Memo for Record   16 Apr 07

Subject: Meeting Summary, TAC Meeting, 27-28 March 07

INTRODUCTION

The NEXRAD Technical Advisory Committee (TAC) held a meeting in Norman, OK at the National Weather Center (NWC) 27-28 March 2007. James Metcalf presided over the meeting in lieu of the TAC Chairman John Snow, who was called out of town on short notice. All current TAC members were present, with the exception of Paul Smith, who had a scheduling conflict. Two new TAC members were also present at the meeting; Todd Pattison (FAA) and David Sharp (NOAA). See Atch 1 for a list of others present at the meeting. Atch 2 is the final agenda for the meeting.

DECISION BRIEFINGS/TAC RECOMMENDATIONS

1. Super-resolution data (Decision to include or not in Build 10): The TAC endorses super-resolution data for the SREC to include in Build 10, as planned. Most of presentation to TAC was qualitative results to date and presenters stated that quantitative studies were the next step. The TAC is interested in results of quantitative algorithm validation comparing legacy data with recombined super resolution data. A mini-TAC will be scheduled for summer '07 for this purpose.

2. Differential reflectivity (Z_{DR}) calibration (Specification of accuracy): The TAC recommends that the contract for the dual-polarization upgrade specify that the differential reflectivity be measured to an accuracy of 0.1dB with 95% confidence. The work of NSSL and NCAR indicates that this level of accuracy is achievable. The TAC recommends to the PMC that work be continued to determine the best operational method of calibration and to quantify the sensitivity of algorithms to the accuracy of Z_{DR}.

3. QPE & HCA algorithms (Decision between Versions 1 & 2 for Build 11): The TAC endorses the recommendation of NSSL to implement Version 2 of these algorithms in Build 11. This endorsement is based on results presented to the TAC, including more flexibility in classification, the inclusion of the data quality vector, sanity checks with hard thresholds, less noisy rain rates, better rainfall estimation at long range, and the use of different rain rate equations according to hydrometeor classification. The TAC would like to see additional development of these algorithms, including application to river forecast models, investigation of the effects of beam blockage, and additional uses of the specific differential phase shift (k_{DP}).

4. REC-PDA (Decision to proceed to implementation or not): The TAC concludes that the scientific basis of these algorithms is sufficient to proceed with their implementation.

OTHER DISCUSSIONS AND PRESENTATIONS

1. Data windowing: The TAC recognizes that the use of the Hamming data window, which is the default window in Build 8, is detrimental to the calculation of reflectivity and mean Doppler velocity but is necessary for the unbiased calculation of spectrum width. The TAC urges that, at the earliest possible time, the calculation of spectrum width be modified to enable unbiased estimates to be calculated with a rectangular data window and that the rectangular window be restored as the default data window. Greg Cate noted that it is necessary to assure that SIGMET will incorporate these changes into the baseline design of the processor.

2. Clutter Mitigation Decision (CDA) algorithm: The TAC endorses the science and utility of the CMD algorithm and recommends implementation as soon as possible to mitigate the inappropriate use of GMAP in non-clutter regions.

3. Spectrum Width Estimator Problems:
a) The TAC endorses the requirement for a more rigorous specification for the spectrum width estimator over a wider range to support the detection capabilities of the turbulence detection algorithm.
b) The TAC recognizes the requirement for improving the quality of base data as stated in TN-32: System Performance, and that a basic deficiency in the present implementation exists for use quantitatively by algorithms over a wide spectral range.
c) The TAC furthermore supports the effort to continue the analysis and validation of the proposed hybrid technique but would require more information before endorsing a particular method.

NEXT MEETING

A Mini-TAC will be scheduled for early June 07 to review super resolution quantitative algorithm validation results. A regular TAC meeting will be scheduled for October 07 and held at Lincoln Lab in Boston.

//SIGNED//
JENNIFER L. WINSLOW, Maj, USAF
TAC Executive Secretary

//SIGNED//
JAMES METCALF
Acting Chair

Attachments:
1. Attendees
2. Final Agenda

TAC Members Present:
James Metcalf, USAF, Acting Chair
Jennifer Winslow, Executive Secretary
Dennis Roofe, FAA
Doug Forsyth, NSSL
James Wilson, NCAR
Todd McNamara, USAF
Bill Bumgarner, FAA
Bob Saffle, NOAA
Mark Walton, NOAA
John Cho, Lincoln Labs (sitting in for James Evans)
Todd Pattison, FAA
David Sharp, NOAA

Presenters:
Mike Jain, NSSL
Don Burgess, NSSL
Sebastian Torres, NSSL
Robert Lee, ROC
Greg Cate,OS&T
Dusan Zrnic, NSSL
John Hubbert, NCAR
Frank Pratt, NCAR
Alenxander Ryzhkov, NSSL
Robert Palmer, OU
Scott Ellis, NCAR
Rich Ice, ROC
Rich Murnan, ROC
John Williams, NCAR
Greg Meymaris, NCAR
Dave Zittel, ROC

ROC Personnel Present:
Rich Vogt, Director
Terry Clark, Deputy Director
Rex Reed
Darcy Saxion
Rick Rhoton
Dan Berkowitz
Randy Steadham
Tim Crum
Dave Warde
Rich Ice

Olen Boydsten
Cheryl Stephenson

Others:
Mark Fresch, NOAA (via VTC)
Mike Istok, NOAA (via VTC)
Brian Cline, NOAA (via VTC)
Mike Spaulding, DoD (Via Telephone)
Jeff Kimpel, NSSL
Roger Hall, OS&T
Pam Heinselman, NSSL
Jami Boettcher, WDTB

Agenda for NEXRAD Technical Advisory Committee (TAC) Meeting
March 27-28, 2006

Location: **National Weather Center Room 3910**
                  120 David L. Boren Blvd.
                  Norman, OK 73072

Tuesday, March 27, 2006

0730: NWC Room 3910 Open. Coffee and Donuts

0745: TAC Executive Session (TAC members only)

 - Assignments for briefing write-ups
 - Discuss objectives for meeting

0815: Convene Open Session with introductions and opening remarks.

John Snow, TAC Chairman

0830: **DATA WINDOWING IN ORDA** [20 Minutes – Decision Brief]

Sebastian Torres, National Severe Storms Laboratory, will present a decision brief
describing the use of data windows in ORDA and associated data quality issues.
A recommendation will be presented to change the default ORDA data window
from Hamming to Rectangular.

0850: **SPECTRUM WIDTH IN ORDA** [20 Minutes – Decision Brief]

Sebastian Torres, National Severe Storms Laboratory, will present a decision brief
describing a spectrum width bias in ORDA if level-I data is processed using a
rectangular window. A recommendation will be presented to correct the spectrum
width bias so that the Rectangular window can be used with current and future
signal processing techniques.

0915: **SUPER RESOLUTION** [30 Minutes - Decision Brief]

Bob Lee, Radar Operations Center, and Michael Jain, National Severe Storms
Laboratory, will present preliminary super-resolution and recombination
algorithm performance results and recommend the evaluation and deployment
plans for Build 10 continue.

0945: Coffee Break

1000: **NWS OFFICE OF SCIENCE AND TECHNOLOGY NEXRAD PRODUCT
IMPROVEMENT** [30 Minutes - Informational]

Greg Cate, OS&T, will present the status of the dual polarization project and other OS&T led NPI efforts.

1030: ZDR CALIBRATION [60 Minutes – Decision]

Dusan Zrnic will present the latest refinements on the NSSL technique for Zdr calibration. John Hubbert will present the latest results of the NCAR Zdr calibration analysis utilizing SPOL.

1130: **Lunch (delivered by Jason's Deli)**

1240: **DUAL POLARIZATION ALGORITHMS, QPE AND HCA**
[75 Minutes - Decision Brief]

Dr. Alexander Ryzhkov (National Severe Storms Laboratory/Cooperative Institute for Mesoscale Meteorological Studies) will describe and provide results of the changes from version 1 to version 2 of the dual polarimetric Hydrometeor Classification Algorithm (HCA) and of the Quantitative Precipitation Estimation (QPE) algorithm. The changes were made mainly during 2006. HCA version 2 has quality controls that were not present in version 1. The QPE algorithm version 2 is based on HCA classifications, while version 1 was based on horizontal reflectivity thresholds.

1355: **INTERIM RESULTS OF NSSL/CIMMS STUDY ON IMPACTS OF WIND TURBINES ON WSR-88D AND FORECAST OPERATIONS**
[20 Minutes – Informational]

Donald Burgess, National Severe Storms Laboratory/Cooperative Institute for Mesoscale Meteorological Studies will provide interim results of his study on the impacts of wind farms on weather forecast office forecast/warning performance and WSR-88D algorithm performance.

1415: **UNIVERSITY OF OKLAHOMA WIND TURBINE CLUTTER STUDY UPDATE** [20 Minutes – Informational]

Dr. Robert Palmer, University of Oklahoma School of Meteorology, will provide an update on his wind farm/wind turbine mitigation study.

1435: **Break**

1450: **RADAR ECHO CLASSIFIER PRECIPITATION DETECTION ALGORITHM** [30 Minutes - Decision Brief]

Mr. Scott Ellis, NCAR, will present results of proposed upgrades to the Radar Echo Classifier (REC). The upgrades include fixes and optimization of the

Anomalous Propagation Detection Algorithm (REC-APDA) and the addition of the Precipitation Detection Algorithm (REC-PDA) module to improve the quality of the data used by the Enhanced Precipitation Preprocessor (EPRE) algorithm to construct the Hybrid Scan of reflectivity (that is uncontaminated by clutter) which is, in turn, converted by a Z/R or Z/S relationship to a precipitation rate for rainfall or snowfall, respectively. Results of storm total accumulations using the current REC configuration and using the proposed REC upgrades will be compared in order to assess the benefits and risks of implementing the changes.

1520: CLUTTER MITIGATION DECISION ALGORITHM
[30 Minutes – Informational]

Rich Ice, ROC, Engineering Branch, and Mike Dixon, NCAR, will describe the evolution of the Clutter Mitigation Decision (CMD) algorithm and discuss recent joint activity between NCAR and the ROC. NCAR recently updated the CMD algorithm as a result of initial implementation planning and additional scientific analysis. The briefing will review CMD performance and will address both algorithm and operational implementation design recommendations. The briefing will include ROC evaluation plans and will summarize options for integrating CMD into the Open RDA system.

1545: Open Discussion Time

1615: Tour of National Weather Center

1700: Reception on Observation Deck

1900: Dinner at Indian Hills in banquet room
Phone: 364-7577
Address: 6221 N Interstate Dr Norman (just off of Indian Hills Rd Exit)

Wednesday, March 28th

0730: Conference Room Open. Coffee and Donuts.

0800: TAC Executive Session

0830: Convene Open Session

0830: CLUTTER MITIGATION DECISION ALGORITHM
[30 Minutes – Informational]

Rich Ice, ROC, Engineering Branch, and Mike Dixon, NCAR, will describe the evolution of the Clutter Mitigation Decision (CMD) algorithm and discuss recent joint activity between NCAR and the ROC. NCAR recently updated the CMD algorithm as a result of initial implementation planning and additional scientific analysis. The briefing will review CMD performance and will address both algorithm and operational implementation design recommendations. The briefing will include ROC evaluation plans and will summarize options for integrating CMD into the Open RDA system.

0900: REFRACTIVITY MEASUREMENTS OF WATER VAPOR, 2007 FIELD STUDY PLANS [20 Minutes - Informational]

Rich Murnan, ROC Applications Branch, will provide 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.

0920: SPECTRUM WIDTH ESTIMATOR PROBLEMS AND THEIR IMPACT ON THE NEXRAD TURBULENCE DETECTION ALGORITHM (NTDA)
[40 Minutes – informational]

Greg Meymaris and John Williams, NCAR, will present performance results for the current pulse-pair spectrum width estimator and an alternative that improves clutter detection and NEXRAD Turbulence Detection Algorithm (NTDA) utility. The TAC is asked to consider updating the NEXRAD SW specification and endorsing development and implementation of an improved SW estimator.

1000: Coffee Break

1020: **PHASED ARRAY UPDATE** [20 Minutes – Informational]

Dr. Jeff Kimpel, WG/MPAR Co-Chair, NSSL, will provide an update on the Phased Array Radar (PAR) R&D Plan and National Radar Test Bed results and activities since the last TAC presentation.

1040: **UPDATE ON COMBINED SZ-2/MPDA VOLUME COVERAGE PATTERN TO MITIGATE RANGE FOLDING** [20 Minutes – Informational]

David Zittel, Radar Operations Center, Applications Branch, will present an update on the status of data collection and analyses for the proposed combined SZ-2 and the Multiple PRF Dealiasing Algorithm. Additionally, he will describe a field test scheduled for the summer and fall 2007.

1100: **STATUS OF TDWR RDA UPGRADE AND COMPARISON OF RV MITIGATION TECHNIQUES** [30 Minutes – Informational]

John Cho, MIT Lincoln Laboratory, will present an informational briefing on the status of the TDWR RDA retrofit project, which has many parallels to the NEXRAD ORDA project. He will also provide results from an experiment using the KOUN NEXRAD to compare RV ambiguity mitigation techniques that are being implemented in the new TDWR RDA.

1130: Open Discussion Time

1200: Executive Session

1230: Adjourn