

# Distance Learning Aviation Course 2: Producing Customer-Focused TAFs



## Wind Simulation Guide: *11/13-15/2006 Case*

Presented by the  
Warning Decision Training Branch



## **Acknowledgments**

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Cover photo courtesy of COMET

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## 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.

<b>Version</b>	<b>Date</b>	<b>Description</b>
1.0	July 23, 2008	This is the second of several aviation simulations in support of COMET's DLAC-2 course.

Note: the date of modification is listed on the cover page.

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

# Table of Contents

<b>Acknowledgments .....</b>	<b>i-ii</b>
<b>Document History .....</b>	<b>i-iii</b>
<b>1: How to Use This Document .....</b>	<b>1-1</b>
Introduction .....	1-1
<b>2: The <i>November 13-15, 2006</i> Event Overview .....</b>	<b>2-1</b>
<b>3: Background Information .....</b>	<b>3-1</b>
WES8.3 AVNFPS .....	3-1
Loading the Case from DVD .....	3-1
AVNFPS Customization .....	3-1
Starting WES-AVNFPS for a Simulation .....	3-1
Localizations: .....	3-4
WESSL: .....	3-5
Data Characteristics .....	3-5
<b>4: Simulation Suggestions .....</b>	<b>4-1</b>
Introduction .....	4-1
Simulations .....	4-1

# 1: How to Use This Document

## I. Introduction

Welcome to the **November 13-15, 2006 DLAC-2 Wind** Simulation Guide! The purpose of this guide is to provide the trainer at a forecast office with case-specific materials needed to prepare and deliver effective simulations for the wind and low-level shear portion of the Distance Learning Aviation Course 2 (DLAC-2). The general approach for using these simulations is the same as with the simulation associated with the convective simulation for DLAC-2 Module 2.

***Since this document outlines the “answers” to the challenges of the event, it is specifically meant for the use of the trainer 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**

<b>1: How to Use This Document</b>
The introduction describes the content of the simulation guide and how to use this document.
<b>2: The November 13-15, 2006 Event Overview</b>
The event overview provides a summary of the key components of this event.
<b>3: Background Information</b>
Read this section to become familiar with loading an aviation simulation, the data characteristics of this case, and information on WESSL.
<b>4: Simulation Suggestions</b>
Descriptions of each of the 3 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 trainer will be ready to begin loading simulations for the trainees. The trainer will need to understand the performance objectives associated with

each simulation, which are directly tied to the DLAC-2 Module 3 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 an corresponding evaluation criteria to allow you to assess the trainee's performance, all of which are provided in Section 4 of this document.

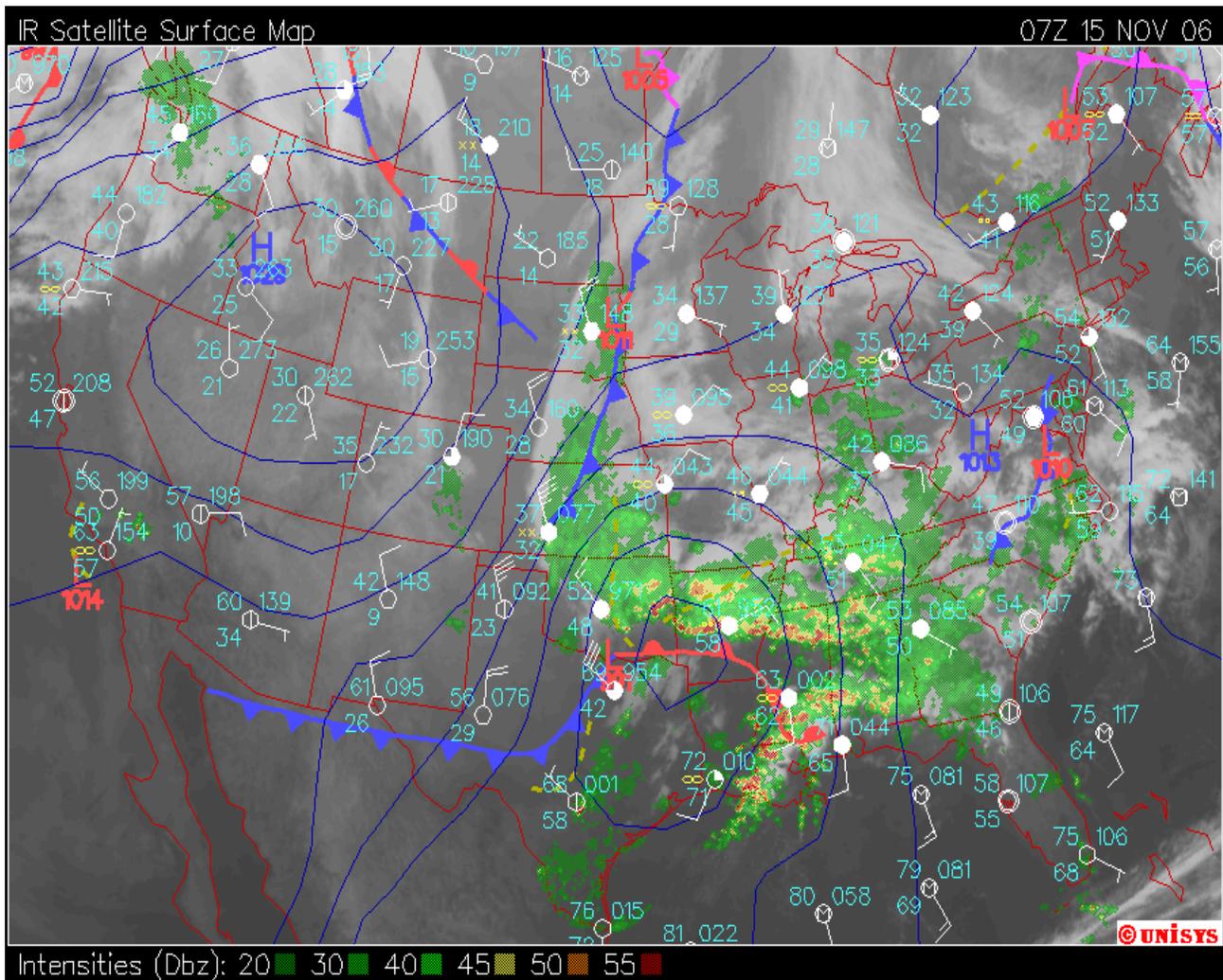
This set of DLAC-2 simulations contains effective ways of incorporating immediate feedback to the trainee without trainer interaction. However, training research indicates that one-on-one training, where ***trainer and trainee participate together for the optimum learning experience***, is the most effective 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 facilitator develops a solid understanding of how well the trainee comprehends the training and how well the trainee transfers the training to application.

In order to manage a simulation session, the trainer must be able to run a simulation as documented with the WES install and testing instructions included with the WES software. The simulations will be much more relevant if local AWIPS and AVNFPS customizations (e.g. preferences, procedures, color tables, etc.) are ported to the WES machine as outlined in the WES installation instructions. For more information on the WES, visit <http://www.wdtb.noaa.gov/tools/wes/index.htm>

## 2: The November 13-15, 2006 Event Overview

Most areas of North Texas experienced a fairly strong cold front during the early morning hours of November 15, 2006 that brought strong west-northwesterly winds for most of the day. These strong winds affected Dallas/Fort Worth International Airport (DFW) throughout the day. However, determining the timing of frontal passage proved to be rather tricky for the forecasters at the Fort Worth Weather Forecast Office. A composite map is given to show the position of the front as well as other features at the time it passed through the Dallas/Fort Worth area(see Fig. 2-1). The OPSNET Delays Report is also provided. Based



**Figure 2-1.** Composite map showing surface observations, position of fronts and weather systems, and radar and satellite overlay for 07Z on 15 November 2006.

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**OPSNET : Delays Report**  
 From 11/14/2006 To 11/15/2006 :  
 Facility - DFW

Facility	Date	Total Ops	Total Delays	Delays By Category				Delays By Class			
				Departure	Arrival	Enroute	TMS	Air Carrier	Air Taxi	General Aviation	Military
DFW	11/14/2006	1973	0	0	0	0	0	0	0	0	0
DFW	11/15/2006	1630	273	6	10	0	257	240	33	0	0
<b>Total</b>		<b>3603</b>	<b>273</b>	<b>6</b>	<b>10</b>	<b>0</b>	<b>257</b>	<b>240</b>	<b>33</b>	<b>0</b>	<b>0</b>

Delays By Cause						Delays Per 1000 Ops	Avg Time (Min)	Total Time (Min)	Percent Ops Delayed
Weather	Term Vol	Center Vol	Equip	Runway	Other				
0	0	0	0	0	0	0.00	0.00	0	0.00
273	0	0	0	0	0	167.48	75.89	20719	16.75
<b>273</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>75.77</b>	<b>75.89</b>	<b>20719</b>	<b>7.58</b>

**Figure 2-2.** A list of the delays for KDFW on 11/14-15/2006.

upon the chart, 17% of the total operations out of DFW on the 15th were delayed, and each delay averaged 76 minutes. 94% of the delays were classified in the traffic management system category, and all of the delays were weather-related.

Three simulations, intended to be taken sequentially, are available to the trainee. The first one involves writing a long-term aviation discussion that will allow the forecaster to give his/her thoughts over what will happen in the 48 hours beginning at 12Z on November 13, 2006. The other two cover writing TAFs for 18Z on the 14th and 00Z on the 15th. The next section of this guide details how to load the data and run the simulator.

## **3: Background Information**

### **I. WES8.3 AVNFPS**

This simulation requires that you have WES8.3 AVNFPS loaded on your WES machine. Do not continue with these simulations until you have successfully installed and tested AVNFPS in a simulation. Full information on this can be found at <http://www.wdtb.noaa.gov/tools/wes/wes83.htm>

### **II. Loading the Case from DVD**

There are 2 install discs for the 13-15 November 2006 case. Two DVDs were shipped to each DLAC-2 facilitator. The case occupies ~ 17 GB of disk space. For details on how to load the case, see the README on the install discs.

### **III. AVNFPS Customization**

There are several easy ways to customize AVNFPS on your WES machine. Prior to starting these DLAC-2 wind simulations, be sure NOT to modify any of the site-specific AVNFPS localization files in /awips/adapt/avnfps/etc. What you can do (and what is recommended) is to copy your forecaster IDs file into the /awips/adapt/avnfps/etc directory. This will overwrite a link to the default forecaster ID file, which contains 5 default IDs. Also, you are encouraged to insert your office's AVNFPS preferences into /awips/adapt/avnfps/etc/app-resources directory. All 5 default preference files are identical.

\*\*\*The AVNFPS localization for this set of simulations should be set by default to be FWD. However, if it is not, just run the script in /data/awips/2006Nov14 called FWD\_Localization\_Change. Also, when any future simulations are run using AVNFPS for a different localization and you want to do one of these FWD simulations again, this script will need to be run prior to starting so the AVNFPS localization can be reset to FWD.\*\*\*

### **IV. Starting WES-AVNFPS for a Simulation**

Starting an aviation simulation is done exactly the same way as other WES simulations, other than the fact that you need to input a "TAFs directory" (See

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Simulation Entry

Please Enter:

FXA\_DATA (i.e. case location): /data/awips/2006Nov14

FXA\_INGEST\_SITE: FWD

Case Start Time: 200611141700

Case End Time: 200611141740

WESSL Script (optional): /data/awips/2006Nov14/wessl/sim2.wessl

WESSL Case Flags (optional):

FFMP File and Radars:

GFE Directory:

TAFs Directory: fwd\_12z

**Figure 3-1.** Simulation Entry window. Pay particular attention to the bottom and “TAF Directory”. You must select either a directory with default TAFs for the time-frame of the simulation, or a previously run simulation from the same trainee.

Fig. 3-1.). Macro files are accessed from the “Load Saved Settings”, and should be used for each of the simulations. The simulation suggestions section details which macro goes with a particular simulation. **You must input a TAFs Directory** to be able to launch AVNFPS after starting the simulation, and the TAFs contained in the specified directory will be initialized into AVNFPS. You have two options for loading TAFs: Default TAFs and previous simulation forecaster-issued TAFs. Remember though, for the first simulation, no TAFs will be written so no TAFs directory needs to be selected.

### Default TAFs:

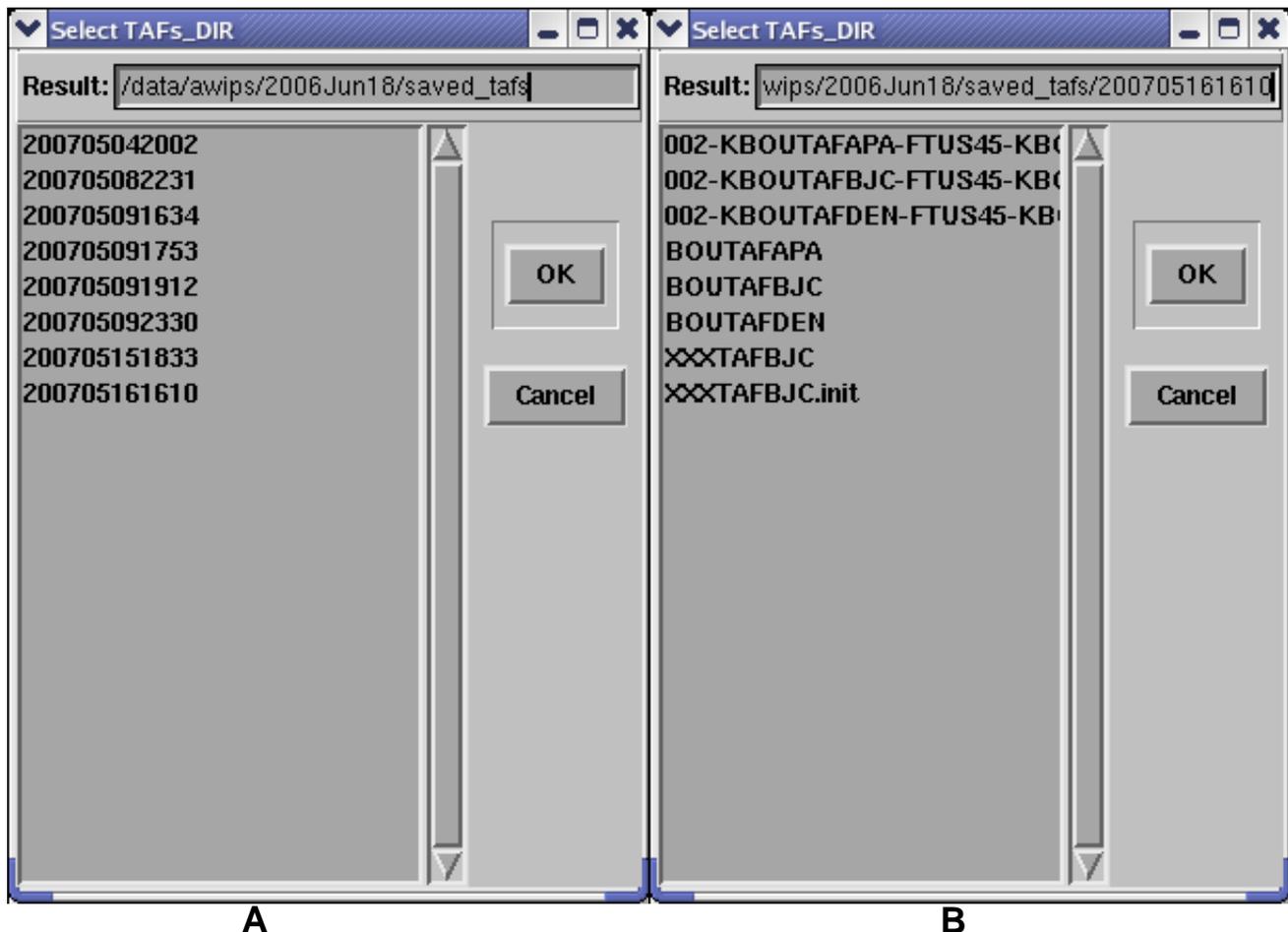
Default TAFs are available for the second and third simulations. For simulation 2, you **MUST** input the default TAF directories, and accordingly the macro inputs the default TAFs Directory. The default TAFs for simulations 2 and 3 are located in the following directories in /data/awips/2006Jun18/avnfps/archived\_TAFs:

- fwd\_12Z (for simulation #2, 18Z TAFs)
- fwd\_18Z (for simulation #3, 00Z TAFs)

For simulation 3 it is recommended that you load the trainee's TAFs from simulation 2, as outlined below.

**TAFs from Previous Simulations:**

For the special case when you have the same trainee running back-to-back simulations, just select TAFs Directory as /data/awips/2006Nov14/avn-fps/archived\_TAFs/previous\_simulation. However, if you want to start up a simulation for a particular trainee who was not going through back-to-back sequential simulations, and you wanted to ingest that trainee's TAFs from his or her previous simulation, the following must be done:



**Figure 3-2.** The select TAFs\_DIR gui. A) is the location of all saved TAFs from all previous simulations, containing a time-stamped directory of each simulation. B) is the result of clicking on one of the time stamped directories. This is what you want to select as the final input into to the TAFs Directory prior to starting the simulation.

- Enter the directory /data/awips/2006Nov14/saved\_tafs into the selection window (Fig. 3-2-A). If you have previously run a simulation, you'll notice a time stamped directory.
- If you know the date and time of the trainee's previous simulation, select that directory.
- If you are unsure about the date/time of the trainee's previous simulation, click into the directories to check (Fig. 3-2-B). Inside each saved, time-stamped directory are TAFs beginning with a number, which is the forecaster ID number. If you customized the avnfps/etc/forecaster file, you would then be able to match the previous TAFs to the proper trainee. Otherwise, the numbers will be one of the five defaults.

### **Launching the AVNFPS GUI and D2D**

After successfully setting up a simulation, and after clicking "Run Simulation", in a separate window in the monitor of your choosing, you will need to run separate commands to load D2D and to load AVNFPS. You can load from any command line these two separate commands:

- start\_awips (this starts D2D)
- start\_avnfps (this starts AVNFPS)

When the AVNFPS GUI loads, choose a proper username.

**NOTE:** If you use default username and configurations for your WES AVNFPS (one of the 5), remind the trainee to remember which default user they select in the AVNFPS startup window. This will allow for quicker identification of their saved TAFs.

## **V. Localizations:**

OB8.3 localizations for FWD are included with the case. We encourage you to customize your WES from your AWIPS. For information on customizing WES, please see the WES users guide available with the WES release.

## VI. WESSL:

The WESSL script for each of the three simulations will contain an introductory Articulate presentation that loads immediately after a simulation starts. These presentations provide an overview of the simulation, a list of what is expected from the trainee, a detailed overview of climatology, airport specific criteria, and other bits of important information. The WESSL script will also have many different pop-up windows: some will require a response from the student, some will have useful reports and information, some will just serve as distractions, and some will pause the simulation. After the third 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. **Loading the appropriate saved settings macro** from the simulation setup window will automatically insert the correct WESSL files for each simulation.

## VII. Data Characteristics

The original data set came from the FWD office archives, but the entire dataset was not archived. Therefore, not all model and satellite data are present. However, 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 exists in this dataset: NAM80, RUC.

### 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.

### Radar Data:

8-bit data exists for KFWS and KGRK. However, some angles are missing.

### Other Data:

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

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## 4: Simulation Suggestions

### I. Introduction

Three simulation descriptions are included in this section for the November 13-15, 2006 case, and they are intended to be taken sequentially. Simulation 1 focuses on having the trainee give their thoughts about what will happen from the time that simulation starts (11Z on the 13th) through the next ~48 hours by writing a long-term aviation discussion. Simulation 2 focuses on writing the routine 18Z TAFs for the 14th (for KDFW and KACT only) and accompanying AvnFD, in which the trainee should become aware that a unique wind situation will be occurring throughout the entire FWD CWA within the next 24 hours. Simulation 3 focuses on writing the 00Z TAFs for the 15th for the same two sites and accompanying AvnFD, in which the trainee will be able to adjust the timing of the wind shift and forecast any other weather concerns that might arise throughout the day on the 15th. No simulations occur during the frontal passage; however, impacts due to the change in wind velocity will be given in the de-brief for the third simulation.

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 (13 November 1100Z - 1120Z) Issuing long-term aviation discussion**

**WES Macro: sim1\_2006Nov14**

***\*\*NOTE: Be aware that the simulation takes a while to to prepare once the OK button has been clicked in the Simulation Entry window due to the total amount of data.\*\****

**AVNFPS Directory:  
none**

## Summary:

This simulation focuses on having the trainee become familiar with the FWD CWA, and the objective of this simulation is to write a long-term aviation discussion in which they will give their thoughts about all weather events that will affect the CWA in the next **48 hours** or so, primarily using BUFKIT to do so. There is limited model data available in D-2D; hence the reliance on using BUFKIT for model data. The Simulation 1 start time is 1100Z November 13, 2006, and the trainee will need to issue the long-term aviation discussion by 1120Z, as one would issue a regular AvnFD. During the data analysis time, BUFKIT is showing the presence of high clouds after 00Z on the 14th and the front descending upon the area during the early morning hours of the 15th.

Simulation 1 is approximately 44 hours prior to the frontal passage and accompanying change in wind velocity affecting Dallas-Fort Worth International Airport. ***Simulation 1 is designed to be taken before any of the other simulations, therefore at the conclusion of Simulation 1, you are advised not to reveal any information regarding the event beyond 1140Z.***

## Schedule for trainee:

- 1100 (Pause): Articulate introduction to simulation with objectives and other useful information (approx. 5 minutes).
- 1100-1120 (20 min): Evaluate data, become familiar with CWA, and write long-term aviation discussion.
- 1120: Simulation will automatically end and an Articulate presentation debrief will automatically load.
- **As soon as trainee issues the long-term aviation discussion, stop simulation and in a new terminal window, load the debrief presentation from the command line by: `firefox file:///data/awips/2006Nov14/wessi/Debrief_Sim1/player.html`**

**Performance Objective 1.** Demonstrate the effective use of BUFKIT for aviation forecasting.

**Evaluation Criteria 1.** The trainee should be able to use BUFKIT effectively and efficiently in order to write a long-term aviation discussion based upon the available data.

**Performance Objective 2.** Effectively articulate forecast logic and uncertainty with a long-term aviation discussion.

**Evaluation Criteria 2.** The trainee will write a long-term aviation discussion in a WESSL window and will be in the same format as a typical AvnFD but will cover the next 48 hours instead of 24. For comparison, the debrief Articulate presentation will contain a long-term aviation discussion written by an expert. A saved copy of the trainee's discussion may be retrieved in /data/awips/2006Nov14/wessl/ and will be labeled sim1.log.YYYYMMDD\_HHMM, with the date and time stamp of those files as the current local date and time.

## 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/2006Nov14/wessl/Debrief\_Sim1/player.html**

The debrief will discuss the expert long-term aviation discussion. There also will be instructions on how to start Simulation 2.

## Simulation 2 (14 November 1700Z - 1740Z) Issuing 18Z AvnFD and TAFs

WES Macro: sim2\_2006Nov14

***\*\*NOTE: Be aware that the simulation takes a while to to prepare once the OK button has been clicked in the Simulation Entry window due to the total amount of data.\*\****

**AVNFPS Directory: Make sure the directory fwd\_12z is selected as the TAF directory**

### Summary:

This simulation is different from Simulation 1 in that the trainee will be writing the 18Z AvnFD for the FWD CWA as well as the TAFs for KDFW and KACT. Note that there are more TAF sites in the Dallas/Fort Worth Metroplex, but these

other three sites typically have the same TAF as KDFW. The Simulation 2 start time is 1700Z on November 14, 2006, at which time it is necessary to begin looking at model data and other data found in AWIPS to write an AvnFD for the Fort Worth CWA as well as the two TAFs. The 12Z models are still showing the front moving through the CWA around 07Z on the 15th and are indicating the formation of a few low clouds around 18Z.

The simulation is approximately 14 hours prior to the frontal passage and accompanying change in wind velocity affecting Dallas-Fort Worth International Airport. ***Simulation 2 is designed to be taken after Simulation 1 and before Simulation 3, therefore at the conclusion of Simulation 2, you are advised not to reveal any information regarding the event beyond 1740Z.***

### **Schedule for trainee:**

- 1700 (Pause): Articulate introduction to simulation with objectives and other useful information (approx 5 minutes).
- 1700-1720 (20 min): Evaluate new data and respond accordingly to any WESSL pop-ups.
- 1720 (Pause): Trainee will write an AvnFD for the Fort Worth CWA to be consistent with the criteria given in the simulation. Trainee will resume simulation after writing the AvnFD.
- 1720-1740 (20 min): Trainee will create TAFs for the two specified TAF sites in the Fort Worth CWA. The simulation can be ended as soon as the forecasts are submitted in AVNFPS.
- 1740 (or when trainee is finished): Simulation will automatically end and an Articulate presentation debrief will automatically load.
- As soon as trainee issues TAFs, stop simulation and in a new terminal window, load the debrief presentation from the command line by: `firefox file:///data/awips/2006Nov14/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 an “expert” would have written in his/her TAF, and this should be the basis for evaluation of the trainee’s TAFs. As facilitator, you have access to the trainee’s TAFs; they will be located immediately after the simulation has ended in /data/awips/2006Nov14/avnfps/archived/\_TAFs/previous\_simulation, and are permanently archived in /data/awips/2006Nov14/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, aircraft data, 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 AvnFD is available in the /data/awips/2006Nov14/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 AvnFD was issued.

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

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

**Performance Objective 4.** Produce a practically perfect TAF for wind and its 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 experts 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/2006Nov14/wessi/Debrief\_Sim2/player.html**

The debrief will discuss the expert 18Z TAFs and the aviation forecast discussion. There also will be instructions on how to start Simulation 3.

## Simulation 3 (14 November 2300Z - 2340Z) Issuing 00Z AvnFD and TAFs

**WES Macro: sim3\_2006Nov14**

***\*\*NOTE: Be aware that the simulation takes a while to to prepare once the OK button has been clicked in the Simulation Entry window due to the total amount of data.\*\****

**AVNFPS Directory: Choose trainee's 18Z TAFs from the saved\_tafs/YYYYMMDDHHMM directory, or use the default TAFs: /data/awips/2006Nov14/avnfps/archived\_TAFs/fwd\_18Z**

## Summary:

This simulation is similar to Simulation 2 in that the trainee will be writing the 00Z AvnFD for the FWD CWA as well as the TAFs for KDFW and KACT. Note that there are more TAF sites in the Dallas/Fort Worth Metroplex, but these other three sites typically have the same TAF as KDFW. The Simulation 3 start time is 2300Z on November 14, 2006, at which time it is necessary to begin looking at model data and other data found in AWIPS to write an AvnFD for the Fort Worth CWA as well as the two TAFs. The 18Z models are still showing roughly the same data as the 12Z models.

The simulation is approximately 8 hours prior to the frontal passage and accompanying change in wind velocity affecting Dallas-Fort Worth International Airport. ***Simulation 3 is designed to be taken after Simulation 2.***

## Schedule for trainee:

- 2300 (Pause): Articulate introduction to simulation with objectives and other useful information (approx 5 minutes).
- 2300-2320 (20 min): Evaluate new data and respond accordingly to any WESSL pop-ups.
- 2320 (Pause): Trainee will write an AvnFD for the Fort Worth CWA to be consistent with the criteria given in the simulation. Trainee will resume simulation after writing the AvnFD.
- 2320-2340 (20 min): Trainee will create TAFs for the two specified TAF sites in the Fort Worth 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 and an Articulate presentation debrief will automatically load.

As soon as trainee issues TAFs, stop simulation and in a new terminal window, load the debrief presentation from the command line by: `firefox file:///data/awips/2006Nov14/wessl/Debrief_Sim3/player.html`

**Performance objectives and evaluation criteria are identical to those from Simulation 2.** All objectives may be evaluated in person by the facilitator during

the simulation, but there are also opportunities for the trainee to receive feedback during the debrief. To retrieve Simulation 3 TAFs, go to /data/awips/2006Nov14/saved\_tafs, and find the corresponding date and time stamped directory. The AvnFDs are located in /data/awips/2006Nov14/wessl/ and are labeled sim3.log.YYYYMMDD\_HHMM, with the date and time stamp of those files also the current local date and time.

## Simulation 3 Debrief

As discussed previously, a short Articulate debrief will launch automatically at the end of the simulation. However, if the simulation is prematurely ended before 2340Z, you also may manually load the debrief presentation from a new terminal window by entering the following command:

**firefox file:///data/awips/2006Nov14/wessl/Debrief\_Sim3/player.html**

The debrief will discuss the expert 18Z TAFs, the aviation forecast discussion, and the full impacts at DFW International Airport due to this event.