

Boston Aviation Workshop

Rick Curtis
Southwest Airlines
Chief Meteorologist
May 4, 2010

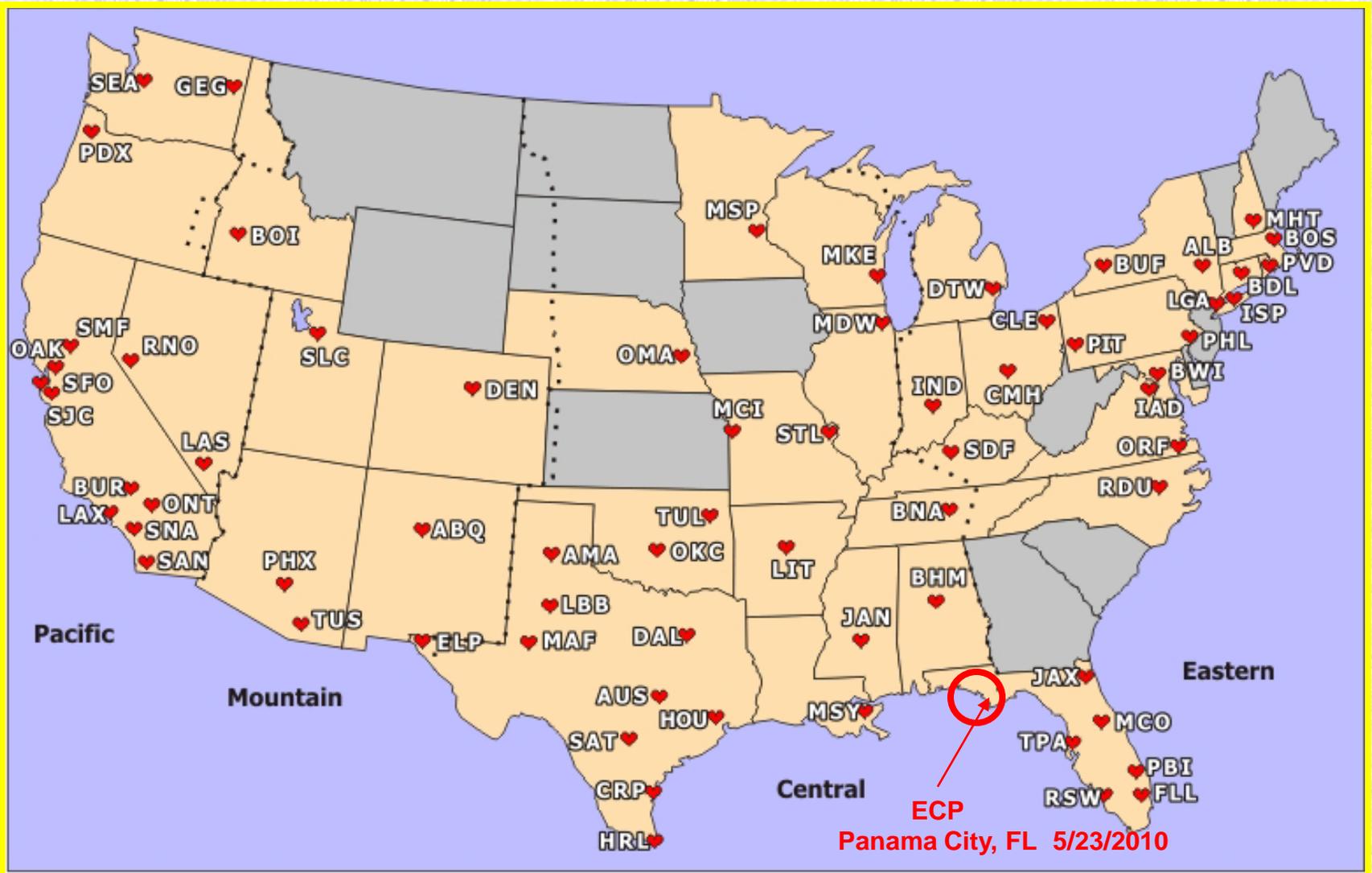


SWA Facts and Figures

- 3200+ daily flights from 68 airports
- 545 Boeing 737 aircraft (300's, 500's, 700's)
- Average flight length is 639 miles
 - Shortest: 133 miles (RSW-MCO)
 - Longest: 2,363 miles (PVD-LAS)
- Southwest consumed 1.4 billion gallons of jet fuel in 2009.
- Southwest offers the most domestic flights of any airline

Boston - Logan

- 16 Daily Departures
- 4 Terminating Aircraft
- 2 Gates
- Compliments other New England service to/from BDL, PVD and MHT.



FAA Policy Regarding Snowfall Intensity...

...For these reasons the FAA is now **requiring the use** of the FAA Snow Intensity Table to determine appropriate holdover times in snowfall conditions (Table 1B, page 8 of the attached document) for all Types of anti-icing fluid (Type I, II, III, and IV). Because the FAA Snow Intensity Table, like the FMH-1 Table, uses visibility to determine snowfall intensities, **if the visibility is being reduced by snow along with other forms of obscuration such as fog, haze, smoke, and etc. the FAA Snow Intensity Table need not be used to estimate the snow fall intensity** for holdover time determination. Use of the FAA Snow Intensity Table under these conditions may needlessly overestimate the actual snowfall intensity and therefore the snowfall intensity being reported by the weather observer or ASOS, the FMH-1 Table may be used.

Source: Official FAA Holdover Time Tables and Allowance Times Winter 2009 - 2010

Snowfall Intensity as a Function of Visibility

Time of Day	Temp.		Visibility (Statute Mile)							Snowfall Intensity
	Degrees Celsius	Degrees Fahrenheit	≥ 2 1/2	2	1 1/2	1	3/4	1/2	≤ 1/4	
Day	colder/equal -1	colder/equal 30	Very Light	Very Light	Light	Light	Moderate	Moderate	Heavy	Snowfall Intensity
	warmer than -1	warmer than 30	Very Light	Light	Light	Moderate	Moderate	Heavy	Heavy	
Night	colder/equal -1	colder/equal 30	Very Light	Light	Moderate	Moderate	Heavy	Heavy	Heavy	
	warmer than -1	warmer than 30	Very Light	Light	Moderate	Heavy	Heavy	Heavy	Heavy	

NOTE 1: This table is for estimating snowfall intensity. It is based upon the technical report, “The Estimation of Snowfall Rate Using Visibility,” Rasmussen, et al., Journal of Applied Meteorology, October 1999 and additional in situ data.

NOTE 2: This table is to be used with Type I, II, III, and IV fluid guidelines.

HEAVY = Caution—No Holdover Time Guidelines Exist

Ice Pellet Allowance Times

Winter 2009-2010 (Type IV Fluid)

	OAT -5 C or Above	OAT Less Than -5 C
Light Ice Pellets	50 minutes	30 minutes
Moderate Ice Pellets	25 minutes	10 minutes
Light Ice Pellets mixed with Light or Moderate Snow	25 minutes	Not Authorized Below -5 C OAT for moderate snow. 15 minute allowance for light snow. No takeoffs allowed for light snow combination when temp -10 C OAT or less.
Light Ice Pellets mixed with Light or Moderate Freezing Drizzle or Light Freezing Rain (Not Authorized below -10 C OAT)	25 minutes	10 minutes Not Authorized Below -10 C OAT
Light Ice Pellets mixed with Light Rain (OAT 0 C or Above)	25 minutes	Not Authorized Below -5 C OAT

Meteorological Data Collection and Reporting System (MDERS)

- Six Airline Participants (AA, Delta/NWA, FedEx, SWA, United, UPS)
- Real-time data access restricted to participating airlines (ESRL web site) and government agencies
 - Aircraft obs are largely limited to winds & temp (water vapor is coming)
 - Aircraft obs frequently over-reported at airline hubs, and under-reported at less-busy locations

Desired Future State of MDCERS

- Aircraft Weather Observations
 - Reported where & when needed through some level of data optimization system
 - Implement standardized reporting rate, data quality, and format.
 - Delivered over standardized comm. systems (NOAAport) and available to everyone that desires real-time access
- Implement an enhanced process for allowing additional program participants

NWS Water Vapor Project

- NWS contracts
 - Awarded to ARINC for installation of 31 water vapor sensors on SWA aircraft
 - SWA teaming with ARINC and SpectraSensors on installation and certification issues for the sensor
 - Awarded upgrade to UPS to retrofit 25 current water vapor sensors on UPS aircraft with newly upgraded sensor.
- Schedule
 - First SWA aircraft reporting water vapor data in February 2010.
 - Second SWA aircraft began reporting in late March 2010.
 - Remaining 29 SWA aircraft to be installed at the rate of approximately 1 aircraft per month.

Water Vapor Sensor





PEMCO

644





A Day in the Life of Southwest N644

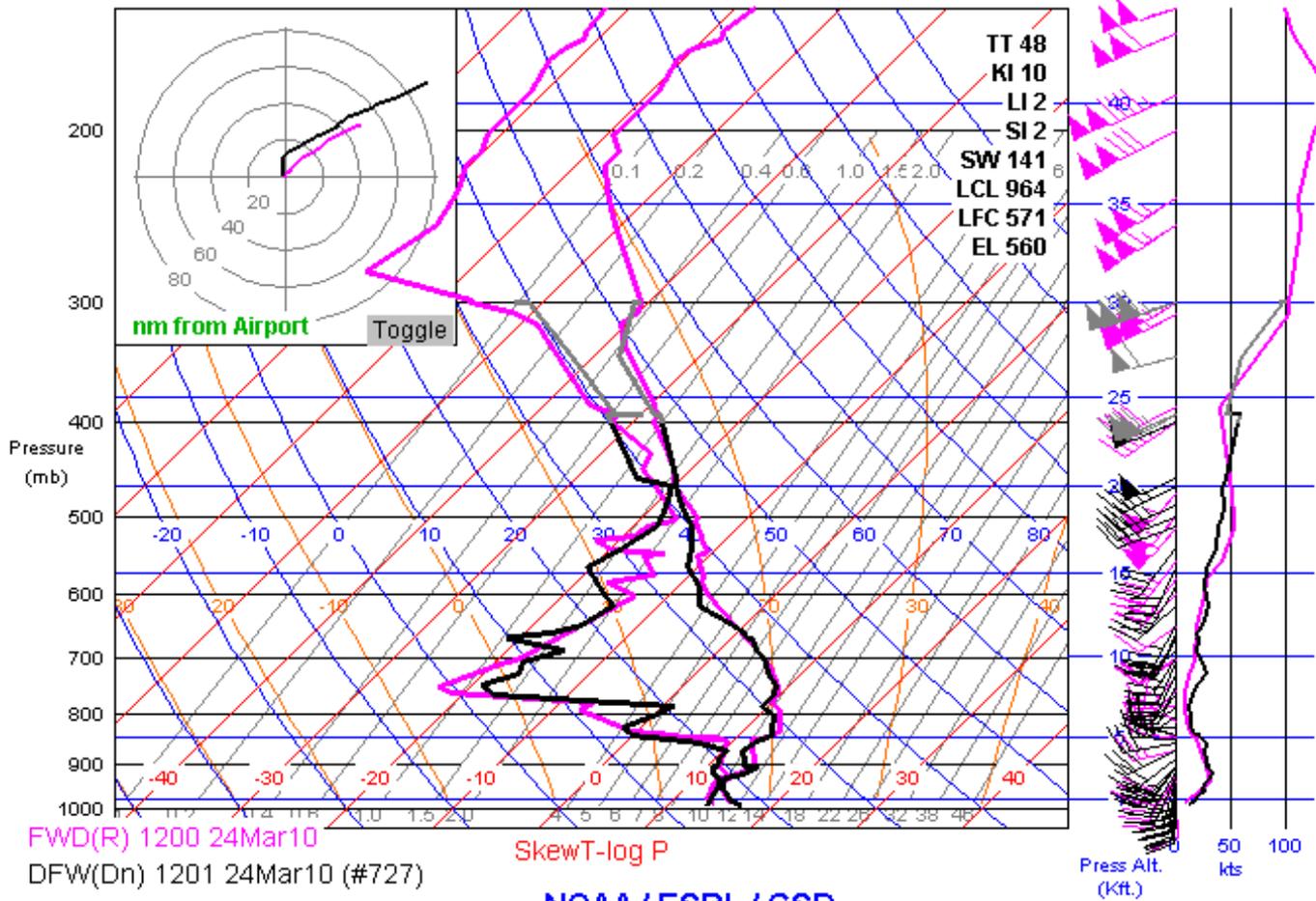
March 18, 2010

From New Hampshire to Arizona;
10 Stops – 18 Soundings



17-Mar-2010 07:30:00 -- 18-Mar-2010 07:29:49 (127746 obs, 717 in range, 504 Data points shown)

NOAA / ESRL / GSD Model: RR1h Vapor Alt: UNLIMITED



FWD(R) 1200 24Mar10
DFW(Dn) 1201 24Mar10 (#727)

NOAA / ESRL / GSD

- Load Other Sdgs
- Get text
- 0.5 mb scale
- SkewT/Tephi.
- Wind scale: 40/100
- Simple plot

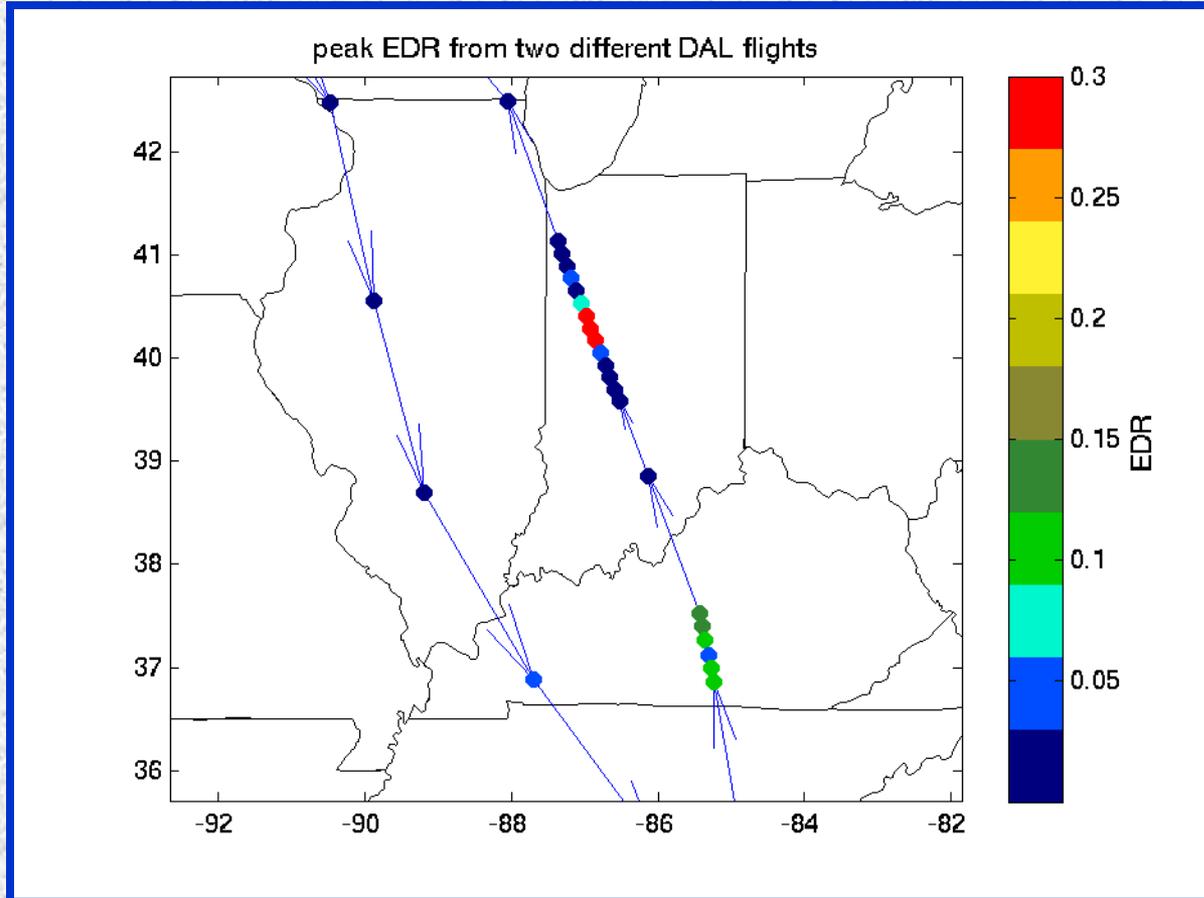
FWD(R) 1200 24Mar10	DFW(Dn) 1201 24Mar10	PHX(Dn) 0339 24Mar10	PHX(Dn) 1051 23Mar10
PHX(Up) 1623 23Mar10	PHX(Up) 2346 23Mar10	PHX(Dn) 1520 23Mar10	KLaS(Dn) 1932 23Mar10
KLaS(Up) 2024 23Mar10	LAS(Dn) 1132 24Mar10	RNO(Dn) 1155 24Mar10	RNO(Dn) 1757 23Mar10
RNO(Up) 1839 23Mar10	PHX(Up) 1623 23Mar10	PHX(Dn) 0339 24Mar10	PHX(Dn) 1051 23Mar10



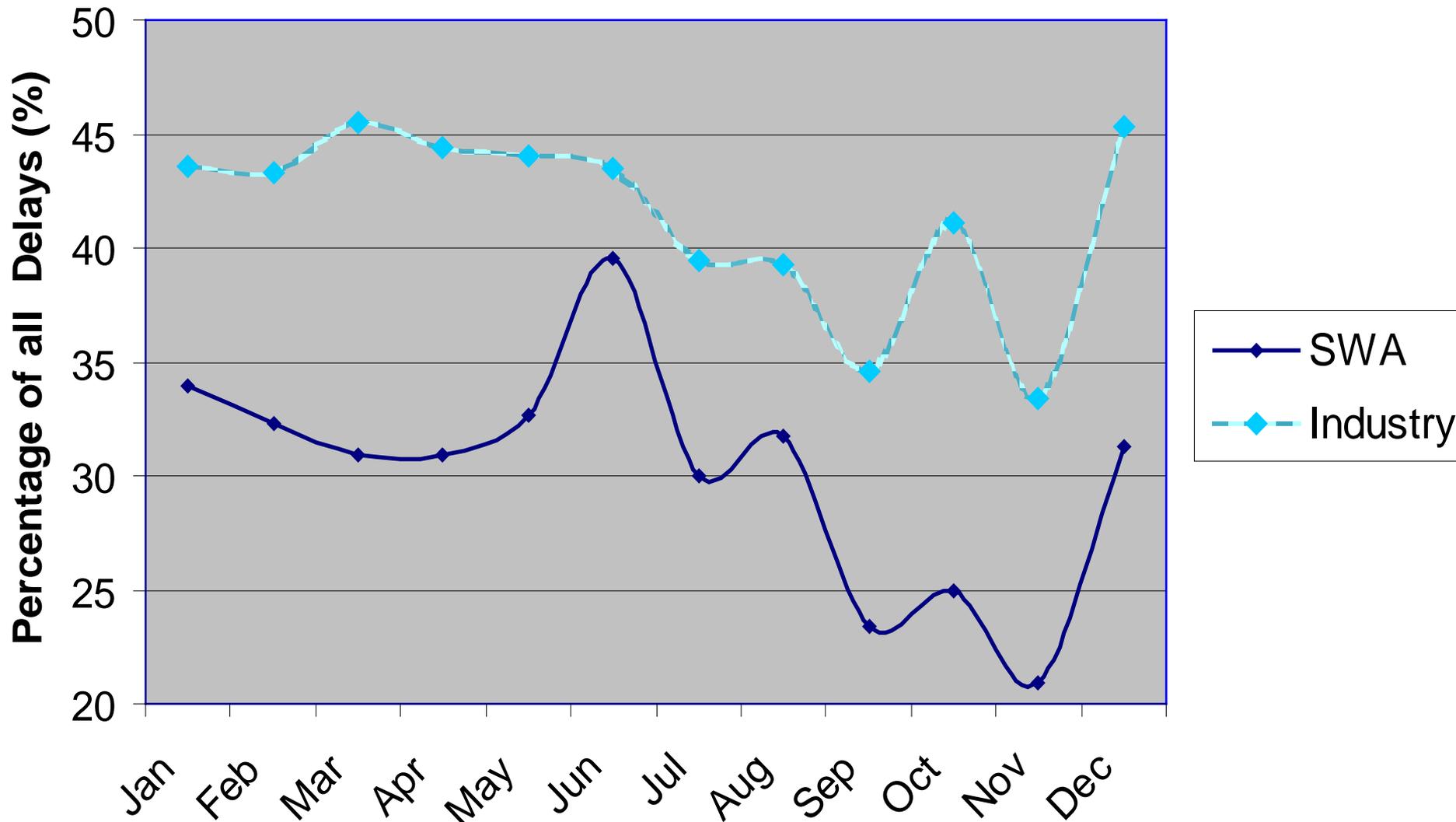
Automated Turbulence Reporting

- SWA plans to have automated turbulence reporting (EDR) on all of its 737-700 airplanes - approximately 340 aircraft.
- New 737 turbulence reporting algorithms were developed by NCAR - funded through the FAA Weather Research Program.
- We plan to begin a test of 10 aircraft in early May and compare reports with PIREPs for 3-6 months.
- Extensive internal process will be initiated within SWA to determine how to integrate this information into our operational decision making process.

New Way of displaying Turbulence Reports



2009 Flight Delays - Weather Related



Source: FAA - RITA

NWS TAF Perspectives

- SWA only uses NWS TAFs for operational decision making.
- We appreciate the steps being taken at BOX to generate TAFs from the Grids.
- We love the TAF Categorical Amendment Criteria (CAC) as it better manages TAF Amendments and items within the “From Group”.



NWS Categorical Amendment Criteria

LOWEST ELEMENT OF CIG OR VIS DETERMINES CATEGORY (CAT)

Site	Cat A Airport Minimum	Cat B Alternate Minimum	Cat C IFR	Cat D MVFR	Cat E Fuel Alternate	Cat F Other Threshold
KBOS* KORH	200' 1/2SM	700' 2SM	1000' 3SM	3000' 5SM	2000' 1SM	2500' 3SM Visual Apch* 1400' 3SM Circling Apch* 800' 2SM ILS Hold Points Assigned*
KPVD* KFMH KHYA	200' 1/2SM	800' 2SM	1000' 3SM	3000' 5SM	2000' 1SM	2500' Visual Apch* 700' 1SM Circling Apch*
KBDL	200' 1/2SM	900' 2SM	1000' 3SM	3000' 5SM	2000' 1SM	
KACK	200' 3/4SM	800' 2SM	1000' 3SM	3000' 5SM	2000' 3SM	
KMHT	300' 3/4SM	800' 2SM	1000' 3SM	3000' 5SM	2000' 3SM	200' 1/2SM Southwest Departures
KBAF	300' 3/4SM	900' 2SM	1000' 3SM	3000' 5SM	2000' 3SM	



Rick's Top 10 TAF Reality "Tough Love" List

- Number 10 – Be aware that TAFs are used (sometimes unfairly) for both longer term planning and flight planning activities.



Rick's Top 10 TAF Reality "Tough Love" List

- Number 10 – Be aware that TAFs are used (sometimes unfairly) for both longer term planning and flight planning activities.
- Number 9 - It takes courage to put 1/4SM +SN on the last few lines of a TAF. Do not be afraid, but do exercise caution!



Rick's Top 10 TAF Reality

"Tough Love" List

- Number 10 – Be aware that TAFs are used (sometimes unfairly) for both longer term planning and flight planning activities.
- Number 9 - It takes courage to put 1/4SM +SN on the last few lines of a TAF. Do not be afraid, but also do exercise caution!
- Number 8 - Don't "over tweak" the details; Sometimes by doing so, you miss the train headed right for you because your head is down.



Rick's Top 10 TAF Reality

"Tough Love" List

- Number 7 – Watch how long you forecast extended periods of very low visibility with winter weather. Pay close attention to climatology when doing so.



Rick's Top 10 TAF Reality "Tough Love" List

- Number 7 – Watch how long you forecast extended periods of very low visibility with winter weather. Pay close attention to climatology when doing so.
- Number 6 – Avoid the forecast “yo-yo” effect among your fellow forecasters.



Rick's Top 10 TAF Reality

"Tough Love" List

- Number 7 – Watch how long you forecast extended periods of very low visibility with winter weather. Pay close attention to climatology when doing so.
- Number 6 – Minimize the forecast “yo-yo” effect of adding/removing items among your fellow forecasters.
- Number 5 – Be aware of your “history”. Group multiple items into single amendments if possible. You need to do what you need to do, but be aware of the message you send when you issue an amendment just after a previous amendment, or regular TAF update.



Rick's Top 10 TAF Reality

"Tough Love" List

- Number 4 – “Know when to fold ‘em” – When you realize that something is not going to happen, “bite the bullet” and amend versus keeping things around until a future update.



Rick's Top 10 TAF Reality

"Tough Love" List

- Number 4 – “Know when to fold ‘em” – When you realize that something is not going to happen, “bite the bullet” and amend versus keeping things around until a future update.
- Number 3 – When going into “chase mode” don’t try to get too detailed when you are not really sure. It may look impressive but, it tends to lead to even more of a miss.



Rick's Top 10 TAF Reality

"Tough Love" List

- Number 4 – “Know when to fold ‘em” – When you realize that something is not going to happen, “bite the bullet” and amend versus keeping things around until a future update.
- Number 3 – When going into “chase mode” don’t try to get too detailed when you are not really sure. It may look impressive but, it tends to lead to even more of a miss.
- Number 2 – Remember that the end time of the event is just as important as the start time. Try to think the event ending time through versus just leaving the event in the TAF and waiting for the next regularly scheduled TAF update.



Rick's Top 10 TAF Reality

"Tough Love" List

- Number 1 – Please make the TAF consistent with other products. Mixed messages kill credibility, and appear as a divide within your WFO!



SWA Partnership with the NWS

- Thanks for your attention and all you do – your efforts are very much appreciated!

