National Transportation Safety Board

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ATTACHMENT 10 to the METEOROLOGY FACTUAL REPORT
CEN17FA168

Record of conversation with an AWC forecaster.

Submitted by: Mike Richards
NTSB, AS-30

RECORD OF CONVERSATION

Date:	**June 19, 2017**
Time:	**Approximately 1030 central daylight time**
Location:	**Aviation Weather Center** **Kansas City, Missouri**
Person Contacted:	**Mr. Jesse Sparks** **Forecaster, Aviation Weather Center**
Subject:	**Low-level Turbulence Training and Product Issuance**

On June 19, 2017, at approximately 1030 central daylight time, Mike Richards from the NTSB and Lora Wilson from the NWS had a conversation with Mr. Jesse Sparks, Forecaster at the NWS's AWC. Mr. Sparks reported the following:

The AWC is responsible for/required to issue AIRMETs, SIGMETs and Convective SIGMETs and other products to identify areas of suspected or occurring turbulence. AWC forecaster training for "high-level" turbulence is good. Training on "low-level" turbulence for AWC forecasters is limited to on-the-job training. Low-level turbulence is turbulence that is not related to shear associated with the jet stream. There is no strict altitude boundary for low/high-level turbulence, although 18,000 ft can be considered sort of a standard, but it changes. Sometimes high-level turbulence can get into the lower altitudes. Occasionally (about once per five years) there may be a facility-wide seminar on low-level turbulence.

COMET training modules are used a lot for official forecaster training, and COMET also uses forecasters as SMEs during module development. About a year or two ago, there were COMET training models developed for high-level turbulence and mountain wave identification, however it is too early to tell if this has made a difference with forecasters. However, forecasters are using indices in products that they haven't before, focusing on more than just the shear, and discussing it more in conversations and on chat.

There has not been a single NWS-sponsored training module developed on non-terrain-induced low-level turbulence, even though this is one of the phenomena most difficult for AWC forecasters to forecast for. There is a big void here with training and there is definitely a need. You can talk to forecasters and get various philosophies on interpretation of low-level turbulence; there is no standard way to interpret it. With high-level turbulence, we have indices to use, but nothing standard for the low fields. For low-level turbulence, mainly we are just looking at winds, low-level lapse rates, and where low-level flow could generate eddies and momentum transfer, etc.

However, nothing in the models will show that. A COMET training module on low-level turbulence for AWC forecasters would be very beneficial. Modules are helpful (in part) because they help explain the physics. Reasons why module development on low-level turbulence has not yet occurred is that there has not been a lot of emphasis on it and not a lot of funding for it.

It is not clear how one would conduct a quantitative assessment of AIRMET/SIGMET issuance. It's possible one could look at chats and see if it's being discussed; pretty sure you would see that for high-level turbulence and mountain wave scenarios.

There are no objective criteria for when a forecaster "shall" issue a SIGMET, and there should not be. The ground truth is subjective. If we were looking at objective data, then yes, you could have that objective criteria. But data like PIREPs are subjective. Even when you're interpreting data itself, it's subjective. With high-level turbulence, we have indices and many show values of metrics of flow that highlight shear and unbalanced flow processes. The favorite is the Ellrod Index, however it is going to vary model-to-model, grid space-to-grid space, and even vertically. It's going to be different for every aircraft. A threshold in your mind based on the Ellrod Index varies vertically because the composite layers we use are different. Everything we use is calibrated on the North American Mesoscale (NAM) model, and we can't compare the NAM Ellrod Index 500mb to the Rapid Refresh model at 500mb.

With regard to AIRMET/SIGMET performance, the Forecast Impact and Quality Assessment (FIQAS) group at GSD provides an assessment for overall office performance, but there is no performance assessment on the issuance of these products for individual AWC forecasters. A forecaster can only get that through user feedback, if at all. There are not a lot of personal performance metrics. Personal opinion is that personal assessments can lead to better performance because it makes a forecaster want to do better. We need more individual performance metrics; there are no Government Performance and Results Act standards for this. However personal assessments can also bring up labor (union) issues.

We generally will not issue an AIRMET or non-convective SIGMET for turbulence for an area already covered by a Convective SIGMET. Do not know if this is written policy, but users say doing so is redundant. A Convective SIGMET is a snapshot with a motion vector, valid for 2 hours, and updated hourly. A non-convective SIGMET is a smear, valid for 4 hours, and updated as needed but at least every 4 hours. AIRMETs imply advisory (moderate-intensity) turbulence and may cover large areas. Convective SIGMETs indicate convective activity which implies warning (severe-intensity) turbulence and generally covers much smaller areas. AWC forecasters may try to make their Convective SIGMETs capture all the turbulence (for example, that which may be occurring in the anvil ahead of convective activity), but it can be difficult for forecasters doing AIRMETs to capture all turbulence outside of Convective SIGMETs. There is a void there. Sometimes we rely on CWSUs to capture these smaller areas of convectively-induced turbulence outside of the Convective SIGMETs with Center Weather Advisories, but they generally don't unless the turbulence is severe. We run into this issue with nocturnal MCSs where there are Convective SIGMETs out all night but as the MCS decays, convective activity becomes smaller than the 3000 square mile size threshold and so then AIRMETs have to be considered in the mornings. There is a lot of desk conversation during transition between the products, and this is almost a daily occurrence during the summers. Some days it is better coordinated than others,

considering additional coordination with the CWSUs. It is a huge gray area with turbulence coverage between Convective SIGMETs and AIRMETs. There probably needs to be a better written definition on how to handle that. A pertinent scenario is when an MCS is falling apart.

Does not believe there would be pushback from AWC management on any of the suggestions made during this conversation.

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