NCAR HIAPER Cloud Radar Development Update

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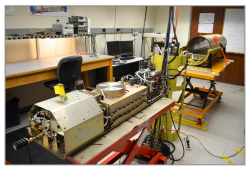
I. Overview

- Airborne, pod-based radar to be flown on the NSF/NCAR GV
- First Phase:
  - -- 94 GHz, fixed nadir pointing
  - -- Transmit V, receive both H and V
  - -- Time series data recording
  - -- February 2013 flight test
- Second Phase:
  - -- Zenith to nadir scanning
  - -- Fully polarimetric
  - -- Summer 2013 completion
- Third Phase:
  - -- Add 35 GHz radar
  - -- Pulse compression
  - -- Not yet funded



HCR installation and GV integration (clockwise from top left): Bench-top Installation , aircraft upload, EMI test on the wing and pod mechanical fitting.

II. GV Integration and Electromagnetic Interference (EMI) Test

- October 16-19, 2012
- Mechanical and electrical compatibility verified
- EMI interference detected within VHF radio band
- EMI issues addressed, retest December 3-7, 2012

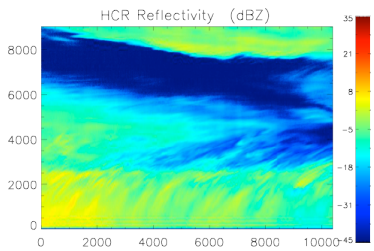
III. Wyoming Cloud Radar (WCR) & HCR Inter-comparison

- Conducted September 24-28, 2012 in Laramie, WY
- Both radars configured to operate with similar characteristics

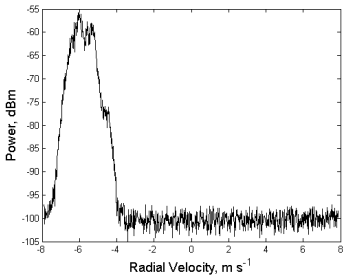
Parameters	HCR	WCR
Pulse width	256 ns	250 ns
Dwell time	162 ms	160 ms
Range resolution	38.4 m	37.5 m
max. range	8.9 km	9.3 km
Elevation angle	30.6 deg	30.6 deg

- Both corner reflector and stratiform rain events were compared
- Signal to noise ratio (SNR) used as basis for comparison

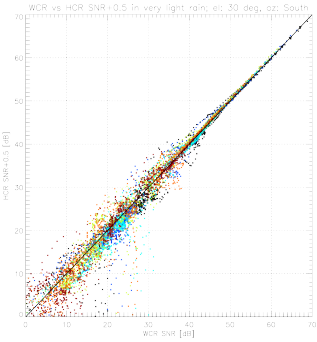
WCR and HCR inter-comparison setup.



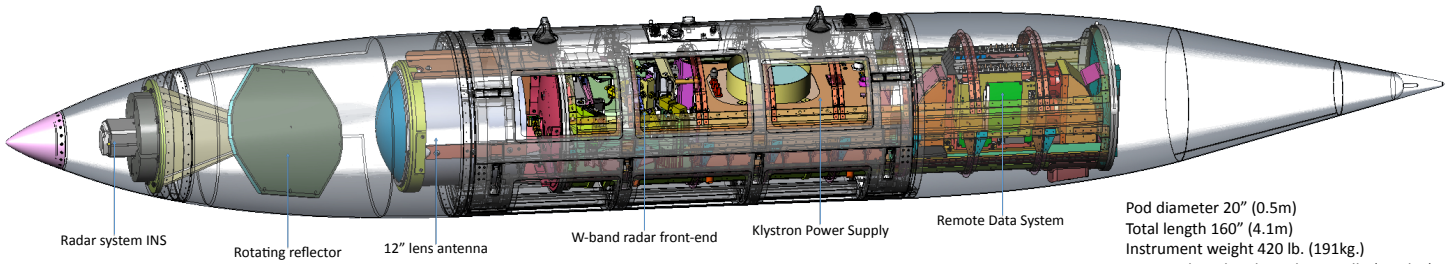
HCR Reflectivity During WCR Inter-comparison)



HCR Spectral Average (10 spectra)



WCR and HCR SNR correlation. (preliminary)



Pod diameter 20" (0.5m)
Total length 160" (4.1m)
Instrument weight 420 lb. (191kg.)
Projected total pod weight ~500 lb. (227 kg.)

CAD model of the HIAPER Cloud Radar scheduled for first test flight in February 2013.