



Decision Support Overview

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U.S. National Weather Service
WMO AvRDP Training
Hong Kong
October 2018

NOAA/NWS Aviation Program



MWO



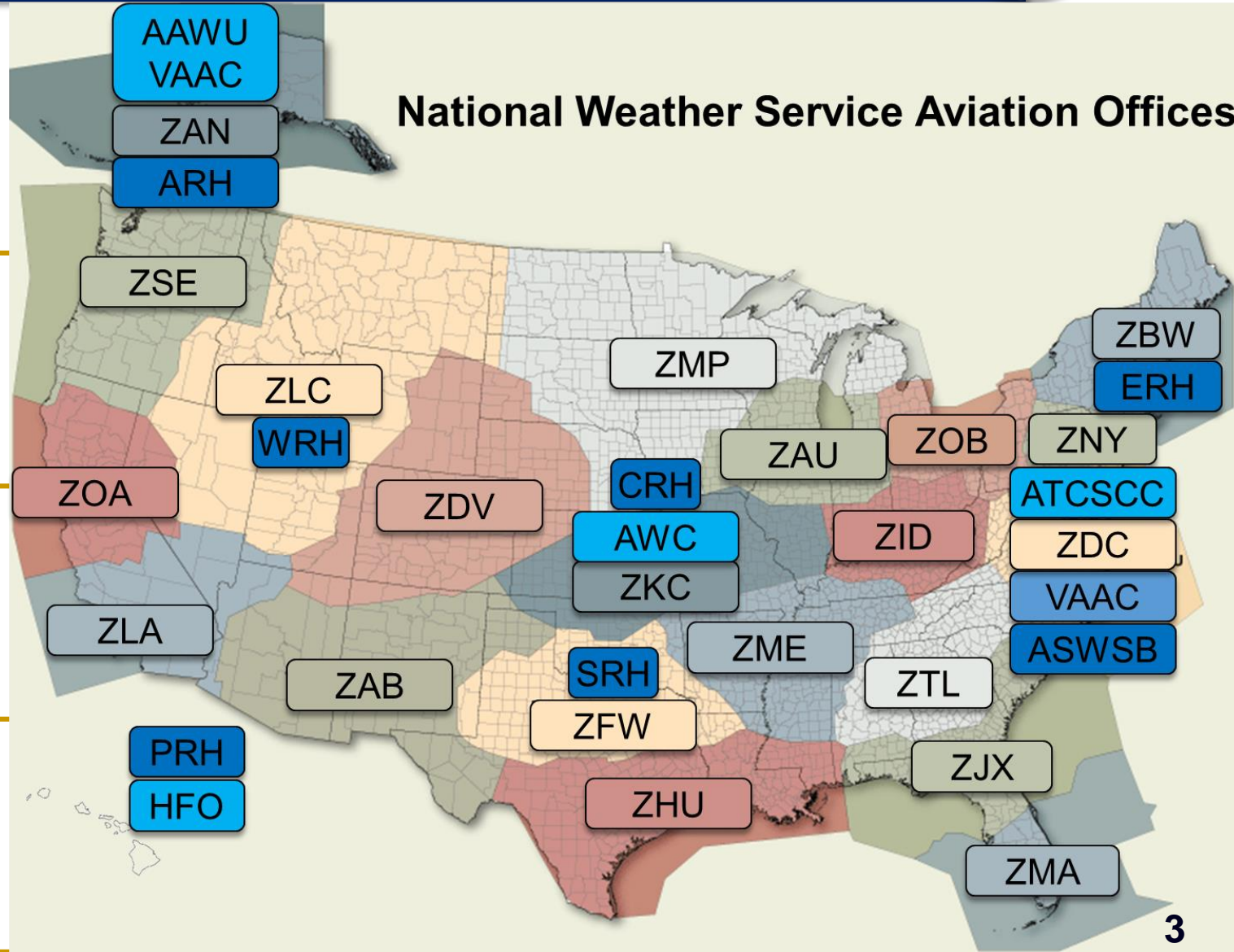
VAAC



CWSU



WFO



Key Stakeholders



Federal Aviation Administration (FAA)



National Transportation Safety Board (NTSB)



National Business Aviation Association (NBAA)



Commercial Airlines



General Aviation Community



Aircraft Owner and Pilot Association (AOPA)



International Meteorological Service Providers

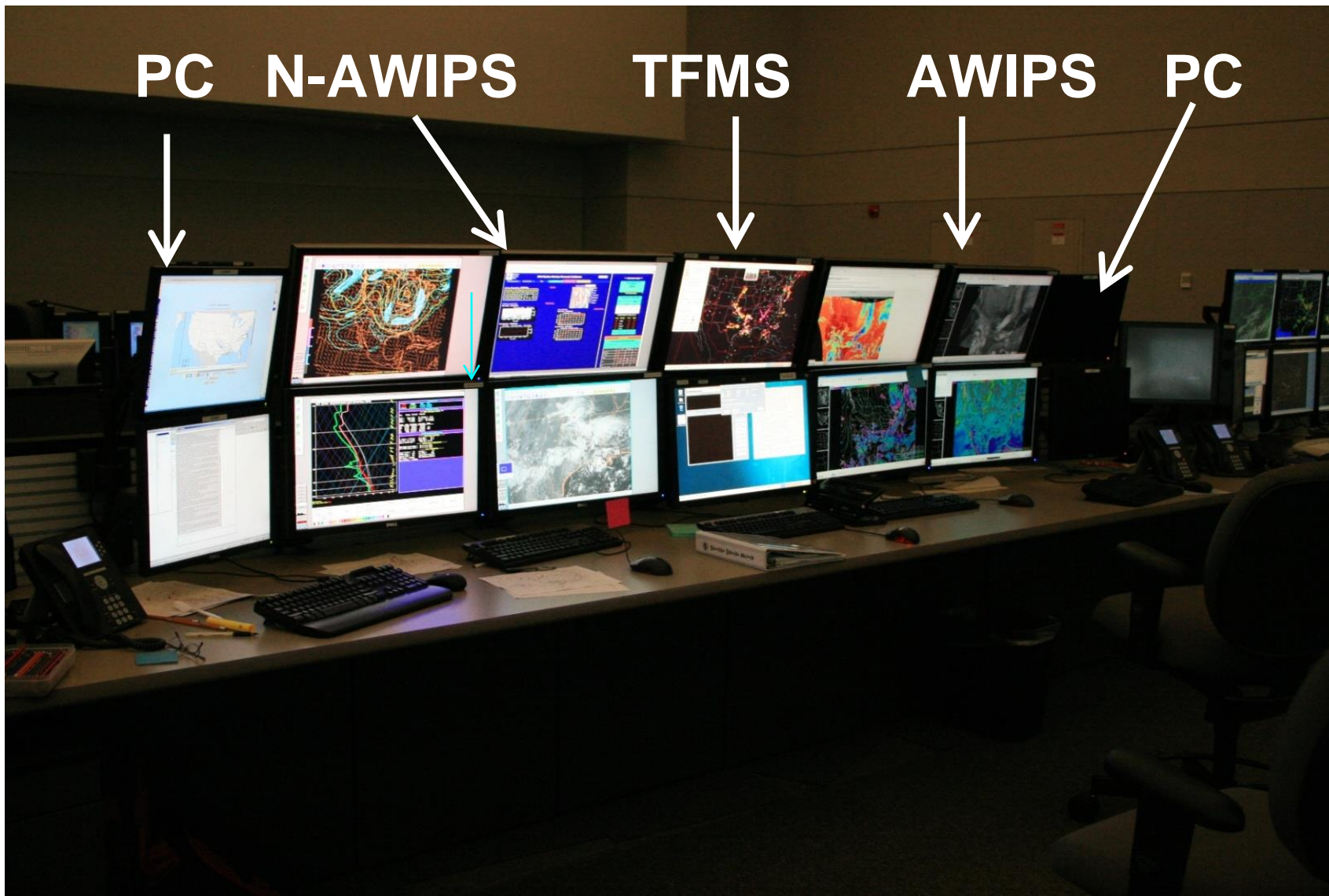


International Civil Aviation Organization (ICAO)



United States Air Force (USAF)

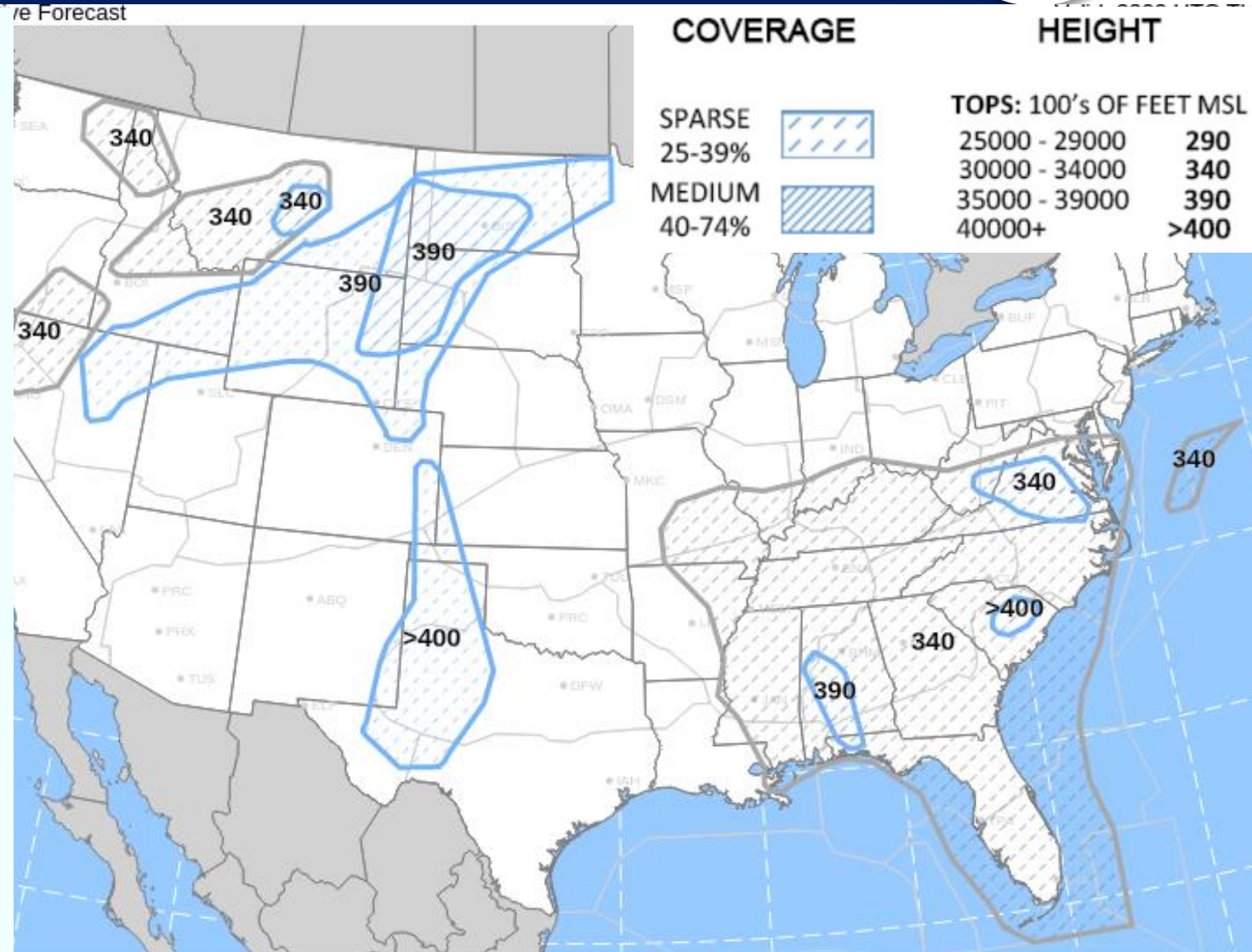
Wall of Weather



Begin with Model Guidance



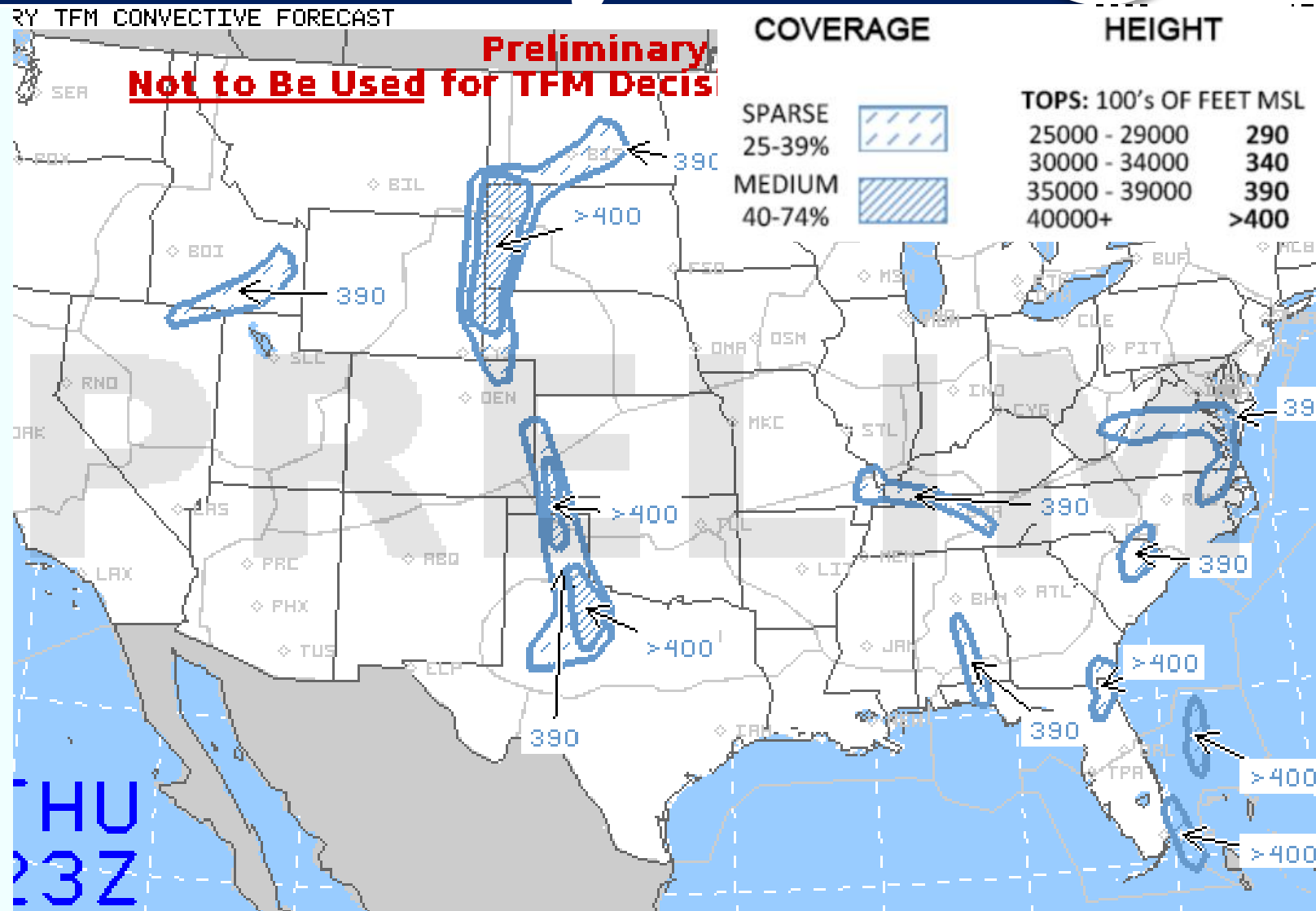
- Combination of multiple models used to generate a forecast of coverage and tops.
- Grey areas are low confidence
- Blue areas are high confidence



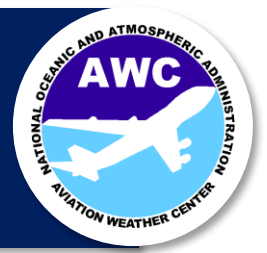
Focusing on ATM Critical Areas, Draw Preliminary TCF



- AWC creates preliminary forecast by improving on model guidance.
- Preliminary forecast is shared with collaborators.
 - Airlines
 - Air Traffic Managers
 - Meteorologist in Center Weather Service Units



Collaborate with Stakeholders



COLLABORATION PARTICIPANTS:

| [AWC-DBlondin](#) | [JBLU-ASnyder](#) | [NAM-BWaranauskas](#) | [SWA-JCohen](#) | [ZAB-DTucker](#) | [ZAU-dz](#) | [ZDC-RWinther](#) | [ZDV-TMeyer](#) | [ZFW-CHays](#) | [ZHU-RNunez](#) | [ZID-CCrosbie](#) | [ZJX-AMichels](#) | [ZKC-JZeltwanger](#) | [ZLA-CMa](#) | [ZLC-SRogowski](#) | [ZMA-LLynam](#) | [ZME-RSlattery](#) | [ZOB-TJanus](#) | [ZTL-BCimbora](#) |

19 Participants Logged into Collaboration

15 Participants Contributing to Collaboration

[AWC-DBlondin](#) 13:45:12Z

It's a difficult forecast today with a lot of sparse coverage areas. I'm trying to focus on the medium coverage and high impact areas today.

[JBLU-ASnyder](#) 13:46:22Z

still think we need at least sparse in in the mid-atlantic at 21

[JBLU-ASnyder](#) 13:46:55Z

and perhaps medium along the front at 23

[ZDC-RWinther](#) 13:48:14Z

JBLU - got your message too late on the last session. Let me try to draw an area in red for 21z (sparse coverage).

[ZDC-RWinther](#) 13:48:55Z

Otherwise looks good.

[JBLU-ASnyder](#) 13:49:23Z

yeah was going more where the better heating is but agree it could be along the entire front

[ZLC-SRogowski](#) 13:49:54Z

Good morning, maps good for ZLC today. Thanks!

[ZJX-AMichels](#) 13:50:55Z

HRRR is suggesting seabreeze activity along the pnhdl at 21z, disregard my marks on 23z. Thanks.

[ZDC-RWinther](#) 13:51:55Z

Best CAPE on the western edge but decent low-level convergence area e-w across central VA.

[JBLU-ASnyder](#) 13:52:18Z

concur Rick

Collaborate with Stakeholders



ZTL-BCimbora 13:58:10Z

It's up to ZME, but I made slight edits to the area over TN, to extend slightly into NW ZTL at 21/23z

AWC-DBlondin 14:02:52Z

Okay. I think I've made all the edits. Let me know if it all looks good.

ZAB-DTucker 14:04:15Z

I'm kind of blending the SPC HRW ARW, HRRR, and TTU WRF. I'm not convinced of medium coverage in the TX Panhandle at 21Z, but won't argue against it because it looks to be there by 22Z. I'd also like to see the medium areas connected at 23Z. This far out, there's too much doubt to argue for that separation.

ZDC-RWintner 14:05:08Z

Deb - Looks good - Thx!

JBLU-ASnyder 14:05:18Z

yup, thanks Deb and Rick

AWC-DBlondin 14:06:22Z

Dave...if you'd like me to reduce the size of the medium area at 21z or take it out altogether, I can do that.

ZAB-DTucker 14:07:12Z

Maybe just trim it down a bit as drawn...

AWC-DBlondin 14:07:40Z

I'll do that. Thanks!

ZAB-DTucker 14:08:08Z

Like I said, I'm sure it will be medium by 22Z, so it's prudent to show the development progressing.

ZID-CCrosbie 14:08:57Z

Maps good for ZID.

ZME-RSlattery 14:09:24Z

agree w maps, thanks

ZMA-LLynam 14:10:24Z

Maps good for ZMA. Thank you

AWC-DBlondin 14:10:59Z

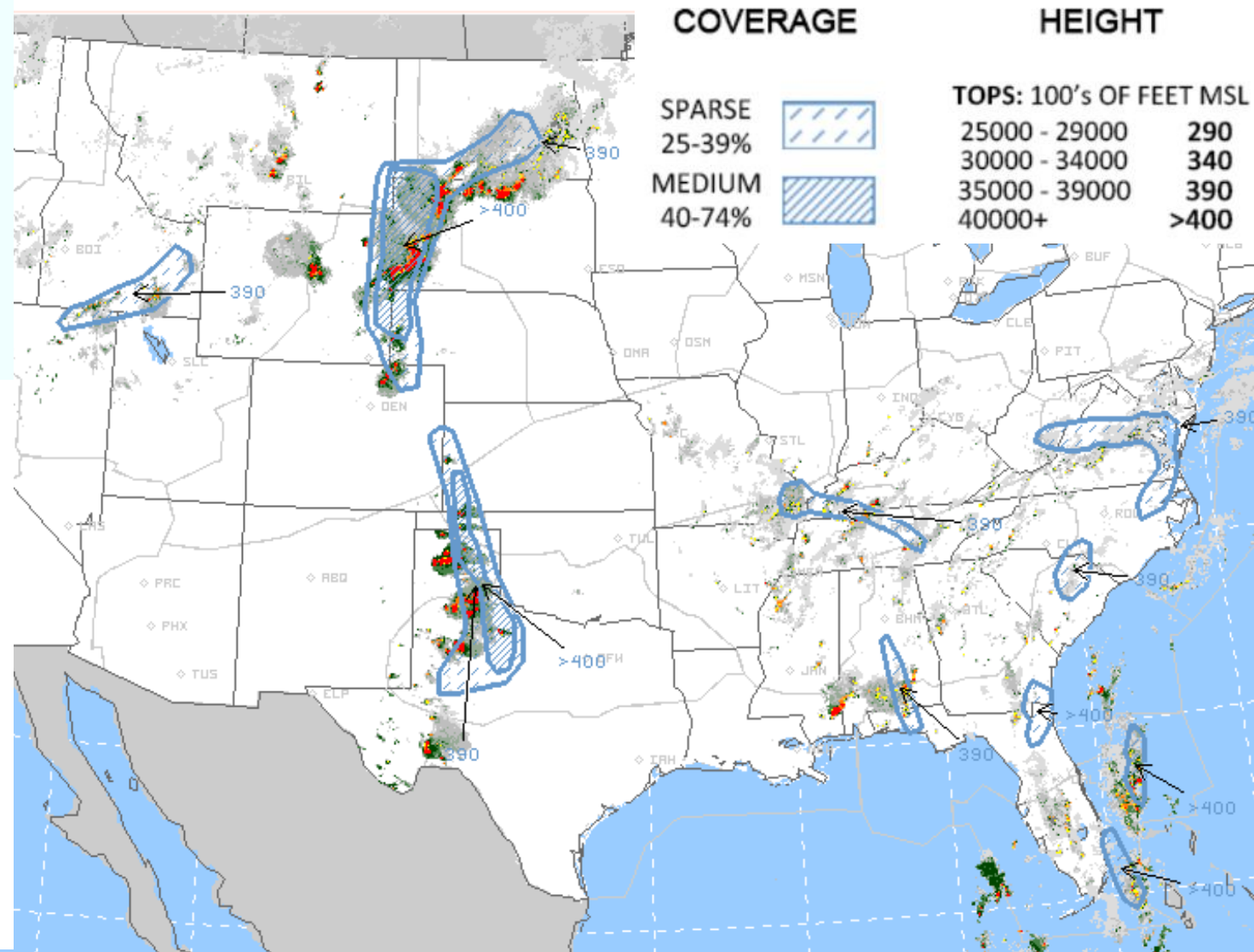
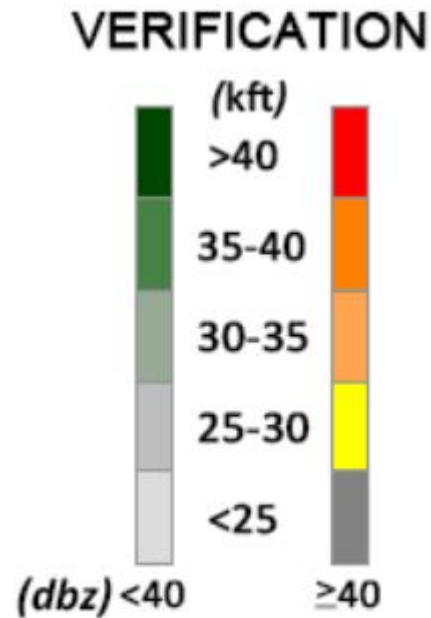
Thank you all so much for giving your input on this package!

Subjective Verification

An opportunity to learn

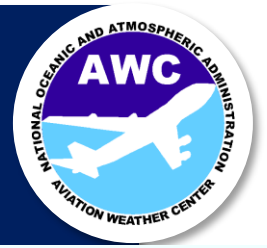


- Grey and Green areas were areas that did not meet the criteria of 20 dbz with tops over FL250.

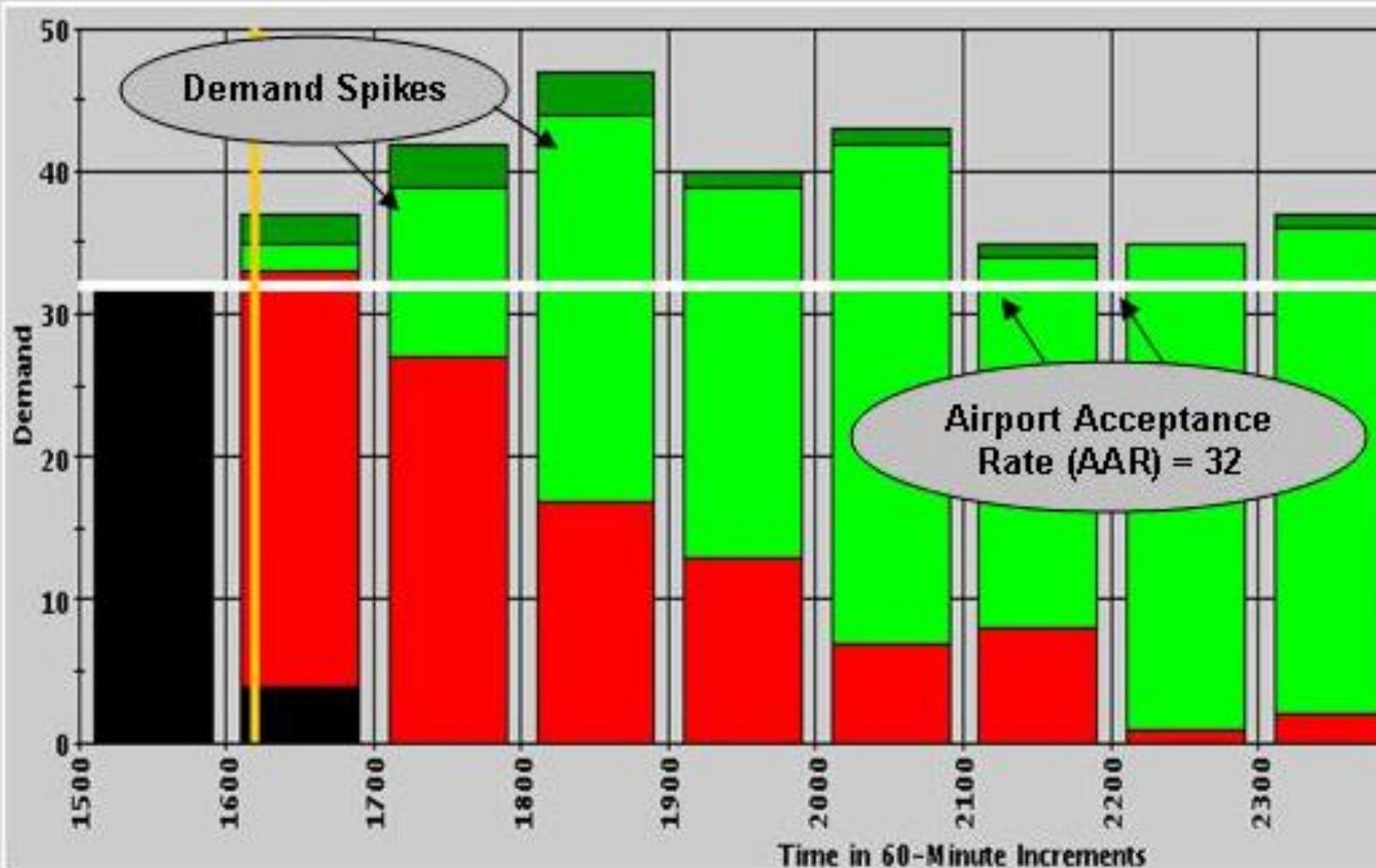


Mitigating Delays

Ground Delay Programs (GDPs) Explained



EWR 12/05/2011 16:12Z ETA

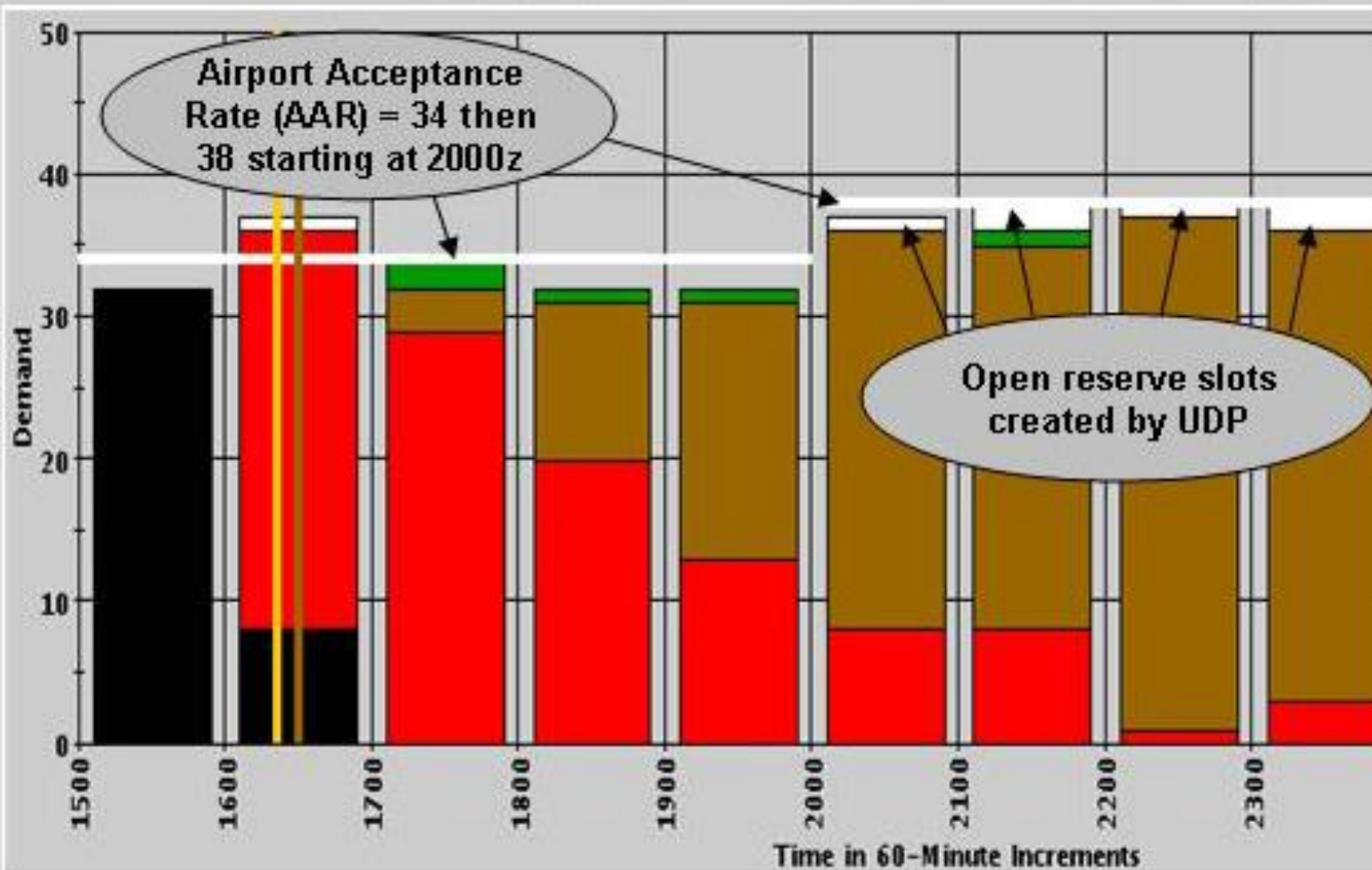


- Tool for predicting how many aircraft will not be able to land due to weather restrictions.
- Aircraft Acceptance Rate (AAR) dependent on weather.
- Once AAR is set, it is easy to see how many flights will have to divert if they are not stopped from taking off.

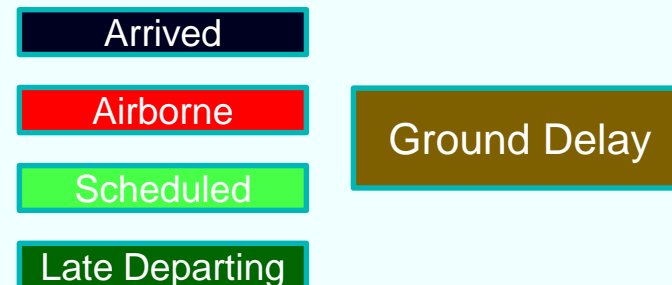
After Ground Delay Program



EWR GDP-UDP 12/05/2011 16:22Z



- Inbound aircraft are delayed before taking off.
- Delays much less expensive than diverting.
- Still expensive. A lot of money can be saved by getting the forecast and the related AAR correct.



San Francisco Fog



San Mateo Bridge



- Very frequent morning fog.
- Flights to SFO take off before the fog lifts.
- It does not always lift before those flights arrive.
- ATM decides how many planes can take off for SFO based on the TAF time of the fog lifting.
- If too many planes take off, some will have to land at other airports.
- If too many planes are ground delayed, then more flights are late than were necessary.

San Francisco Fog Case



- Planes can land side by side at SFO if they can see each other as they cross the San Mateo Bridge
- Maximum Acceptance Rate at SFO = 60 planes per hour.
- Arrival Rate reduced to as low as 30 if they cannot see the bridge.

Using Satellite for Decision Support



IDSS @ SFO using GOES-16 (03/03/17)

1. 1600Z - Patch of Stratus formed over SFO & SMB necessitating a Ground Delay Program 1700z-1959z
2. 1700Z – GOES-16 loop shows edges starting to erode
3. 1715Z – GOES-W loop shows edges starting to erode
4. 1719Z – NAM Coordinates with CWSU ZOA & ATCSCC Specialists that Stratus is clearing rapidly
5. 1730Z – GOES-16 loops shows stratus almost clear
6. 1747Z – CWSU ZOA reports Pilots are getting Visuals into SFO
7. 1756Z – ATCSCC cancels GDP

Original GDP impacted 48 flights @ 38 min average delay per flight

48 x 38 = 1824 minutes of delay x \$81.00/min cost = **~\$150,000.00 (Total Delay Costs)**

GOES-16 Estimated Savings:

32 flights freed up

32 x 38 = 1216 min of delay
recovered x 81.00/min =

~\$100,000.00 (Costs recovered)

minus

GOES-W Estimated Savings:

16 flights freed up

16 x 38 = 608 min of delay
recovered x \$81.00/min =

~\$50,000.00 (Costs recovered)

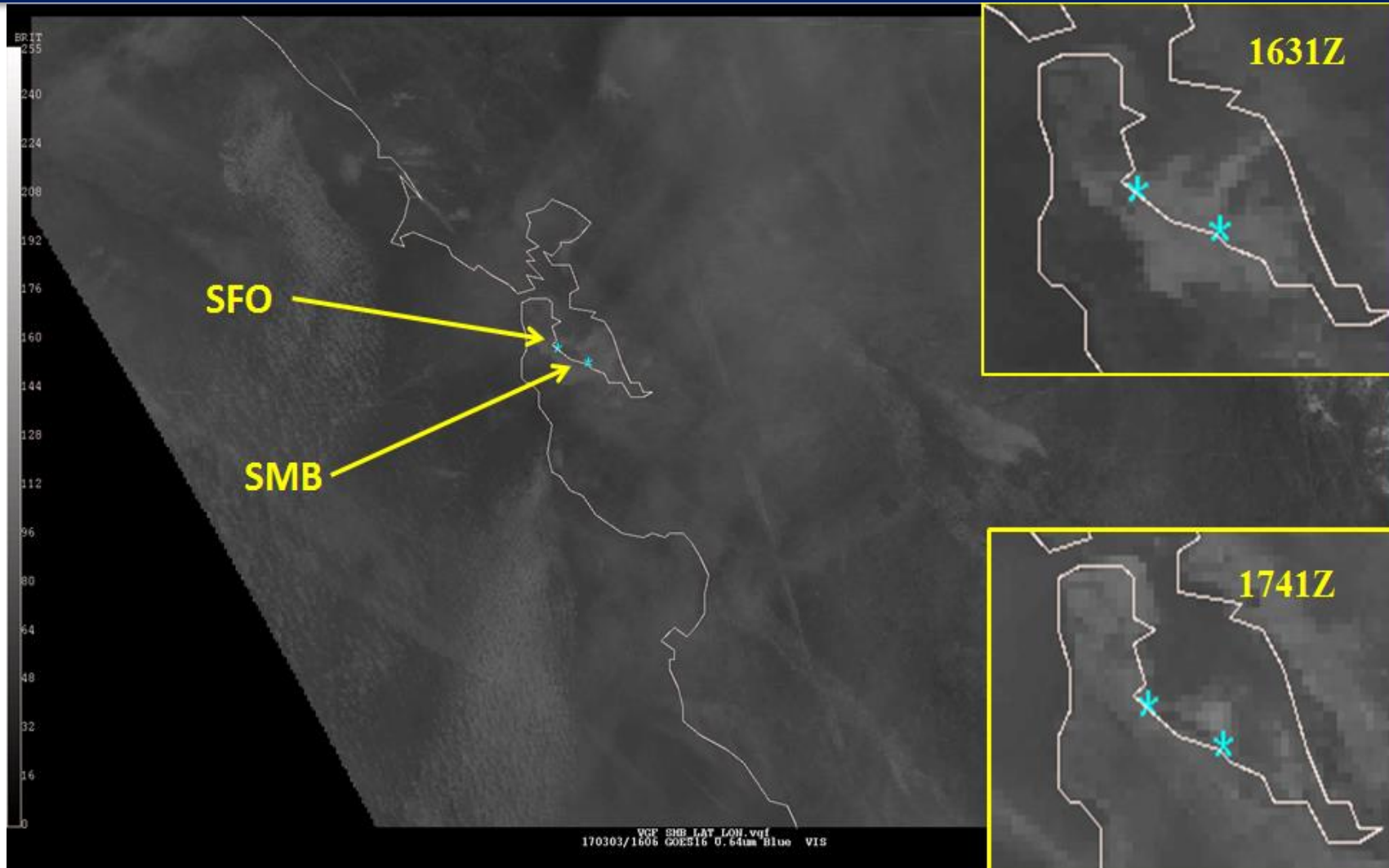
Estimated cost savings related to GOES-16 = **~\$50,000**

Main Takeaway

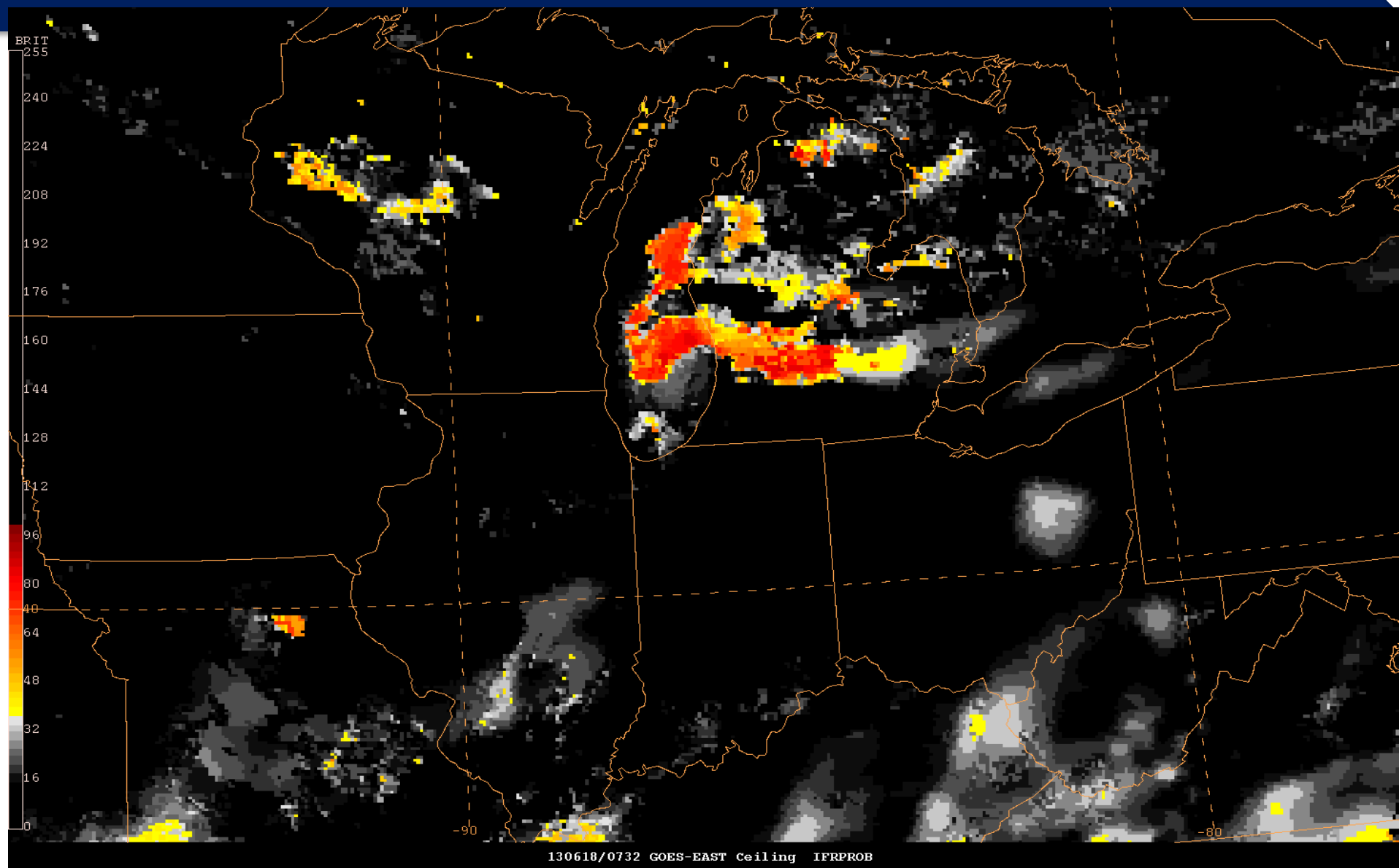
GOES-16... 5 min updates & higher resolution –vs- GOES-W... 15 min updates & lower resolution provided AWC/NAM with earlier & higher confidence that clearing would hold.

Imparting this information to the FAA resulted in the earlier Ground Delay Program cancellation.

New Satellite Fog Imagery



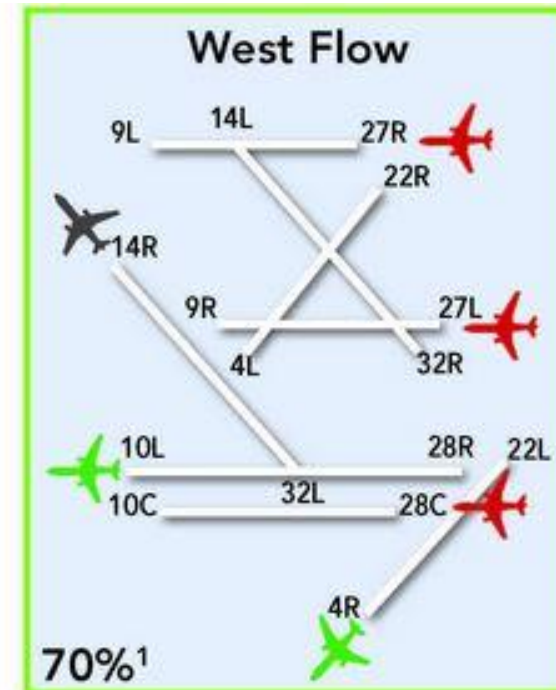
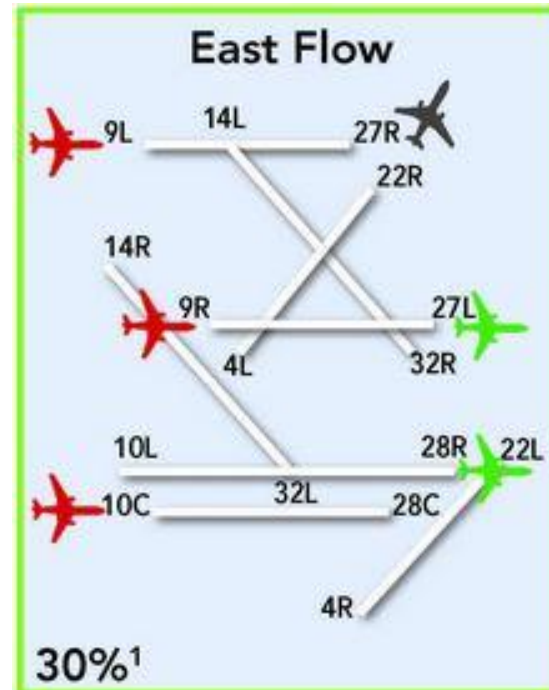
ORD Stratus Event 06/18/13



ORD Fog/Stratus Event 06/18/13



- ✂ TAF had VFR Forecast
- ✂ GOES-R IFR showing ↑ area high probability IFR over Lake MI
- ✂ ATM notified of major changes
- ✂ ORD/Airlines ready for IFR/LIFR (extra fuel for holding??)
- ✂ Airport operations changes made to accommodate the IFR conditions



ORD Fog/Stratus Event 06/18/13



ORD 181004Z ... 10SM OVC008...

ORD 181034Z ... 4SM BR OVC004...

ORD 181051Z ... 1 3/4SM R10L/5500VP6000FT BR OVC004...

ORD 181055Z ... 1/4SM R10L/4500VP6000FT BR OVC004...

Flights 10Z - 12Z = 60

Diversion cost ~\$10,000/Flight... "NO DIVERSIONS"

SAVINGS ~\$600,000 – EXTRA FUEL

National Aviation Meteorologists (NAM)

FAA Air Traffic Control System Command Center (ATCSCC)



Improve safety, efficiency, and decision making for the National Air Space

Fully integrated and coordinated weather decision support

Balance air traffic demand with the capacity



Decision support @ ATCSCC



Support Collaborative Decision Making



Focus on greatest NAS weather impacts



History



- /// Pre 1995
 - /// NWS Meteorologists in ATCSCC
- /// Post 1995
 - /// FAA Weather Specialists in ATCSCC
- /// May 2012 – NWS back in ATCSCC (2 Meteorologists)
- /// August 2014 – Add 1 Meteorologist & MIC
- /// Fiscal 2016 – Add 2 Meteorologists

Role/Mission of the NAM



- /// Orchestrate weather support to the ATCSCC through coordination/collaboration with partners
 - /// Maximize efficiency/safety in the NAS
 - /// Minimize delays in the NAS
 - /// Tools
 - /// Impromptu Briefings
 - /// Telcons



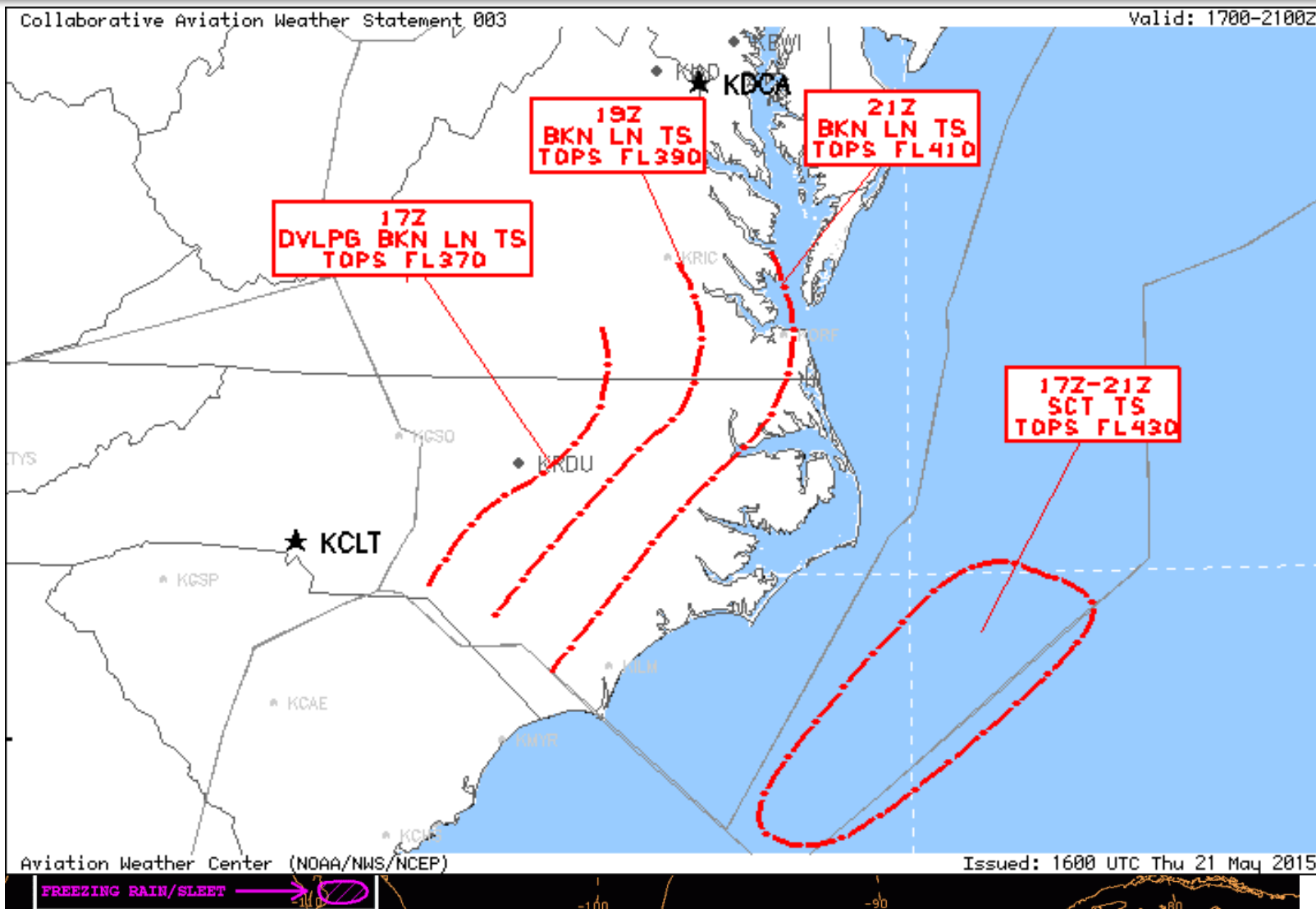
ATCSCC DSS Partners



- /// Nat'l Ops Manager (NOM)
- /// Severe (Enroute Planning)
 - /// STMO – Supervisor
 - /// SV – Specialist
- /// Terminal (Individual Airports)
 - /// TTMO – Supervisor
 - /// East & West – Specialist
- /// CONUS Planner
- /// Nat'l Ops Control Center (NOCC)
- /// Tactical Customer Advocate (TCA)
- /// Int'l Air Traffic Assoc. (IATA)
- /// Nat'l Business Airline Assoc. (NBAA)
- /// Airlines for American (A4A)



Briefings

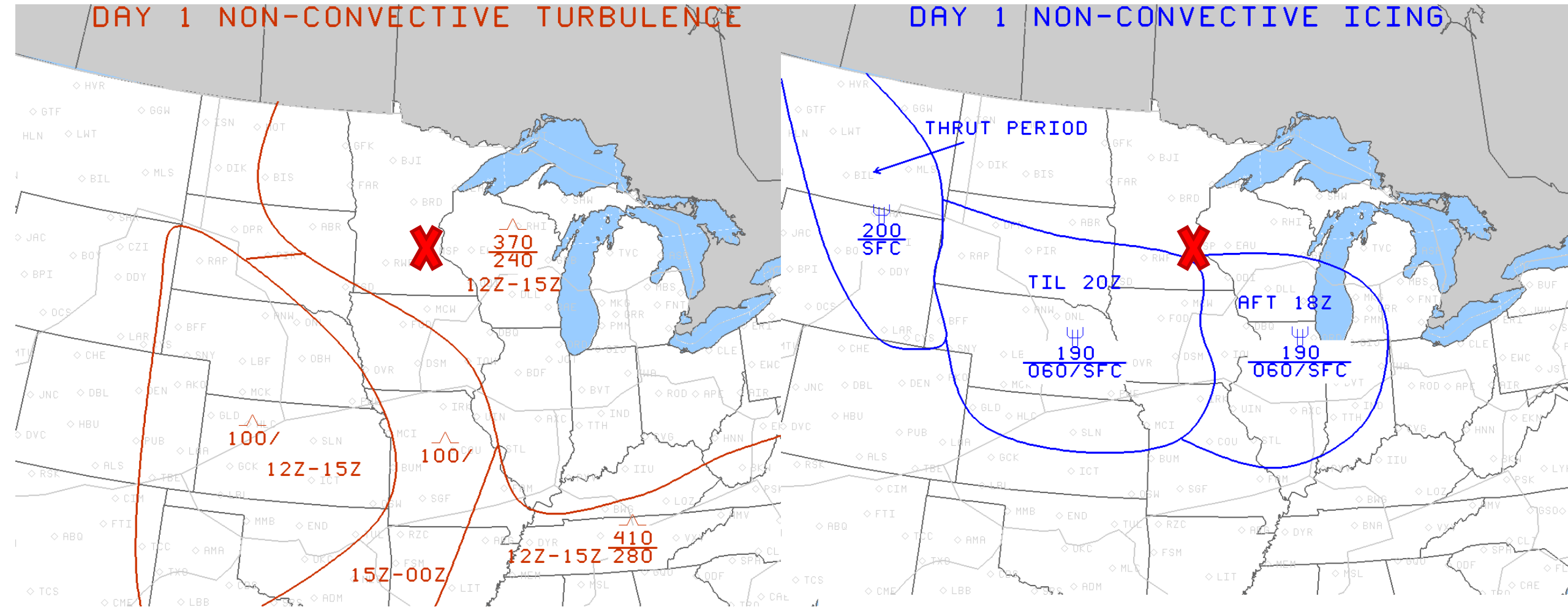


Special Event – Super Bowl



DAY 1 NON-CONVECTIVE TURBULENCE

DAY 1 NON-CONVECTIVE ICING



TAF Impact Board



AVIATION WEATHER CENTER

NOAA NATIONAL WEATHER SERVICE

Welcome: matt.strahan@noaa.gov

Local Forecast



HOME ADVISORIES FORECASTS OBSERVATIONS TOOLS NEWS SEARCH ABOUT USER



Impacts TAF Board

TAF Home Plot Data Board Info

FOR SITUATIONAL AWARENESS. NOT TO BE USED FOR FLIGHT PLANNING PURPOSES.

IDs:

Potential Impact **None** **Slight** **Moderate** **High**

Valid at: 2000 UTC 03 Oct 2018

Time	OBS	03/20Z	03/21Z	03/22Z	03/23Z	04/00Z	04/01Z	04/02Z	04/03Z	04/04Z	04/05Z	04/06Z	04/07Z	04/08Z
KBOS	CIG	CIG	CIG	CIG										
KMSP		WX	WX					Spd	WSpd	WSpd	WSpd	WSpd	WSpd	WSpd
KORD	WGst	WGst	WGst	WGst				WGst	WGst	WGst	[WX]	[WX]		
KMDW											[WX]	[WX]		
KDEN								WGst	WGst	WGst	WGst	CIG	CIG	CIG
KLAX			WX	WX	WX	WX	WX	WX	WX					
Time	OBS	03/20Z	03/21Z	03/22Z	03/23Z	04/00Z	04/01Z	04/02Z	04/03Z	04/04Z	04/05Z	04/06Z	04/07Z	04/08Z

ID: KORD **Date:** 03/21Z

WX	VIS	CIG	WDir	WSpd	WGst
--	>6	--	200	20	32

GST[0] W:150-220 S:25 999 = 3

NOTE: TEMPO conditions in [brackets]. Keep in mind TEMPO conditions might be better (lower impact) than prevailing conditions.

FOR SITUATIONAL AWARENESS. NOT TO BE USED FOR FLIGHT PLANNING PURPOSES.

Arrival/Departure Gate Forecasts

Automated, but meteorologist can edit

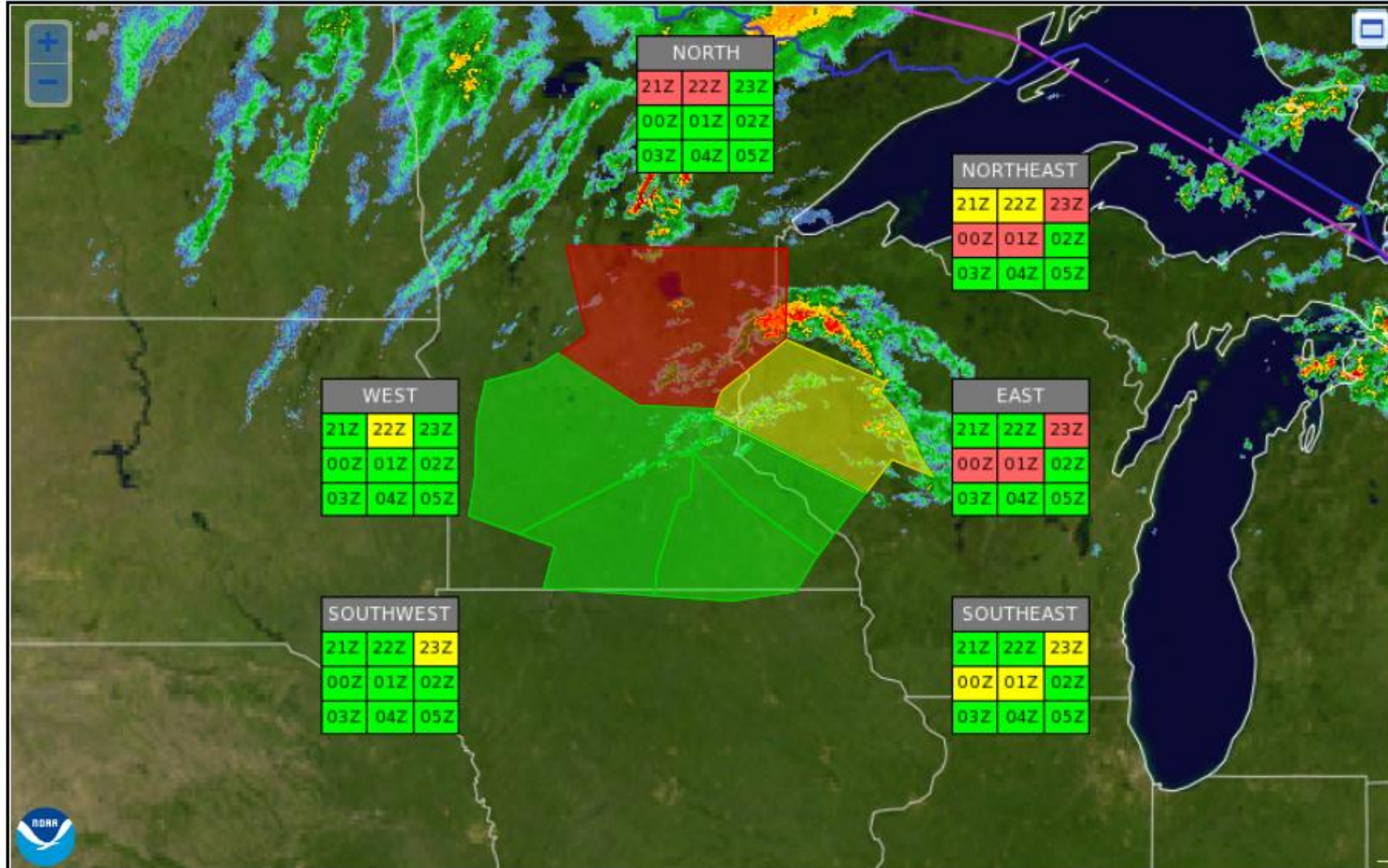


KMSP Gate Forecast (Experimental)

[TFM Home](#) [Gate Home](#)

[Weather](#) [Overlays](#) [Options](#)

2000 UTC 3 Oct 2018



Questions?



US Area of Responsibility for Aviation Warnings (SIGMETs)

