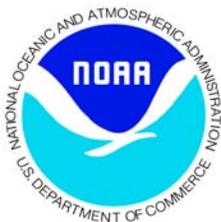


CWSU Virtual WES Simulations: Producing Customer-Focused TAFs



Ceiling and Visibility Simulation Guide: *11/18/2009 Case*

Presented by the
Warning Decision Training Branch



Acknowledgments

Special thanks to WFO Birmingham for providing the data for this event and to Cyndie Abelman, Jon Carney, Tom Dulong, Rich Mamrosh, Doug Schneider, Cammye Sims, Leslie Wanek, Carl Weiss, and Paul Witsaman from NOAA and Tsvetomir Ross-Lazarov and Warren Rodie from COMET for their help with providing data and assisting with development of these simulations. Also special thanks to Randy Baker and the meteorologists at UPS Airlines for creating their crossover technique.

Cover photo courtesy of COMET

Ed Mahoney, Chief

Warning Decision Training Branch

Training Division, OCWWS

December 15, 2010

Document History

The document history is provided to track updates and changes to the simulation guide. The version number, seen at the bottom of every page, will be updated as each significant change is made to the simulation guide.

Version	Date	Description
1.0	December 15, 2010	This is one of several virtual WES aviation simulations designed for CWSU meteorologists.

To provide feedback, comments or ideas related to this document, please visit our web site at: <http://www.wdtb.noaa.gov>

Table of Contents

Acknowledgments	i-ii
Document History	i-iii
1: How to Use This Document	1-1
Introduction	1-1
2: The <i>November 18, 2009</i> Event Overview	2-1
3: Background Information	3-1
AVNFPS Customization	3-1
Setting Up and Starting AVNFPS and D2D for a Simulation	3-1
WESSL:	3-2
Data Characteristics	3-2
Performance	3-3
4: Simulation Suggestions	4-1
Introduction	4-1
Simulations	4-1
Appendix A: METAR Observations for TAF sites.....	A-1

1: How to Use This Document

I. Introduction

Welcome to the **November 18, 2009 DLAC-2 Ceiling and Visibility** Simulation Guide! The purpose of this guide is to provide the training facilitator with case-specific materials needed to prepare and deliver effective simulations originally developed for the Distance Learning Aviation Course 2 (DLAC-2) which have been re-purposed to meet the CWSU WES training requirement.

Since this document outlines the “answers” to the challenges of the event, it is specifically meant for the use of the training facilitator only.

In order to create effective simulations with this case, you will need to familiarize yourself with the details of this event. We recommend installing the case first, followed by reading each short section in order. See Table 1-1 for a description of the layout of this document.

Table 1-1: Simulation Guide Layout

1: How to Use This Document
The introduction describes the content of the simulation guide and how to use this document.
2: The November 18, 2009 Event Overview
The event overview provides a summary of the key components of this event.
3: Background Information
Read this section to become familiar with loading an aviation simulation, the data characteristics of this case, and information on WESSL.
4: Simulation Suggestions
Descriptions of each of the two simulations, including the performance objectives and evaluation criteria are contained in this section.

After reviewing the simulation guide and becoming familiar with the details of this event, the training facilitator will be ready to begin loading simulations for the trainees. The training facilitator will need to understand the performance objectives associated with each simulation, which are directly tied to the DLAC-

Warning Decision Training Branch

2 Module 5 training module. You will be able to evaluate a trainee's performance either during each simulation, or afterwards as all TAFs will be archived for each simulation. Each performance objective has a corresponding evaluation criteria to allow you to assess the trainee's performance, all of which are provided in Section 4 of this document.

This set of simulations contains effective ways of incorporating immediate feedback to the trainee without training facilitator interaction, and it is possible for the trainee to start and complete the training without the training facilitator present. However, training research indicates that one-on-one training, where ***training facilitator and trainee participate together for the optimum learning experience***, is the most effective way to run a simulation. While time consuming, this can insure that:

1. the trainee remains focused on the objectives of the simulation,
2. the trainee receives essential feedback on performance, and
3. the training facilitator develops a solid understanding of how well the trainee comprehends the training and how well the trainee transfers the training to application.

2: The November 18, 2009 Event Overview

Portions of the Birmingham CWA, which covers the middle third of Alabama, experienced a fog and low ceiling event during the early morning hours of November 18, 2009. A weak front passed through the CWA, allowing for clear skies and calm winds, good indicators that radiation fog may develop. Light rain showers moved over the CWA during the overnight hours the night before, providing another fog-forming ingredient: ground moisture. Some TAF sites in the Birmingham CWA were affected by the fog but most were not. The trainee will take two simulations before this fog event so that he/she will have a chance to

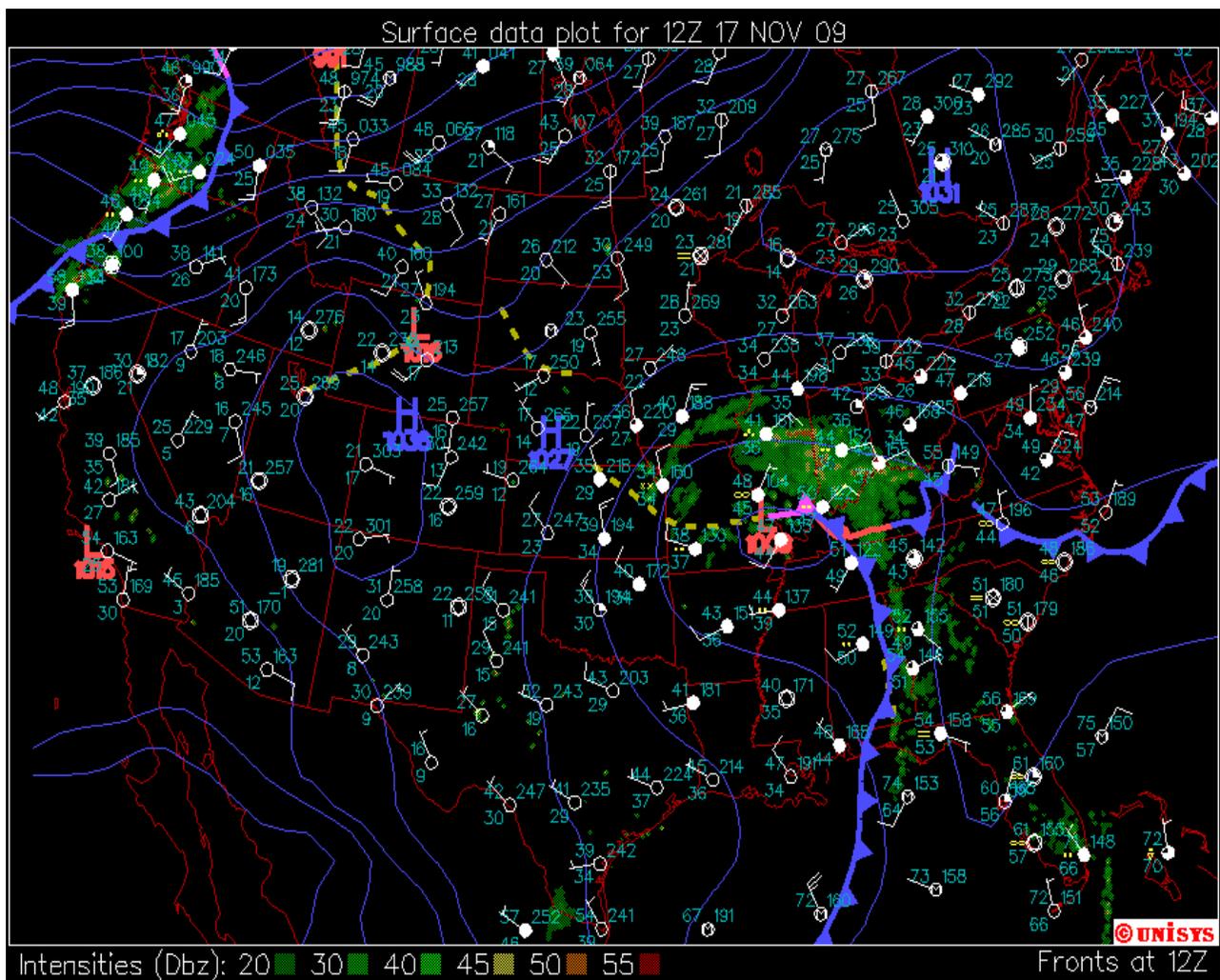


Figure 2-1. Composite map showing surface observations, position of fronts and weather systems, and radar overlay for 12Z on 17 November 2009.

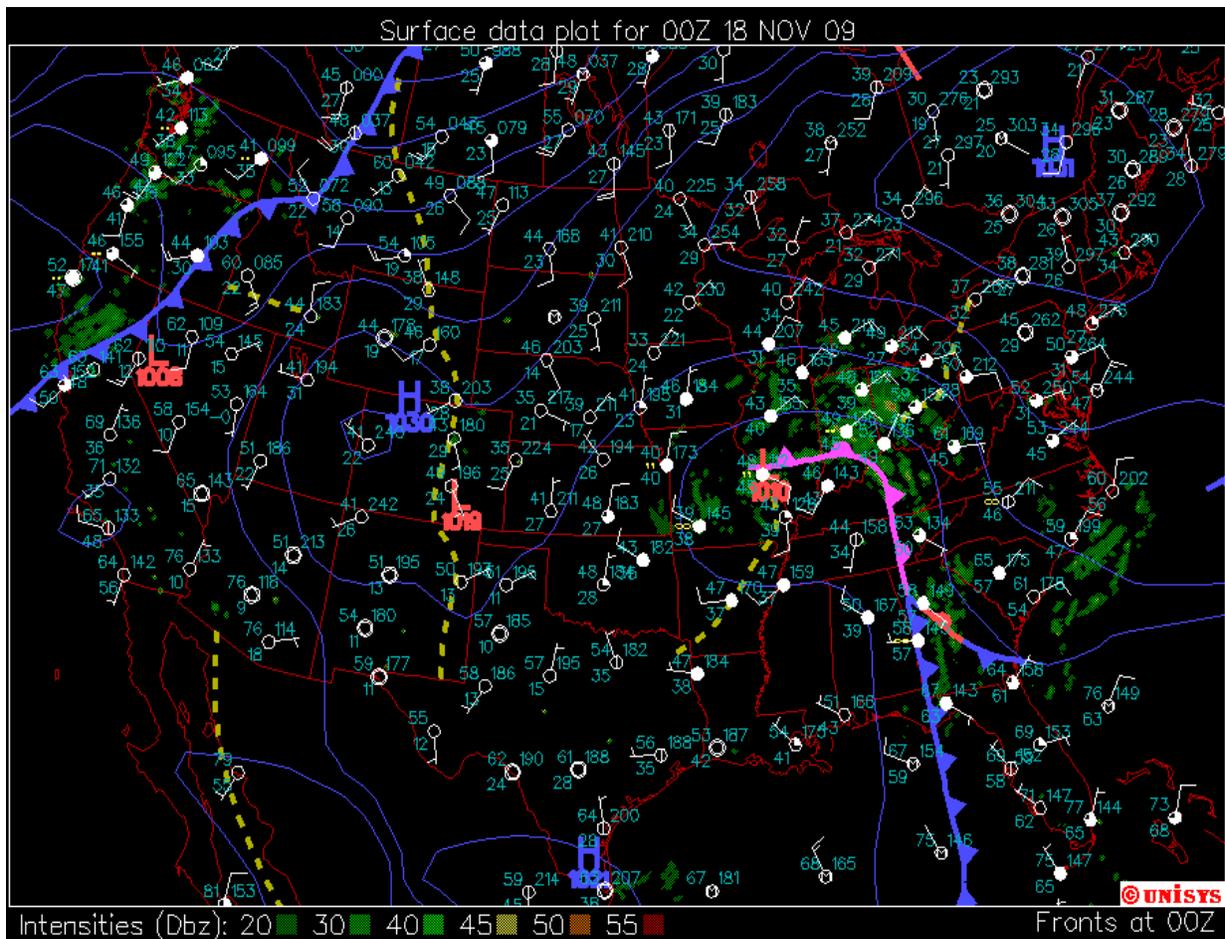


Figure 2-2. Composite map showing surface observations, position of fronts and weather systems, and radar overlay for 00Z on 18 November 2009.

forecast the formation of the fog and also the possibility of low ceilings at three of Birmingham's six TAF sites: KANB, KBHM, and KMGM. Maps are provided to show the nationwide conditions 11 hours before the first simulation (12Z on November 17th) (see Fig. 2-1) and 12 hours later (00Z on November 18th) (see Fig. 2-2).

The OPSNET Delays Report for Birmingham Shuttlesworth International is also provided (see Fig. 2-3). Based upon the chart, no delays occurred at KBHM on the 17th or 18th.

Two simulations, intended to be taken sequentially, are available to the trainee. The first one begins at 23Z on November 17th and the second one begins at 05Z on November 18th. In both simulations, the trainee will create an Aviation Forecast Discussion and the accompanying TAFs previously mentioned for the

OPSNET : Delays : Ground Delay Report

From 11/17/2009 To 11/18/2009 | Facility=BHM

Date	Ground Stops			EDCT		
	Delays	Minutes	Average	Delays	Minutes	Average
11/17/2009	0	0	0.00	0	0	0.00
11/18/2009	0	0	0.00	0	0	0.00
Total :	0	0	0.00	0	0	0.00

Total			
Date	Delays	Minutes	Average
11/17/2009	0	0	0.00
11/18/2009	0	0	0.00
Total :	0	0	0.00

Figure 2-3. A list of the delays for KBHM for 11/17-18/2009 (UTC-based).

Birmingham CWA. The next section of this guide details how to load the data and run the simulator.

Warning Decision Training Branch

3: Background Information

I. AVNFPS Customization

The localization for this set of simulations should be set by default to be BMX. However, if it is not, please contact Darrel Kingfield or Mark Sessing at WDTB for assistance.

II. Setting Up and Starting AVNFPS and D2D for a Simulation

To start AVNFPS for these WES simulations, you will need to double-click the Start AVNFPS icon on your virtual desktop. **Do not do this until after the simulation has been resumed after the pause and after watching the pre-brief.** There are two options for loading TAFs: Default TAFs and previous simulation forecaster-issued TAFs. To switch between the two, follow the steps given in the TAFs from Previous Simulations section below.

Default TAFs:

Default TAFs are available for both simulations. You **MUST** ensure that a default TAF directory appears when the simulation macro loads so that AVNFPS will have TAFs to process when it starts. The default TAFs for the simulations are located in the following directories in /data/awips/2009Nov18/avnfps/archived_TAFs:

- bmx_18Z (for simulation #1)
- bmx_00Z (for simulation #2)

Sending TAFs:

Once the trainee has created their TAFs in AVNFPS, you will want to check for Syntax and QC by clicking those respective buttons. Doing so will cause the TAFs to be highlighted in a yellow-orange color. However, not to worry as the QC results are purely advisory/informational, not indicating anything wrong with the TAFs; it is just merely informing the forecaster or potential impacts to plan-

ning/airport operations, like the Fuel-Alternate rule or LIFR conditions, or flagging something climatologically rare.

Once the TAFs are ready, click the “Send” button only; **DO NOT CLICK THE “SAVE” BUTTON.**

TAFs from Previous Simulations:

When the same trainee will be running back-to-back simulations, edit the appropriate sim_ToHistory files located in the DRT directory (cd DRT in a terminal window and then ls and look for those files) by typing vi sim_ToHistory and editing the line that has bmx_xxz and replacing that with previous_simulation. **DO NOT DELETE ANY BLANK LINES OR THE LINE THAT bmx_xxz IS ON. This will mess up the macro used to start the simulation.** However, if another trainee runs a simulation in the period between when the first trainee runs simulations, the previous simulation option is not possible, and the default files will need to be used.

Launching the AVNFPS GUI and D2D:

After successfully starting up a simulation and watching the pre-brief and resuming the simulation, double-click on the Start D2D and Start AVNFPS icons on the virtual machine desktop.

III. WESSL:

The WESSL script for each of the two simulations will contain many different pop-up windows: some will require a response from the student, some will have useful reports and information, and some will pause the simulation. The NWSSchat pop-up that occurs a few minutes after the simulation starts is optional. After the second simulation, there will be an Articulate debrief of the entire event along with TAFs created by aviation forecasting experts designed to provide instant feedback to the trainee.

IV. Data Characteristics

The original data set came from the BMX office archives, and most all data is accessible during the simulations. While there may be some incomplete or

missing data due to the archiving process, there is enough data that the trainee should be able to satisfy the learning objectives. The details of the data sets are included below:

Model Data:

The following model data in this dataset is missing: RUC13, ECMWF-HiRes, and 00Z NAM12 data. All other data should be available.

Bufkit Data:

Each simulation will have a Bufkit window pop up approximately one minute into the simulation that will contain NAM model data from the most recent run. Verify that the local time is set to Central Standard Time (GMT - 6 hours). If the time needs to be changed, click the "Adjust Time" button at the bottom of the Overview window.

Radar Data:

8-bit data exists for KBMX and the surrounding radars. However, some elevation angles are missing.

Other Data:

VWPs, wind profilers, and MDCARS are available for this event.

Also remember to pass along the UPS Fog Technique to the trainee - if the minimum temperature of a given night is forecast to be equal to the minimum dewpoint temperature from the warmest part of the previous afternoon, generally forecast 1-3 miles visibility with mist. If the minimum temperature of a given night is forecast to be three degrees F or lower than the minimum dewpoint temperature from the warmest part of the previous afternoon, generally forecast 1/2 mile visibility or lower, unless turbulent mixing will prevent fog.

V. Performance

The simulation may run slow depending on the available memory the virtual machine has to work with. Thus it may seem like the simulation processor is

Warning Decision Training Branch

getting bogged down; no worries, the only effect is that updates may come slightly later than expected. By not starting D2D and AVNFPS until after the pre-brief has been viewed and the simulation has been resumed, the data feeding process will be helped.

4: Simulation Suggestions

I. Introduction

Two simulation descriptions are included in this section for the November 18, 2009 case, and they are intended to be taken sequentially. Simulation 1 focuses on writing the routine 00Z TAFs and accompanying Aviation Forecast Discussion for the 18th for three of the six TAF sites in the Birmingham CWA (KANB, KBHM, and KMGM). Simulation 2 focuses on writing the routine 06Z TAFs for the 18th and accompanying AFD for the same three sites.

WESSL files are provided to help pace each simulation and provide extra data sets. The WESSL file response boxes are also used to document information that can be accessed after the simulation is over.

II. Simulations

Simulation 1 (17 November 2301Z - 2340Z) Issuing 00Z AFD and TAFs

AVNFPS Directory: bmx_18z

Summary:

In this simulation, the trainee will be writing the 00Z AFD for the Birmingham CWA as well as the TAFs for KANB, KBHM, and KMGM. The simulation start time is 2300Z on November 17, 2009, at which time it is necessary to begin looking at model data and other data found in AWIPS to write an AFD for the Birmingham CWA as well as the TAFs.

No weather of note is occurring during this simulation; it only serves as a chance to anticipate the possibility of fog formation over parts of the Birmingham CWA several hours from now.

Simulation 1 is designed to be taken before Simulation 2, therefore at the conclusion of Simulation 1, you are advised not to reveal any information regarding the event beyond 2340Z.

Schedule for trainee:

- 2301 (Pause): Articulate introduction to simulation with objectives and other useful information (approx 5 minutes).
- 2301-2320 (20 min): Become familiar with CWA, evaluate data and respond accordingly to any WESSL pop-ups. The NWSSChat pop-up that occurs a few minutes after the simulation starts is optional.
- 2320 (Pause): Trainee will write an AFD for the Birmingham CWA to be consistent with the criteria given in the simulation. Trainee will resume simulation after writing the AFD.
- 2320-2340 (20 min): Trainee will create TAFs for the TAF sites in the Birmingham CWA. The simulation can be ended as soon as the forecasts are submitted in AVNFPS.
- 2340 (or when trainee is finished): Simulation will automatically end. However, **as soon as trainee issues TAFs, stop simulation and in a new terminal window, load the debrief presentation from the command line using: `firefox file:///data/awips/2009Nov18/wessl/Debrief_Sim1/player.html`.**

Performance Objective 1. Demonstrate the ability to assess potential aviation hazards and their impacts to TAF sites.

Evaluation Criteria 1. The trainee should attempt to properly assess any possible weather threat that will disrupt aviation activity based upon the available data. Feedback will be provided at the end of this simulation on what TAFs the DLAC team created, and this should be the basis for evaluation of the trainee's TAFs. As facilitator, you have access to the trainee's TAFs (located in /data/awips/2009Nov18/avnfps/archived/_TAFs/previous_simulation immediately after the simulation has ended). The trainee's TAFs are also permanently archived in /data/awips/2009Nov18/saved_tafs/ in the directory time-stamped with the actual date and time when the trainee completed the simulation. It may be a good idea to go over them with the student at the completion of this first simulation.

Performance Objective 2. Demonstrate the effective use of aviation forecasting tools.

Evaluation Criteria 2. The trainee should be able to effectively use such tools as BUFKIT, AWIPS model soundings, surface observations and analyses, satellite and radar, and local climatology. This objective may be evaluated in person as you monitor which tools the trainee uses during this simulation. Also, the trainee will be writing an aviation forecast discussion where it is appropriate for the trainee to mention the tools used in the forecast preparing process. The trainee's AFD is available in the /data/awips/2009Nov18/wessl/ directory, as a current date/time stamped file with the format sim1.log.YYYYMMDD_HHMM". It is a text file, and the HHMM time stamp is LOCAL TIME that the AFD was issued.

Performance Objective 3. Effectively articulate forecast logic and uncertainty with an Aviation Forecast Discussion.

Evaluation Criteria 3. The trainee will write an AFD in a WESSL window which will be in the same format as one written operationally. For comparison, the debrief Articulate presentation will contain an AFD written by the DLAC team. A saved copy of the trainee's AFD may be retrieved; see Evaluation Criteria 2 above for information on how to do so.

Performance Objective 4. Produce a practically perfect TAF for low ceilings and visibility and their related hazards:

- Write to the flight categories first, establish trends
- Add specific ceiling and visibility details for the first 6 hours only (the critical TAF period)
- Limit TEMPOs to first 6 hours and avoid use of PROB groups
- Review for consistency and make sure you have addressed the expected flight category changes

Evaluation Criteria 4. This is the most important of the four criteria. The guidelines above will be in the pre-brief for the trainee. The trainee should use these guidelines as much as possible when writing the TAFs. During the Articulate debrief, the PPTAFs written by the DLAC team will be shown along with the reasoning for their forecast. As facilitator, you are encouraged to discuss the

trainee's TAFs with them, and information on how to retrieve their TAFs is included in Evaluation Criteria 1.

Simulation 1 Debrief

As discussed previously, at the end of the simulation a short Articulate debrief will be launched manually after the TAFs have been sent. From a new terminal window, enter the following command:

[firefox file:///data/awips/2009Nov18/wessi/Debrief_Sim1/player.html](file:///data/awips/2009Nov18/wessi/Debrief_Sim1/player.html)

The debrief will discuss the DLAC team's 00Z TAFs and the aviation forecast discussion. There also will be instructions on how to start Simulation 2.

Simulation 2 (18 November 0501Z - 0540Z) Issuing 06Z AFD and TAFs

AVNFPS Directory: bmx_00z or previous_simulation

Summary:

In this simulation, the trainee will be writing the 06Z AFD for the Birmingham CWA as well as the TAFs for KANB, KBHM, and KMGM. The Simulation 2 start time is 0500Z on November 18, 2009, at which time it is necessary to begin looking at model data and other data found in AWIPS to write an AFD for the Birmingham CWA as well as the TAFs.

The simulation occurs a few hours before the time period that fog could possibly form over portions of the Birmingham CWA.

Schedule for trainee:

- 0501 (Pause): Articulate introduction to simulation with objectives and other useful information (approx 5 minutes).
- 0501-0520 (20 min): Evaluate new data and respond accordingly to any WESSL pop-ups. The NWSChat pop-up that occurs a few minutes after the simulation starts is optional.

- 0520 (Pause): Trainee will write an AFD for the Birmingham CWA to be consistent with the criteria given in the simulation. Trainee will resume simulation after writing the AFD.
- 0520-0540 (20 min): Trainee will create TAFs for the TAF sites in the Birmingham CWA. The simulation can be ended as soon as the forecasts are submitted in AVNFPS.
- 0540 (or when trainee is finished): Simulation will automatically end. However, **as soon as trainee issues TAFs, stop simulation and in a new terminal window, load the debrief presentation from the command line using: [firefox file:///data/awips/2009Nov18/wessl/Debrief_Sim2/player.html](file:///data/awips/2009Nov18/wessl/Debrief_Sim2/player.html).**

Performance Objective 1. Demonstrate the ability to assess potential aviation hazards and their impacts to TAF sites.

Evaluation Criteria 1. The trainee should attempt to properly assess any possible weather threat that will disrupt aviation activity based upon the available data. Feedback will be provided at the end of this simulation on what TAFs the DLAC team created, and this should be the basis for evaluation of the trainee's TAFs. As facilitator, you have access to the trainee's TAFs (located in /data/awips/2009Nov18/avnfps/archived/_TAFs/previous_simulation immediately after the simulation has ended). The trainee's TAFs are also permanently archived in /data/awips/2009Nov18/saved_tafs/ in the directory time-stamped with the actual date and time when the trainee completed the simulation. It may be a good idea to go over them with the student at the completion of this first simulation.

Performance Objective 2. Demonstrate the effective use of aviation forecasting tools.

Evaluation Criteria 2. The trainee should be able to effectively use such tools as BUFKIT, AWIPS model soundings, surface observations and analyses, satellite and radar, and local climatology. This objective may be evaluated in person as you monitor which tools the trainee uses during this simulation. Also, the trainee will be writing an aviation forecast discussion where it is appropriate for the trainee to mention the tools used in the forecast preparing process. The trainee's AFD is available in the /data/awips/2009Nov18/wessl/ directory, as a current date/time stamped file with the format sim2.log.YYYYMMDD_HHMM". It

is a text file, and the HHMM time stamp is LOCAL TIME that the AFD was issued.

Performance Objective 3. Effectively articulate forecast logic and uncertainty with an Aviation Forecast Discussion.

Evaluation Criteria 3. The trainee will write an AFD in a WESSL window and will be in the same format as one written operationally. For comparison, the debrief Articulate presentation will contain an AFD written by the DLAC team. A saved copy of the trainee's AFD may be retrieved; see Evaluation Criteria 2 above for information on how to do so.

Performance Objective 4. Produce a practically perfect TAF for low ceilings and visibility and their related hazards:

- Write to the flight categories first, establish trends
- Add specific ceiling and visibility details for the first 6 hours only (the critical TAF period)
- Limit TEMPOs to first 6 hours and avoid use of PROB groups
- Review for consistency and make sure you have addressed the expected flight category changes

Evaluation Criteria 4. This is the most important of the four criteria. The guidelines above will be in the pre-brief for the trainee. The trainee should use these guidelines as much as possible when writing the TAFs. During the Articulate debrief, the PPTAFs written by the DLAC team will be shown along with the reasoning for their forecast. As facilitator, you are encouraged to discuss the trainee's TAFs with them, and information on how to retrieve their TAFs is included in Evaluation Criteria 1.

Simulation 2 Debrief

As discussed previously, at the end of the simulation a short Articulate debrief will be launched manually after the TAFs have been sent. From a new terminal window, enter the following command:

firefox file:///data/awips/2009Nov18/wessl/Debrief_Sim2/player.html

The debrief will discuss the DLAC team's 06Z TAFs, the aviation forecast discussion, and show the metars from 07Z to 15Z for each TAF site.

Appendix A: METAR Observations for TAF sites

METARs for KANB:

KANB 180653Z AUTO 21003KT 10SM CLR 04/03 A3004 RMK AO2 SLP176 T00440033
KANB 180753Z AUTO 00000KT 9SM CLR 04/03 A3004 RMK AO2 SLP178 T00390028
KANB 180853Z AUTO 00000KT 1 1/4SM BR CLR 03/03 A3005 RMK AO2 SLP179
T00330028 52004
KANB 180953Z AUTO 00000KT 1/2SM FG VV001 02/02 A3006 RMK AO2 SLP184
T00220017 FZRANO
KANB 181053Z AUTO 00000KT 8SM FEW001 03/02 A3007 RMK AO2 SLP189 T00280017
KANB 181153Z AUTO 00000KT 1/4SM FG VV001 02/02 A3008 RMK AO2 SLP194 70003
T00220017 10061 20017 51008 FZRANO
KANB 181253Z AUTO 00000KT 1/4SM FG VV001 02/02 A3010 RMK AO2 SLP199
T00220022 FZRANO
KANB 181353Z AUTO 00000KT 7SM SCT001 04/04 A3012 RMK AO2 SLP204 T00390039
KANB 181453Z AUTO 00000KT 10SM CLR 07/04 A3012 RMK AO2 SLP206 T00670044
51008

METARs for KBHM:

KBHM 180653Z 00000KT 10SM BKN035 06/02 A3006 RMK AO2 SLP178 T00610022
KBHM 180753Z 00000KT 10SM OVC031 06/03 A3006 RMK AO2 SLP178 T00610028
KBHM 180853Z 00000KT 10SM OVC031 07/03 A3007 RMK AO2 SLP180 T00670033
53002
KBHM 180953Z 28003KT 10SM OVC029 07/02 A3007 RMK AO2 SLP183 T00720017
KBHM 181053Z 29003KT 10SM OVC029 07/01 A3008 RMK AO2 SLP185 T00720011
KBHM 181153Z 30003KT 10SM OVC031 07/01 A3010 RMK AO2 SLP190 T00720011 10072
20056 53010
KBHM 181253Z 28005KT 10SM OVC031 07/02 A3011 RMK AO2 SLP196 T00720017
KBHM 181353Z 28005KT 10SM OVC031 08/02 A3012 RMK AO2 SLP201 T00780017
KBHM 181453Z 26004KT 10SM BKN029 08/01 A3014 RMK AO2 SLP208 T00780011 53016

METARs for KUIN:

KMGM 180653Z 00000KT 10SM CLR 04/03 A3006 RMK AO2 SLP179 T00390028
KMGM 180753Z 00000KT 10SM CLR 03/02 A3006 RMK AO2 SLP178 T00280022
KMGM 180853Z 00000KT 10SM CLR 03/02 A3006 RMK AO2 SLP181 T00280017 53003
KMGM 180953Z 23005KT 10SM CLR 03/02 A3008 RMK AO2 SLP185 T00280022”
KMGM 181053Z 00000KT 10SM CLR 02/02 A3009 RMK AO2 SLP190 T00220017
KMGM 181153Z 00000KT 10SM CLR 01/01 A3010 RMK AO2 SLP193 T00110006 10056
20011 51011
KMGM 181253Z 00000KT 8SM CLR 03/02 A3011 RMK AO2 SLP198 T00280022

Warning Decision Training Branch

KMGM 181353Z 00000KT 10SM CLR 07/06 A3013 RMK AO2 SLP203 T00670056
KMGM 181453Z 00000KT 10SM FEW050 09/04 A3015 RMK AO2 SLP207 T00940044