

November 2013 TAC, Nov 21<sup>st</sup>, 2013

**Agenda Item: Decision Brief: Automated Microburst Detection Algorithm**

Presenter: Mark Veillette, LL

**Comments after presentation:**

Note: All data based on Denver NEXRAD and TDWR.

**Questions from the audience during the presentation:**

**Burgess:** Difference in viewing angle, 90 degree difference in angle in the Denver radar

**Response from Veillette:** The radar is at a different angle, the main thing trying to be demonstrated is the signal--

**Ice:** Have you thought about the beam difference?

**Pattison:** In all cases are you asking about ITWS detection.

**Response from Mark:** talking about the ITWS running on the TDWR.

**Post Briefing Questions:**

**Vogt:** What is the range limitation?

**Response from Mark:** 50 km

**Saul:** Is it an overlay on the lowest elevation angle products?

**Response from Mark:** Yes

**Lee:** How confident are you that every detection made is a microburst?

**Response from Veillette:** Very confident, algorithm not concerned about length of event, i.e. microburst vs macroburst

**Schultz:** Algorithm cannot determine the wind shear strength, i.e. will or will not cause damage.

**Schultz:** Concern about the algorithm working on base elevation data. Concern the event may have already have happened.

**Response from Veillette:** ITWS is able to tell between strength, microburst.....

**Pattison:** The AMDA is purely to generate a warning for the controller to provide to pilots.

**Berkowitz:** Does the AMDA detect the leading edge of the microburst, vs rear of microburst as they move across the area of coverage?

**Response from Veillette:** Not that I know of, we did not see that

**Kelleher:** Are there any IT restrictions in regard to license?

**Response from Veillette:** It is restricted use.

**Istock:** We take this software out, would have to go to Lincoln

**Kelleher:** Would have to get directly from Lincoln Lab

**Saul:** Will it run on Langley hill? It runs at .2 degrees, not .5 degrees.

**Response from Veillette:** We are looking for AMDA to run on all radars and is currently only able to run at .5 degrees.

**Edens:** The data cases shown for validation were based on Denver. How many cases were used to validate the algorithm's performance?

**Response from Veillette:** Multiple days, multiple detections were incorporated into the statistics.

### **Agenda Item: CLEAN-AP Update**

Presenter: Sebastian Torres

#### **Post Briefing Questions:**

**Ice:** Will it run on the environment at KOUN?

**Response from Torres:** We have a separate processor so we can compare to NEXRAD.

### **Agenda Item: Staggered PRT Update**

Presenter: David Ward

#### **Post Briefing Questions:**

**Saul:** Most recent pictures were at .5 degree, but that is not where you want to be.

**Response from Ward:** Modeled on worst case scenario.

**Burgess:** The only difference from the previous change is the 2VDA needs to be changed.

**Stephenson to Zittel:** Have the changes to the velocity dealiasing algorithm to correct catastrophic failures been installed in the operational RPG code? I don't remember seeing it.

**Zittel:** Yes, that occurred several builds ago and it was covered under a CCR.

### **Agenda Item: Range Oversampling**

Presenter: Chris Curtis

#### **Post Briefing Questions/Comments:**

**Snow:** What is the next step?

**Response from Curtis:** Would like to implement on KOUN on the DSP

**Agenda Item: Thresholding of DB Variables and CBT**

Presenter: Igor Ivić

**Note:** 1.07 should be 1.36 on last half of slides.

**Post Briefing Questions/Comments:**

**Snow:** You're not prepared to say what values should be used?

**Response by Torres:** Higher values lose too much data but that data was meaningless (2db vs 10db). Despite being meaningless to the end user, it still concerns them. Maybe 3-4 db would be a good compromise.

**Zittel:** We are using Bragg scatter and would not be able to see it using this thresholding.

**Agenda Item: Improved Correlation-Coefficient Estimator**

Presenter: Igor Ivić

**Post Briefing Questions/Comments:**

**Ice:** How did you improve on the cross correlation?

**Response by Ivić:** Thought the estimator results were more important to show. The NSSL report will give insight to that. The estimator identifies how the bias works in the current legacy estimator, i.e. creating an estimator that has less bias.

**Curtis:** Range oversampling will improve those estimators.

**Krause:** Cross correlation should be done first, because cross correlation is right next to Z as it relates to its predictive power.

**Burgess:** I disagree. I believe super resolution's biggest advantage was in reflectivity. That's what the field uses.

**Agenda Item: NWRT PAR Adaptive Weather Scanning**

Presenter: David Priegnitz

**Post Briefing Questions/Comments:**

**Burgess:** Are these all sector scans

**Response by Priegnitz:** Yes

**Torres:** Many of these things can only be done with phased array radar.

**Snow:** Previously we used four smaller radars south of Norman that were controlled by an algorithm. They had the ability to do vertical cuts. Adaptive control systems are the way of the future, whether we're using phased array or current tech.

**Burgess:** For forecasters, the assimilation of data straight into models is needed.

**Agenda Item: NEXRAD Budget Outlook**

Presenter: Richard Vogt

**Post Briefing Questions/Comments:**

**Snow:** Wished congratulations and Good Luck to Mr. Vogt in his pending retirement.

**Agenda Item: Wind Farms and Interference**

Presenter: Jessica Schultz

**Post Briefing Questions/Comments:**

**Krause:** What is the method for solving?

**Response by Schultz:** We are using beam filling methods. Jessica will provide specific information to John after meeting.

**Unknown Audience Member:** What algorithm is being used?

**Response by Schultz:** It is a binary algorithm, that looks for non-precip/precip.

**Berkowitz:** This is a half degree tilt.

**Burgess:** It gives an option for precipitation only as some WFO's may not want to know where wind farms are.

**Maj. Cunningham:** Is this a true probability

**Response by Schultz:** No, it is an index.

**Executive Session Meeting:**

Bill Bumgarner

Lt. Col. Neil Edens

Jim Evans

Richard Ice

Mike Istok

Kevin Kelleher

Todd Pattison

Dr. John Snow

Dr. John Zapotocny

Kelly Thomason (PSA)

**Decision Brief: Decision Brief: Automated Microburst Detection Algorithm**

**Vote and Comments:**

**Vote Summary: Yes 9, No 0**

**Comments:**

**Pattison:** Yes, no comments, likes the progress that has been made on it

**Ice:** Yes, likes the progress that has been made on it. The NEXRAD/TDWR locations are similar to Denver locations. Can be used when it gets to ROC.

**Snow:** Yes, concerned that they freeze the software when the process of implementing it into operations. For areas that do not have a TDWR, this is better than nothing and many areas are not served by the TDWR. This is a better value

**Smith:** Yes, I would support approving the algorithm for incorporation in a future RPG build. (Note: Per e-mail to Kelly Thomason)

**Evans:** Yes, Issues such as microbursts outflows are not always fixed. This would be a big help with the NEXRAD fleet.

**Kelleher:** Yes, concerns, false alarm seemed really low, this would normally be tested within the testbed, independent verification with the ROC.

**Snow:** Equivalent to the Hazardous Weather Testbed, will be tested more per Rich Ice, while it is being coded at the ROC.

**Kelleher:** Is this similar to NSSL microburst algorithm?

**Evans:** You have to understand that with TDWR you are shooting for 10% and when the word microburst is used with pilots, they must abort their landings. The goal is 10%.

**Pattison:** IPWSS was the comparison tool for the TDWR?

**Istok:** Yes, Following on what Kevin said, things could be evaluated in the testbed, it has value, we don't have anything like it. AWIPSII was upgraded with something similar.

**Bumgarner:** Yes, I'm biased, this has come before TAC several times, they have improved it.

**Pattison:** It has improved a lot over the last year, 5 airports will have direct benefits because they have no current coverage.

**Snow:** See this as a complementary algorithm to the tornado detection algorithm as to what can be seen at the surface, i.e. improved detection.

**Zapotocny:** Yes, NWS perspective, utility for operational need, curious to get some testing, like the predictive component for legitimate need for complement to ??TDA??, Two TDWR available for testing purposes, incorporate into KOUN Testbed for testing purposes.

**Istok:** When you say give access to Testbed KOUN, they only have base data.

**Pattison:** Could be used in conjunction with lab to lab connections.

**General Comments:** Starting to see improvements to baseline base data for Dual Pol, very encouraging.

**Evans:** What is the status to the calibration of the NEXRADs in the field?

**Ice:** Several papers at AMS Oral conference were presented about this, they are available for download, Rich made mention of what he's doing, Dave Zittel was looking at weather returns and brag scattering, results show that 60 percent of sites is showing good calibration. Subcommittee between ROC and NSSL to work on this, converging on a much improved calibration process.

**Evans:** Improved calibration will assist with icing in regard to aviation.

**TO DO NEXT TAC:** Give update/report on calibration improvement drive.

**Ice:** You can go online and listen to AMS sessions.

**Bumgarner:** Mike and I have been looking at this very closely. I am not as optimistic as Rich Ice, were looking for an engineering solution, not a meteorological solution.

**Ice:** Working with ROC Hotline on differential reflectivity when comes to bias to ZDR.

**Istok:** Clear negative bias at KTLX

**Ice:** We are working to tighten up tolerance.

**Bumgarner:** ZDR is not reliable enough when modifying reflectivity data when it comes to icing. Is there any way we can accelerate this? Can we get NSSL focused more on this?

**Snow:** Can staff in the field work on this?

**Lt. Col Edens:** Coefficients can be improved in regard to dry snow and ice crystals. Staff in the field, a half dozen in the Eastern Region are on board with looking at a better value for that. How to go about that in terms of storm type, by region, etc we will be looking at all those factors. We will do more field tests with the coefficients.

### **Strategic Thoughts:**

**Lt. Col Edens:** When I read the charter on TAC website I realize there is a TAC history as too the roles the TAC has fulfilled. Within the last TAC or two I have heard comments such as, "I don't care what the TAC says, we are going to install it anyway." If the TAC wants to stay relevant, I suggest we relook at the charter, strategic directions document and/or the list of technical needs.

**Snow:** Roll of TAC has changed with the implementation of Dual Pol due to contract language of the contractor. Once contract was signed with Baron Services, the TAC focus on DP changed and we lost momentum. Now we can impact NEXRAD with calibration as articulated in this conversation today. A strategic issue should be calibration. Do all variables need to be looked at, or are some more important, do we need to prioritize? As a TAC, we need to focus resources on those tasks.

**Ice:** We can look for specifics in subcategories.

**Action Item:** Neil will forward files and please provide input/response to those files by the first week in January.

**Action Item:** We will schedule a workshop in the spring for opportunities beyond extending the life, what new technologies do we want to add.

**Lt. Col Edens:** You can see that that was the push when the TAC was created.

**Bumgarner:** FAA is on board for SLEP, but FAA wants MPAR, FAA may not support this expanded roll.

**Ice:** Looking at improved process's.

**Snow:** SLEP Process itself does deal with hardware decisions, we can have input on these components.

**Snow:** Good meeting; came at a good time.

**Evans:** We don't deal with tornados in my region of the country, seems to me there have been more significant tornado damage as of late. Have there been issues with NEXRAD and tornado detection that have immersed?

**Snow:** NEXRAD has performed extremely well. The issue was the communications getting cut between the NEXRAD and the WFO. Rich Vogt did touch on this after the Joplin tornado.

**Evans:** I'm not saying it's not useful, but how can we do it better.

**Snow:** I've seen reports, and there were items identified that need to be improved/tweaked. They are looking at improving warning time, etc.

**Jim Evans:** What do you do when you find a microburst?

**Snow:** We have a parallel problem, because each state does emergency management differently. The NWS has to do more work with the social side of weather alerts and how to deal with that.

**Evans:** I completely agree, the main problem with us is not commercial pilots because they are well trained, but general aviation pilots.

**Lt. Col Edens:** When do we want to have the next TAC?

**Snow:** April time frame, we should have had communicated about the reports Neil is sending out. Perhaps we can roll something out by the next TAC