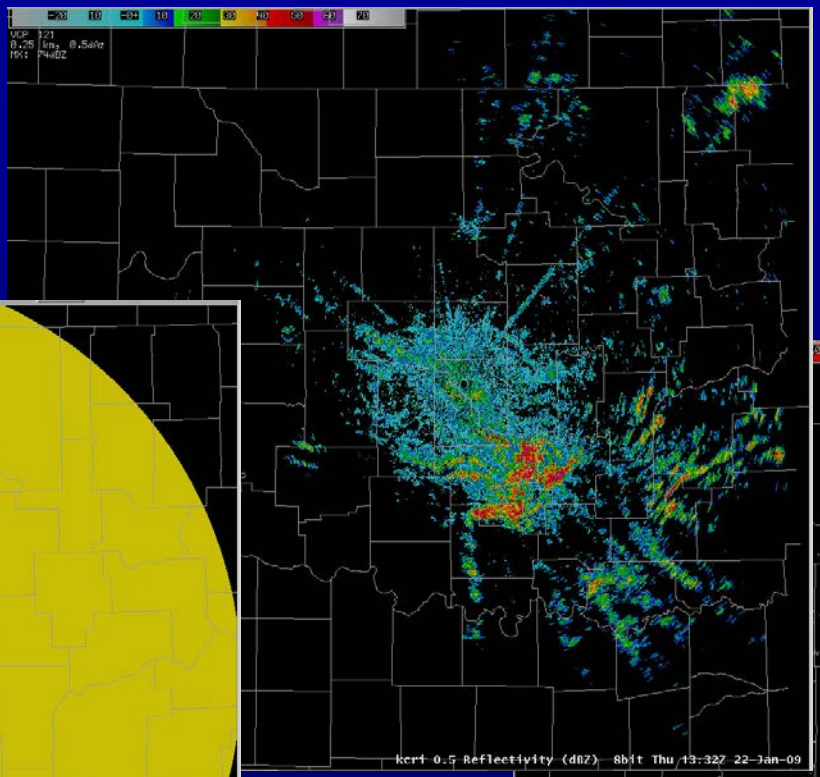
CMD on RPG Main Page

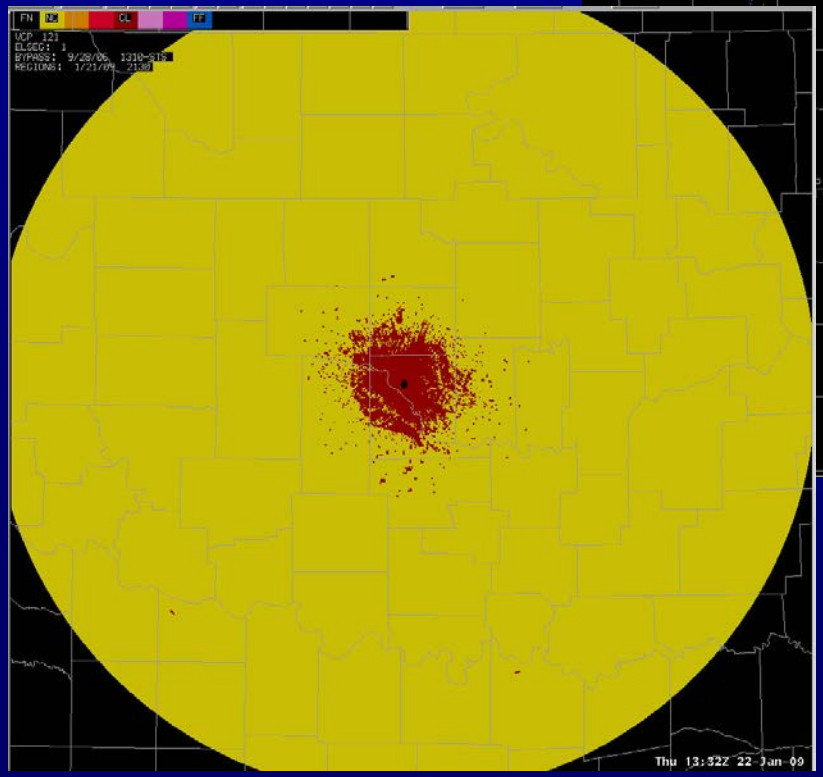


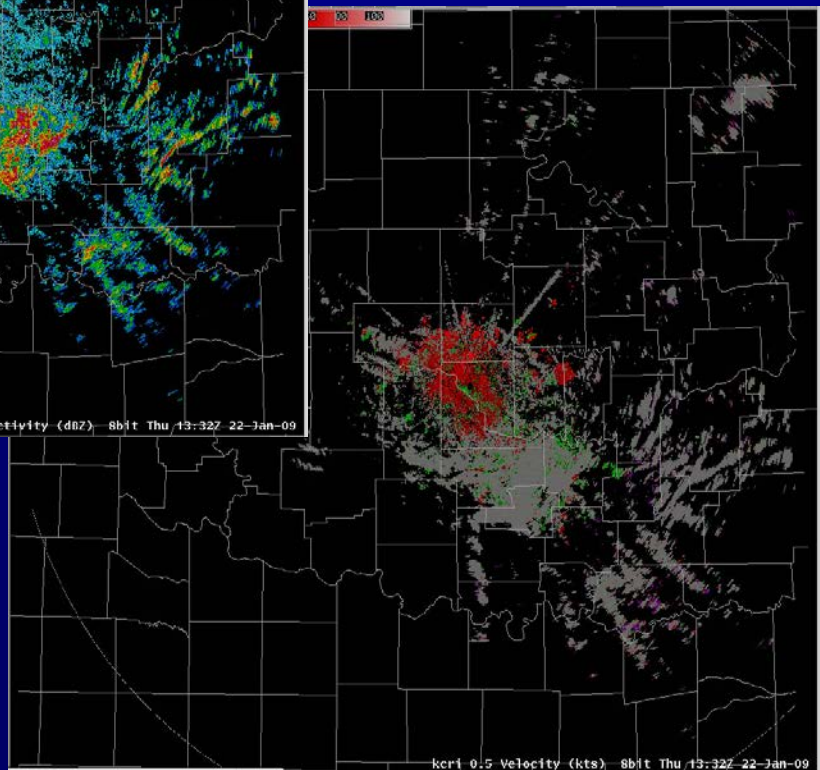
- If you disable CMD:
  - Static Bypass Maps used for all 5 elevation segments
  - AP clutter addressed manually

AP Clutter with CMD Off

- CMD Off

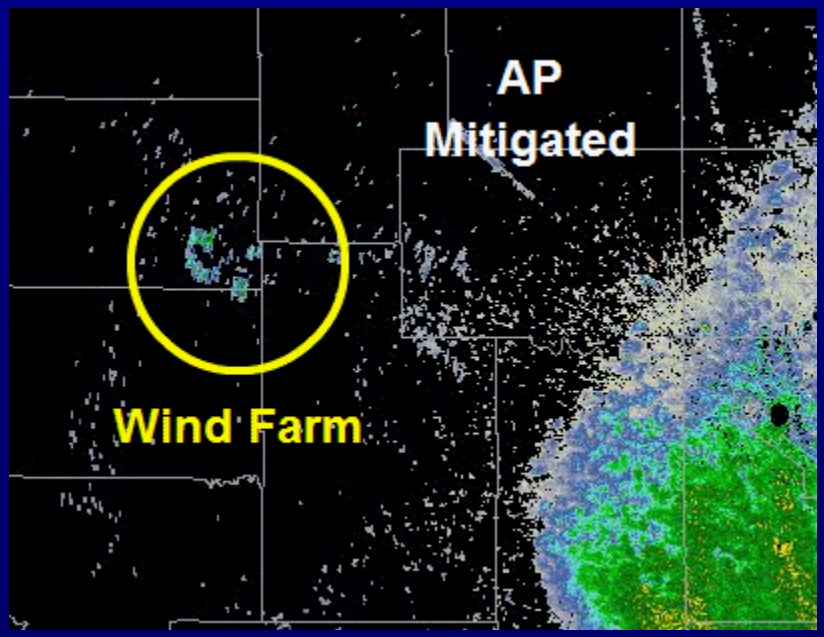


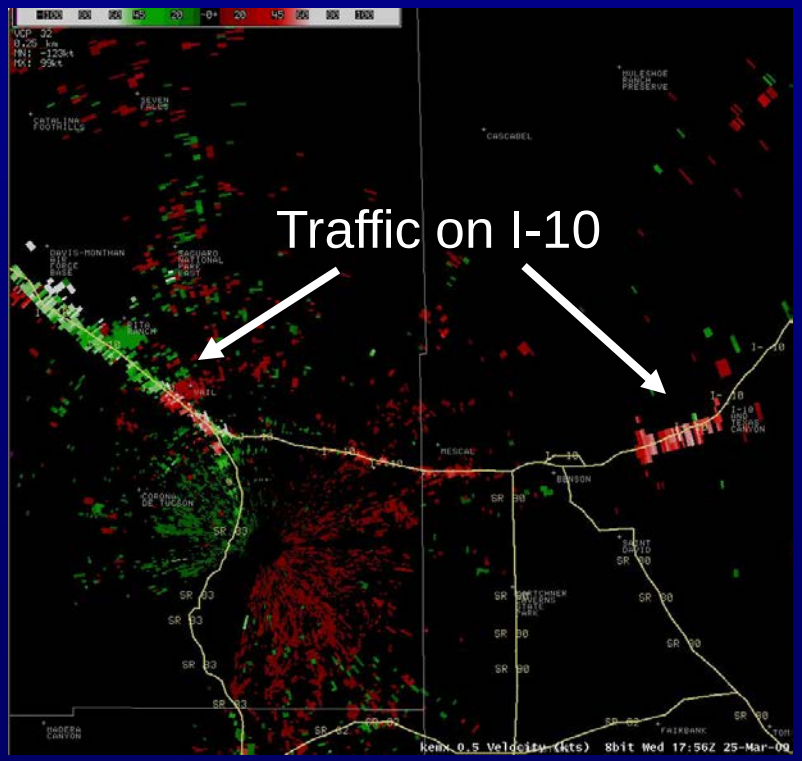




If It's Moving, It's Not Clutter

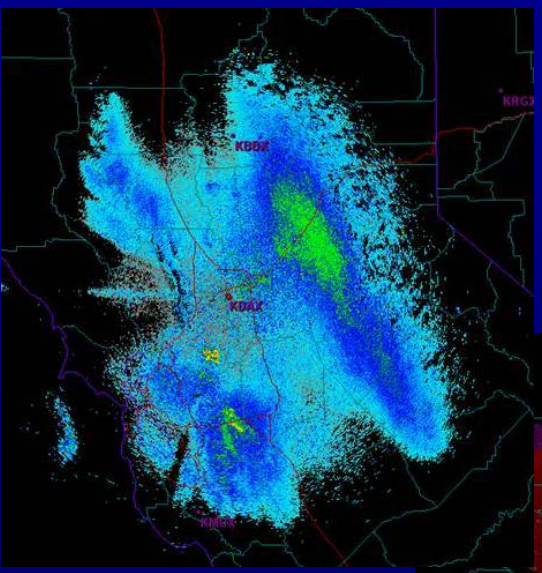
- CMD looking for ***ground*** clutter
- Returns from wind farms, traffic on roads ***not*** identified by CMD



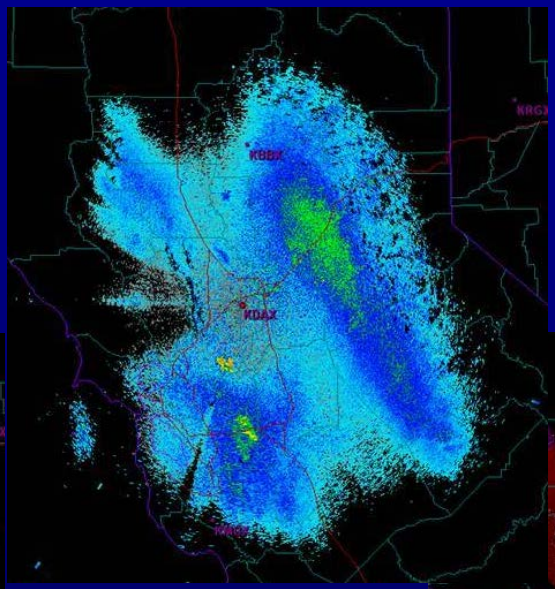


If It’s Moving, It’s Not Clutter

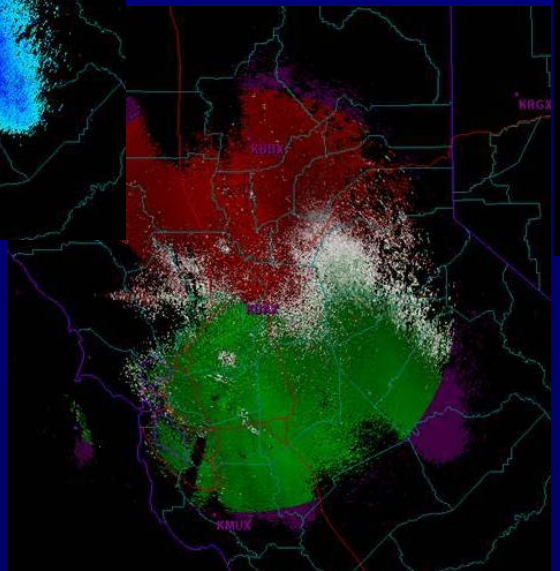
- The “bloom”
  - Returns from biological targets and particulates

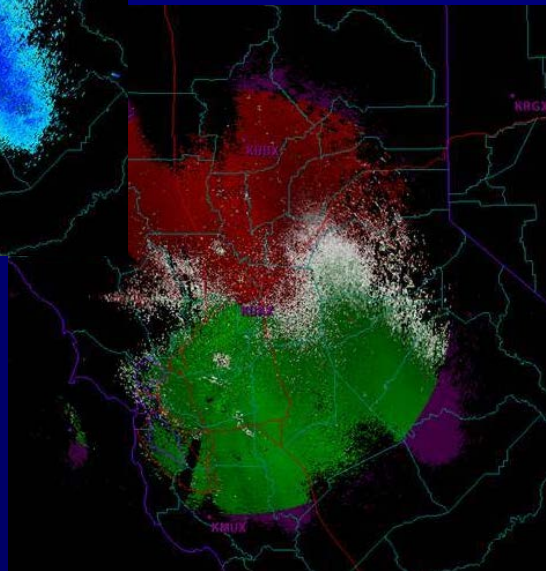


CMD



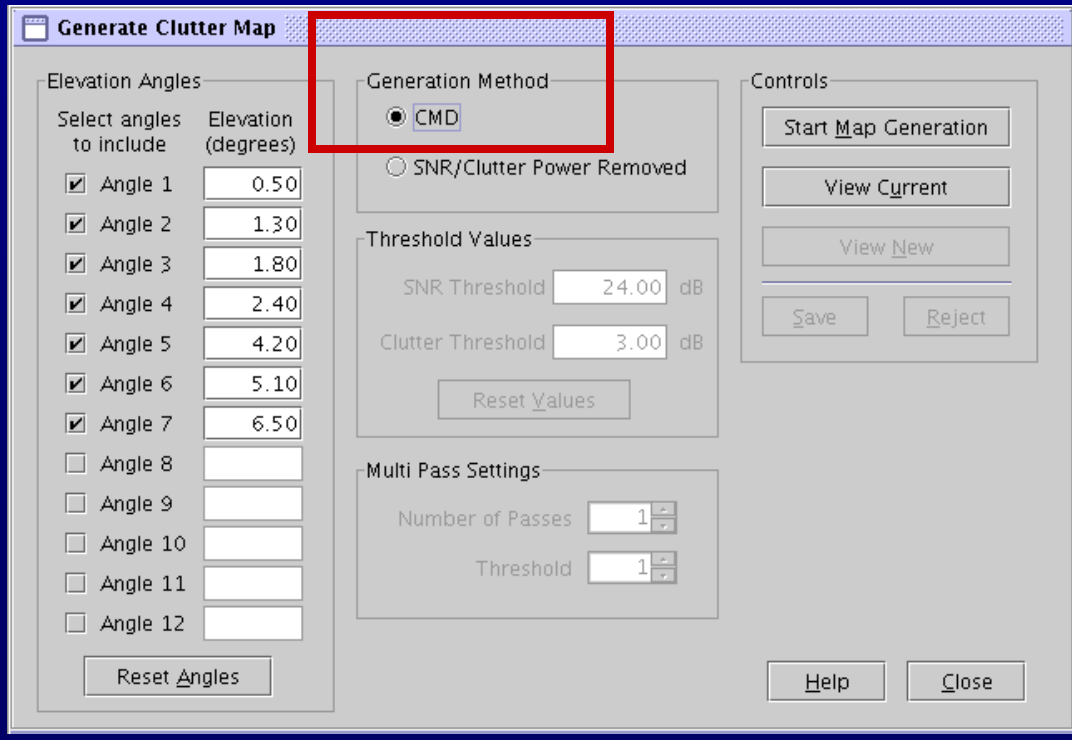
All Bins





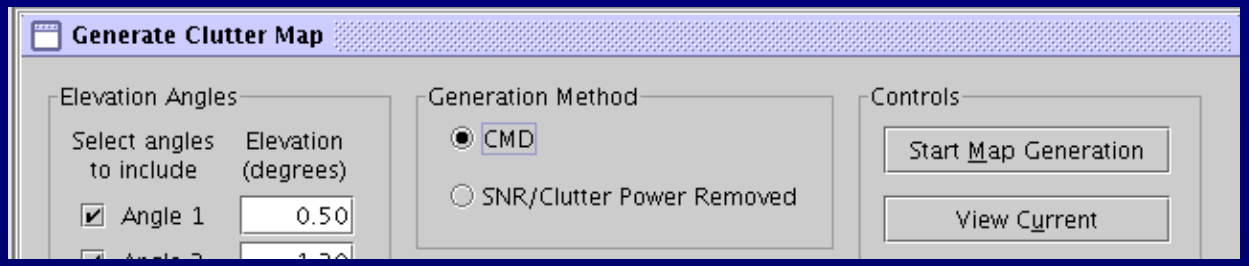
Generating Static Bypass Maps

- Can use CMD (off-line) to build ***Static*** Bypass Maps for ***all 5*** elevation segments
  - Recommended method!



Generating Static Bypass Maps

- Best Practice: generating Static Bypass Maps
  - Met and tech work together
  - Use CMD to generate maps
  - Improved Viewing functions (Current and New)

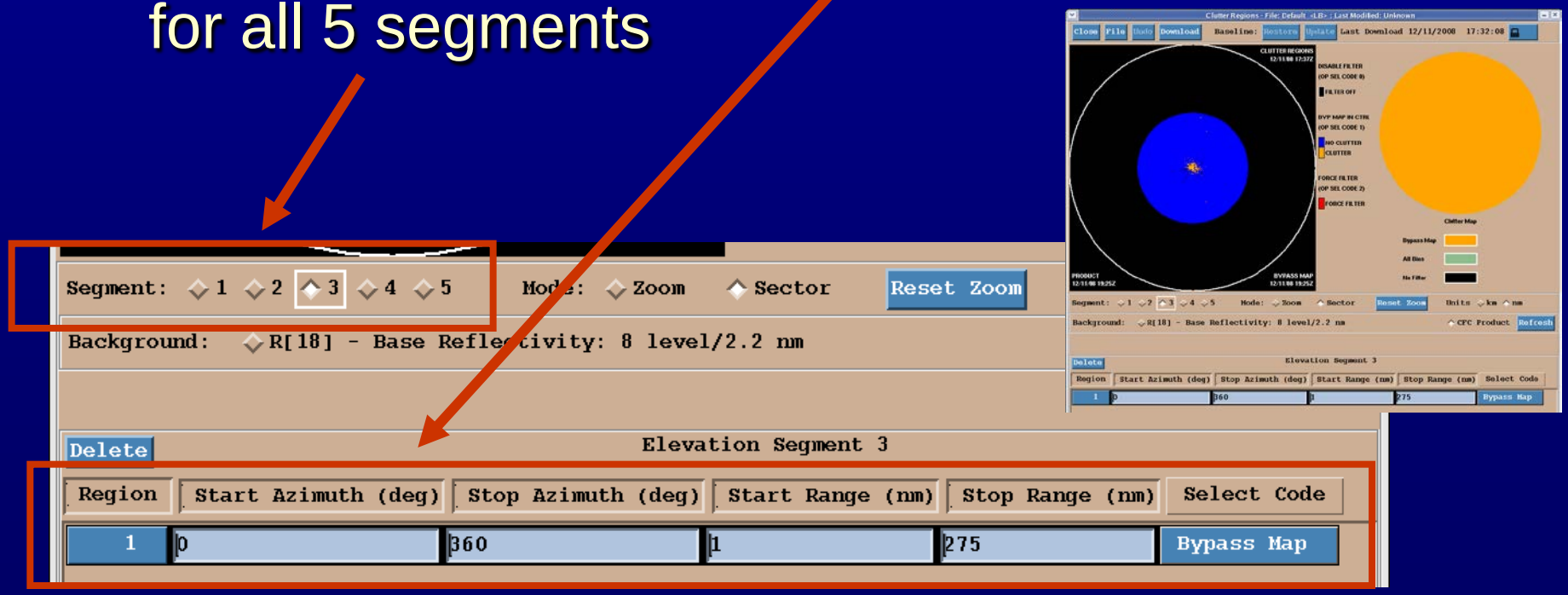


Techs, SOO, Radar Focal Point…

See document for more

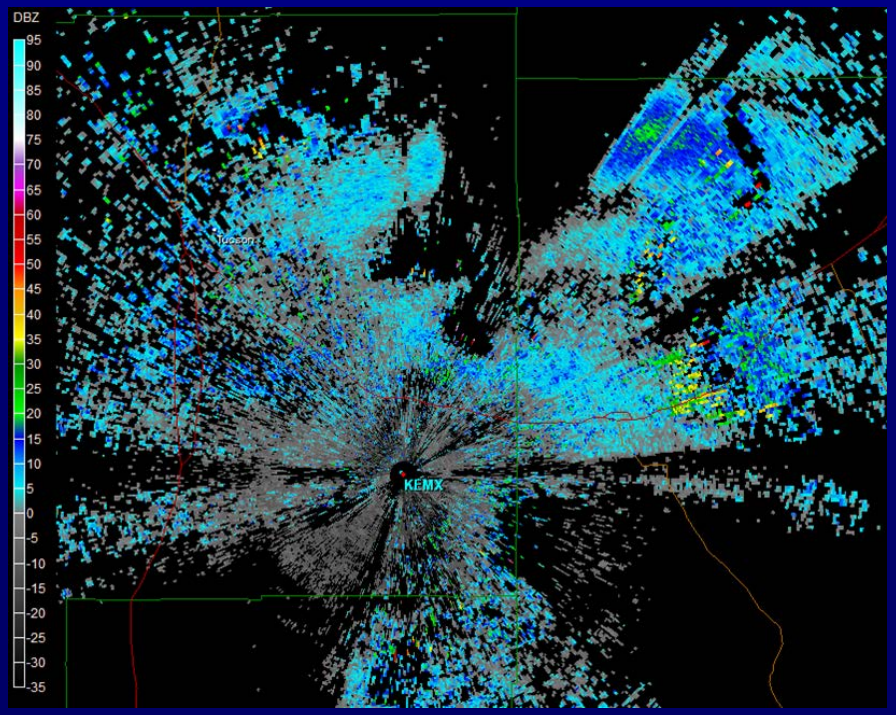
Implementing New Static Bypass Maps

- Once new Bypass Maps generated
  - Clutter Regions window (RPG)
  - For all files, Bypass Map is region 1 for all 5 segments

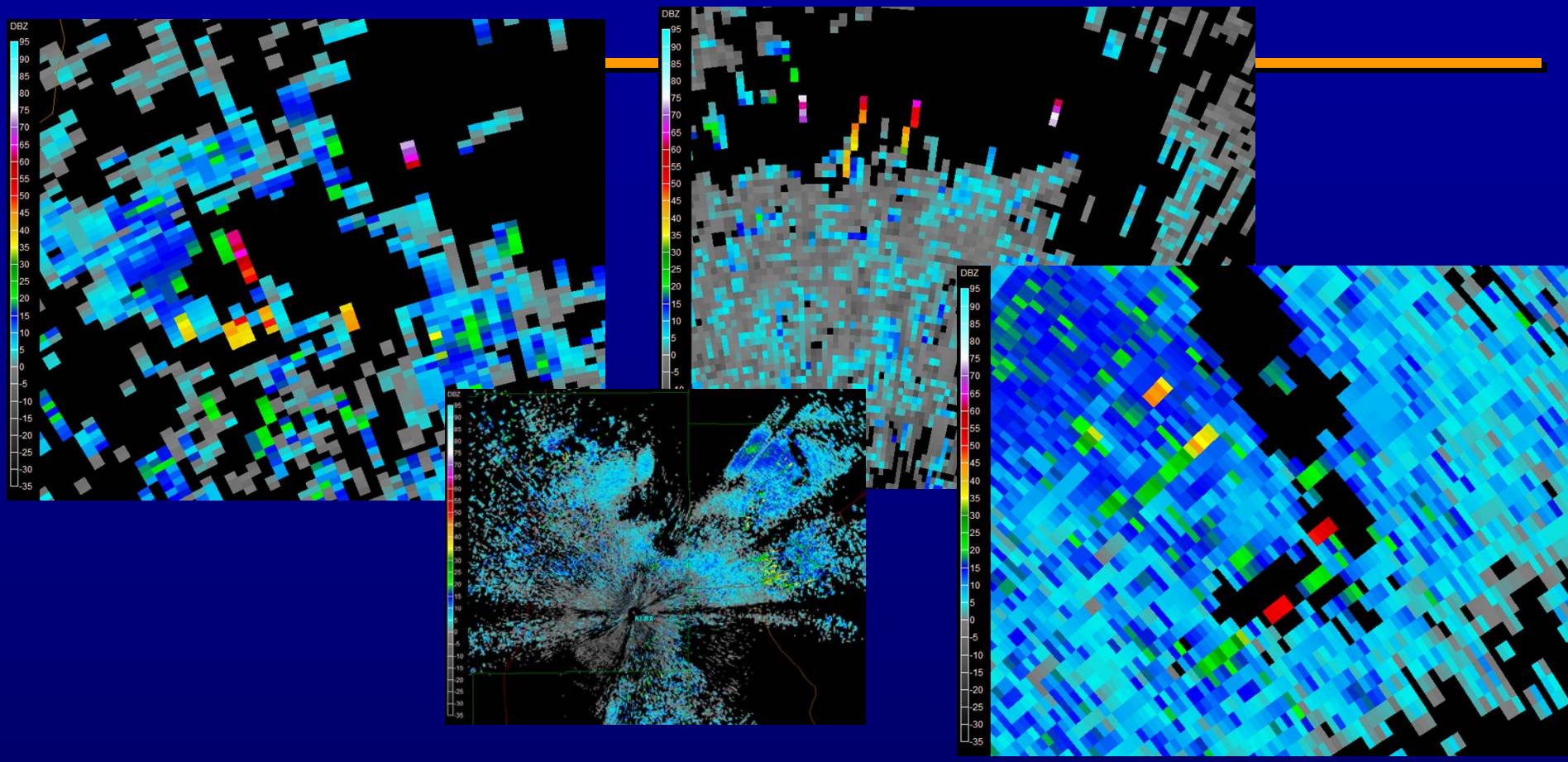


Missed Clutter Detections Within Terrain

- Result from Build 11.0 Beta Test
  - Mountainous sites chosen
  - Discrete bins within terrain missed by CMD
- CMD update expected Summer 2009:
  RDA Build 11.1

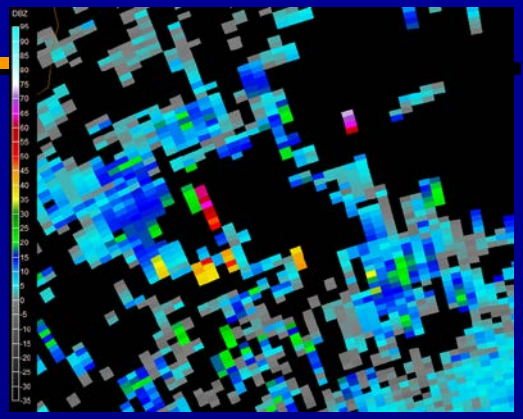


CMD and Nearby Terrain



- Build small regions applying All Bins
  - Create a local default file

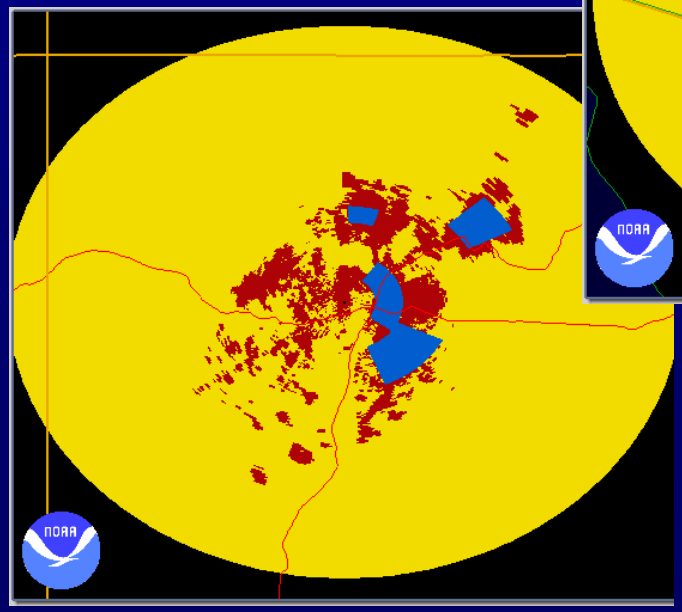
CMD Missed Detections Strategy

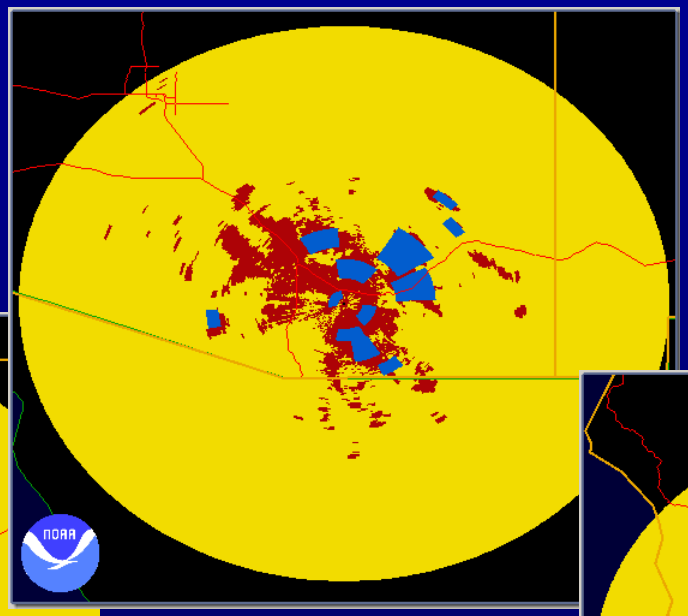


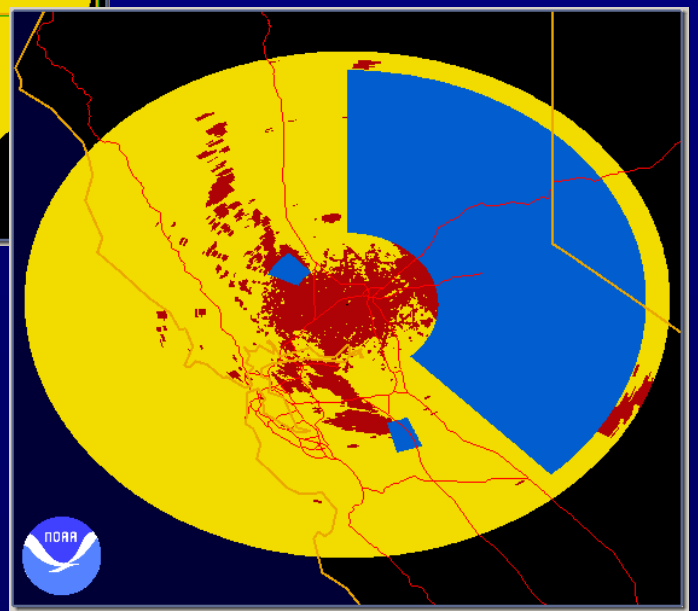
- New clutter regions file
  - Bypass Map in control everywhere, all 5 segments
  - Define small regions of All Bins for affected segments
- Give it a catchy name!
  - “CMD Local”
- “CMD Local” instead of “Default” file

CMD Missed Detections Strategy

- Example “CMD Local” files from Beta Test sites

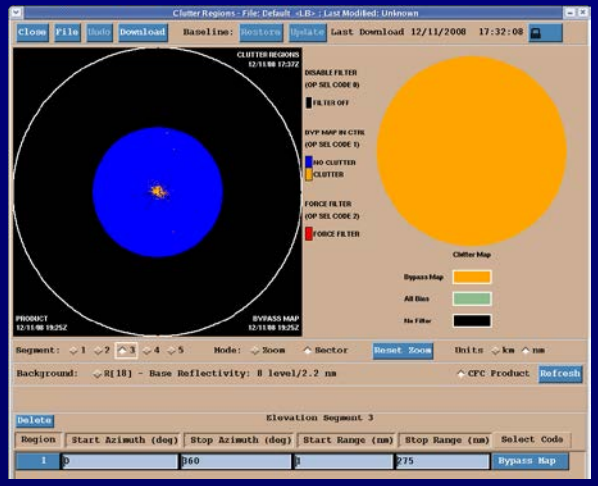


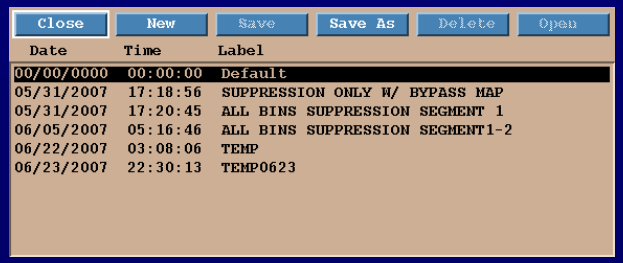




CMD and All Bins

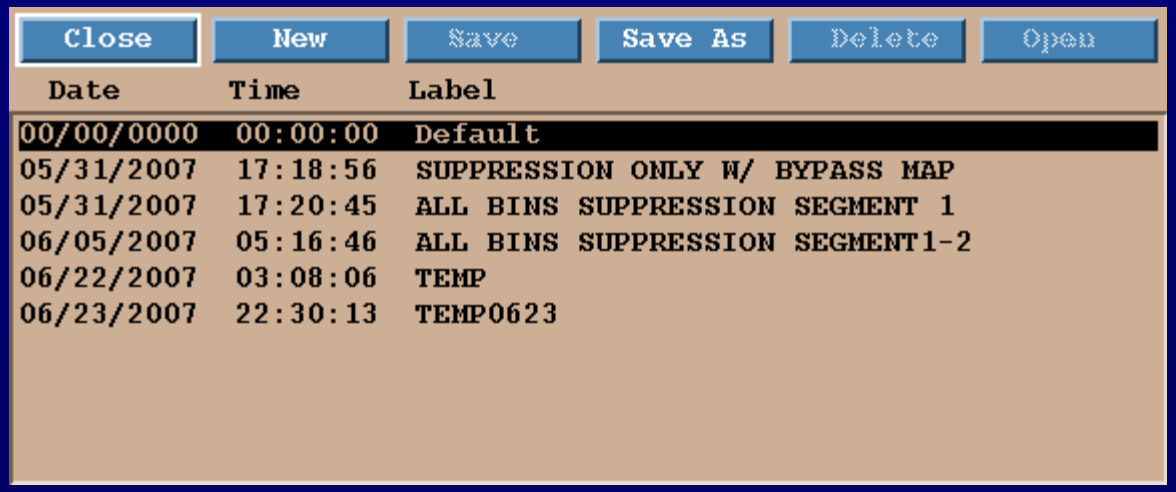
- All Bins takes precedence over Bypass Map
- Download file with All Bins everywhere?
  - Impact same as disabling CMD
- Bypass Map in control where you want CMD





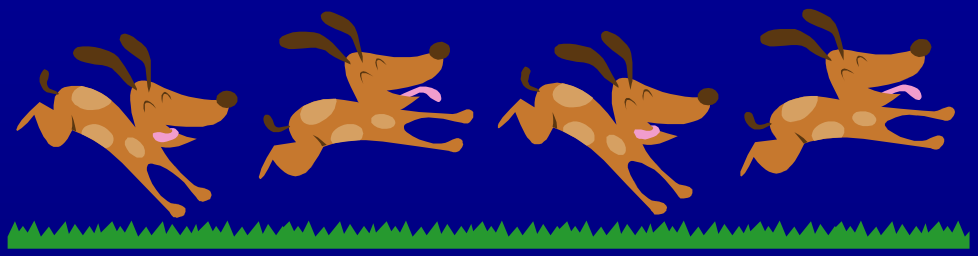
CMD and All Bins

- ***Do not*** use a “CMD Local” file?
  - Ensure Default file last one downloaded
- ***Do*** use a “CMD Local” file?
  - Ensure “CMD Local” last one downloaded



CMD Better Than All Bins for AP Clutter

- CMD lets you avoid “chasing the AP”



- CMD dynamic Bypass Maps identify AP Clutter ***bin by bin***
- CMD better discriminates clutter from nearly stationary weather targets

CMD and SZ-2 VCPs

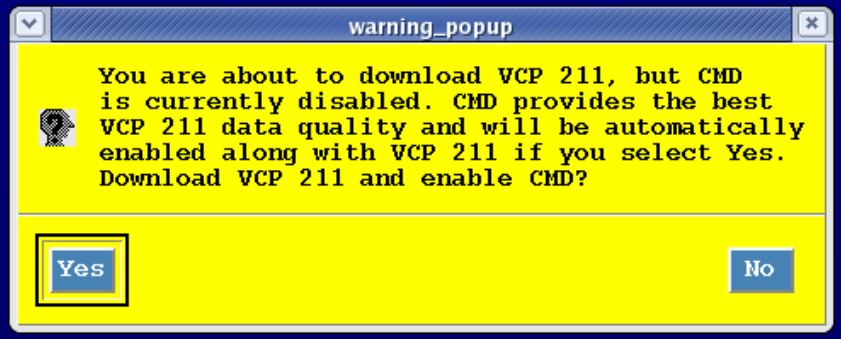
- CMD enabled and downloading VCP 211, 221 or 212?
  - “Default” clutter regions file ***also*** downloaded
  - Ensures All Bins not applied
- If “CMD Local” is default, must be downloaded once SZ-2 VCP is running

Techs, SOO, Radar Focal Point…

See document for more

CMD and SZ-2 VCPs

- CMD disabled and downloading VCP 211, 221 or 212?
  - CMD enabled and “Default” clutter regions file downloaded
- If “CMD Local” is default, must be downloaded once SZ-2 VCP is running

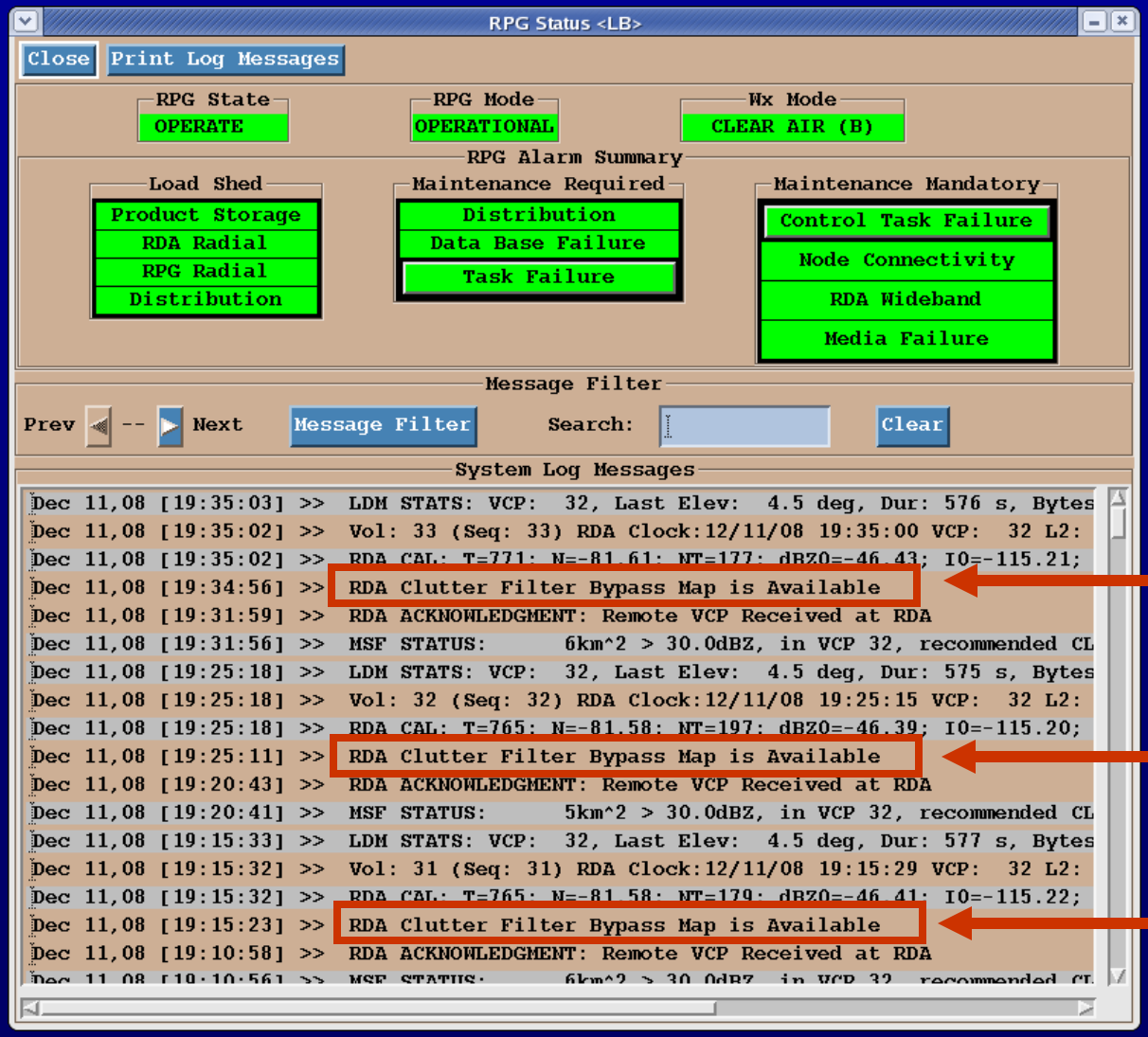


Techs, SOO, Radar Focal Point…

See document for more

RPG HCI Windows and CMD

- RPG Status messages…

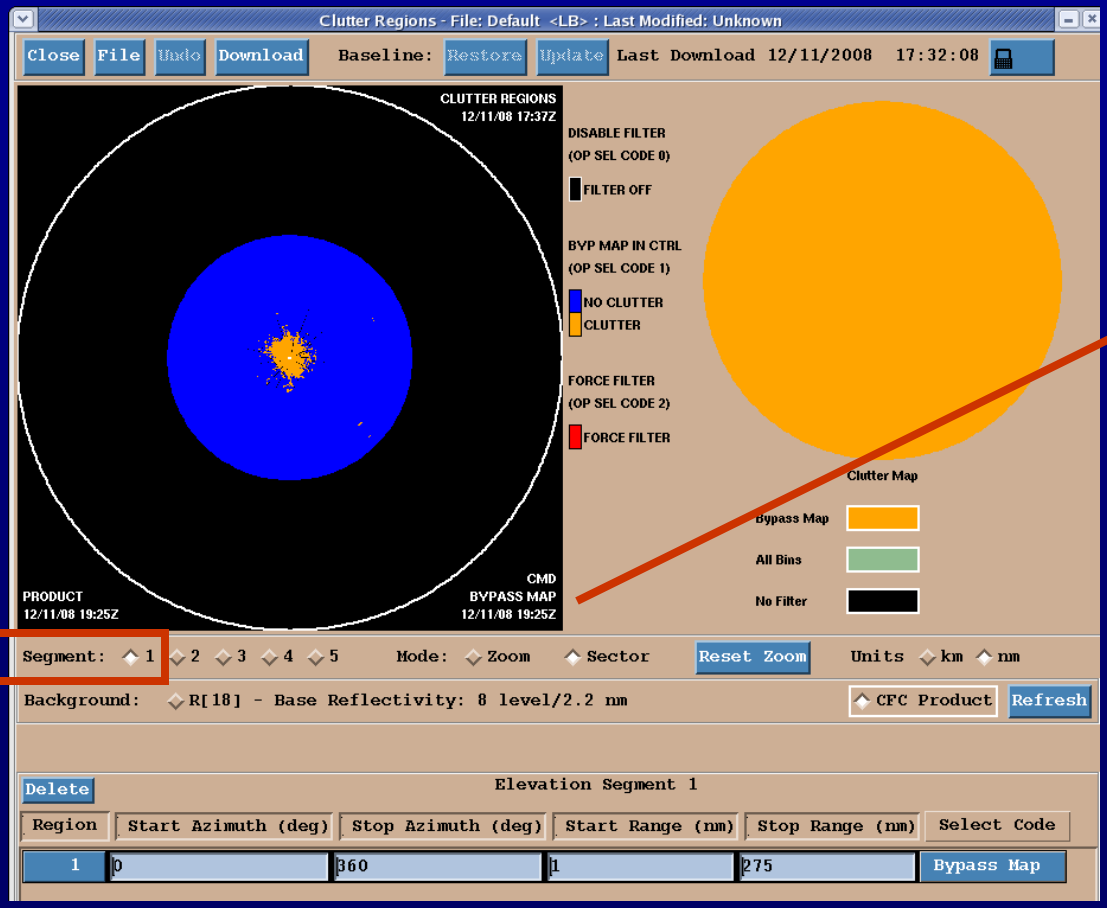


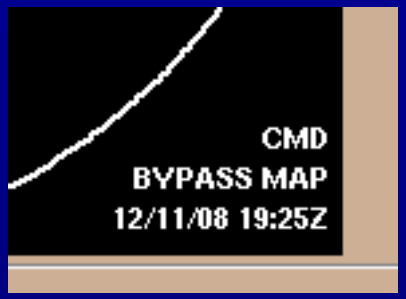
Techs, SOO, Radar Focal Point…

See document for more

RPG HCI Windows and CMD

- CFC product on Clutter Regions File window



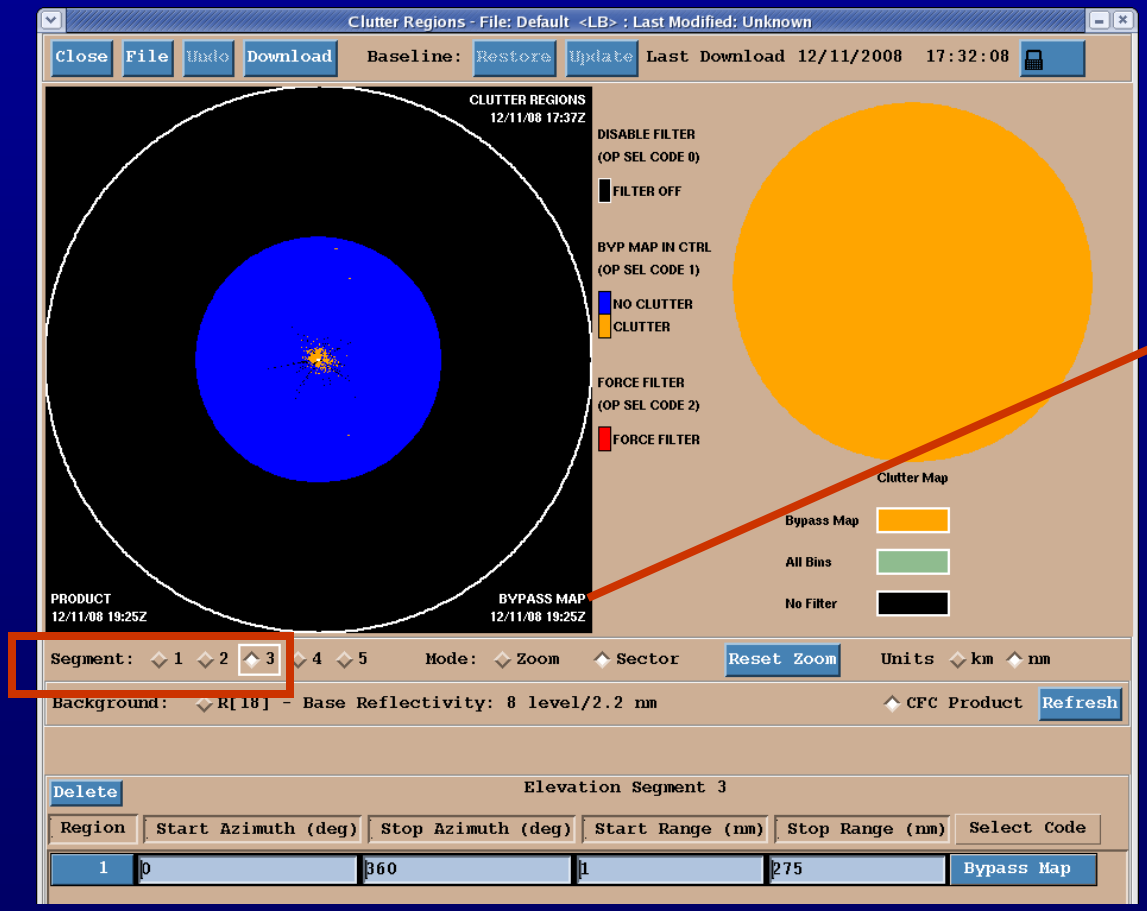


Techs, SOO, Radar Focal Point…

See document for more

RPG HCI Windows and CMD

- CFC product on Clutter Regions File window

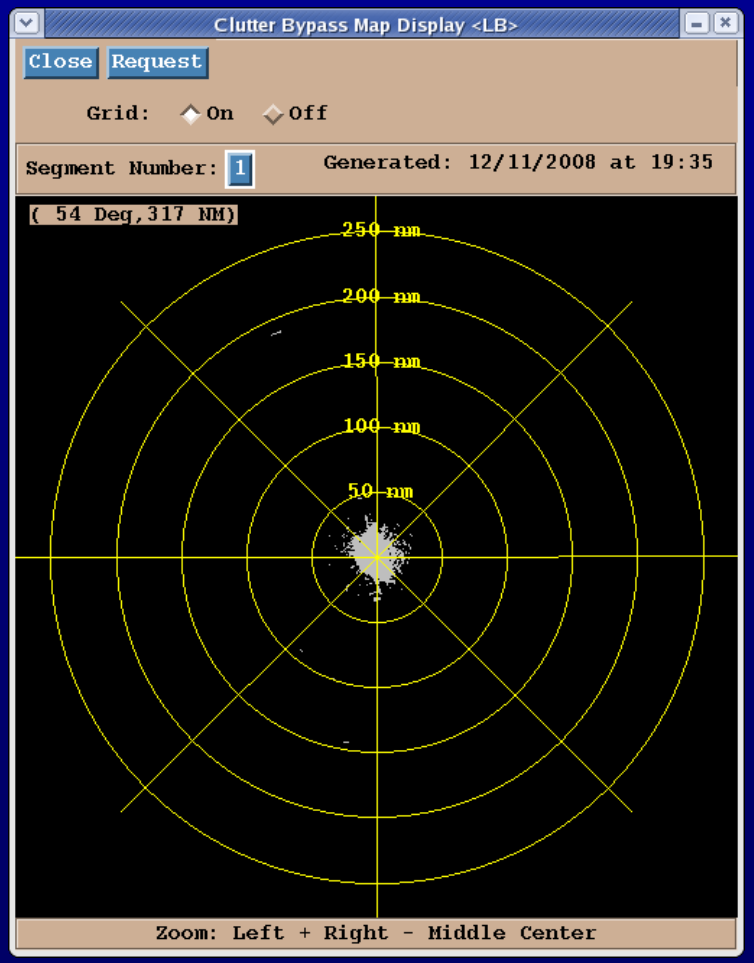


Techs, SOO, Radar Focal Point…

See document for more

RPG HCI Windows and CMD

- Clutter Bypass Map Display window



Techs, SOO, Radar Focal Point…

See document for more

CMD Implementation Recommendations

1. New Static Bypass Maps using CMD
2. Check saved clutter regions files
3. If needed, create “CMD Local” file
4. No “CMD Local”?
   - Keep “Default” last one downloaded
5. “CMD Local”?
   - Keep “CMD Local” last one downloaded

Techs, SOO, Radar Focal Point…

See document for more

CMD and Dual Pol
Stay Tuned!

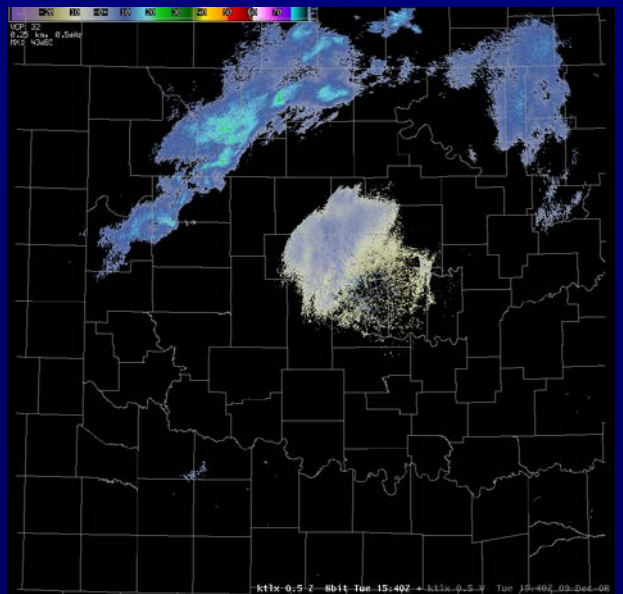
- CMD scheduled to go away with Dual Pol installation (Build 12)
  - Be prepared to filter clutter ***without CMD***
- CMD comes back with first post-Dual Pol upgrade (Build 13)
  - Time without CMD will vary (up to 16 months)

Other RDA/RPG Build 11.0 Changes

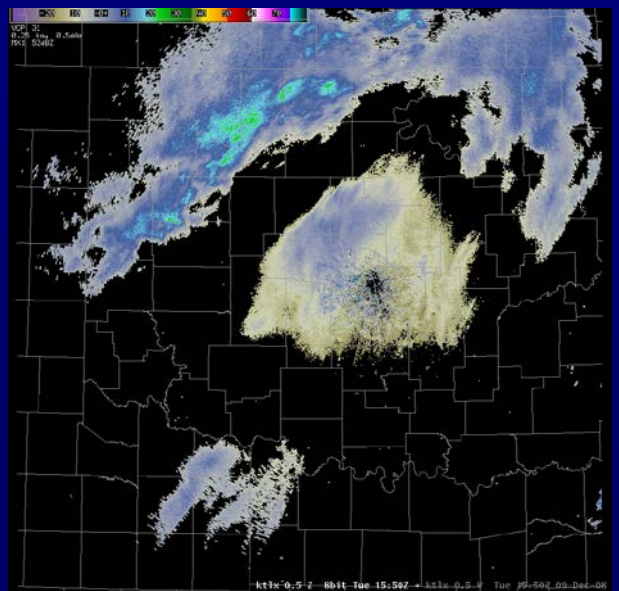
- Addressing false RDA alarms when switching to/from VCP 31
- Improvement to MDA performance
  - Reduction of detections in insignificant areas
- Removal of rarely used products
- VAD Slant Range parameter reset

False RDA Alarms when Switching to/from VCP 31

- VCP 31 uses long pulse
  - Switching to/from requires adjusting pulse width and recalibration
  - Build 11.0 addresses false RDA alarms

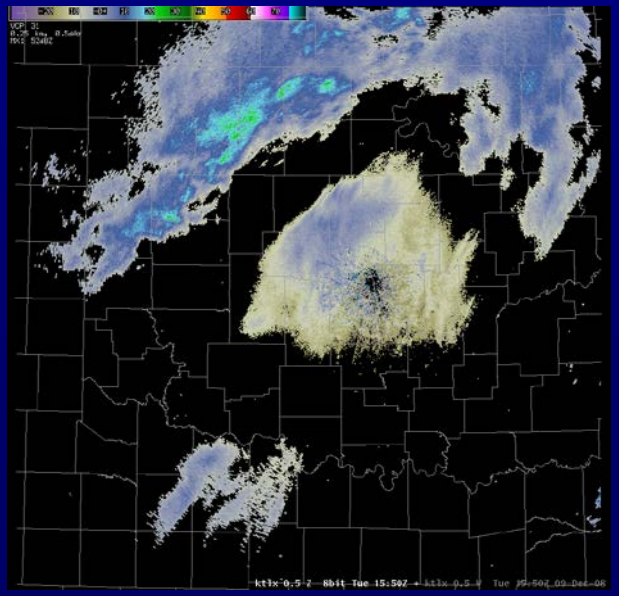


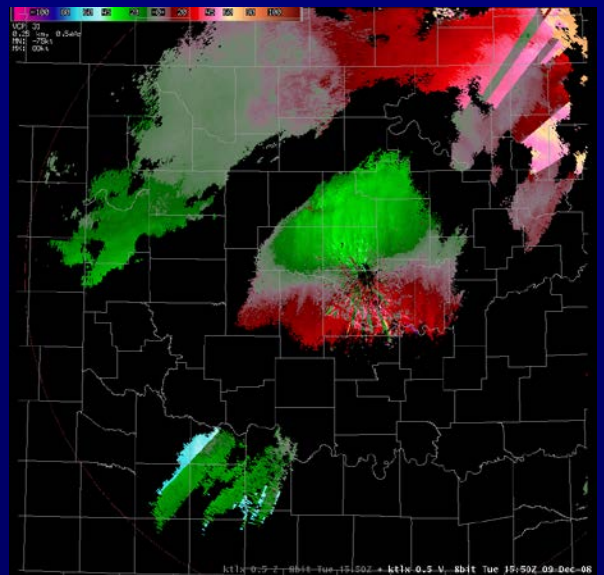
From VCP 32 to 31



False RDA Alarms when Switching to/from VCP 31

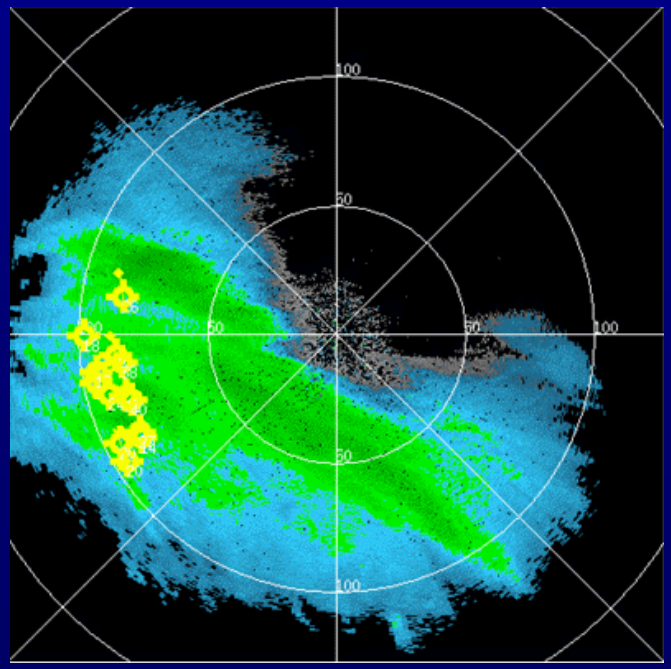
- VCP 31 has higher sensitivity!
  - Good for freezing drizzle detection
- PRF 2 used for Doppler mode
  - Increase in velocity dealiasing failures



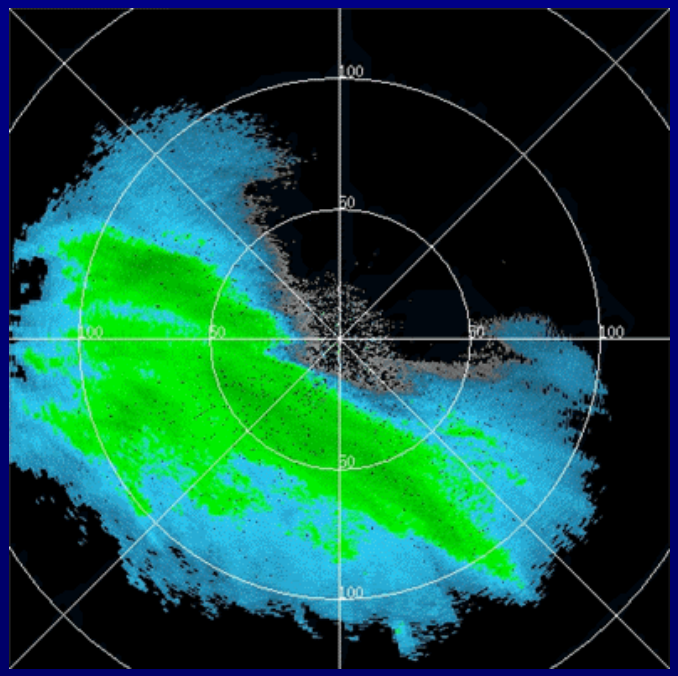


MDA Improvement

- Circulations ***not*** within 20 km of SCIT cell are discarded
  - Reduces insignificant/distracting detections



Before Build 11.0



After Build 11.0

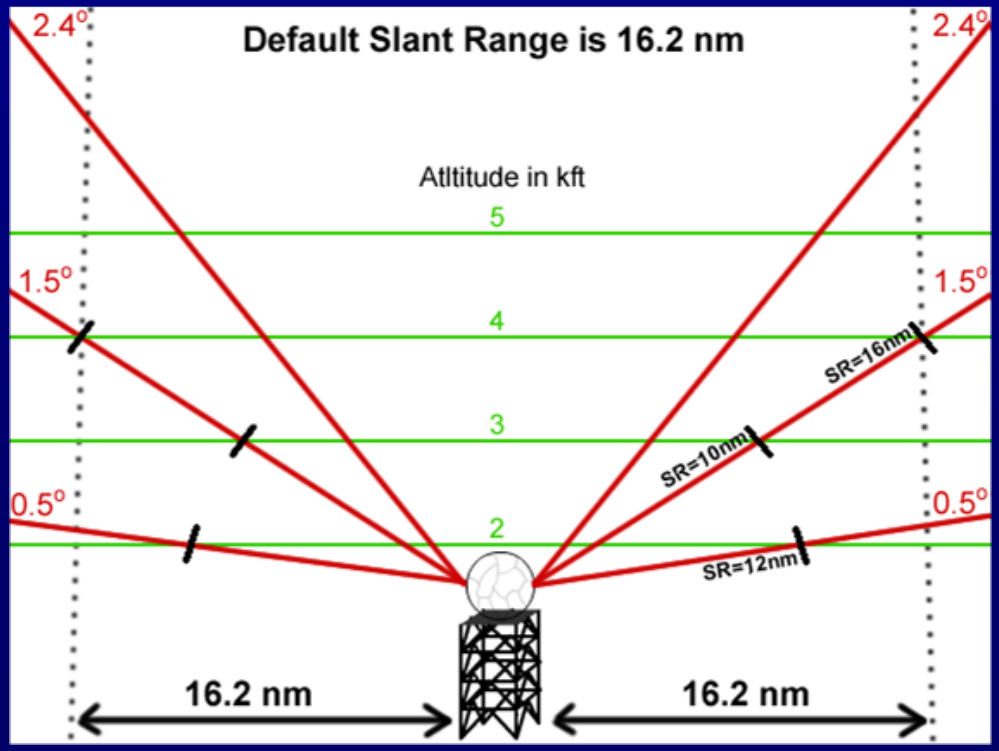
Removal of Rarely Used Products

- Based on field survey, these go away:
  - Combined Shear (CS)
  - Severe Weather Probability (SWP)
  - Severe Weather Reflectivity (SWR)
  - Severe Weather Velocity (SWV)
  - Severe Weather Spectrum Width (SWW)

- Frees up RPG resources!

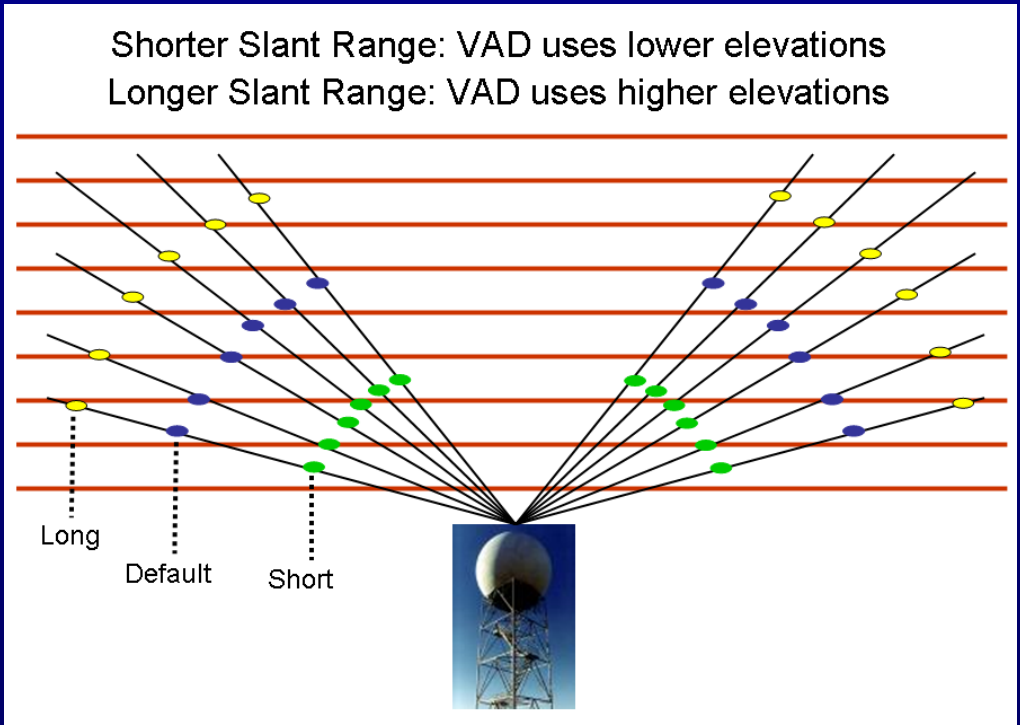
VAD Slant Range Reset

- Computes wind speed/direction for series of MSL (kft) heights
- Uses elevation closest to editable slant range
- Default 30 km (16.2 nm)
  - 2kft: 0.5° @ 12 nm
  - 3kft: 1.5° @ 10 nm
  - 4kft: 1.5° @ 16 nm…



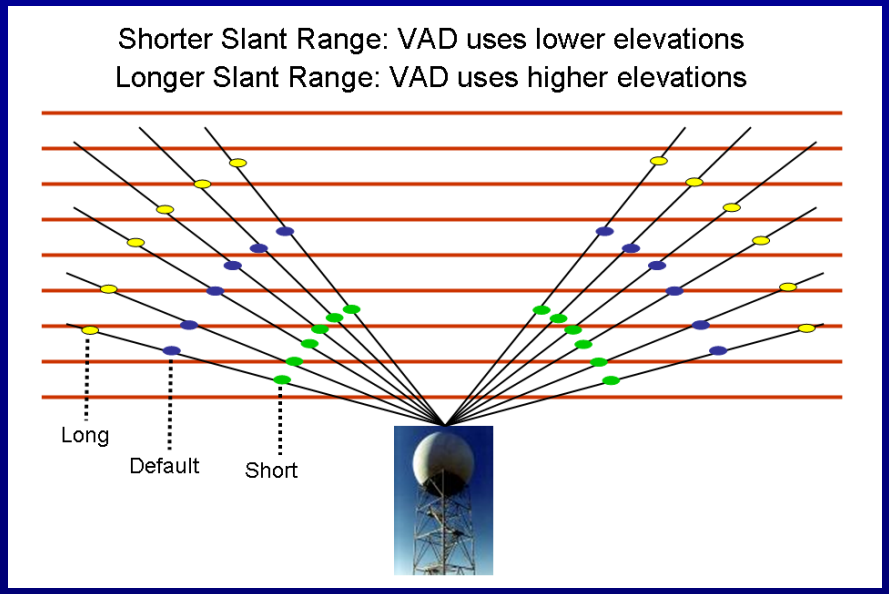
VAD Slant Range Reset

- Edit Slant Range to improve access to scatterers
  - Cold clear day
    - shorter slant range
  - Warm muggy day
    - longer slant range



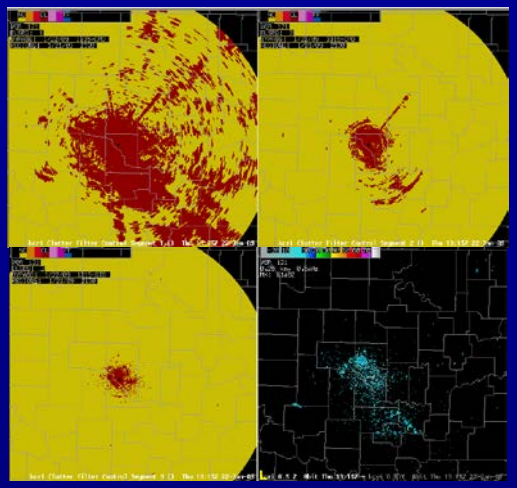
VAD Slant Range Reset

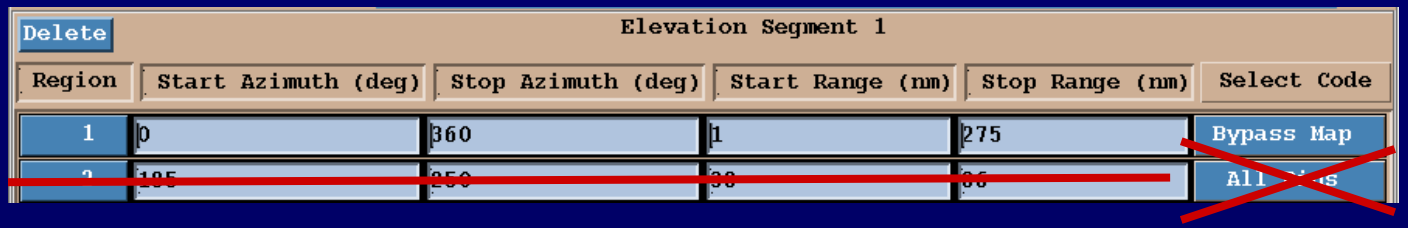
*Easy to change, hard to remember to **reset***



- Build 11.0 install resets VAD Slant Range to default 30 km
- Still editable

RDA/RPG Build 11.0 Training



- Thank you for your time!
  - jami.b.boettcher@noaa.gov
  - (405) 325-2804
  - www.wdtb.noaa.gov/buildTraining/Build11

- Your feedback is appreciated!