



NEXRAD PROGRAM MANAGEMENT COMMITTEE

RECORD NPMC 07-1

April 11, 2007

1. CONVENED – 10:00 A.M. Eastern Time

A meeting of the NEXRAD Program Management Committee (NPMC) was convened by Chair John McNulty on Wednesday, April 11, 2007, in room 16246 of the NWS Silver Spring Metro Center #2 building in Silver Spring, MD, and was video-teleconferenced to the North Conference Room in the WSR-88D Radar Operation Center, Norman, OK.

Members participating:

Chair	- Mr. John McNulty
DOC Rep.	- Ms. Deirdre Jones & Mr. Frank Kelly for Greg Mandt
DOD Rep.	- Col. Harold Elkins
DOT Rep.	- Mr. Carmine Primeggia
Integration Mgr.	- Mr. Rich Vogt
Exec. Secretary	- Mr. Felix Lee

Guest included:

Guests included: Mark Fresch, Greg Cate, Roger W. Hall, Bob Saffle, Chris White and Mike Istok from the DOC; Mike Spaulding (audio-telephone) from the DOD; Jim Stobie, Bill Bumgarner, Cam Tidwell, Tom Webster, Dennis R. Roofe, Vaughn Yates, Nayeem Hoq, Ken Kraus and Jim Pritchard from the DOT; and Bob Palmer from Oklahoma University

This meeting was video-teleconferenced to the North Conference Room in the WSR-88D Radar Operation Center, Norman, OK. Guests at the Norman, OK, location included: Tim Crum, Terry Clark, Rich Murnan, Maj. Winslow, Maj. Miller, 1Lt. Parish, Rich Ice, Dan Berkowitz, Ed Berkowitz, Rex Reed, Randy Steadham, Bill Armstrong, Mike Jain and Jeff Kimpel from the DOC; and Rick Mattox and Bettie Loudenslager from the DOT.

OPENING REMARKS

Call to order. NPMC06-2 Meeting Record approved.

(3c) REFRACTIVITY MEASUREMENTS OF WATER VAPOR, 2007 FIELD STUDY PLANS [Informational]

Mr. Rich Murnan, ROC Applications Branch, provided an information briefing regarding the spring 2007 demonstration project in the Norman, OK area to measure atmospheric refractivity from radar transmissions. These measurements can be directly related to water vapor content in the lower atmosphere - which is an important predictive meteorological variable. The following topic points were covered:

What's Refractivity (N)?

- Is a measurement of the variability of the radar wave propagation due to changes in the atmosphere between the radar and target

KTLX Refractivity Project Objective

- General: To build a business case on the cost benefit of implementing a refractivity monitoring capability on the Nation's network of weather radars.
- Specific: Refractivity demonstration at Norman WFO to evaluate impact to mission (pro/con) and concept of operation
 - Dates: April 2 – July 9, 2007.
 - Forecaster Training: Week of April 9.
 - Report: Due August 31, 2007.

KTLX Refractivity Project Overview

- Builds on recent NCAR REFRACTT research and 2006 field experiment –(Reference Rita Roberts' presentation at November 2006 TAC)
- Independent code developed at OU but based on original work by Fabry
- Real-time refractivity fields from KTLX sent to local WFO for forecaster use/evaluation –(Additional information: As part of the MPAR activities this year, NSSL has intentions to generate real-time refractivity fields using the MPAR.)
- Qualitative/quantitative assessment procedure developed by NSSL

KTLX Refractivity Project Collaborators

- Project Management (ROC) - Rich Murnan
- Software Development (OU) - Bob Palmer and Boon Leng Cheong
- Display Workstation: WDSS-II (NSSL) - Kurt Hondl
- Operator Training (NSSL) - Pam Heinselman
- Equipment / Comms / ECP (ROC) - Christina Horvat

KTLX Refractivity Project Methodology

At RDA:

- Level 1 data from RVP8 recorded and processed into Refractivity products.
- Products shipped via new T1 line to Norman WFO.

At WFO:

- Products displayed on WDSS-II in forecast area.

KTLX Refractivity Project Data Flow

KTLX Refractivity Project Data

KTLX Refractivity Project Training Approach – Interactive Lecture

- Relevance, potential use, and how the technique works
- Examples of data and hands-on practice interpreting refractivity retrievals
- How to display refractivity in WDSS-II
- Understand their role in the project

KTLX Refractivity Project Evaluation Method

- Develop a pilot survey designed to evaluate relative advantages and limitations of refractivity fields to NWS WFO operations
- Forecasters respond to survey on a daily basis
- Assess pilot survey (early May) by interviewing a few forecasters about its utility and completing a preliminary analysis of responses
- Revise survey as needed
- Assess all survey results using qualitative (coding) and quantitative methods
- Report analysis of forecaster responses to the ROC

KTLX Refractivity Project Concept of Operations (item in Operations and Services Improvement Process (OSIP))

- Operational, Technical, and Organizational Impacts
- Operational Impacts (examples):
 - Baseline refractivity field calibration on seasonal or more frequent basis.
 - Customize display colors targeting trigger thresholds.
 - Effect of clutter filtering to refractivity products.
- Technical Impacts (examples):
 - Communication issues (a new moment from the RDA).
 - Level 2 dissemination/collection.
- Organizational Impacts (examples):
 - AWIPS display and database issues.
 - Level 3 product distribution to external users (NCDC and RPCCDS).

(2a) IPM UPDATES ON VARIOUS PROJECTS

[Informational]

Mr. Richard Vogt, IPM, provided updates on the status of various projects and events taking place at the ROC and in the NEXRAD Program that didn't require a separate formal briefing. The following topic points were covered:

Keep Operational Systems Running

- ROC completed 20 electronics maintenance trips since last PMC meeting to field sites for radar maintenance, resolve data quality issues, depot-level support, and Build 9 Beta Test support
 - Includes 2 Limited Production Phase pedestal modifications
 - Trend: FY99 = 36; FY00 = 46; FY01 = 28; FY02 = 50; FY03 = 58; FY04 = 74;

FY05 = 73; FY06 = 74

- Monthly Average Service Availability Last 12 Months
- NEXRAD Actual Parts Usage Cost Separated By Agency
- NEXRAD Actual Parts Usage Separated By Agency
- Contracted depot-level radome and tower maintenance
 - Radome (5 repaired; 7 inspected since last PMC)
 - Repaired sites: Elko, NV; Topeka, KS; Glasgow, MT; Nashville, TN; and Mobile, AL
 - Panel/site trend: FY02 = 136/11; FY03 = 119/11; FY04 = 27/14; FY05 = 48/10; FY06 = 47/7
 - Tower (2 repaired; 1 inspected since last PMC)
 - Repaired sites: State College, PA and Dover AFB, DE
 - Repaired/inspected trend: FY05 = 16/32; FY06 = 13/20
 - Projected repairs/inspections through end of FY07: radome 5/32; tower 4/42
- Awarded 1-year (4 option years) radome services contract to L3-ESSCO
- Developing shelter refurbishment contract solicitation
 - Contract award slated for May/June 2007
 - NWS regions can issue ROC-prepared SOW for task order contracts

Sustain Baseline Operational Radar System Capabilities

- Evansville, IN radar support
 - Installed UPS bypass; keeps radar up during UPS maintenance
 - Updated signal processor firmware; improve data quality
- Decreased VCPs 11 and 21 time by 55 and 48 sec
 - Investigating additional data quality issue
- Modification documents issued since last NPMC
 - Two triagency software notes (Build 8.2 and Build 9.0)
 - Triagency mod note (Build 9.0 and RPG Refresh)
 - Triagency mod note (RPG connection to FAA WAN)
 - Mod Note/TCTO kit allowing ingest of NWS and DOD WSR-88D data into FAA new digital FTI WAN
 - Mod Note/TCTO (RPG modem/circuit change for OPUP)
 - 3 USAF TCTOs (OPUP Build 9; OPUP for new radar connections (CONUS); OPUP for new radar connections (Hawaii, Korea, Kadena)
 - 1 NWS Mod Note (FAA dedicated circuit & modem relocations to the RPG)
- GPS update of radar location data
 - Generated and issued updated terrain relief data for 30 additional sites in Build 9; improves accuracy of precipitation products
 - In all, 84 sites have required updating; all updates completed in Build 9 or earlier
 - Analysis of 5 FAA Alaska sites, Kadena, and Kunsan needed; required updates targeted for Build 10
- Software Recommendation Enhancement Committee (SREC) activities
 - “Mini” SREC held 3/28; define Dual Pol algorithm version implementation plans based in part on TAC recommendation
- SREC plans, by 5/12

- Finalize plan for next full SREC (now planned for mid June)
- Build 11 content and release date recommendation finalized for NPMC consideration
- Build 12-14 targeted contents and release dates
- Technology transfer MOU review
- Decide whether Build 11 should be tied to Dual Pol
- Support NPI Program
- Supported ORDA Project
 - 66,500 hours overall, 1900 hours last PMC
 - ROC electronics technician provided ORDA installation assistance at Shanghai and Taiwan
- Supported Dual Pol Project
 - 2,392 hours overall, 838 hours last PMC
 - Upgraded Pedestal Test Facility to support Dual Polarization engineering development
- Special Projects
- Contacts with congress/media/interest groups
 - Panama City, FL TV station inquired why Ft. Rucker WSR-88D not part of real-time Level II data collection network
 - Group interested in weather near mouth of Columbia River (Oregon) again asking for a radar along the Pacific coast
- DOC OIG report regarding Rogers, MN tornado in September 2006; major radar-related findings
 - WSR-88D working properly
 - NWS should assess connecting rest of TDWRs to WFOs
 - NWS should deploy all available technology (e.g., 3D display (AWIPS), Super Resolution data)
- Supported December 2006 and March 2007 MPAR Working Group meetings
- ROC engineering attended Gulfstream G-IV Tail Doppler Radar project CDR
- Participated in NWS Central Region ET conference and Western Region SOD/EPM/ESA conference
 - 8 maintenance workshops conducted at Central Region conference
- FMH-11 Updates
 - OFCM published Part C update in December; supports NEXRAD agency and external users
 - Targeting OFCM publishing Part A update in May; supports Build 9 deployment
- Wrote NWS Public Information Statement in regard to proposed Build 10 changes in Level II format and data
 - NEXRAD agency and external Level II users must prepare for planned data format and content changes
 - Data Format Change
 - Required for Dual Polarization
 - Data Content Change
 - Legacy Resolution to Super Resolution
 - If can't send Super Resolution data due funding issues, will send Recombined Data

- ROC Consolidation

- Applications Branch, Radar Engineering, Electronics Maintenance, RSIS Management, and Documentation Teams are in place as of mid Sept 06...49 total staff
- Adair Bldg renovation is complete and IT&S moves Apr 07
- Adair Bldg Lease in approval process...7 yr Operating Lease
- Bldg 600/"NSSL" renovation underway Mar - Sept 07; move remaining staff in Oct 07
- Bldg 600 Lease awaiting "Best and Final Offer"...anticipate 10 yr Operating Lease

Additional Information

- The NWS has released an RFP to build and install
 - 35 operational and 3 support wind profilers
 - Option for 18 additional operational wind profilers
 - Updates frequency from 404 to 449 MZ (avoid conflict with European satellite emergency frequency) and tech refresh
- Contract will be awarded in FY07
 - Deployment FY08 through FY11
- ROC will provide life cycle support for the wind profiler network
 - Wind profiler test bed at ROC
- Current planning: ROC will assume wind profiler support responsibility in FY10
 - Additional NWS resources will be transferred to ROC to support this activity

(2b) UPDATES ON VARIOUS ENGINEERING PROJECTS

[Informational]

Mr. Rex Reed, ROC Engineering Branch Chief, provided updates on various WSR-88D engineering projects that didn't require a separate formal briefing. The following topic points were covered:

Interference

- Working 7 interference cases
 - Shows on products
 - Attempting to locate interference sources
 - Possible frequency changes of other systems
- ASR-11 Interference,
 - Fort Smith, AR, Springfield, MO, Columbia, SC
 - Fix requires WSR-88D and ASR-11 changes
 - WSR-88D modifications installed (will become fleet-wide mod)
 - Interim ASR-11 mod at Ft. Smith & Springfield
 - Still awaiting delivery & installation of final ASR-11 hardware
- ASR-7 Interference Identified-Green Bay & Mobile & Midland/Odessa
 - ASR-11 replaces ASR-7 - Mobile Aug 2007, Midland/Odessa Dec 2007, Green Bay Oct 2008
 - Minor operational impact
 - SR & CR agreed to wait for ASR-11 installation

Lightning Investigation

- Inspected Albuquerque in Nov 2006
- Site requested inspection as part of Optic-Isolation DAU test
- Ground grid tied to overhead commercial power neutral feed
- Bond exposes ground grid to lightning energy on power neutral
- After coordination, bond was removed
- ROC will monitor site reliability for reliability trend

DAU Optic Isolator

- Field test units: Tallahassee, Melbourne, Dodge City, Miami, Albuquerque and Kauai
- Single DAU failure at Tallahassee; failure not due to lightning energy from external cables
- Melbourne had pedestal faults but believe not mod related
- Planning deployment & follow on DAU redesign
- Begin deployment by end FY07

LED-Based Obstruction Lights Kits

- Installed by local technicians
- Still investigating any other sites requiring kit
- Total of 92 kits shipped

LPP Pedestal Lubrication

- Impacts 8 field and 3 support sites
- Requires ROC depot team to implement
- Developed procedures on NSSL LPP pedestal
- NWSTC pedestal now modified
- Plan mod complete end FY07
- TM with modified lubrication procedures

Louisville/Ft. Knox WSR-88D Blockage Study

- NWS CR HQ/WFO/RFC requested study
- Several sectors of reduced precipitation accumulations
- Vegetation growth increasing blockage?
- ROC radar site visit
- Radar on Ft. Knox military reserve
- Much blocking terrain in impact zones
- Impact zones have limited access
- Special studies on impact zones needed to remove vegetation
- Trip report: shows blockage/recommends vegetation removal
- Ft. Knox personnel resistant to large scale vegetation removal
- Next ROC action:
- Study showing increased blockage by vegetation growth over time
- Expect completion May 07
- Will request vegetation removal in one area to show benefit
- Large scale vegetation removal may require more impact studies/funding
- *Bob Saffle commented that dual pol might mitigate this issue --*

OPUP Security Recertification

- AFWA Requires New Process for C&A (DIACAP vs. DITSCAP)
- ROC Submitted Package 28 Feb 2007

–OPUP first DIACAP Package Received by AFWA Certifier
–ISA Approved 7 Mar 2007

–Certifier Recommended Approval to AO 15 Mar 2007

–Reaccreditation Due 2 Apr 2007

–Until AO Approval Received

•Maintain WSR-88D to OPUP interconnections

•Document as WSR-88D POA&M Issue

–Expect Approval No Later than 15 May 2007

WSR-88D C&A Status

–Updates for Reaccreditation in Progress

–NWS Requires New Process (NIST vs NIACAP) & new C&A

–Other Updates Based on Comments from DoD, NWS and FAA Certifiers

–Under Review

•Updates to Tri-agency and Security Specific Memorandums of Agreement

•ISAs for East & West Ranges, WSMR, SRP, FAA RMS, and FAA ITWS

–Approved: ISAs for CR, ER, SR, NWS HQ, AWIPS and OPUP

–Being Finalized: HW & SW Inventories and Configuration Profiles

–Pending: POA&Ms-DoD OPUP and FAA RMS Reaccreditation

–New Vulnerability Scans Necessary (June 2007)

–Submit C& A Package Jun 2007

–Need WSR-88D Package Approved by AO 17 Nov 2007

RPG Refresh

–Deployment with Build 9

–HW purchased & kits ready to ship

–Outstanding support from NRC & NLSC to meet schedules

–Initial beta installations

•Provided valuable feedback

•Successful

ROC Remote Access-Frame Relay

–Access and monitoring via frame relay

•Allows ROC remote troubleshooting, recovery, status, resets

•Reduces time/travel to reconfigure or troubleshoot routers

•Includes DOD/FAA connections

–Access included in RPG SW Changes: Builds 8 & 9

–Build 9 extends frame relay monitoring/troubleshooting capability to 83 sites

–Working with CIO

•To determine if NOAANet can be used

•If use possible, cost of using NOAANet

–Expanding to more hurricane-prone sites

Implement IPV6 Capability

–OMB mandated implementation by June 2008

–WSR-88D has no Internet access; only required for OMB compliance

–SREC briefed: not in Build 10 - Build 11 or later

–Implementation:

- Only implement on routers to external networks
- Implement on remaining WSR-88D hardware by attrition (ex: RPG Refresh)
 - In ROC 8-year mod plan as FY08 router replacement
- Existing hardware obsolete & can not be updated
- Since now replacement and not upgrade, FY08 Cost increases to:
 - DOC \$1.625M, DoD \$584K (includes OPUP), DOT \$387K
 - 1,200 hours ROC & 120 hours NRC/NLSC staff time required
 - Can not meet June 08 deadline; waiver needed until implemented

Trigger Amplifier Modification-Revision C

- Now being deployed by attrition via NRC/NLSC
- Mod takes about 16 hours vs 5 hours to repair old unit
- Approximately 184 of 420 units now modified (43%)
- 20 modified Rev C units returned for repair
- 2 unmatched units (now matching SCRs to reduce failures)
- 4 with failed, matched components
- Remainder: shipping damage, failures unrelated to mod or no defect found
 - Result: significant transmitter reliability improvement!!

NEXRAD to WARP Interface

- Software to FAA RPGs in Build 9
- ROC supporting deployment
- Resolving issues as they arise
- FTI Connectivity not available in time for San Juan Build 9 Beta test
- Need \$135K to keep ongoing contractor support

Pedestal Mounting Bolts

- Pedestal mounting bolt torque problem
- Validated concept of using anti-spin washers & SmartBolts
- Issuing solicitation to procure SmartBolts
- ROC depot team installation when on site for other work
- Reduces number of climb for maintenance

Post Hurricane Satellite Communications

- Emergency communication when terrestrial service lost
- NWS CIO Purchased 10 satellite terminals
- CIO provided ROC 3 testing/operational terminals
- No commercial satellite service selected
- ROC performing tests on 3 service providers
- Last test planned in April 2007 delayed
- ROC report after last test in progress
- Current results:
 - One test during heavy thunderstorms (operation satisfactory)
 - Tested operational scenarios (radar up, WFO down, and etc.)
 - SATCOM concept proven

USAF-OPUP Projects

- Deployment of OPUP
- Ft. Riley only OPUP awaiting installation

- Waiting for communications to schedule installation date
 - Future OPUP
- JET is OPUP display replacement
- Clarifying JET era requirements with AFWA
- Current general concept
 - Central radar product server feeding JET displays
 - Full OPUP functionality on JET
 - Timeframe is 2010
- Supportability of OPUP to JET timeframe under study
- If JET delayed, OPUP refresh may be needed
 - OPUP digital communications
- Convert OPUP communications to digital service
- Planned for Build 10; Build 11 now more likely
- Alaska reconfiguration
 - Need to reconfigure Alaska circuits in Dec 2007
 - Requires test ECP & ROC site visits to accomplish

(2c) STATUS OF UPCOMING MOVES OF WSR-88D SYSTEMS

[Informational]

Mr. Ed Berkowitz, ROC Program Branch, presented an update on the planning for the moves of the Camp Humphreys, Korea and Sterling, VA WSR-88Ds. The following topic points were covered:

Sterling, Virginia:

- Move necessitated by runway expansion at Dulles Airport
- MWAA contracting with RSIS on construction of the new NEXRAD site
- 90% Submittal on Design Report was reviewed on 15 March
- ROC analyzed potential radar obstructions at new radar site – no issues
- RSIS solicited cost estimates for long lead items:
 - Standard 30 meter tower
 - ESSCO NEXRAD Radome w/ Aircraft Warning Lights.
 - Civil Engineering Support
- Project on Schedule (complete Aug 08) -moderate risk

Camp Humphreys, ROK:

- Move precipitated by construction of new barracks on base
- Camp Humphreys Relocation Delayed
 - 2 months slip in Army’s award of site prep, power installation, and communications installation
 - Award of site prep contracts - April 4
 - USAF prefers service cutover to occur post typhoon season
 - Completion of relocate will slip to 1FY08
- Purchased long lead items
 - Radome in storage in ROK

-Tower in storage in CONUS

- ROC will implement add'l spot blanking sector due to delay of radar relocate to protect workers constructing near-by new barracks
- ROC on schedule for 1 Nov - Low Risk (risk due to dependency on Korean labor)

(2e) IMPACT OF FTS NETWORKX UNIVERSAL CONTRACT AWARD UPON EXISTING NEXRAD WSR-88D TELECOMMUNICATIONS [Informational]

Chris White from the CIO's office presented the NPMC with the plan for transitioning NEXRAD communications to the NETWORKX environment. The following topic points were covered:

NEXRAD WSR-88D TELECOMMS

•NEXRAD telecomms are currently distributed among three FTS2001 Vendors as well as commercial Vendors. These Vendors and the type of services provided are:

-Verizon Business /MCI (FTS2001)

-Frame Relay Service - CONUS

-Dedicated point-to-point (mainly T1s for Rdr ckts)

-AT&T (FTS2001Crossover Contract)

-Frame Relay Service - OCONUS (AK, HI, SJ)

-A few dedicated-point-to-point T1 Rdr ckts

-Sprint (FTS2001) - Dial VPN service

-Various Commercial Vendors - Dedicated point-to-point T1s (Rdr ckts)

Impact of Fair Opportunity Requirements on NEXRAD FTS Telecomms

•What is the impact if Fair Opportunity requires that the NWS transition certain types of NWS FTS2001 services to one particular Network Vendor?

•The time frame for transition would be mid 2009 to 2010.

•The impact varies with each Vendor (Verizon, AT&T, or Qwest).

•For example, the impact is less if chosen vendor is Verizon (MCI) for Frame Relay or dedicated transmission service than if chosen vendor is AT&T, but much greater if Qwest for NEXRAD telecomm circuits.

-Verizon < Impact than AT&T

-AT&T < Impact than Qwest

Impact If Verizon is the Chosen Vendor

•All CONUS Frame Relay Services Remain

-Approximately 80 frame relay circuits

-Less impact on work load of ROC and CIO14

-Only the OCONUS Frame Relay service via AT&T to transition

-Approximately 30 Frame Relay circuits to Transition

-Assuming One month dual Operations & One time credits - financial impact minimal

•Most CONUS T1 Radar Circuits Remain

-Approximately 47 T1 Radar circuits

-Less impact on work load of ROC and CIO14

-Only the T1 Radar circuits via AT&T crossover to transition

- Approximately 7 T1 Radar circuits to Transition
- Assuming One month dual Operations & One time credits - financial impact minimal
- Dial VPNs via Sprint would have to Transition
- Approximately 3 per WFO ORPG; 2 PER DOD ORPG; Approximately 400
- Could require an impact on work load of ROC and CIO14 if retained
- Not sure if offered, but could require a moderate financial burden if retained.

Impact If AT&T is the Chosen Vendor

- All OCONUS Frame Relay Services Remain
- Approximately 30 frame relay circuits
- Greater impact on work load of ROC and CIO14
- All the CONUS Frame Relay service via Verizon to transition
 - Approximately 80 Frame Relay circuits to Transition
 - Assuming One month dual Operations & One time credits financial impact Substantial
- Most CONUS T1 Radar Circuits Must Transition
- Approximately 47 T1 Radar circuits
- Great impact on work load of ROC and CIO14
- Only the T1 Radar circuits via AT&T crossover to Remain
 - Approximately 7 FTS2001 T1 Radar circuits to Remain
 - Assuming One month dual Operations & One time credits financial impact Substantial

- Dial VPNs via Sprint would have to Transition
- Approximately 3 per WFO ORPG; 2 PER DOD ORPG; Approximately 400
- Could require an impact on work load of ROC and CIO14 if retained
- Not sure if offered, but could require a moderate financial burden if retained.

Impact If Qwest is the Chosen Vendor

- All CONUS Frame Relay Services Must Transition
- Approximately 80 frame relay circuits
- Extreme impact on work load of ROC and CIO14
- All 30 OCONUS Frame Relay service via AT&T to transition
- Assuming One month dual Operations & One time credits - financial impact Extreme
- Most CONUS T1 Radar Circuits Must Transition
- Approximately 47 (Verizon) + 7 (AT&T) T1 Radar circuits
- Extreme impact on work load of ROC and CIO14
- Assuming One month dual Operations & One time credits - financial impact Extreme
- Dial VPNs via Sprint would have to Transition
- Approximately 3 per WFO ORPG; 2 PER DOD ORPG; Approximately 400
- Could require an impact on work load of ROC and CIO14 if retained
- Not sure if offered, but could require a moderate financial burden if retained.

(2d) STATUS OF AUTOMATION EFFORTS FOR IMPROVING WSR-88D SYSTEM OPERATIONAL EFFICIENCY [Informational]

Randy Steadham and Dan Berkowitz, ROC Applications Branch, presentrd the status of

ROC efforts to improve WSR-88D operational efficiency through automation. The discussion reported on: (1) the successes and failures of the use of the Mode Selection Function to automatically select the VCP mode; (2) current and future efforts to automatically select the optimal VCP for operations; and (3) current efforts and status toward implementing the Clutter Mitigation Detection algorithm in the ORDA for automatic control of clutter filtering. The following topic points were covered:

Mode Selection Function and VCP Automation

[Randy Steadham, Applications Branch]

Overview

- MODE SELECTION FUNCTION (MSF) in RPG Build 8

- Volume Coverage Pattern (VCP) Usage Trends

- Optimization of VCPs

- Optimized VCP Efforts

Mode Selection Function (MSF)

- A tool in the RPG that helps manage VCP usage based upon radar detection

- Implemented in Build 8

- Replaced the obsolete Precipitation Detection Function

- WSR-88D operators may automate use of VCPs

- Automation consists of switching between “Clear Air” and “Precipitation” modes

MSF Advantage

- Options for field use:

- Operators can override to manually control VCP usage

- Radar can respond automatically to the type of weather mode detected

- Net reduction in antenna rotations:

- Cost savings due to reduced wear on antenna pedestal components

- Reduced communications usage

- Increased sensitivity

- NWS VCP Usage by Month 2006

- NEXRAD VCP Usage (2005-2006)

- Automatic VCP Example

- Missed MSF Opportunity?

Optimization of VCPs

- NWS - Versatility, Hands-on, Scans to match the meteorological situation

- FAA - Faster updates for controllers, Consistency (that automation provides)

- DoD - Do no harm

Optimized VCP Efforts

- NSSL studying an Enhanced MSF that automatically detects convection aloft

- MSF provides a platform to expand automation capabilities

- Faster VCPs in NWS OSIP project pool

- ‘Lower elevation angles’ project

- Automated “Smart” VCP selection is goal

-- Col. Elkin's question – Is this long pulse or short pulse VCP? Answer: Short pulse VCP. --

Clutter Mitigation in the WSR-88D – Present and Future

[Dan Berkowitz, Applications Branch, Radar Operations Center]

What is “Clutter”?

- “Clutter” refers to undesirable echoes (i.e., non-precipitation echoes in weather radar displays), whether moving or stationary.
- Ground Clutter - terrain, buildings and towers, trees, highway and street traffic, wind turbines
- Biological Clutter - insects, birds, bats

Impacts of Clutter Contamination

- Erroneous rainfall and snowfall estimates and, consequently, false weather or flood warnings
- Erroneous velocity information and output from nearly all algorithms
- Delaying or rerouting air traffic because of suspected thunderstorms, resulting in wasted fuel and time for flights
- Misleading the public and commercial data users (e.g., TV weathercasters)

Current Mitigation Methods

- Operator control allows:
 - Selection of no clutter filtering
 - Filtering using the Clutter Bypass Map (Stationary targets are identified during non-operational periods.)
 - Filtering within specified regions (sectors or zones)
 - Filtering on all locations
- Data quality at the RPG is done automatically within selected algorithms.
- Precipitation products use Radar Echo Classifier (REC).
- Some aviation products use the Data Quality Algorithm (DQA).
- Other products have no clutter removed by any algorithm.

Clutter Mitigation Decision (CMD) Software

- Would run at the RDA
- Would not increase the total VCP time
- Identifies ground clutter in real-time (as it appears or changes)
- Performs automatic filtering of clutter in conjunction with manually set suppression regions and prior-generated clutter bypass maps
- Improves overall basic data quality for everyone
- Improves performance of algorithms

Concept of Operation includes the ability of an operator to override CMD with manual and/or selective control.

KFTG, 21 September 2006, 05:30 UTC – Unfiltered Z vs. Z filtered on CMD Clutter Map

Current CMD Status

- NCAR has tested the CMD performance on varied weather scenarios (e.g., convective precipitation, mixed precipitation with AP, isolated AP, snowfall, and stratiform rain).
- CMD is compatible with dual polarization.
- May 2006 SREC recommended targeting CMD for Build 13 based on

- Lack of readiness at that time and
- Concern over major ORDA changes after the dual pol. contractor has been given the baseline.
- The spring 2007 NEXRAD TAC endorsed the science and the use of CMD to improve data quality.
- TAC recommended implementation as soon as possible.

Future CMD Efforts

The next milestones are

1. SREC consideration for earlier software build,
2. Further ROC independent validation and verification testing,
3. Documentation,
4. Coding,
5. Completion of design reviews, and
6. Software deliveries for integration in the designated software build.

Summary

- CMD permits better data quality in real time without operator action.
- CMD implementation requires coding, further testing, and documentation.
- The SREC will consider implementation readiness and an ORDA software release.

(2f) IMPACTS OF WIND FARMS ON WSR-88D OPERATIONS AND POLICY ISSUES [Informational]

Mr. Richard Vogt, IPM, provided an update on the actions taken in regard to wind farms impacting WSR-88D operations. The discussion also included what the government should do when we have operational concerns of degradation of radar coverage or quality. The following topic points were covered:

Wind Farm Related Actions Since Last NPMC Meeting

- ROC continues to receive notices of proposed wind farm projects (primarily via IRAC)
- A subset of all potential additions, voluntary participation
- Provided 22 evaluations
 - All but two evaluations found “minimal interference”; recommended no action required by developer
 - Two evaluations showed the turbines will be in the line of sight of the nearby WSR-88Ds; recommended wind farm relocation
- A wind farm developer inquired how WSR-88D could see wind farms 80 km away
 - Provided explanation
 - Developers may be concerned about liability issues
- Project with Don Burgess (OU/CIMMS) to study impacts of wind farms on WSR-88D data and forecast office warnings/operations
- Collected additional data to support signal processing study by OU (Dr. Palmer)
- ROC still learning of wind farms and impacts from field sites (e.g., Fort Drum, NY WSR-88D/Burlington, VT WFO)
- Congressman Neugebauer, TX, requesting public forum regarding wind farm

development and military readiness

–Represents Dyess AFB, TX area

–Large wind farm proposed west of Dyess

- Congressman concerned wind turbines may impact current and future Dyess mission capability
- Wind farm likely will impact WSR-88D performance
- ROC presented wind farm paper at AMS annual meeting
 - Considerable audience interest
 - Paper a useful reference for inquiries

Near-Term Action Plans

•Poster presentation and paper at American Wind Energy Association's Annual Meeting; WINDPOWER2007, June 2007

–Inform wind energy industry of:

- Mission critical WSR-88Ds; locations
 - Impacts of wind farms on WSR-88Ds, forecasts/warnings, and other radar data users
- Discuss how we can work together to site new wind farms for non-interference
- Continue to be proactive in learning more about
 - Wind farm locations
 - Analyzing proposed wind farms for radar impacts
 - How to mitigate impacts on WSR-88D

Criteria for Wind Farm Operational Impacts

•Wind farm evaluation – strategy for conclusion

–Turbines/towers within radar beam?

- If NO, impacts likely minimal during normal conditions
 - If YES, impacts likely most of time; *Recommend proposed wind farm be sited in a geographic location on a non-interfering basis where the turbines/blades will not protrude into the radar beam (i.e., outside radar line of sight)*
- Wind farm evaluation – strategy for conclusion
- Evaluation factors – not yet quantitatively defined:
- Distance from radar
 - Number of turbines in wind farm
 - How far into the main beam the turbines/towers protrude
 - Location of wind farm with respect to prevailing weather track(s)
 - Orientation of wind farm with respect to radar (i.e., down radial or cross radial)

Actions To Take When Operational Impacts Expected

•Federal government does not have land-use decision authority on private property

•ROC, via IRAC, tells developer

–Wind farm will impact the radar

–Recommend different siting – outside radar line of sight to mitigate impact

•Continue participation in Federal Interagency Wind Siting Working Group meetings

•Inform WSR-88D owner of impact assessments

–Encourage local interaction with developers and permitting authorities

-- *Comments by Carmine Primeggia/John McNulty: Is it possible to resolve the issue of wind turbine interference using software by, for instance, injecting (i.e. wind velocity,*

air density, rain rate, blade up-wash and down-wash effect, etc.) at the turbine data into software as a filtering mechanism? Action item assigned to look into feasibility/utility of collecting this data. --

(2g) UNIVERSITY OF OKLAHOMA WIND TURBINE CLUTTER STUDY UPDATE [Informational]

Dr. Robert Palmer, University of Oklahoma School of Meteorology, provided an update on his wind farm/wind turbine mitigation study. The following topic points were covered:

KDDC Level-I Experiment, June 2006

–Gray County Wind Farm Near KDDC – located 25 miles SW of Dodge City, Kansas; 170 towers; height of towers – 217 feet (66m); length of blades: 77 feet (23.5m); 28.5 rpm; tip velocity of 70.14 m/sec

–Level-II Radar Loop - Dodge City, Kansas (KDDC), June 17, 2006

–KDDC VCP 21 Scanning Data Mixed Wx and WTC, March 31, 2006

–KDDC VCP 21 Scanning Data Wx/WTC Interaction

Simple 3D Interpolation Results

–Level-II Interpolation Method

- Global Interpolation using a Radial Basis Function, weights are determined by the distance between the points

- Use the “multiquadratic” method developed by Roland Hardy, 1971

–Level-II Interpolation Results - KDDC, 3D Interpolation Reflectivity

KTFX Level-I Experiment, Nov 2006

–Great Falls, Montana near KTFX – located 6 km West of Great Falls, Montana; 6 towers; height of towers – 262.4 feet (80m); length of blades: 126 feet (38.5m); variable 11-20.4 rpm; tip velocity of 82.25 m/sec

–KTFX Level-II Example – November 30, 2006

–KTFX VCP 21 Scanning Data – WTC During Clear-Air

–Doppler Spectra from Wind Turbine Clutter (WTC) – the Doppler spectrum is a power-weighted distribution of radial velocities within the resolution volume – examples of unique velocity distributions include: tornados, ground clutter, sea clutter, birds, WTC

–Examples of Multi-Trip and Three-Body Scatter from WTC Verified by Doppler Spectra

Summary and Future Work

–Explored WTC characteristics (Doppler spectra and moments) from Dodge City and Great Falls WSR-88Ds

Developed simple interpolation technique (loss in resolution)

–Investigated existence & characteristics of multi-trip and three-body scatter for Great Falls case

–Future work will include interpolation scheme based on three-dimensional continuity of Doppler spectra

(2h) INTERIM RESULTS OF NSSL/CIMMS STUDY ON IMPACTS OF WIND

TURBINES ON WSR-88D AND FORECAST OPERATIONS

[Informational]

Tim Crum, ROC, presented Mr. Don Burgess', National Severe Storms Laboratory/Cooperative Institute for Mesoscale Meteorological Studies, interim results of his study on the impacts of wind farms on weather forecast office forecast/warning performance and WSR-88D algorithm performance. The following topic points were covered:

Study Goals

- 1st Priority: Dodge City WSR-88D (KDDC)
 - Two Wind Farms
 - Large Farm ~40 km Southwest of Radar
 - Smaller Farm ~22 km Northeast of Radar
 - Climatology of Echoes
 - Impacts/Potential Impacts on Operations
- 2nd Priority: Great Falls WSR-88D (KTFX)
 - One Wind Farm: Close to Radar (~6 km), 6 Turbines
 - Spot Observations
 - Impacts/Potential Impacts on Operations

DDC Southwest (SW) Wind Farm

- Montezuma Wind Farm
- 170 Turbines
- Turbine Tops ~120 m AGL
- Azimuth Extent ~12° (240°-252°)
- Range Extent ~7 km (37-44 km)
- Center AzRan ~245°/40 km
- 0.5° Beam Height at Center ~400 m
- Max Reflectivity ~40-50 dBZ
- 0.9°, 1.3°, 1.5° Reflectivity Much Weaker/Rare

DDC Northeast (NE) Wind Farm

- Spearville Wind Farm
- 72 Turbines
- Turbine Tops ~120 m AGL
- Azimuth Extent ~10° (051°-061°)
- Range Extent ~8 km (18-26 km)
- Center AzRan ~ 056°/22 km
- 0.5° Beam Height at Center ~220 m
- 0.5° Max Reflectivity ~30-40 dBZ
- 0.9°, 1.3°, 1.5° Reflectivity Much Weaker/Rare

SW & NE Echo Climatologies

- ~ 60 days: 20 Jan – 20 Mar
- 8 observations per day
- 480 observations: Clear Air & Precip Mode

- Loops of all data
- DDC surface observations
- DDC soundings 12Z & 00Z
- SW > 5 dBZ ~86%
- NE > 5 dBZ ~97%

- SW has Diurnal Trend
- NE has no Trend

SW & NE Echo Climatologies -2

- SW > 20 dBZ ~77%
- NE > 20 dBZ ~81%
- SW has Diurnal Trend: Morning Best
- NE has Diurnal Trend: Night Best
- Considerations:

–Beam Propagation

 Super-refraction: Night?

 Sub-refraction: Day

–Wind Speed

 Returns disappear during winds near calm (< 5 kt)

Sub-Refraction Example

Light Wind Example

Impacts/Potential Impacts to Dodge City WFO Operations

- False Storm Identification: Some Impact
- Velocity Dealiasing Errors: Some Impact
- False VAD Wind Profile: Almost No Impact
- Clear-Air Boundary Detection: Small Impact
- Severe Storm Detection: Small Impact
- Precipitation Estimation: Big Impact

KDDC Velocity Dealiasing Errors

KDDC False Mesocyclone Detection

- 16 June 06, 0749Z
- ORPG Replay – Default Adaptable Parameters*
- Severe Storms to Southwest and Northwest
- VCP 12: 0.5° and 0.9°
- No Known Negative Impact from this Event on DDC Staff or Products

KDDC Tornadoic Supercell Near SW Wind Farm

- 24 Feb 07, 04Z
- EF2 Tornado, 27 km Track
- VCP 12
- No Known MDA Detection Failures or False Detections
- No Known DDC Warning Problems

DDC Examples of Precipitation Estimation Errors

KTFX Reflectivity Examples

KTFX Velocity Examples

Impacts/Potential Impacts to Great Falls WFO Operations

- False Storm Identification: ?
- Velocity Dealiasing Errors: Some Impact
- False VAD Wind Profile: Some Impact
- Clear-Air Boundary Detection: Some Impact
- Severe Storm Detection: Some Impact
- Precipitation Impact: ?

KTFX VWP Example

- 2 Mar 07, 18Z
- VCP 32, Light Snow Case
- Disturbed Velocity in Several Elevation Angles
- No good Range for VAD Computation

Interim Summary

- Draft Report Due April 1; Final Report Due June 1
- Extend KDDC Climatology into Spring
- Examine KTFX Warm Season Cases
- Results Not Likely to Change
 - Wind Farms at Ranges <50 km (25 nm) Impact WFO Operations; Bigger Impact for Near-Range Farms; Bigger Impact for Bigger Farms
 - Biggest Impact at Dodge City WFO is Precipitation Estimation
 - Biggest Impact at Great Falls WFO is Bad Velocity Data and Poor VWP Outputs

3. SYSTEM DEVELOPMENT:

(3a) BUILD 9.0 AND RPG REFRESH MODIFICATION

[Informational]

Major Mike Miller, ROC Operations, provided an update on the deployment of software Build 9.0 and the RPG Refresh hardware. He provided information on the use of the SZ-2 range unfolding algorithm and any perceived impacts on the system; and a Beta Test update, especially the requirement for field technicians to test the new RPG hardware prior to installation. The following topic points were covered:

Scope & Schedule

- Build 9.0 ports RPG software to Linux operating system
 - New OS and PC-based processors
- RPG Refresh hardware must be installed as a part of loading new Build 9.0 software
- Beta testing Mar-May 2007
- Deployment May-Sep 2007
- Deployment spread out
 - Eases Hotline call load
 - Eases NRC/NLSC workload

Scope of RPG Refresh

- Hardware installed by site personnel (NWS and DoD)

-Cables, RPG, BDDS, and MSCF processors; KVM switch, RPG LAN switch, Console server

- Significantly increases RPG processing capacity

-Load average was 60%; goal is 30%

-New processor reduces average load to 18%

- Hardware shipping container used to ship old hardware to central disposal facility*

Site Work Required

- Prerequisites:

-Mod Note 81 (Power Administration) installation

- Provides sufficient power outlets for new hardware

-Power Administrator/DIO Upgrade (FAA)

- Day 0: 2 hours - bench check new hardware upon delivery

- Day 1: 8 hours

-Install Build 9 RDA Software and test overnight with Build 8 RPG

- Day 2: 8 hours

-Remove old hardware, install new hardware, and load Build 9 RPG Software

Scope of Build 9.0

- Infrastructure and Support Function Changes

-Migration to Linux OS

-FAA radar support of BDDS and Level II distribution

-Automatic configuration of various hardware devices

-GUI interfaces for displaying log files

-Improved RPG Status Log message filtering

-GSM no longer depends on Delta Syscal (reduced number of GSMs)

-Updated RPG communications to support FAA ITWS digital comms

-VCP change or download allowed any time during volume scan

-Site Blockage Display GUI

- Most ambitious new science software build to date (RDA, RPG & display)

-New VCPs 211, 212 and 221 with SZ-2 on split cuts (*reduces range ambiguities*)

-MIGFA - Machine Intelligent Gust Front Algorithm

-HRVIL - weak weather upgrade

-MDA changes

-Ingest of RUC model data from AWIPS

VCP 12 to VCP 212 Graphics

Status of Build 9.0

- Build 9 Software Status

-System and Operations Tests Complete

-Beta Test in progress (sites)

- * Norman, OK (NWS Single – Multiple DOD Frame Relay)

- * San Juan (FAA Redundant)

- * Davis-Monthan AFB, AZ (Large and Small OPUP Configurations)

- * Yuma, AZ (NWS Redundant)

- Albuquerque, NM (NWS Single – Commercial T1 Link) (*In progress*)

- Beale AFB, CA (DOD – Frame Relay)

- MCAS Miramar (Medium OPUP Configuration)
- Des Moines, IA (NWS Single – Fiber Link)
 - * Installation Complete
- Test Dates: 5 March – 24 May 2007

Conclusion

- Most challenging development and testing effort
- Testing is on schedule for completion on 24 May
- Deployment on schedule to start on 29 May

(3b) DUAL POLARIZATION, TERMINAL DOPPLER WEATHER RADAR ACCESS, and NEW SCIENCE STATUS [Informational]

Mr. Greg Cate, OS&T, presented the status of the dual polarization project and other OS&T led NPI efforts. The following topic points were covered:

Dual Polarization Description - modify existing radar to gather additional atmospheric data in the vertical plane

- Outcomes
 - Improve flash flood warnings
 - Improve weather products
 - Probability of hail detection improves from 88% to 94%
 - Probability of false alarm goes from 39% to 8%
 - Improve data quality
 - Detect 99% of non-meteorological scatterers
- Support NCEP model initialization

Dual Polarization Team

Contractor Project Tasks

- Provide overall program management activities
 - Must include Earned Value consistent with OMB Requirements
- Design, develop and produce the Dual Polarization modification for the WSR-88D fleet
- Identify and address support requirements (Tech manuals, training (train-the-trainer, spares, test plans/procedures/reports, etc))
- Document the design
- Deploy the Dual Polarization modification to the WSR-88D fleet

Government Project Tasks

- RPG/Display Systems Development
- Technical Manual Publication
- Software Distribution
- System/Operations/Beta Test Administration
- Data Quality Review and Consulting
- Provide GFI/GFE
- Training (Operations and Maintenance)

Project Structure

- Dual Polarization Contractor focus on RDA

- Coordination with Government development activities
- Interface Control Document is the delimiter
- Initial Design on ROC Pedestal Test Facility
- Design Review and Decision
- Prototype Design on KOUN Radar
- Requires coordination with Government Use
- Design Review and Decision
- Production
- Complete Development and Test (KCRI)
- Hardware acquisition
- Deployment (FY09-FY12)

Acquisition Strategy

- Use GSA Government-Wide Acquisition Contract (GWAC) Millennia Lite
- Provides contract award, administration and close-out support
- Contracting Officer and staff located in Oklahoma City Federal Building
- Streamlines acquisition process
- Compete among pre-qualified vendors
- Use performance based statement of objectives
- Use Firm Fixed Price (FFP) contract
- Award on best value considering technical, past performance and price

Support Resources

- Radar Operations Center
- CM of Production Hardware and Software
- Software Distribution
- Pedestal Test Facility
- ROC/NSSL
- Test Beds
- Requires resource contention management
- ROC/NSSL/NCAR/OS&T/OU
- Government Furnished Information
- Data Quality Evaluation
- Subject-Matter Experts
- Office Facilities

Infrastructure Upgrades

- Archiving (National Climactic Data Center estimate)
- \$150K one-time costs for load balancing server and data storage upgrades (NPI PAC budget)
- \$100K/year for communication costs and archive tapes (NEXRAD O&M budget)
- RDA to RPG communications
- NWS study: existing RDA-RPG links sufficient
- RPG to national users comms (Level II)
- <\$50K for one-time cost for communications upgrades (NPI PAC budget)
- \$260K/year for RPG-NWSnet bandwidth increase (NEXRAD O&M budget)
- Includes Super-Res AND Dual Pol data

Site Impact

- New Calibration Techniques
 - Accurate calibration is key to sound dual polarization data
 - Tasking to NSSL/NCAR for calibration techniques suitable for field operations
- Current Plan for two-week install
 - As in ORDA, coordinate with site/region on schedule and training
 - Significant modification to pedestal/antenna
 - Add second receiver path

ISSUE

- Which version of algorithms (HCA and QPE) to deploy
 - Work to date has been on the initial version developed by NSSL (Version 1)
 - NSSL has developed improved versions (Version 2)
 - Is there sufficient time for the Gov't to implement and test Version 2?
- Key is Contractor-proposed schedule
 - Reevaluate in mid-May and at June SREC

Acquisition Milestones

12/15/06	Industry Day
01/09/07	NITRB
02/28/07	CITRB
04/06/07	Obtain Delegation of Procurement Authority
03/31/07	Issue Draft Solicitation
05/7/07	Issue Solicitation
06/07/07	Receive Proposals
07/13/07	Complete Proposal Evaluation
07/21/07	Contract Award

Milestones

Milestone	Single Thread Config	Dual Thread Config
PDR	10/1/2007	5/1/2008
CDR	3/1/2008	7/1/2008
Integrated Test Readiness Review	3/24/2008	5/25/2008
System Test Readiness Review	8/20/2008	8/13/2009
Production Readiness Review	10/15/2008	10/15/2008

Operational Test Readiness Review	2/24/2009	1/11/2010
Beta Test Readiness Review	4/30/2009	3/8/2010
Deployment Readiness Review	10/9/2009	7/12/2010

TDWR Data Ingest

- NOAA mandate to install remaining 35 TDWR Data Ingest systems
 - OS&T will acquire, deploy and prepare for support management responsibility transfer in FY07-08
- Utilize ROC COMMITS vehicle
- Finalize FAA/NWS MOU
 - Support management responsibility
- Transfer to ROC in FY09
- Dependent on \$1M increase to O&M budget
- Proposed Schedule

(3d) NEXRAD TECHNICAL ADVISORY COMMITTEE (TAC) MEETING SUMMARY [Informational]

Terry Clark for Major Jennifer Winslow, ROC Applications Branch and TAC Executive Secretary, provided an overview of the major outcomes of the March 2007 TAC meeting. Results of discussions on dual pol field calibration and quality of the dual pol products. The following topic points were covered:

Introduction

- Focus: Dual Pol
- Chair: Dr James Metcalf in Lieu of Dr John Snow
- TAC held 27-28 March 2007, Norman, OK at NWC
- 4 decision briefings
 - Super Resolution
 - Differential Reflectivity Calibration
 - QPE & HCA Dual Pol Algorithms
 - REC-PDA
- 11 informational briefings

Decision Briefs / TAC Recommendations

- Super Resolution
 - Decision: recommend activation in Build 10
 - Need additional, *quantitative* validation of legacy algorithms using recombined data
 - Schedule Mini-TAC for Summer '07 for review/update
- Differential Reflectivity Calibration
 - Decision: recommend differential reflectivity be measured to accuracy of 0.1 dB with 95% confidence

- NSSL + NCAR work indicates this is achievable
- TAC recommends to PMC work be continued
 - Determine best operational method of calibration and
 - Quantify sensitivity of algorithms to accuracy of Z_{DR}

Decision Briefs/ TAC Recommendations

- QPE &HCA Dual Pol Algorithms
- Decision: TAC endorses NSSL recommendation to implement Version 2 algorithms to SREC
- TAC would like to see additional development of algorithms with respect to:
 - Applications to river forecast models
 - Investigation of effects of beam blockage
 - Additional use of specific differential phase shift
- REC-PDA
- Decision: TAC recommends scientific basis is sufficient to proceed with implementation to SREC

Significant Presentations

- Data Windowing
- Recommendation: Rectangular window be restored as default window
- However, before using the rectangular window as the default window, ORDA spectrum width needs to be fixed
- Clutter Mitigation Decision (CMD) Algorithm
- TAC endorses science and utility
- Recommends implementation as soon as possible

Next Meeting(s)

- Mini-TAC planned for Summer '07
- To review super resolution quantitative algorithm results
- Regular TAC planned for October '07
- Location - Lincoln Labs, Boston

(3e) PHASED ARRAY RADAR RESEARCH & DEVELOPMENT PLAN AND TESTING UPDATES [Informational]

Dr. Jeff Kimpel, WG/MPAR Co-Chair, NSSL, provided an update on the Phased Array Radar (PAR) R&D Plan and National Radar Test Bed results and activities since the last NPMC presentation. The following topic points were covered:

March 20-21 MPAR/WG Meeting

- New member from DHS, reps from DOD
- Status of Phased Array Research – CASA, Army, MIT/LL, NCAR
- Market Research of Transmit/Receive Modules
- Agency Radar Requirements - NOAA/NWS, FAA, DHS, DOD, NASA, USDA, USGS
- Way Forward – cost/benefit analysis – depends on concept of operations, requirements, cost to keep legacy systems operational (SLEP)
- Presentations given at meeting: <http://www.ofcm.gov/wg-mpar/index.htm>

NWRT Now a National Facility

- Created NWRT Assessment Panel as required by the Navy/FAA/NOAA MOA and the NOAA/OU MOA

- NOAA – Jeff Kimpel, Douglas Forsyth

- FAA – James Williams, Bill Benner (Garth Tarok)

- Navy – Ron Ferek, Scott Sandgathe

- OU – Mark Yeary, Robert Palmer

- Developed procedures for requesting access to the NWRT

- http://www.nssl.noaa.gov/research/radar/nwrt_use.php

- Intent is to charge only for costs exceeding basic NWRT support.

2007 National Weather Radar Testbed Projects

- Leader of NWRT – Doug Forsyth

- Adaptive Scanning & Radar Client Interface – Dave Priegnitz

- Data Collection – Ric Adams

- Beam Multiplexing & PAR Support – Chris Curtis

- Oversampling and Whitening, Staggered PRT – Sebastian Torres

- NWS Liaison: Severe Weather Warning Decision Making R&D – Greg Stumpf

- NWS Pre-proof-of-concept experiment – Pam Heinselman

- Algorithm Work – Travis Smith

- Refractivity Fields – Bob Palmer

Upcoming Events

- April 13th – DHS Radar Meeting, Reagan Building, Washington, DC. VTC?

- May 1-3 – International Communications Navigation and Surveillance conference, DC area, 3 MPAR papers

- June 19 -20 – MPAR workshop with NORTHCOM and DHS, Colorado Springs, CO.

MPAR vs. NEXRAD Scan Rate: Microburst Event

- MPAR captures 29 clear images and more data during the time it takes NEXRAD for 4, the result is better forecasts and earlier warning

4. OLD BUSINESS

NPMC03-2.2: Greg Cate will investigate the possibility of incorporating the multiple data stream software enhancement for software Build 8 and the potential impacts of incorporating this software enhancement.

Status: New 05/07/03. The SREC has this change targeted for Build 8. Greg Cate will be meeting with the FAA on clarifying the requirements. (OPEN 08/21/03). The FAA is utilizing data from multiple radars to support Air Traffic Control Operations. Sites are inconsistent in their application of clutter filtering, leading to contamination by AP. Blanket application of the current clutter filters impacts OH with loss of some reflectivity data. Alternatives: A. Implement a base data stream with clutter filter parameters set to FAA specifications and that are under control of the FAA. Issue becomes time and resources dependent to implement; B. Leverage off of new developments on adaptive clutter filters and AP removal to provide adequate data quality for FAA and OH. Action:

Bob Saffle and Greg Cate examine improvements in the pipeline and determine if these improvements are adequate to address FAA and OH requirements. Upcoming improvements will also be examined to assure there is no duplication of effort and which combination of improvements affords the most benefit. Work with agency personnel during this effort. Make recommendation of NEXRAD modifications to address issue. Note: Bob Saffle and Capt. Dustin Evancho have determined that the current RDA-RPG T1 is adequate to handle bandwidth requirements through dual-pol (with compression). (OPEN 11/19/03). As stated in previous response, FAA is receptive to alternatives which provide consistent application of clutter processing. Use of the new adaptive clutter processor (GMAP) in ORDA holds promise in this area. There may still be procedural issues to address. (OPEN 6/2/04). We are incorporating the new clutter processing technique into ORDA. Its effectiveness in supporting improvements in data quality need to be evaluated as ORDA is deployed and the operators become familiar in its use. So it was recommended that this remain open as evaluations progress. (OPEN 9/8/04). As stated in earlier update, we intend to use the new adaptive clutter processor (GMAP) in ORDA, and evaluate its contribution to improving data quality consistently across the network. Recommend action item remain open, as data quality continues to be monitored through ORDA testing. (OPEN 3/2/05) Recommend this remains open; data quality should continue to be evaluated as ORDA continues to be deployed. (OPEN 9/28/05) In discussions with the FAA technical staff, they are generally satisfied with the performance of the GMAP clutter filter and are less inclined to support a requirement for dual data streams. However, would recommend this item remain open until ORDA deployment is complete (Sept. 2006) to ensure ORDA data quality meets their requirements. (OPEN 3/29/06) The FAA feels that current and future improvements aimed at improving data quality should be adequate with the *proper application* of those tools. The FAA is concerned that the extended hiatus of changes during Dual Polarization RDA development will significantly delay the introduction of promising technology which improves data quality (i.e. the Clutter Mitigation Decision Tool), and has asked NPI and the ROC to investigate introducing the CMD tool at least by Build 12. (OPEN 10/4/06). **NPI and the ROC are mindful of the FAA data quality concerns. These concerns will be a factor in the deliberations of the upcoming June SREC meeting to determine timing and content of future builds. The latest Dual Polarization schedule, schedules for improvements related to data quality, and the potential of data quality improvements with dual polarization will all be considerations of the tri-agency SREC.** (OPEN 4/11/07)

5. NEW BUSINESS

NPMC07-1.1: The ROC/NSSL contact Naval Research Laboratory (NRL) to discuss technological advances in phased array radar technology that may be applicable to the National Weather Radar Testbed (Phased-Array).

Status: Action Officer – TBD. New 04/11/07.

NPMC07-1.2: The ROC determines the potential utility/feasibility of putting selected surface sensors (e.g. wind direction, wind speed, pressure, humidity and temperature) at wind farms.

Status: Action Officer – TBD. New 04/11/07.

6. NEXT MEETING

The proposed date for the next NPMC Meeting is Wednesday, September 19, 2007, in Norman, Oklahoma.

7. ADJORN 1:45 P.M. Eastern Time