RDA/RPG Build 18.0 Training

WARNING DECISION TRAINING DIVISION (WDTD)

RDA/RPG Build 18.0 Overview

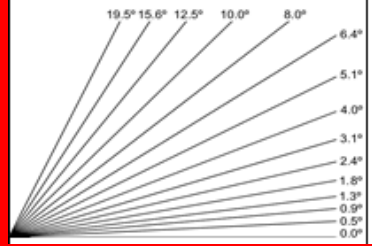
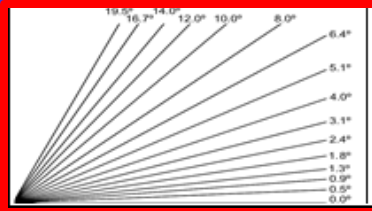
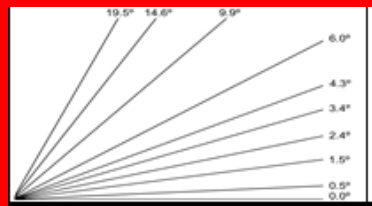
- VCP Changes
- RDA Changes
  - Better quality dual pol base data
- RPG Changes
  - HCA tuning to better identify:
    - Wet snow or graupel in melting layer
    - Biota and clutter in the cold season
  - Tornado Rapid Update (TRU) and Mesocyclone Detection (DMD) use SAILS cuts
- Expanded sets of PRFs

Modernized VCPs Overview

- Remove: 11, 21, 211, 221
- New General Surveillance VCP (215)
  - Combines strengths of VCPs 11 and 21
  - AVSET, SAILSx1, ~ 6 mins
- New Clear Air VCP (35)
  - SAILSx1, VCP 32 sensitivity, ~7.5 mins

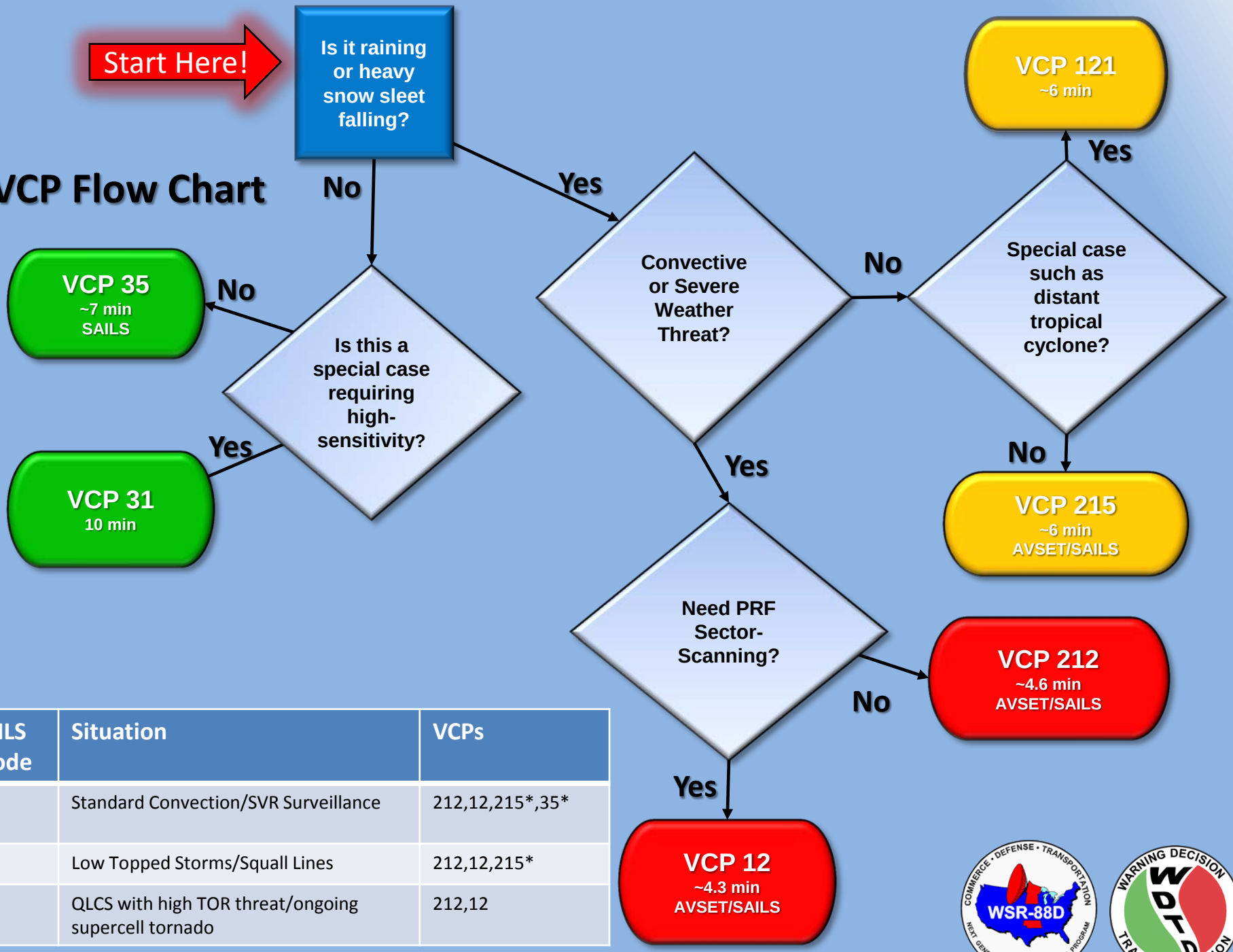
Build 18 VCPs

Quick Reference VCP Comparison Table for RPG Operators as of RPG Build 18 May 2017

Slices	Tilts	VCP	Time*	Algs.	Usage	Limitations
	14	12	4.3 mins	AVSET SAILS	Fastest VCP. Rapidly evolving, severe convective events (e.g. squall line, MCS).	High antenna rotation rate decreases the effectiveness of clutter filtering and decreases the accuracy of the base data estimates.
		212	4.6† mins		Rapidly evolving, severe convective events (e.g. supercells, squall line, MCS). Uses SZ-2 to significantly reduce range-obscured V/SW data compared to VCP 12.	All Bins clutter suppression is not recommended. High antenna rotation rate decreases the effectiveness of clutter filtering and decreases the accuracy of the base data estimates. PRF sectors not allowed.
	15	215	6† mins	AVSET SAILS	VCP of choice for general surveliance of precipitation. Best vertical coverage. Lower SNR than VCPs 12/212. Uses SZ-2 to reduce range-obscured V/SW data. Lower low-level antenna rotation rates increase the accuracy of base data estimates. Shares common lower elevations with VCPs 12/212 and 35.	All Bins clutter suppression is not recommended. Slower low-level updates than VCP 12/212. Limited to a single SAILS scan. PRF sectors not allowed.
	9	121	6 mins	AVSET	VCP of choice for hurricanes or widespread stratiform precipitation events. Significantly reduces range-obscured V/SW data within 230km compared to other VCPs.	PRFs are not editable for any tilt. Gaps in coverage above 5°.
	5	31	10 mins	None	Clear-air, snow, and light stratiform precipitation. Best sensitivity. Only long pulse VCP.	Susceptible to velocity dealiasing failures. No coverage above 5°. Rapidly developing convective echoes aloft might be missed.
		32	10 mins		Clear-air, snow, and light stratiform precipitation.	No coverage above 5°. Rapidly developing convective echoes aloft might be missed.
	9	35	7† mins	SAILS	Clear-air, snow, and light stratiform precipitation. Shares common lower elevations with VCPs 12/212 and 215. Overlapping low-level coverage. Uses SZ-2 to significantly reduce range-obscured V/SW data compared to VCPs 31/32.	All Bins clutter suppression is not recommended. No coverage above 6.4°. Rapidly developing convective echoes aloft might be missed. Limited to a single SAILS scan. PRF sectors not allowed.

* VCP Update times are approximate and subject to variation with use of dynamic scanning algorithms. † VCP update times will vary based on Active PRF.

VCP Flow Chart

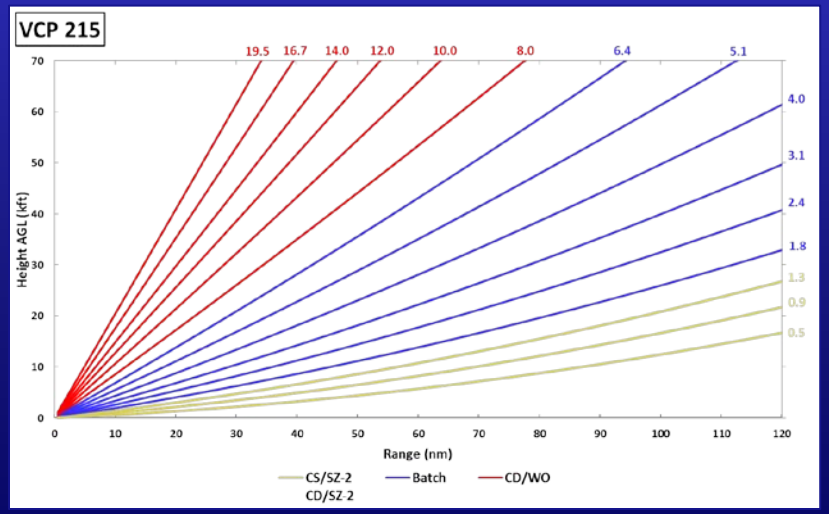


SAILS Mode	Situation	VCPs
1	Standard Convection/SVR Surveillance	212,12,215*,35*
2	Low Topped Storms/Squall Lines	212,12,215*
3	QLCS with high TOR threat/ongoing supercell tornado	212,12

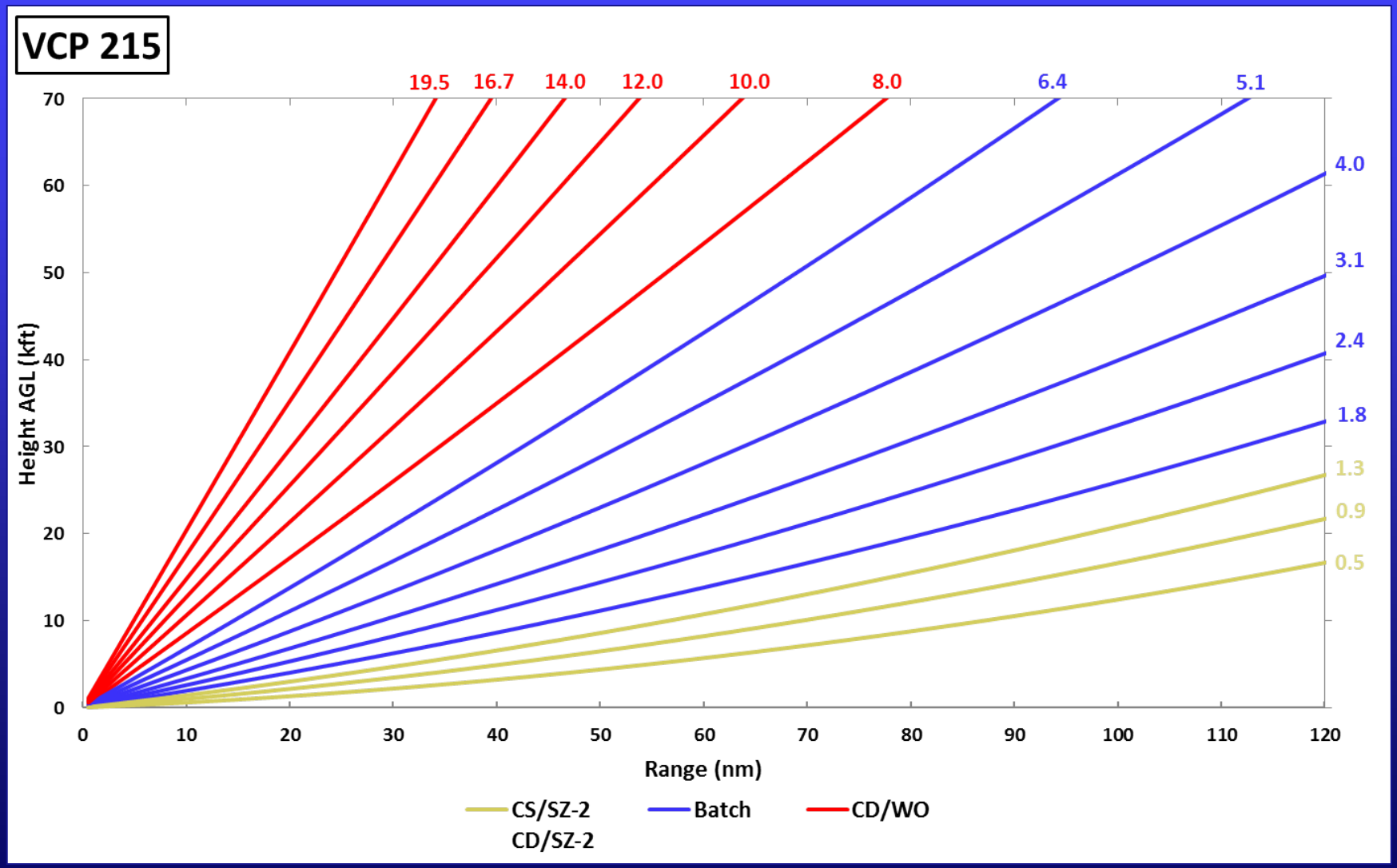
*Not recommended for SVR Wx monitoring

Replace VCPs 11 & 21 with Something Better

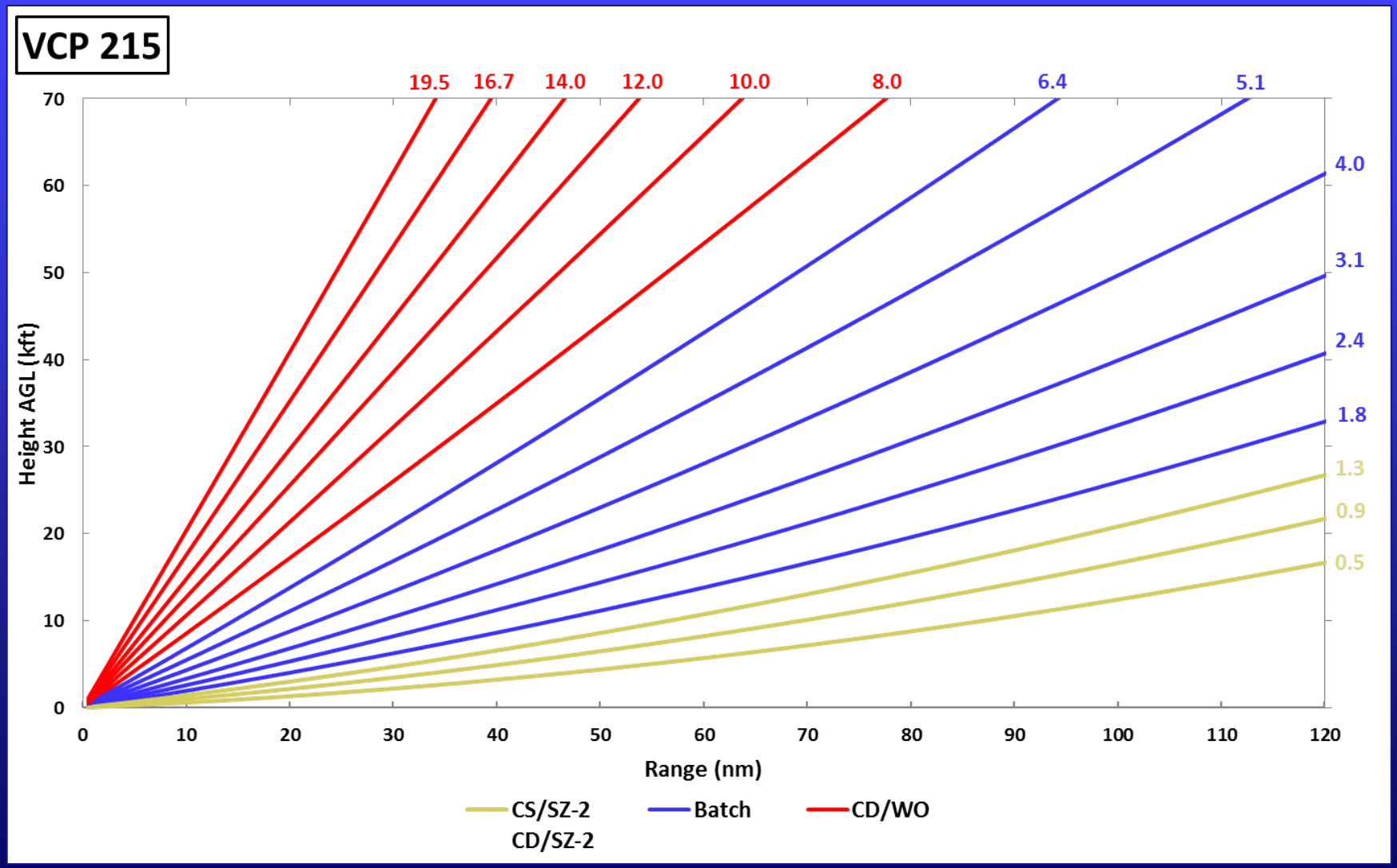
- VCP 215, General Surveillance
  - VCP 12 angles low & mid levels with SZ-2 Range Unfolding
  - VCP 11 angles aloft
  - VCP 21-like data quality 0.5º, 0.9º, 1.3º
  - Update rate ~6 min
  - Precip Mode Default



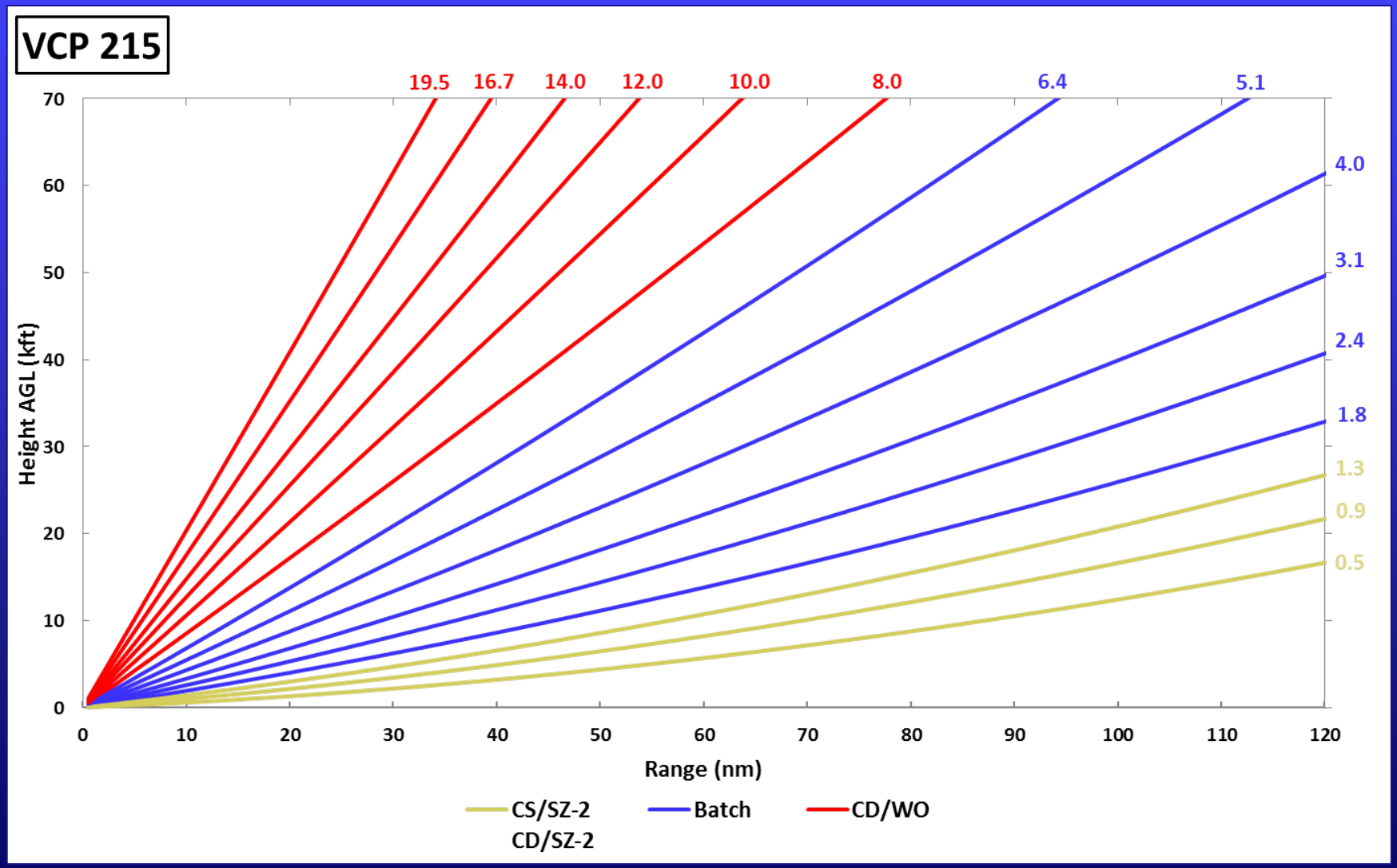
VCP 215: Vertical Resolution



VCP 215: SZ-2 Range Unfolding



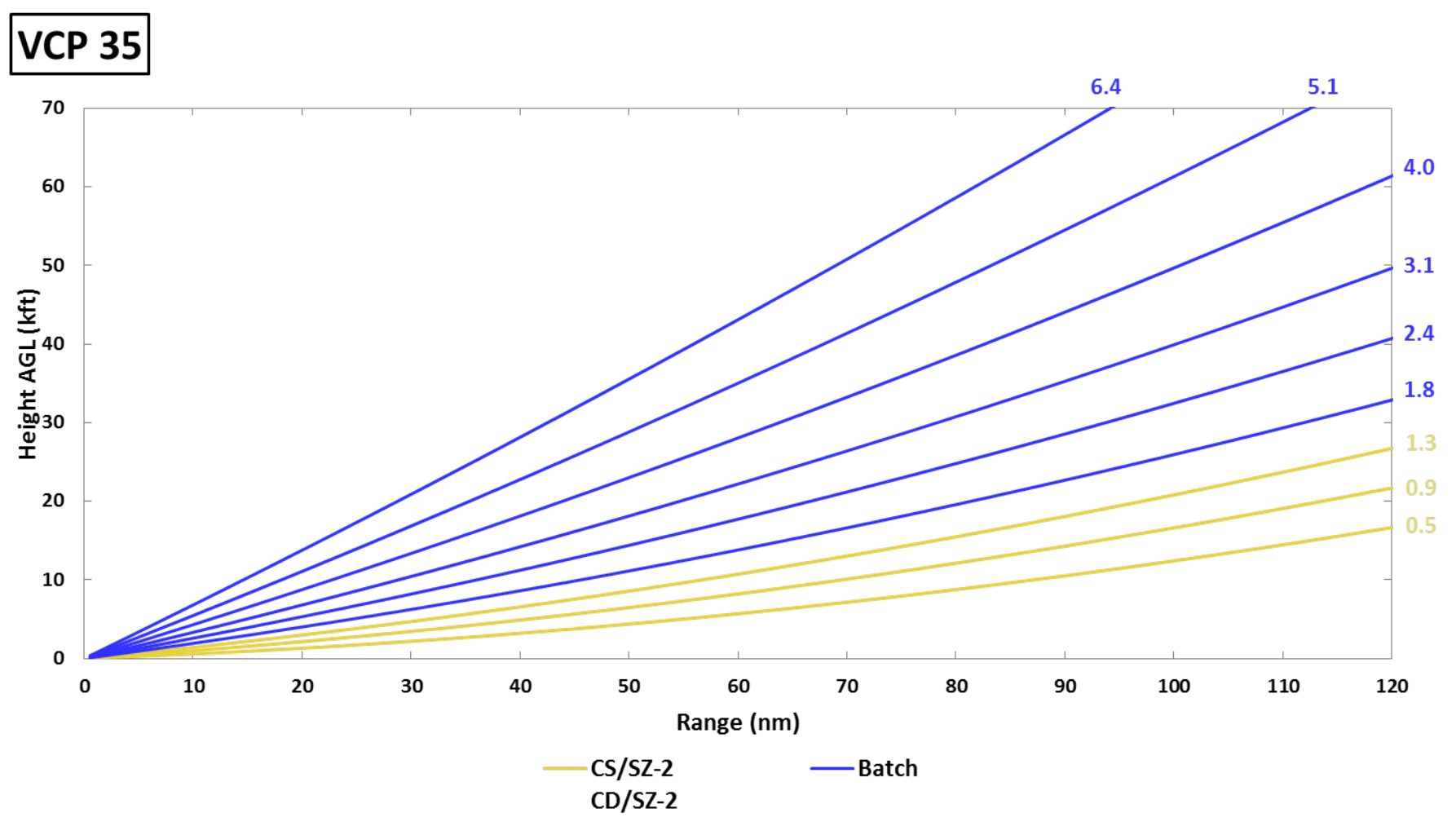
VCP 215: ~6 Minute Update



New Clear Air VCP 35

- VCP 12 angles through 6.4°
  Smooth transition from Clear Air to Precip Mode
- Same pulses/radial as VCP 32 for angles 0.5°, 0.9°, 1.3° in surveillance cuts, fewer in the doppler scan
  - Best data quality and target detection
- SZ-2 Range Unfolding, SAILS
- Update time ~7.5 minutes

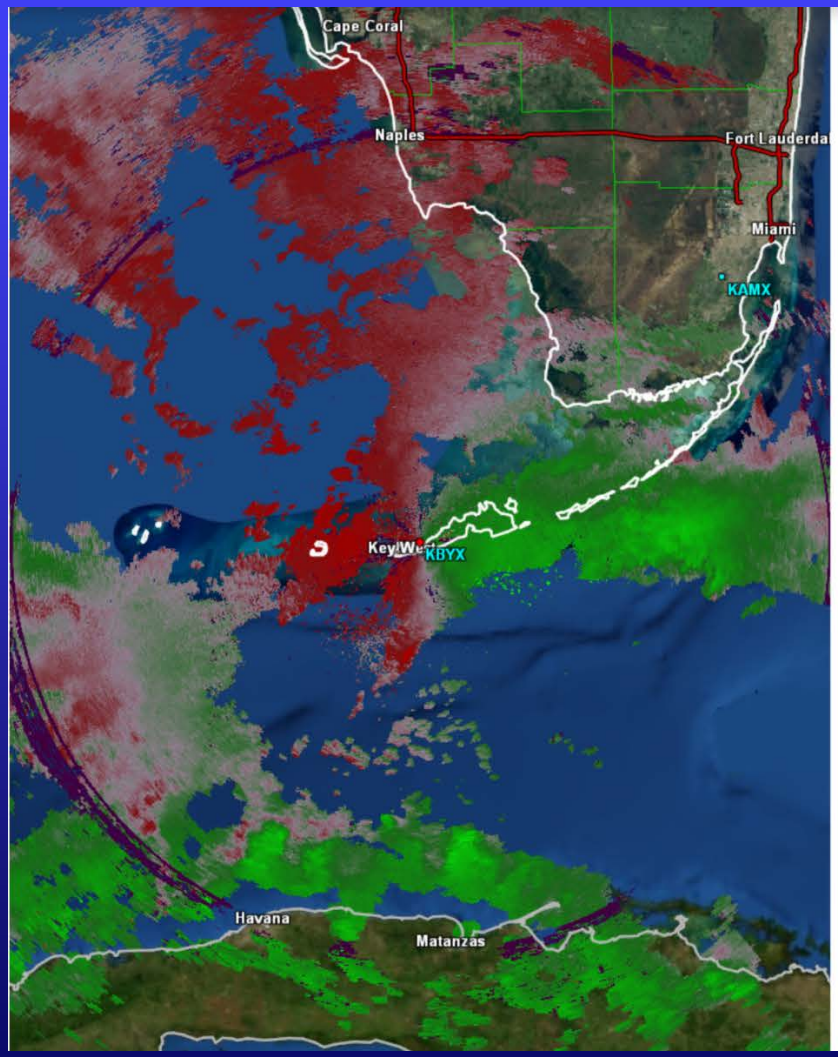
VCP 35: Vertical Resolution

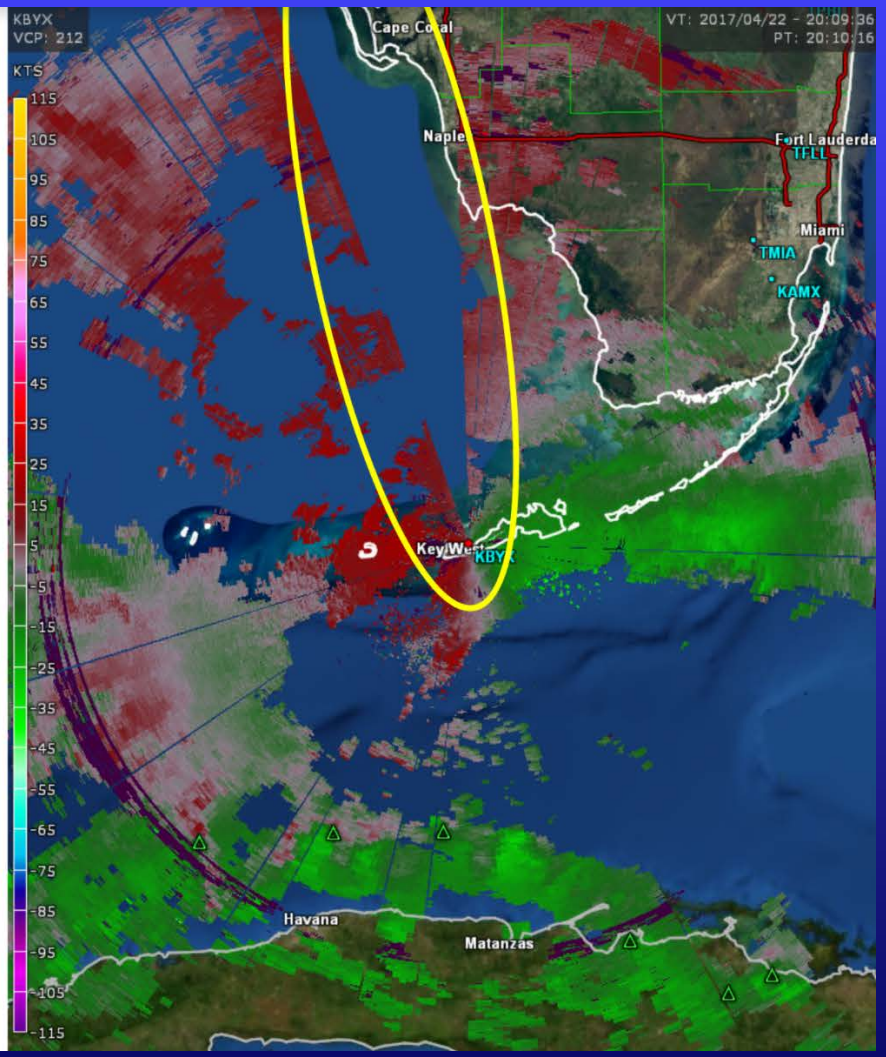


Modernized VCPs Summary

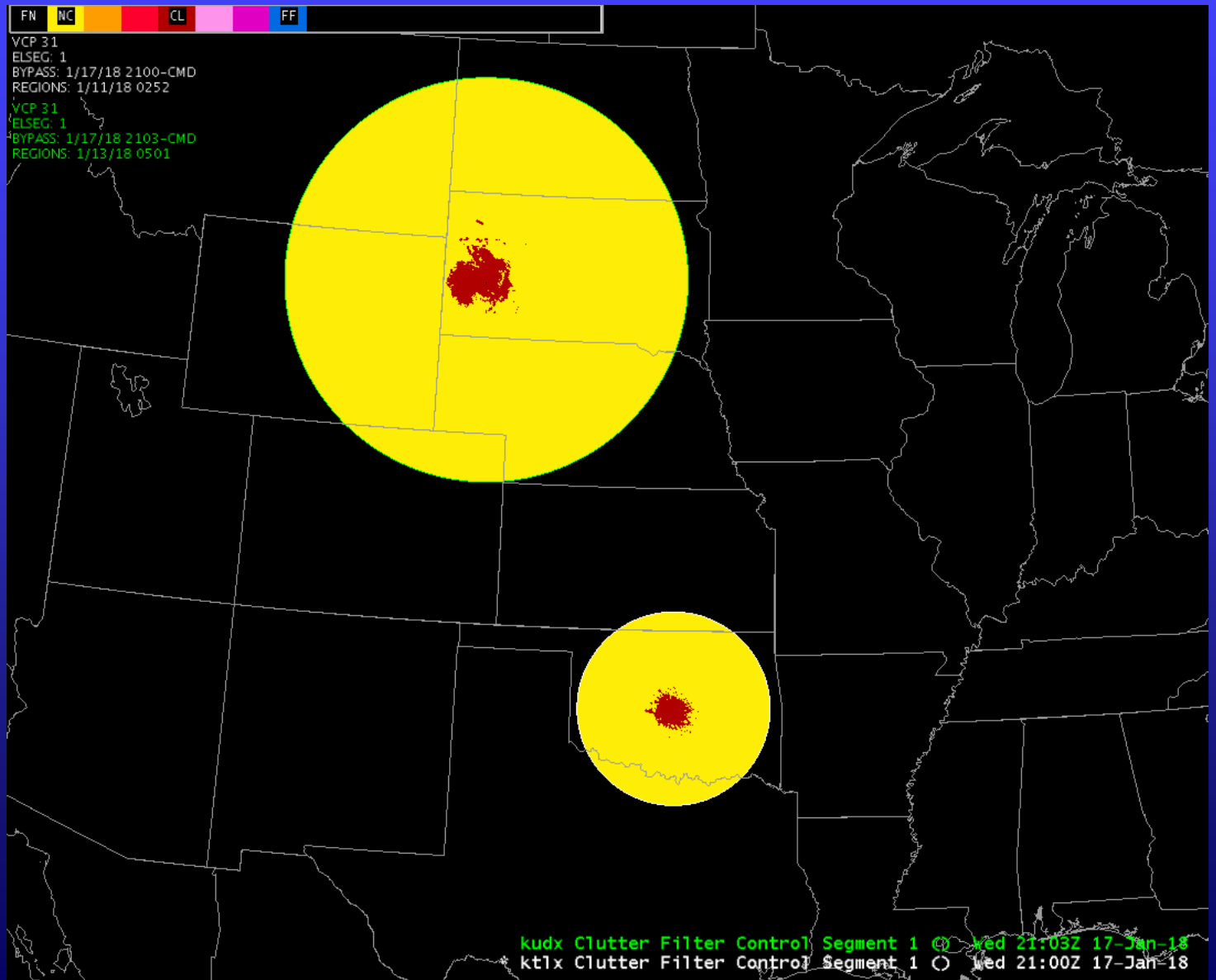
- New General Surveillance VCP (215)
  - Combines strengths of VCPs 11 and 21
  - AVSET, SAILSx1, ~ 6 mins
  - Does NOT replace VCP 12/212 for severe wx
- New Clear Air VCP (35)
  - SAILSx1, VCP 32 sensitivity, ~7.5 mins

Manual PRF with SZ-2

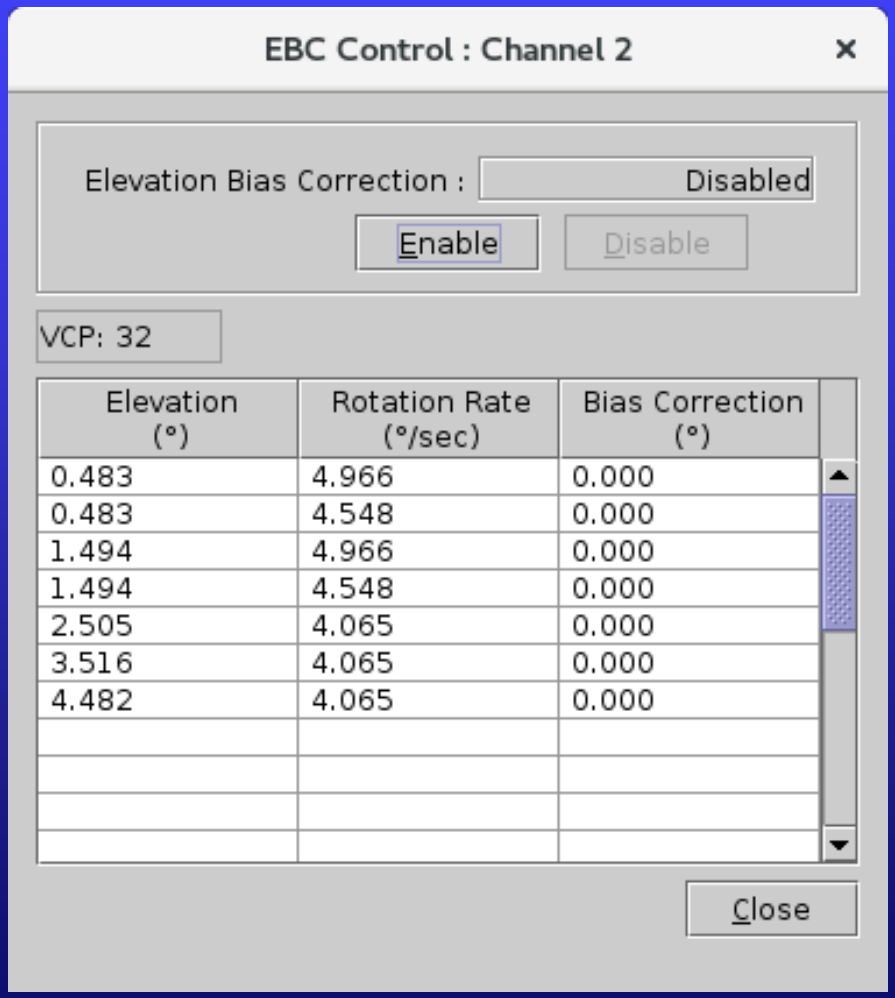




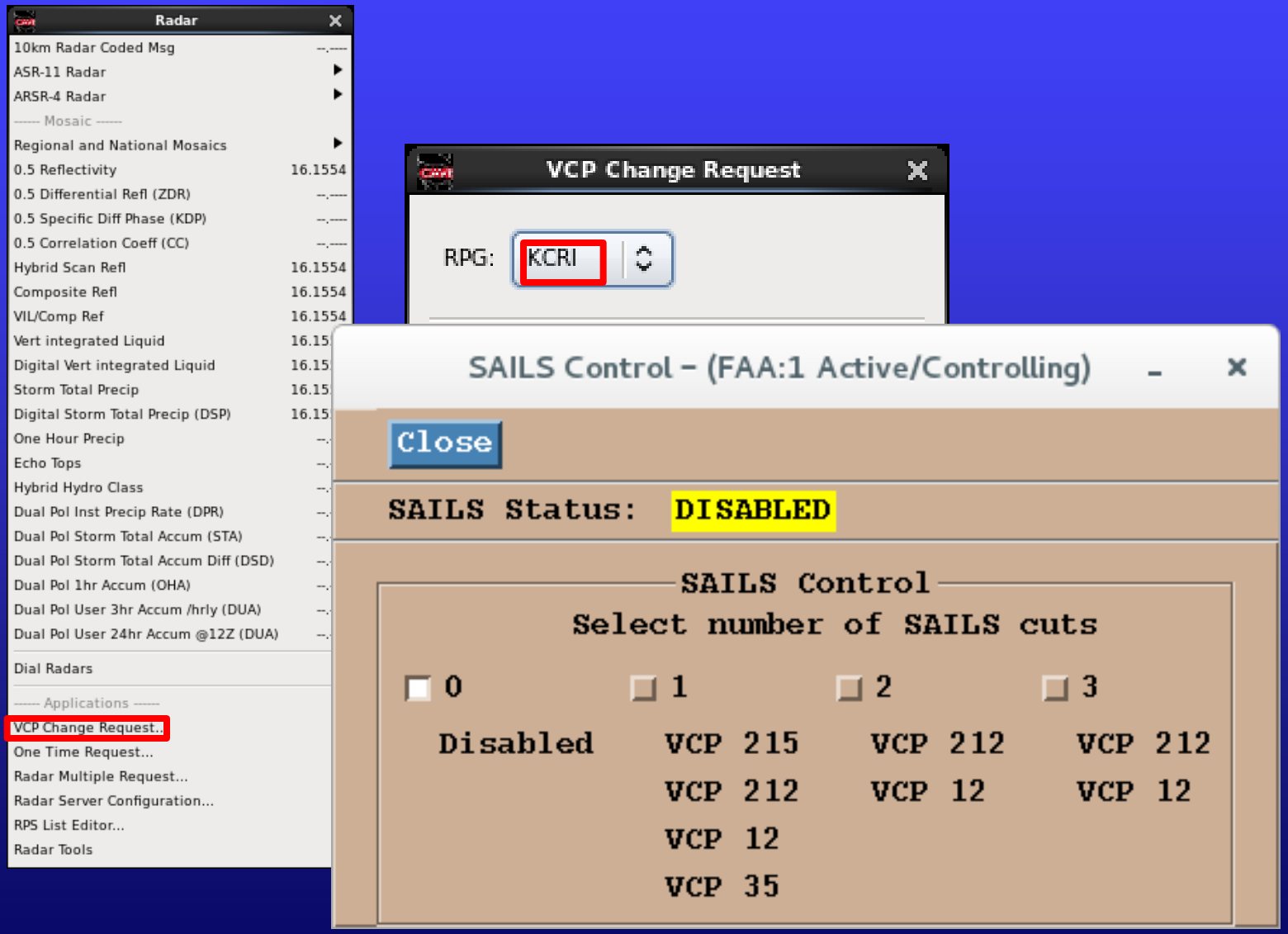
Clutter Filter Control 248 nm



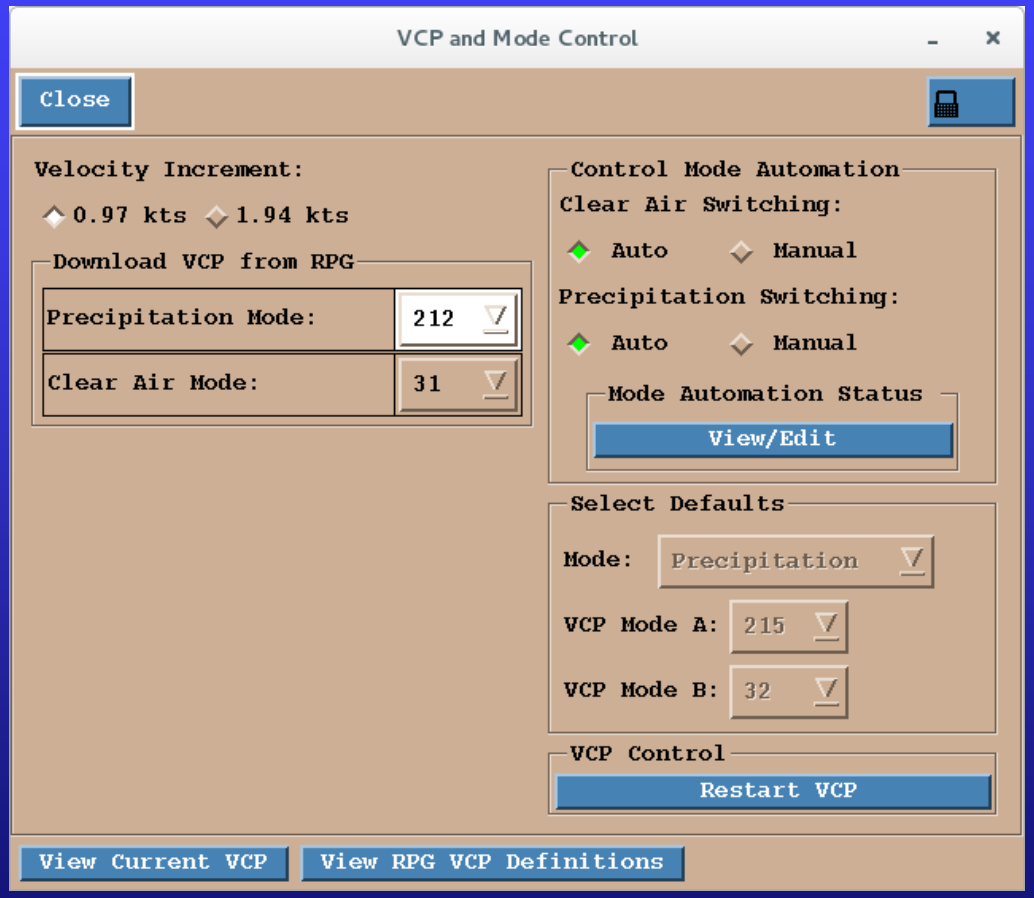
Elevation Bias Control



Change VCP From Workstation

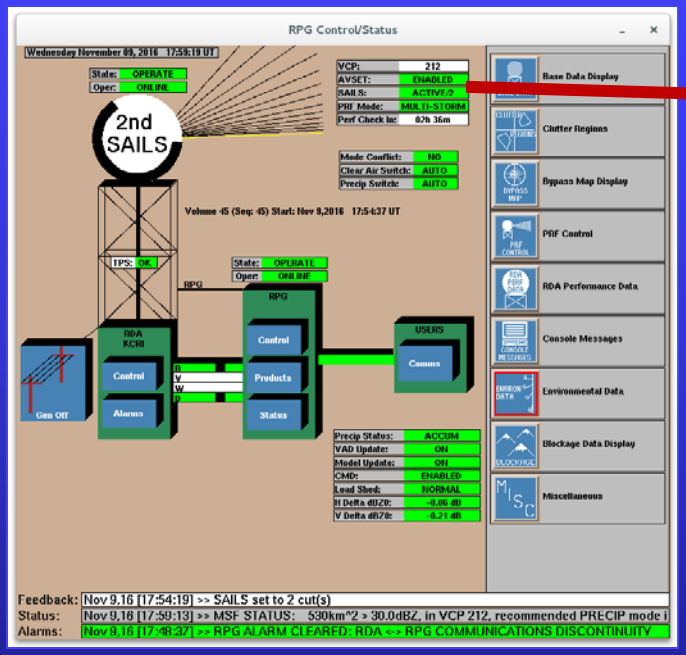


VCP and Mode Control



- Download Only
  - “Change to RDA VCP” box gone

Simplifying VCP Status



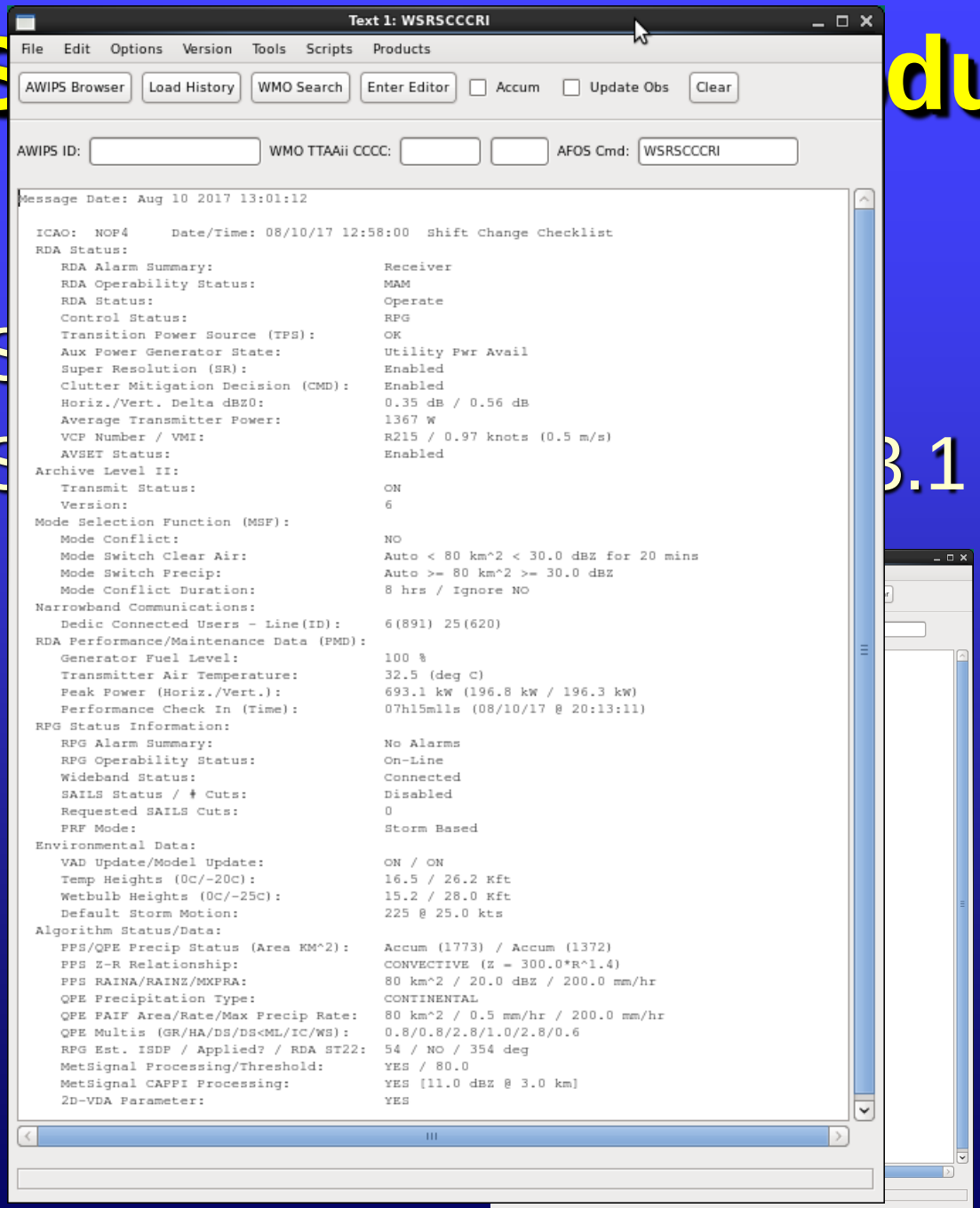
VCP:	212
AVSET:	ENABLED
SAILS:	ACTIVE/2
PRF Mode:	MULTI-STORM
Perf Check In:	02h 36m

VCP:	R12/A
AVSET:	ENABLED
SAILS:	ACTIVE/3
PRF Mode:	MULTI-STORM
Perf Check In:	03h 06m

- VCP number only
  - Origin (R or L) and Mode (A or B) no longer relevant

S duct

- WSRS
- WSRS 3.1




```
Message Date: Aug 10 2017 13:01:12

  ICAO:  NOP4     Date/Time: 08/10/17 12:58:00  Shift Change Checklist
  RDA Status:
     RDA Alarm Summary:                      Receiver
     RDA Operability Status:                 MAM
     RDA Status:                             Operate
     Control Status:                         RPG
     Transition Power Source (TPS):          OK
     Aux Power Generator State:              Utility Pwr Avail
     Super Resolution (SR):                  Enabled
     Clutter Mitigation Decision (CMD):      Enabled
     Horiz./Vert. Delta dBZ0:                0.35 dB / 0.56 dB
     Average Transmitter Power:              1367 W
     VCP Number / VMI:                       R215 / 0.97 knots (0.5 m/s)
     AVSET Status:                           Enabled
  Archive Level II:
     Transmit Status:                        ON
     Version:                                6
  Mode Selection Function (MSF):
     Mode Conflict:                          NO
     Mode Switch Clear Air:                  Auto < 80 km^2 < 30.0 dBZ for 20 mins
     Mode Switch Precip:                     Auto >= 80 km^2 >= 30.0 dBZ
     Mode Conflict Duration:                 8 hrs / Ignore NO
  Narrowband Communications:
     Dedic Connected Users - Line(ID):       6(891) 25(620)
  RDA Performance/Maintenance Data (PMD):
     Generator Fuel Level:                   100 %
     Transmitter Air Temperature:            32.5 (deg C)
     Peak Power (Horiz./Vert.):              693.1 kW (196.8 kW / 196.3 kW)
     Performance Check In (Time):            07h15m11s (08/10/17 @ 20:13:11)
  RPG Status Information:
     RPG Alarm Summary:                      No Alarms
     RPG Operability Status:                 On-Line
     Wideband Status:                        Connected
     SAILS Status / # Cuts:                  Disabled
     Requested SAILS Cuts:                   0
     PRF Mode:                               Storm Based
  Environmental Data:
     VAD Update/Model Update:                ON / ON
     Temp Heights (0C/-20C):                 16.5 / 26.2 Kft
     Wetbulb Heights (0C/-25C):              15.2 / 28.0 Kft
     Default Storm Motion:                   225 @ 25.0 kts
  Algorithm Status/Data:
     PPS/QPE Precip Status (Area KM^2):      Accum (1773) / Accum (1372)
     PPS Z-R Relationship:                   CONVECTIVE (Z = 300.0*R^1.4)
     PPS RAINA/RAINZ/MXPRA:                  80 km^2 / 20.0 dBZ / 200.0 mm/hr
     QPE Precipitation Type:                 CONTINENTAL
     QPE PAIF Area/Rate/Max Precip Rate:     80 km^2 / 0.5 mm/hr / 200.0 mm/hr
     QPE Multis (GR/HA/DS/DS<ML/IC/WS):      0.8/0.8/2.8/1.0/2.8/0.6
     RPG Est. ISDP / Applied? / RDA ST22:    54 / NO / 354 deg
     MetSignal Processing/Threshold:         YES / 80.0
     MetSignal CAPPI Processing:             YES [11.0 dBZ @ 3.0 km]
     2D-VDA Parameter:                       YES
```

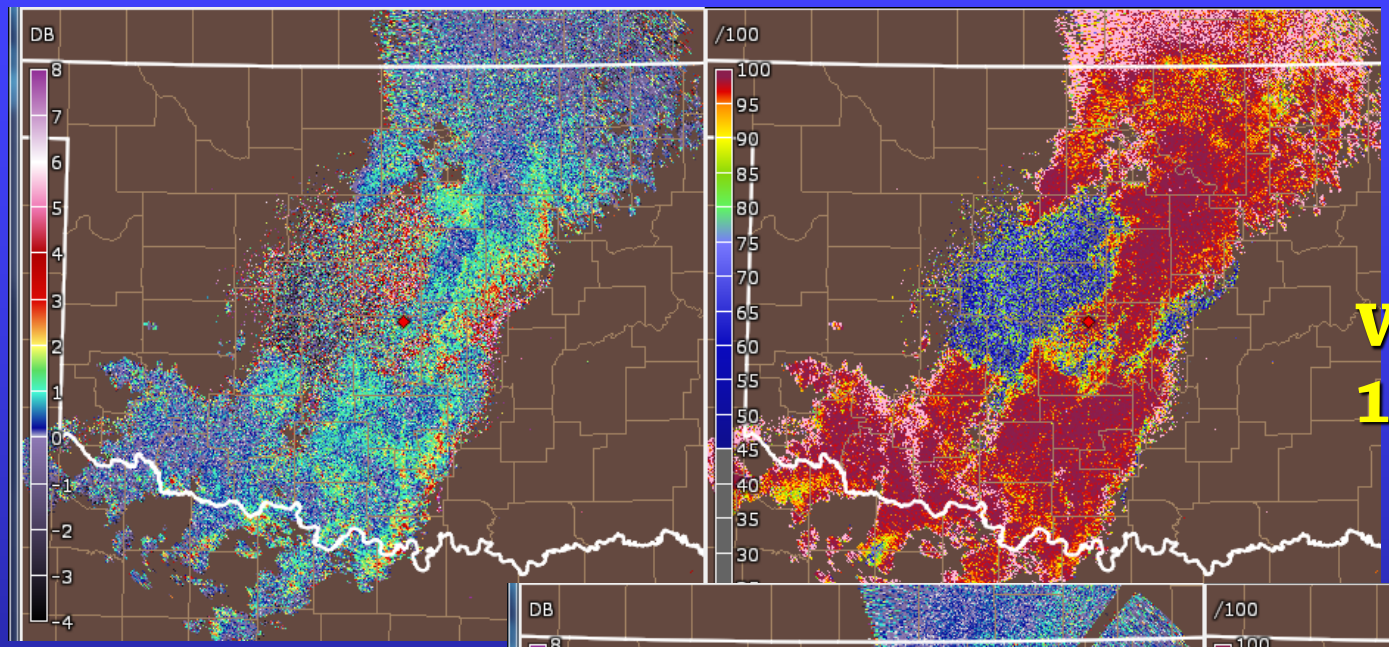
SAILS Cut Times

- Time for SAILS cuts on product menu fixed

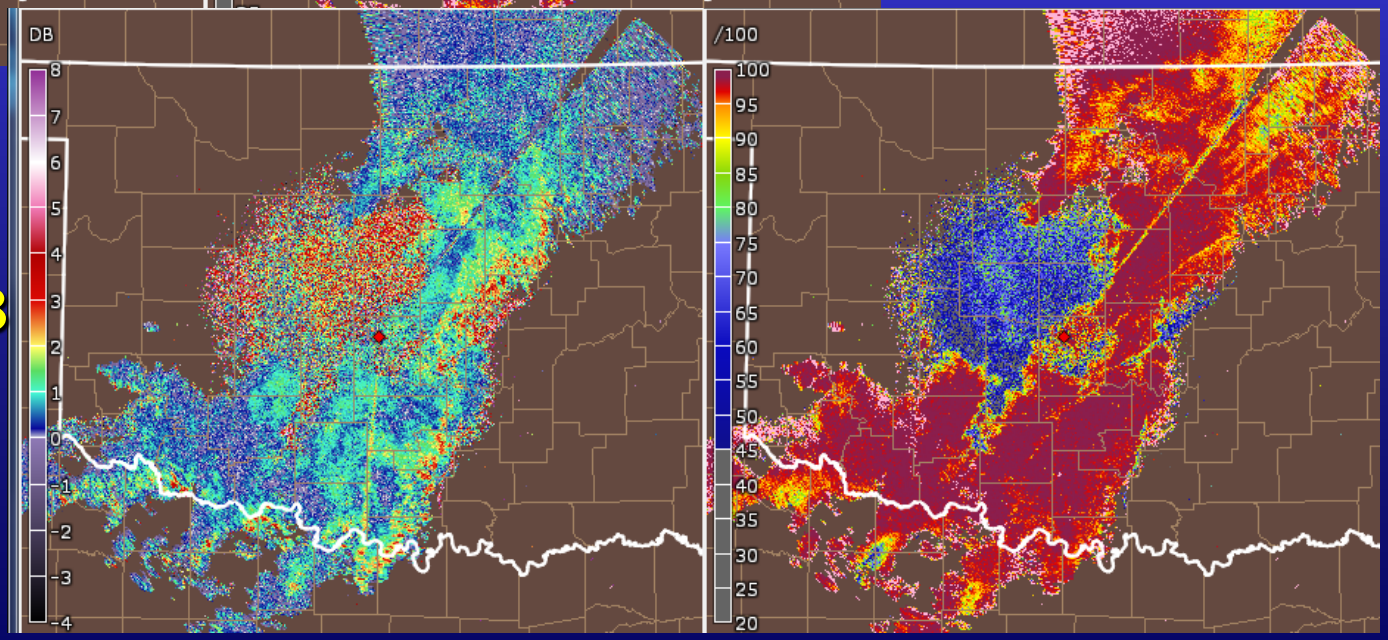
Better Quality Dual Pol Base Data

- Signal Processing: new data windowing technique
- Noise correction in low SNR regions
- New default VCP 215 has more pulses/radial than VCP 212

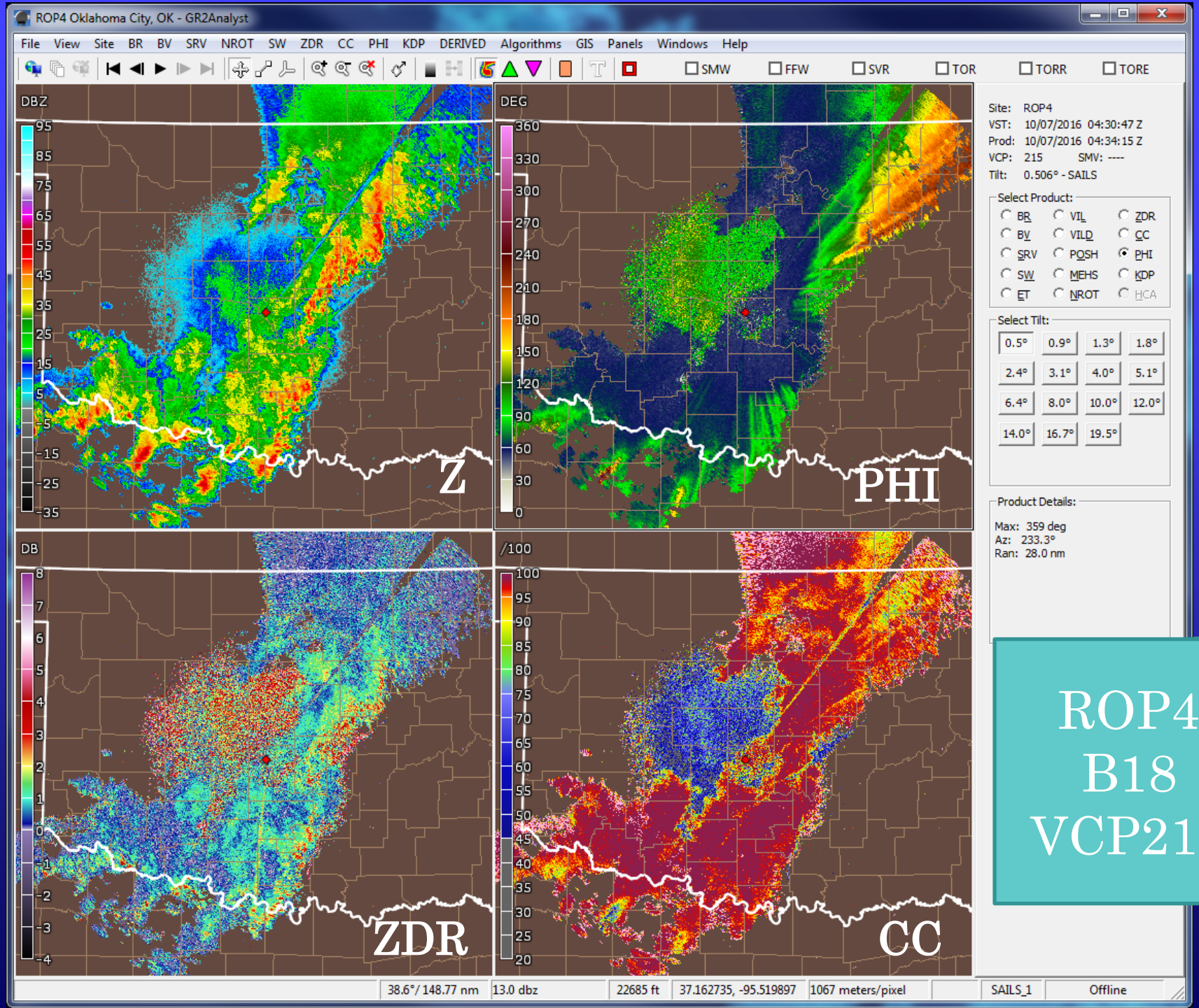
Less Noisy Dual Pol Base Data



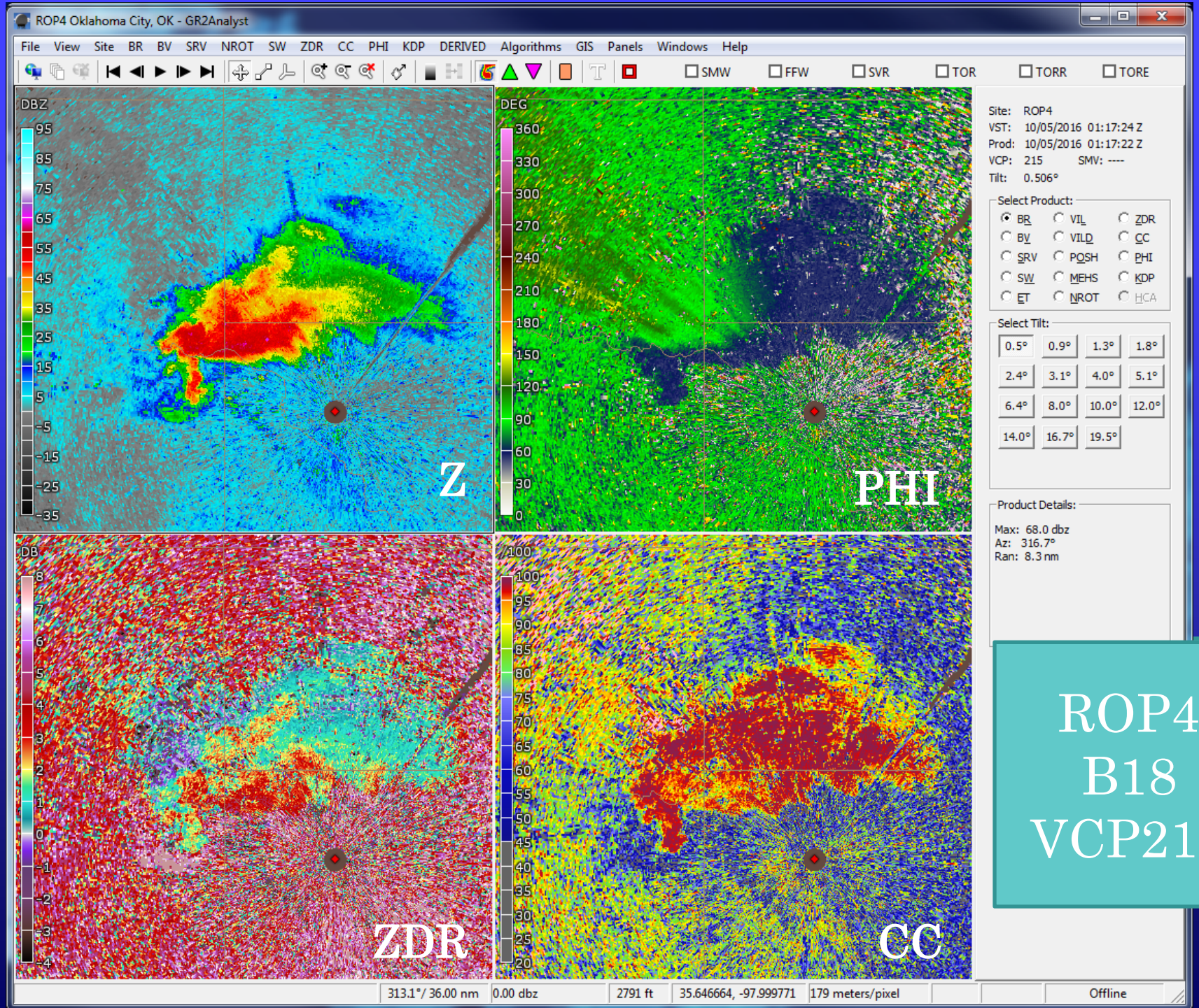
VCP 212 Build 16



VCP 215 Build 18



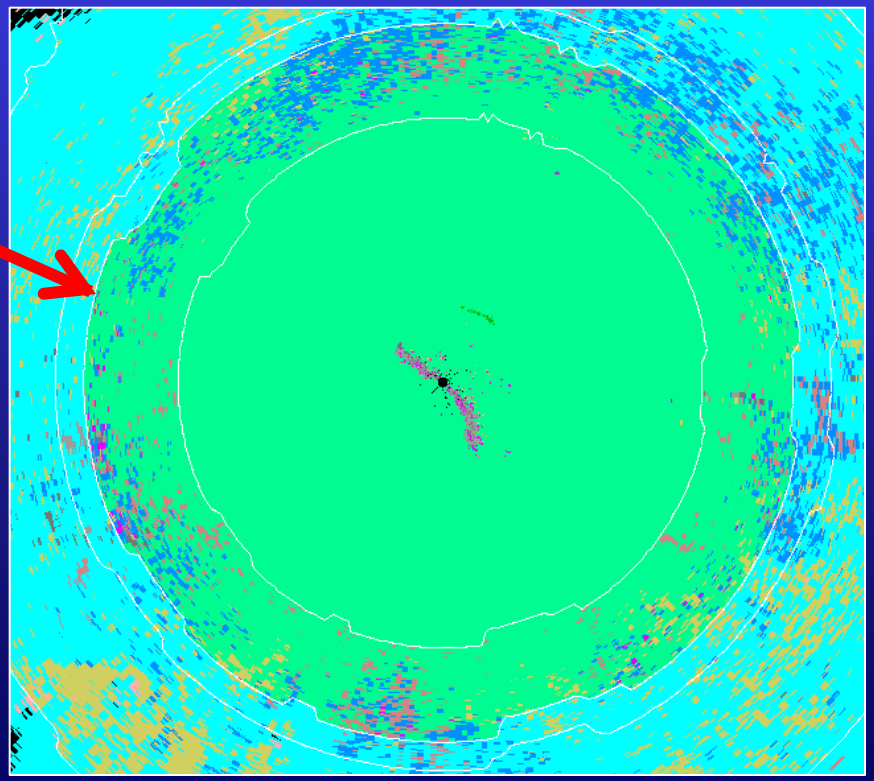
ROP4
B18
VCP215



ROP4
B18
VCP215

HCA Tuning

- Hydrometeor Classification Algorithm
  - Within melting layer, Dry Snow (DS) unrealistically dominant
  - Sharpens transition to light/moderate rain (RA) bottom of melting layer

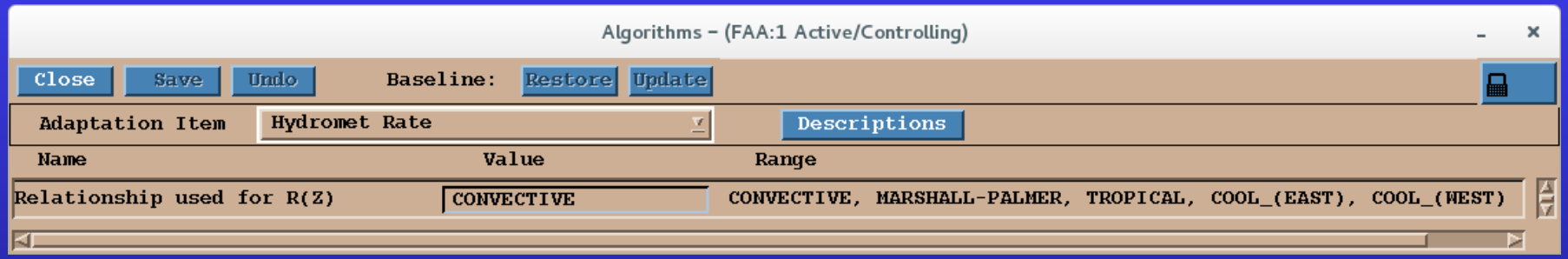


TRU and DMD and SAILS Cuts

- Tornado Rapid Update (TRU)
  - Elevation-based output from Tornado Detection Algorithm
- Mesocyclone Detection (DMD)
- Overlay products available for SAILS cuts
  - Position and attributes will better match SAILS cut data

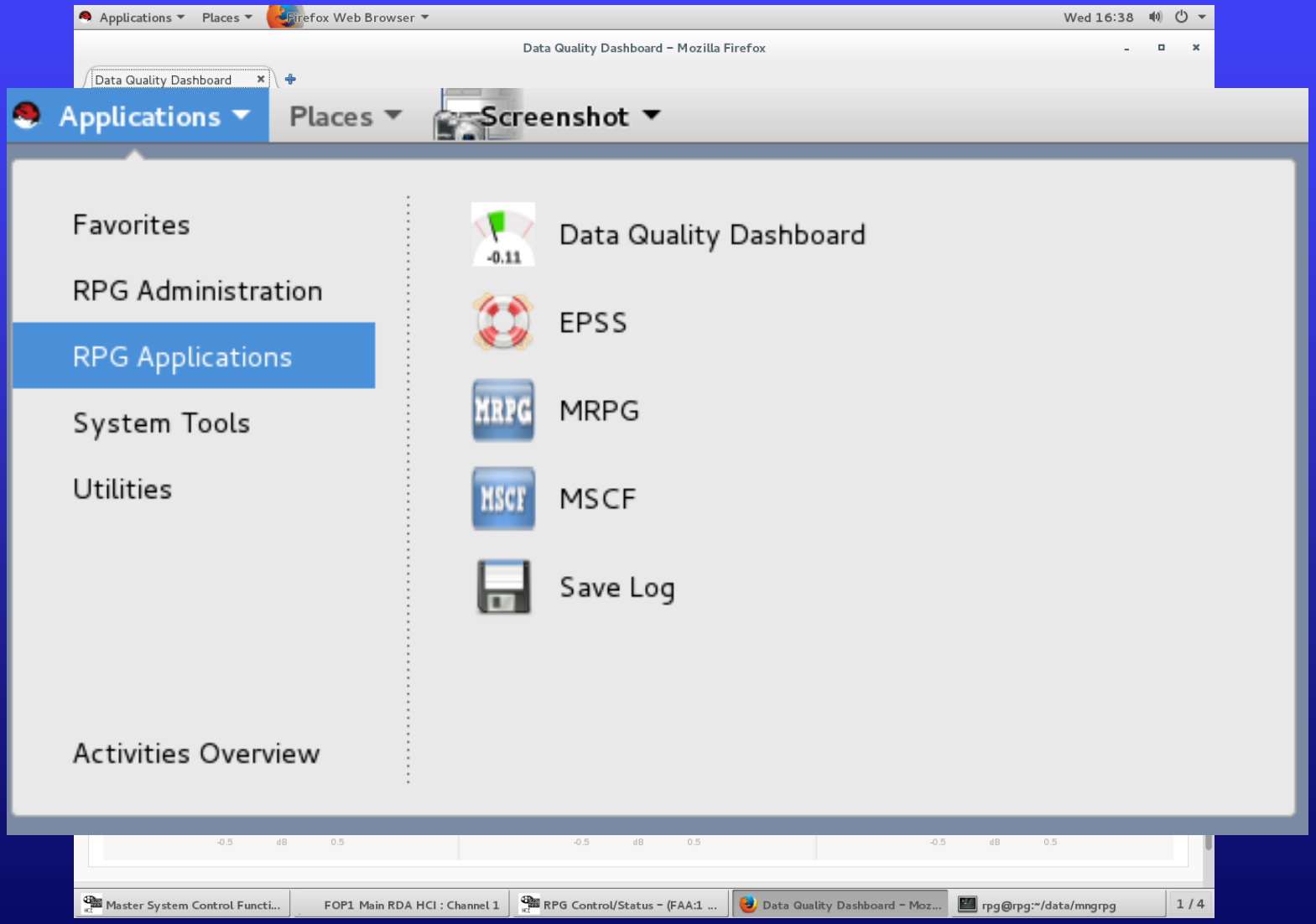
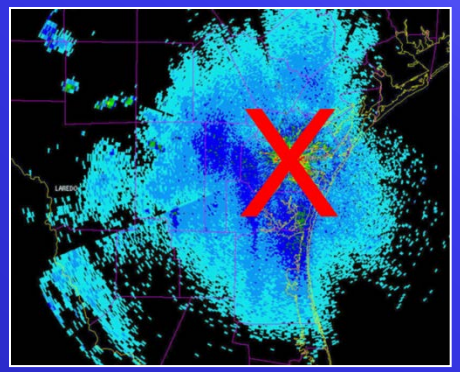
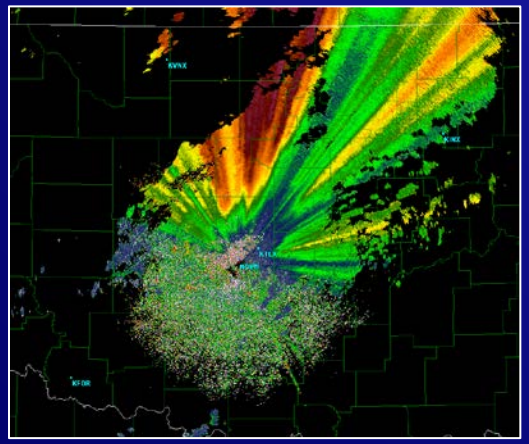
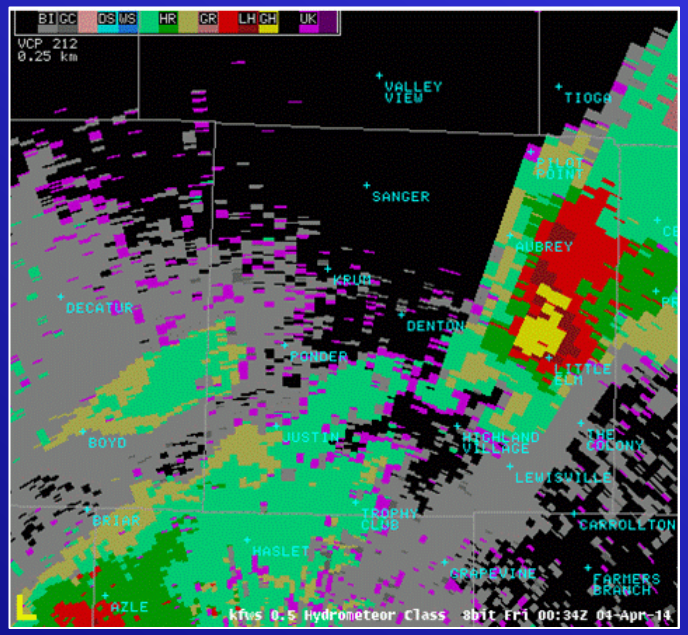
Z-R Relationship Simplification

- Plain language instead of the equations



- QPE resets like PPS (Bug Fix)
- Legacy Z-R a single choice
- Dual Pol Max and MXPRA

Data Quality Dashboard



Thank You For Your Time