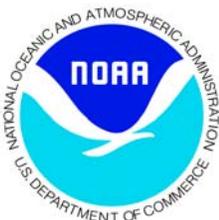


CWSU Virtual WES Simulations: Producing Customer-Focused TAFs



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

Ed Mahoney, Chief

Warning Decision Training Branch

Training Division, OCWWS

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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.

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

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>

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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 originally developed for the wind and low-level shear portion of 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 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

1: How to Use This Document
The introduction describes the content of the simulation guide and how to use this document.
2: The November 13-15, 2006 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 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. You will be able to evaluate a trainee’s performance either during each simula-

tion, 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 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.

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

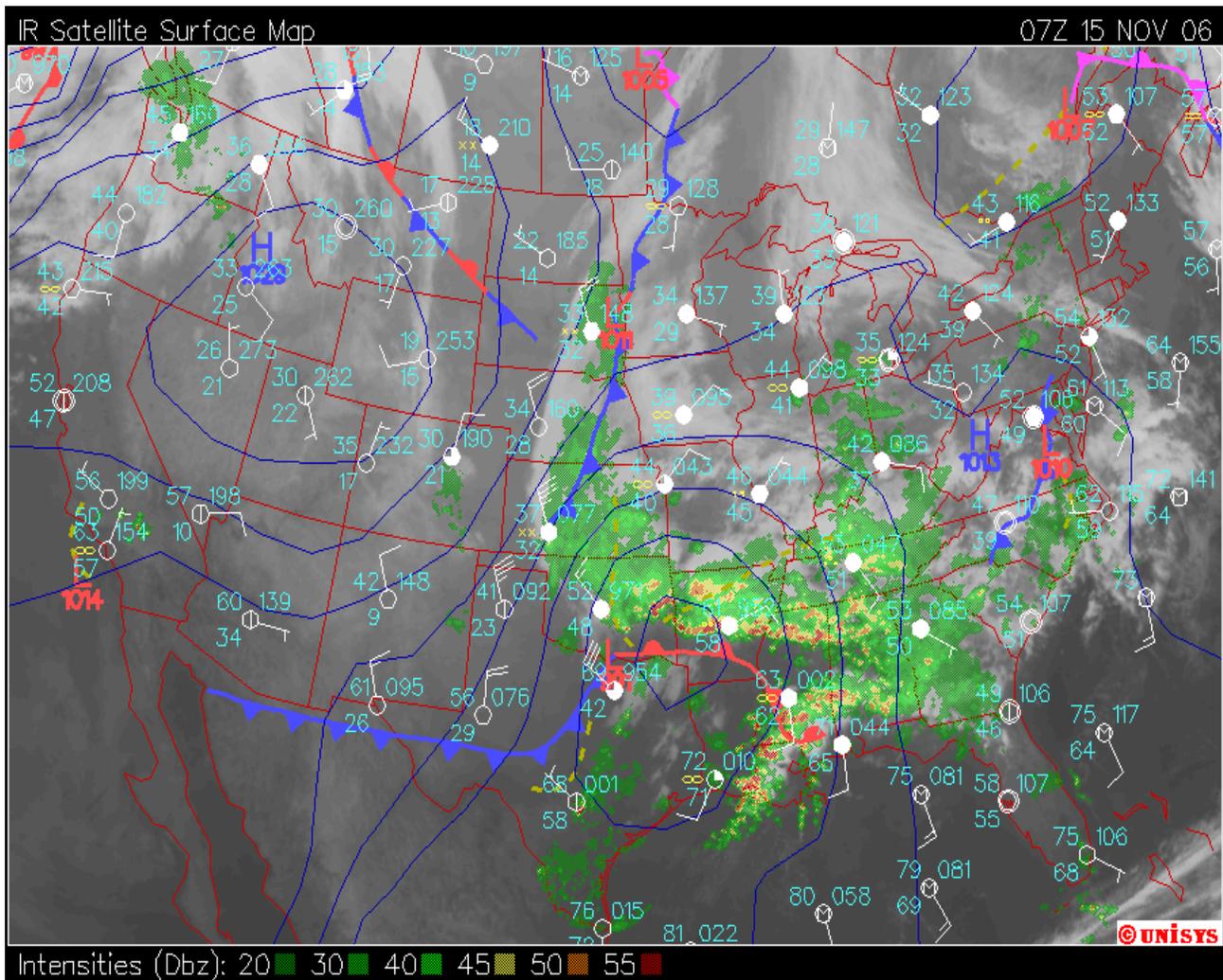


Figure 2-1. Composite map showing surface observations, position of fronts and weather systems, and radar and satellite overlay for 07Z on 15 November 2006.

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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
Total		3603	273	6	10	0	257	240	33	0	0

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
273	0	0	0	0	0	75.77	75.89	20719	7.58

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. AVNFPS Customization

The localization for this set of simulations should be set by default to be FWD. 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 the second and third simulations (the first simulation does not use AVNFPS, thus no default TAFs for that simulation). The default TAFs for simulations 2 and 3 are located in the following directories in /data/awips/2006Nov14/avnfps/archived_TAFs:

- fwd_12Z (for simulation #2, 18Z TAFs)
- fwd_18Z (for simulation #3, 00Z TAFs)

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 planning/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 fwd_xxz and replacing that with previous_simulation. **DO NOT DELETE ANY BLANK LINES OR THE LINE THAT fwd_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 setting 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 three simulations will contain 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.

IV. 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.

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 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.

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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 1101Z - 1120Z) Issuing long-term aviation discussion

*****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 D2D; 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:

- 1101 (Pause): Articulate introduction to simulation with objectives and other useful information (approx. 5 minutes).
- 1101-1120 (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 1701Z - 1740Z) Issuing 18Z AvnFD and TAFs

*****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: fwd_12z

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:

- 1701 (Pause): Articulate introduction to simulation with objectives and other useful information (approx 5 minutes).
- 1701-1720 (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 2301Z - 2340Z) Issuing 00Z AvnFD and TAFs

*****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: fwd_18z or previous_simulation

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 2301Z 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:

- 2301 (Pause): Articulate introduction to simulation with objectives and other useful information (approx 5 minutes).
- 2301-2320 (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

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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/wessi/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.