Status of Test and Analysis Plans
For 915 MHz Wind Profiler Replacement
Technology Assessment

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Test Objective

• Evaluate the performance and output of instruments that could replace the current 915-MHz Doppler Radar Wind Profiler (DRWP) networks at the Eastern Range (ER) and Western Range (WR) over a three month (12 week) period.
Instrument Characteristics

• **449-MHz DRWP**
  - Output: Altitude (z), wind speed (WS), wind direction (WD), westerly wind component (u), southerly wind component (v), vertical velocity (w), radial velocity (Vr), signal-to-noise ratio, spectral width, quality flag. Output is provided in “ASD” files.
  - Data are typically provided every five minutes from ~110-8,000 m with 55 m gate spacing.
    - Low-mode: ~110-3,000 m
    - High-mode: ~3,000-8,000 m
    - Interleaving modes – data from both modes are produced every five minutes
  - Vr is typically estimated from combining the current measurement with information from the previous 30 minutes.
  - Quality flag ranges from 0-1 and aids meteorological judgement of a valid / invalid profile. MSFC Natural Environments requests to receive all data regardless of quality.
  - Settings are configurable
Instrument Characteristics

- **Windcube Lidar**
  - 400S system.
  - Output: z, WS, WD, u, v, w, Vr, carrier-to-noise ratio, Doppler Spectrum Broadening, quality flags. Output is provided in csv files.
  - Data are typically provided, on average, every ~20 seconds from 75-200 m to 7,000-14,000 m with 75-200 m gate spacing, depending on the system and configuration.
    - Need to solidify how data reported at this interval would be used operationally.
  - Settings are configurable
Analysis Plan

• Compare measurements from both sources to balloon & profiler measurements
  – Desire one-second balloon data (for consistent block averaging). AutomatedMeteorological Profiling System (AMPS) Low-Resolution Flight Element is mandatory, AMPS High-Resolution Flight Element is nice-to-have.
  – Desire four launches per day, five days per week; at 6:00 AM, 10:00 AM, 3:00 PM, and 6:00 PM local time.
    • Sample different boundary layer regimes.
    • Take advantage of range daily synoptic balloon launches.
  – Use 915 DRWP data from the ER and WR
  – Tropospheric DRWP data could be used above 3 km at the ER.
  – Perform statistical comparisons of concurrent DRWP / Lidar and balloon data.
Analysis Plan (continued)

- Data availability versus altitude
  - Maximum gate altitude distribution
  - Minimum gate altitude distribution (including an examination of ground clutter)
- Calculate effective vertical resolution via spectral analysis.
- Reliability of each instrument, as feasible, due to limited testing period.

- Working with the ER and WR to determine final Analysis Plan
Test Plan

• Working with the ER and WR to determine detailed test plan

• Need to determine configuration of operation for each instrument
  – Gate spacing
  – Time interval between profiles

• Need to determine time period spent in each mode
  – For example; 3 weeks in a particular configuration, 2 days per week in each configuration, etc.

• Expect to produce a 12 week testing schedule