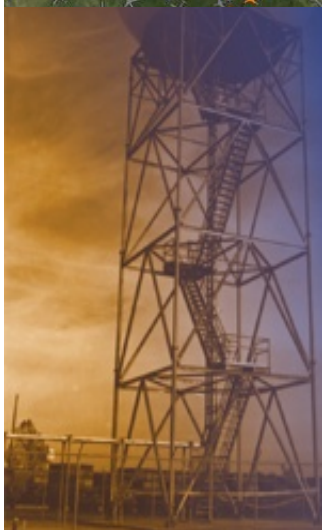




# The Package Has Been Delivered! Decision Support for Cargo Operations at Memphis

*Stephen Kearney  
Meteorologist*

*NWS - Center Weather Service Unit  
Memphis, Tennessee*

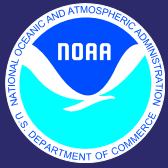




# Disclaimers

- *Represent the NWS and ops at CWSU ZME*
- *Not an endorsement of FedEx or it's products*
- *Weather forecasts provided to FAA and aviation community*



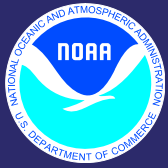


# Agenda



- *Memphis Airport Layout & Configurations*
- *Daytime Operations*
- *Nighttime Operations*
- *CWSU Products & Services*
- *Operational Takeaways*

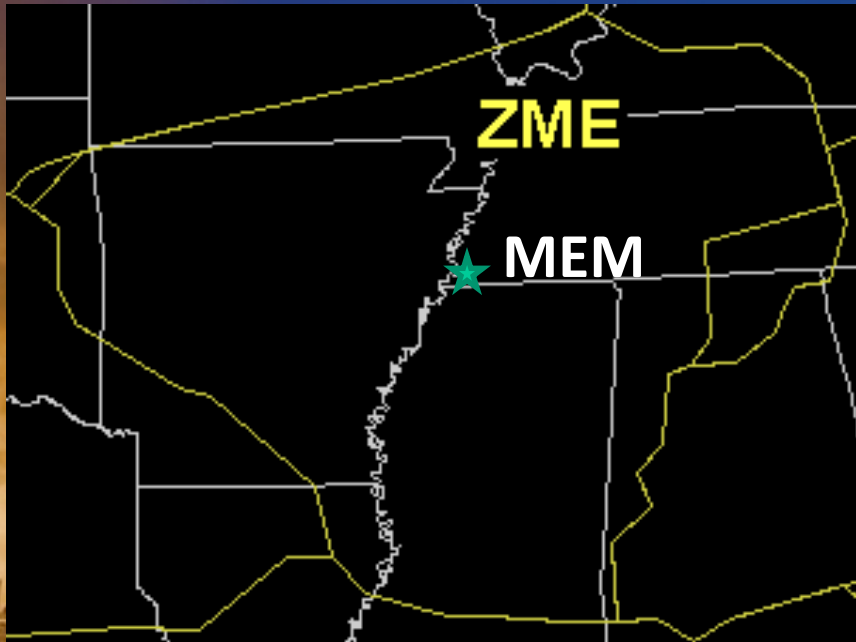




# Memphis International Airport

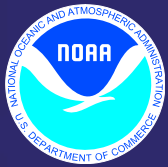


- Busiest cargo hub in the United States
- Second-busiest in the world (1st: Hong Kong)\*
- 2014 Loaded/Unloaded cargo: ~9.4 billion lbs



\*Source: Airports Council International 2014 statistics





# FedEx Preference

FedEx Hub



09

27

Land North

Depart South

Saves fuel on excessive taxiing



18C

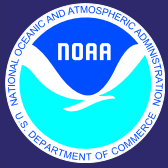
18L

18R

36L

36C

36R



# Tailwind thresholds



- Commercial aircraft tailwind threshold = 10kt
- Memphis Tower uses 8 knots as a safety buffer
  - *South wind <8kt allows for North landing operation*
  - *North wind <8kt allows for South departures*





# "3 Runways North"



Ideal arrival configuration

Minimizes taxiing

Max Arrival Rate (~99)

Planning Minimums:

• Vis: 6mi; Ceiling 800ft

• Vis: 4mi; Ceiling 1000ft

• South wind < 8kt



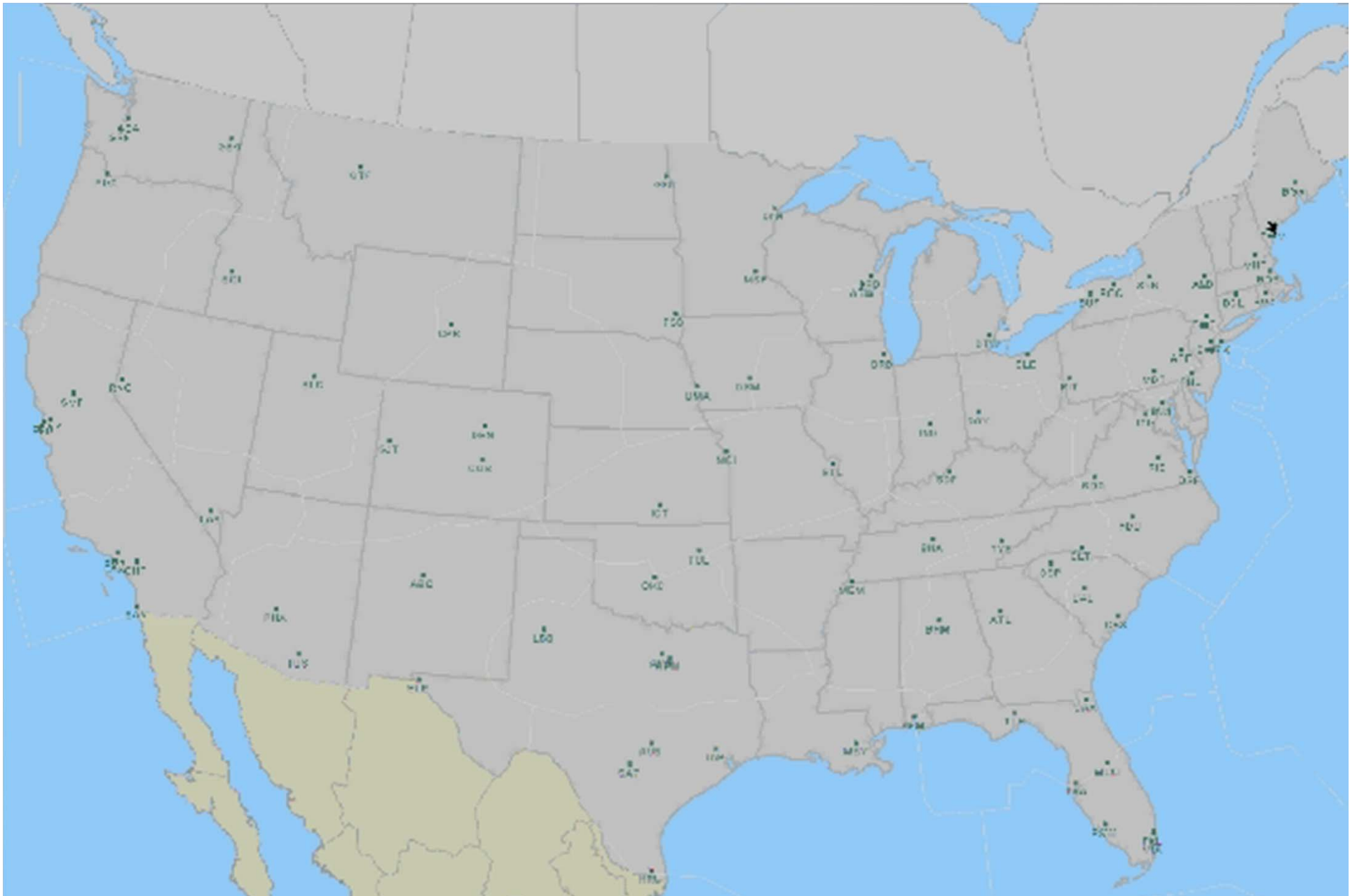
# “2 Runways North/South”



Below 1000ft/6mi

VFR with North or South winds >20KT

Reduced Arrival Rate (~60)

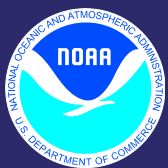


FedEx Global Operations Control

Wed Feb 16 2006 02:36 34Z

FedEx Operations - The World On Time





# Daytime Operations

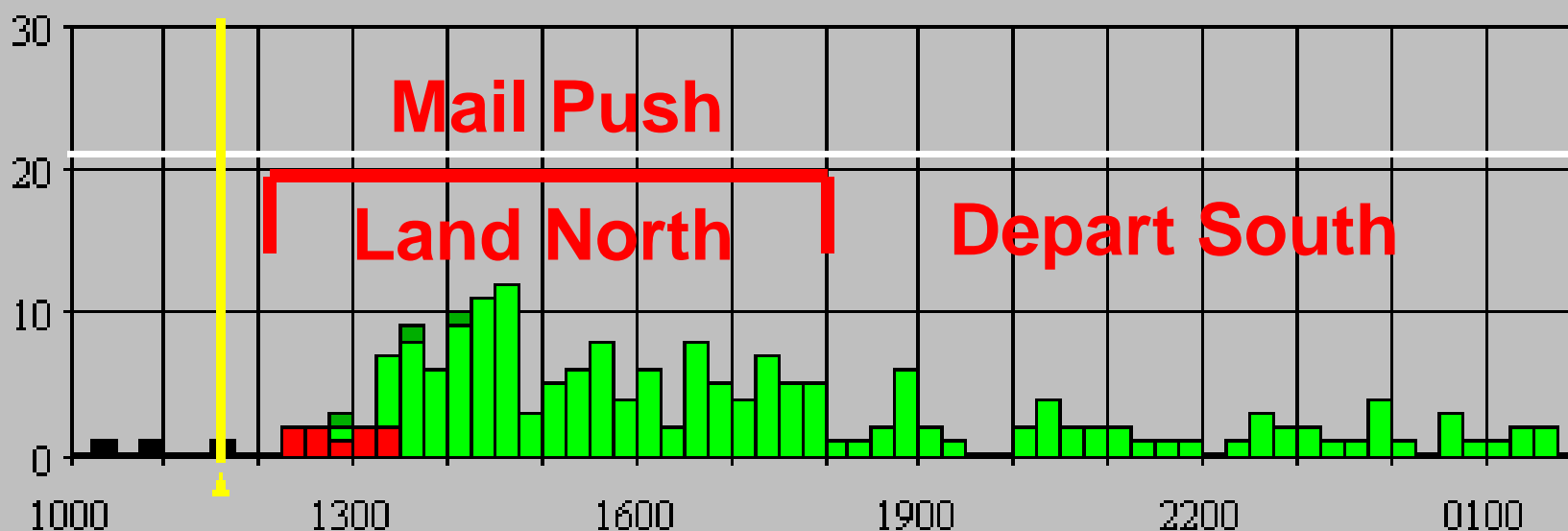


- Tues-Fri morning FedEx mail push
- ~150 planes arrive between 8am-1pm
- Afternoon outbounds between 2pm-5pm

MEM 03/24/2015 11:52z

Cancelled Flights: 4

No GDP

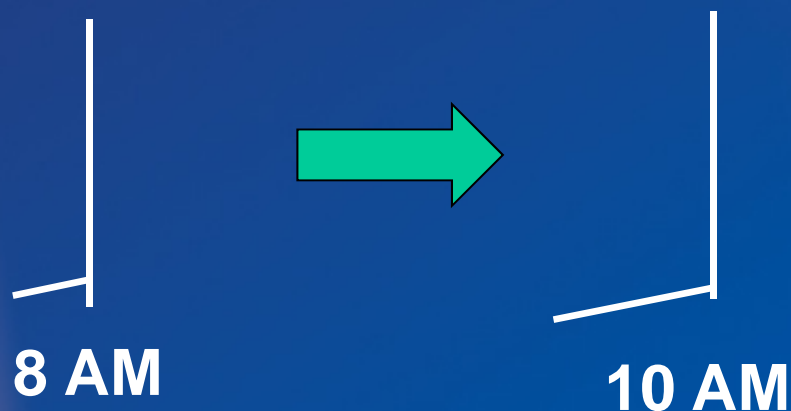


[www.fly.faa.gov/Products/AADC/aadc.html](http://www.fly.faa.gov/Products/AADC/aadc.html)



# Daytime Operations

- Brief TRACON on wind speed/direction; onset of thunderstorms & freezing precip
- Changes in wind speed/direction are critical
  - *South winds >8 KT (morning arrivals)*
  - *North winds >8 KT (afternoon departures)*





# Airplane Icon – Expected Configuration



North Operation



South Operation

WIND <8KT  
EXPD

North or South

**Runway configuration change**  
(Frontal passage, outflow bndry, etc)



# Daytime Brief



2ME DAYTIME TRACON FORECAST FOR MEMPHIS INTL AIRPORT - VALID 11AM CDT-6PM CDT

DA WGG			NORTH			WLDER		
16Z	17Z	18Z	16Z	17Z	18Z	16Z	17Z	18Z
19Z	20Z	21Z	19Z	20Z	21Z	19Z	20Z	21Z
22Z	23Z	22Z	23Z	22Z	23Z			

DISCUSSION: STRONG COLD FRONT ON ITS WAY...GET READY FOR SOME NEAR HURRICANE FORCE WINDS!



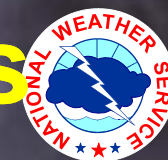
SIGNIFICANT WIND SHIFTS EXPD (TIME DIR/SPD-DIR/SPD): 3:00PM 20015625KT-33040665KT

UJM			SOUTH			LUGOH		
16Z	17Z	18Z	16Z	17Z	18Z	16Z	17Z	18Z
19Z	20Z	21Z	19Z	20Z	21Z	19Z	20Z	21Z
22Z	23Z	22Z	23Z	22Z	23Z			

MOST RECENT UPDT: 08-18-2012 00:00UTC



# Evening/Overnight Operations

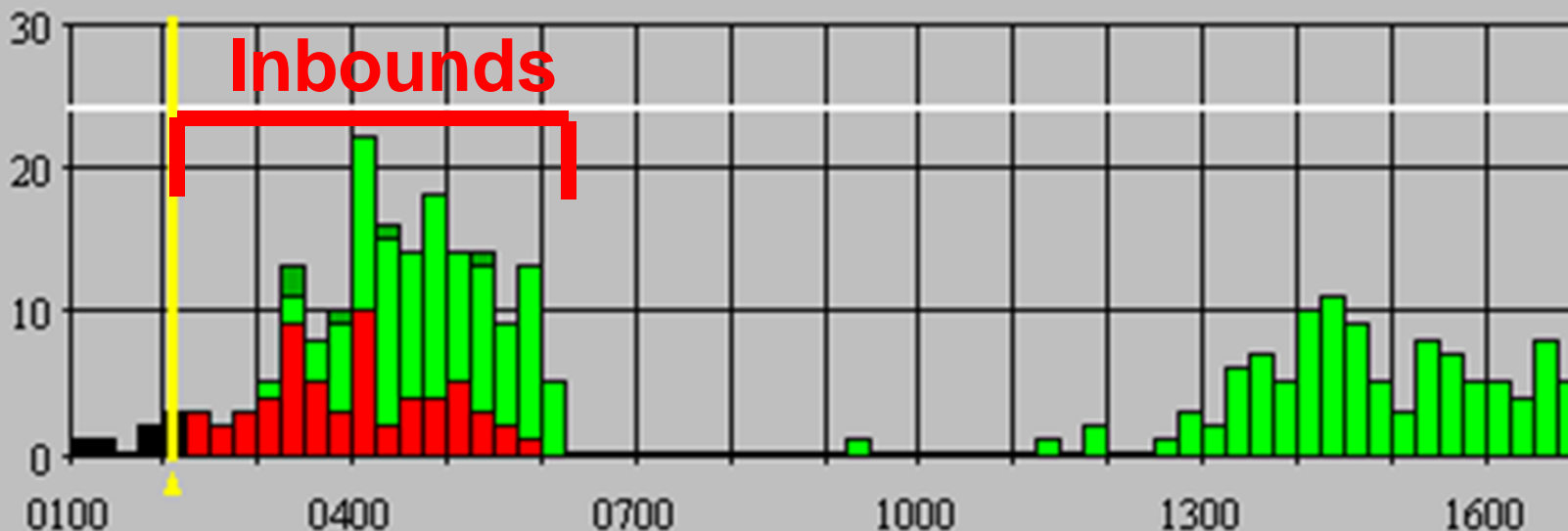


- Mon-Fri between 10pm-1am: Over 140 aircraft arrive (including int'l arrivals)
- 3 hours to arrive, 2 hours to sort & reload, 3 hours to depart

MEM 03/17/2015 02:17z

Cancelled Flights: 3

No GDP



[www.fly.faa.gov/Products/AADC/aadc.html](http://www.fly.faa.gov/Products/AADC/aadc.html)

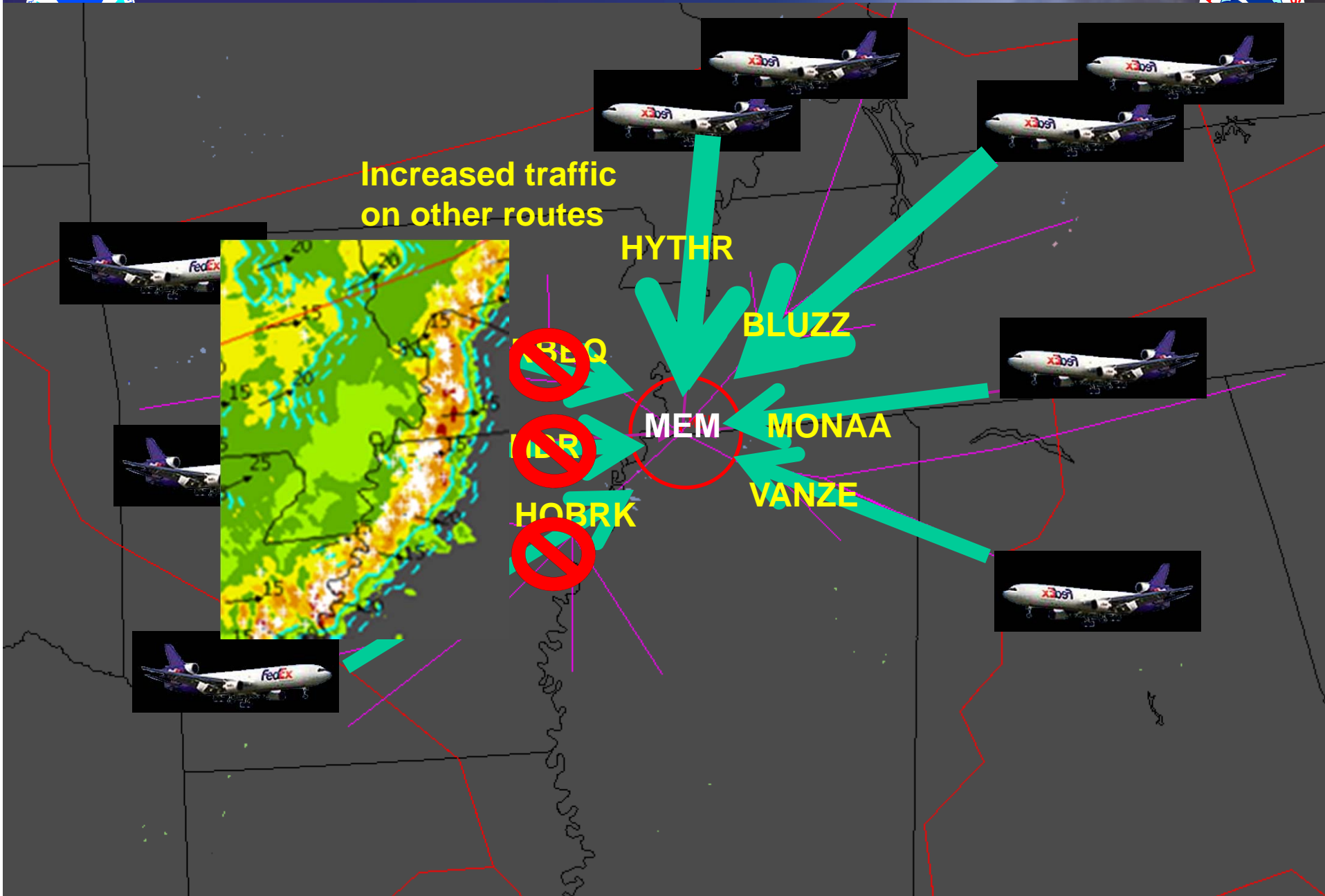


# Overnight Sort

## Sort Video



# MEM Approach Corridors



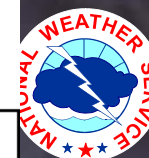


# MEMPHIS TRACON OVERNIGHT BRIEFING

\*\*\*for air traffic planning purposes only\*\*\*

Memphis TRACON area only--valid from 10:00 PM through 4:00 AM

**VALID: 03Z-09Z**



	10 PM	11 PM	12 AM	1 AM	3 AM
<b>SFC WIND</b>	25005KT	25005KT	23005KT	23005KT	23005KT
<b>SKY/CIG</b>	CLR	CLR	CLR	BKN250	BKN250
<b>SFC VIS</b>	10SM	10SM	10SM	10SM	10SM
<b>SFC WX</b>	-	-	-	-	-
<b>1000 FT WINDS</b>	24020KT	24024KT	24024KT	24026KT	26028KT
<b>2000 FT WINDS</b>	24022KT	24024KT	24026KT	24026KT	26028KT

**BRBBQ**  
10P 11P 12A 1 A

**HYTHR**  
10P 11P 12A 1 A

**BLUZZ**  
10P 11P 12A 1 A

ALL TIMES LOCAL (CST)

**CONDR**  
10P 11P 12A 1 A



**MONAA**  
10P 11P 12A 1 A

**WINDSHIFT TIME(S):**

**HOBKR**  
10P 11P 12A 1 A

**SOUTH**  
10P 11P 12A 1 A

**VANZE**  
10P 11P 12A 1 A

**GATE T-STORM FORECAST**

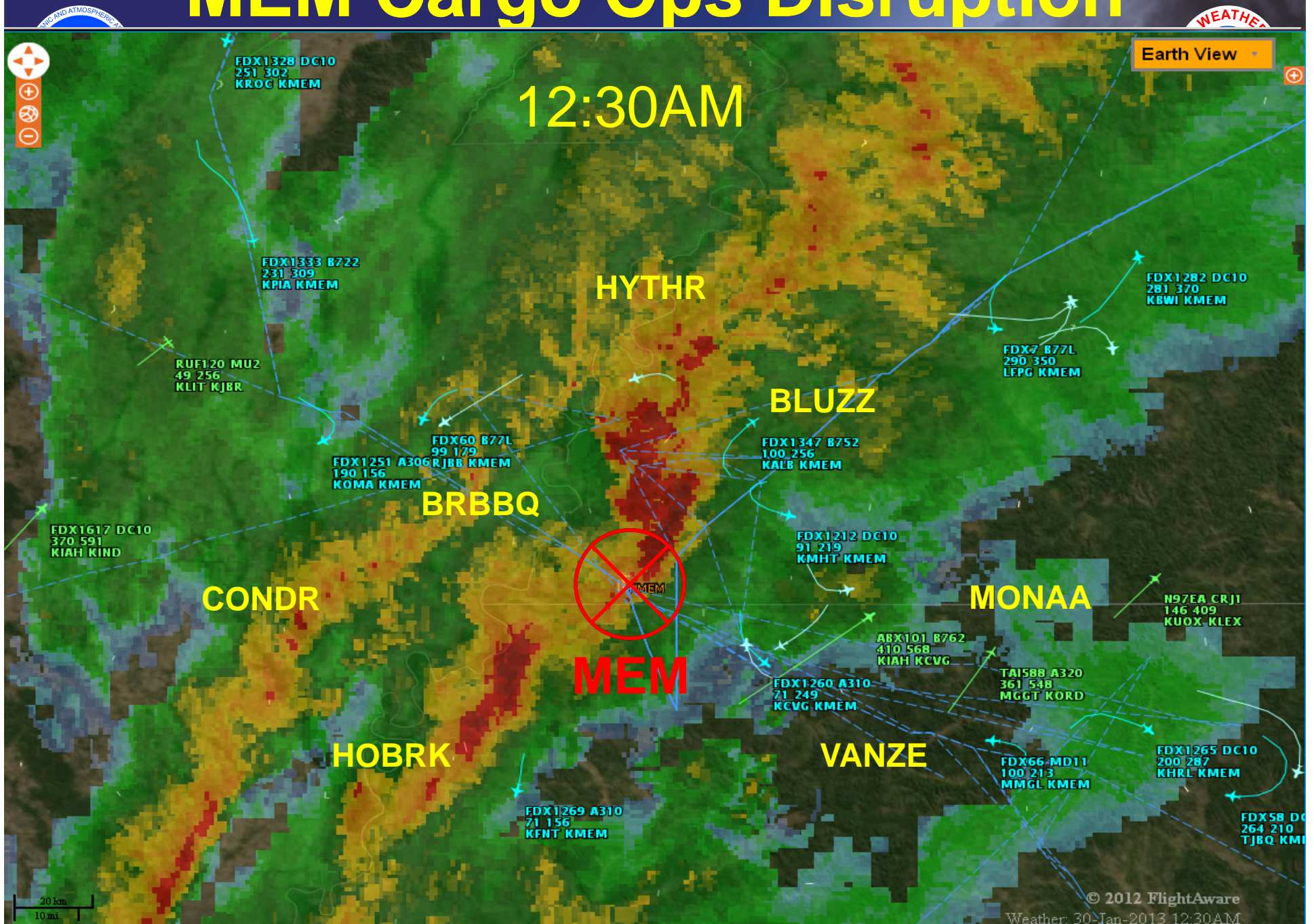
Unlikely (0%–29%)    Chance (30%–59%)    Likely (60%–100%)

**MISC:**

Winds may occasionally gust over eight knots from 00Z–03Z, then decrease to around five knots.

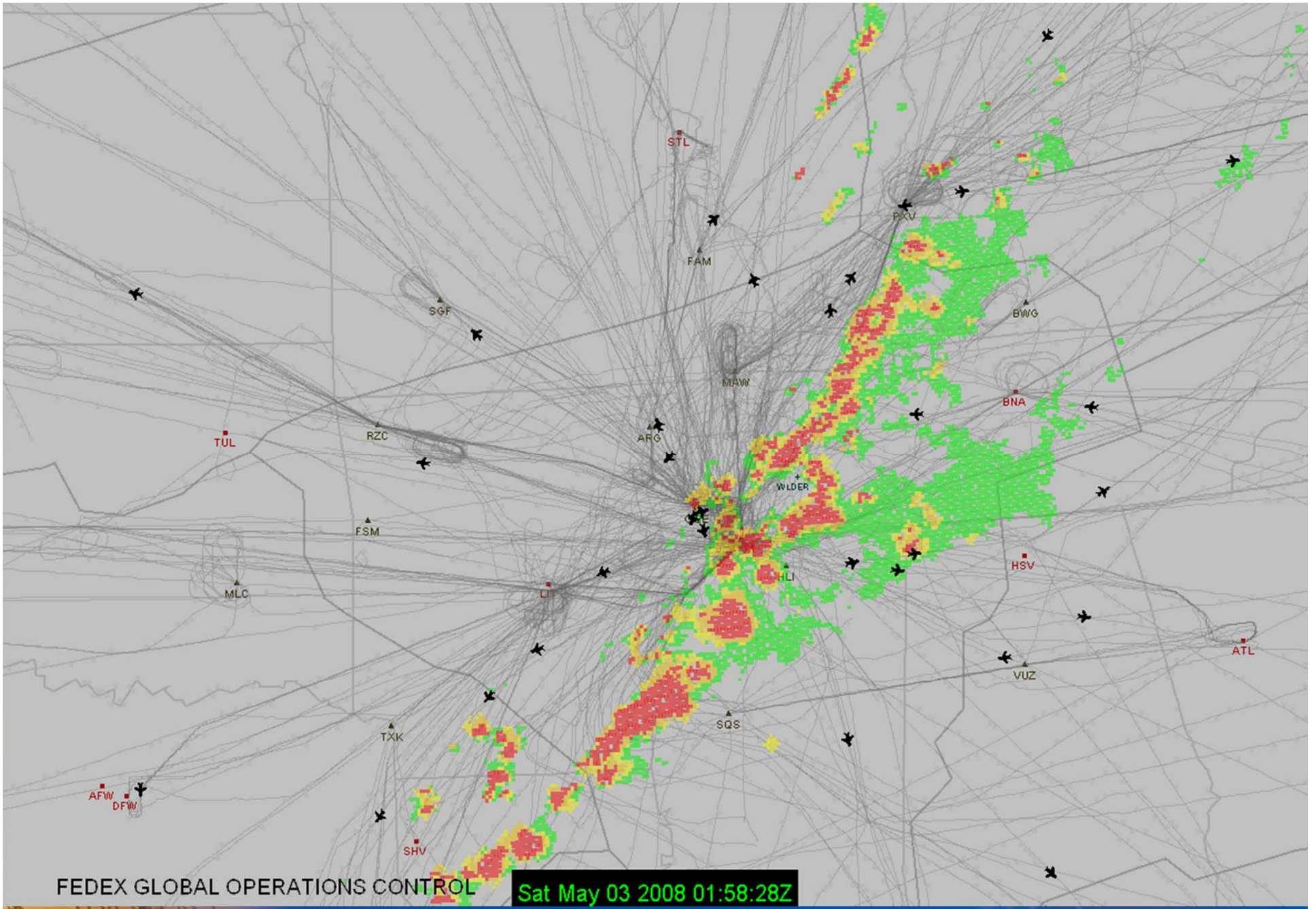
Issued Monday–Friday only. No updates 0230Z–1030Z. Contact Memphis WFO or refer to latest TAF and MIS during those hours  
This Product supports ATC planning for overnight operations in Memphis Center and is reflective of conditions across the entire Memphis TRACON airspace

# MEM Cargo Ops Disruption



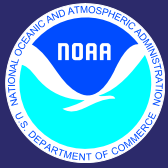
# MEM Cargo Ops Disruption





FEDEX GLOBAL OPERATIONS CONTROL

Sat May 03 2008 01:58:28Z



# Forecast Collaboration



- CWSU, WFO Memphis, FedEx Meteorology
- Exchange thoughts & expected challenges
- Runway configuration & arrival rate communicated

(12/5/2014 4:05:06 PM) nws-CWSU ZME-stephen. Kearney: MEM is currently 2 runways South, arrival rate 60. Reduced arrival rates are planned for the rest of the day due to low ceilings.

(12/5/2014 4:05:52 PM) nws-CWSU ZME-stephen. Kearney: It looks like you're still having some internet troubles, so feel free to give me a call if there's something that might need to be changed on the TAF

(12/5/2014 5:02:52 PM) nws-jonathan. howell: Hi Stephen...was having some issues with my chat/internet but I am now back on...but its up and down. Was planning to keep IFR cigs in place through the afternoon...but with even low cigs behind the warm frontal band/precip band over arkansas...plan to keep tempo for lifr later this afternoon. Once in the real warm sector this evening...may be better potential for thunder...so will leave as previous taf. Also think I will hold on to ifr through the period (18z Sat.) with low level northeast flow setting up behind the front locking in the low clouds. Does this sound reasonable?

(12/5/2014 5:05:35 PM) nws-CWSU ZME-stephen. Kearney: Yeah, I think so. The thunder in the warm sector airmass is probably the only wild-card in the forecast, although it's certainly reasonable. Given how we've trended on ceilings this past week, I think keeping them in here through most of Saturday is a good call.

(12/5/2014 5:24:10 PM) nwsbot: KZME issues [Center Weather Advisory](#)

(12/5/2014 5:30:01 PM) nws-jonathan. howell: Thanks Stephen...agree. Appreciate the input.

(12/5/2014 6:17:23 PM) fdx-kory. gempler: **Not convinced MEM will be LIFR in cigs tonight while in the warm sector. But with TSRA in the area, compression, and cigs, look's like a 2 rwy night with TMI's likely.**

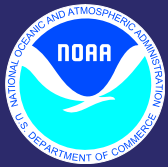
(12/5/2014 7:12:55 PM) nws-jonathan. howell: Hi Kory...thanks for the input. I will continue to monitor cigs through the afternoon. Just prior to issuing the tafs the warm sector contained several lifr cigs...mainly across southern arkansas. They have mainly lifted to ifr over these areas in the latest obs...but not sure if this will hold considering very moist low levels. Although with increasing large scale ascent associated with the upper shortwave...cigs may be higher than currently advertised. Again I will monitor the latest situation and can make some updates as needed. Thanks again.

(12/5/2014 7:21:53 PM) nwsbot: KZME issues [Center Weather Advisory](#)

(12/5/2014 7:22:28 PM) fdx-kory. gempler: **Sure John, looks like one of those nights where it will SCT/BKN in the low levels and a solid deck in the 2k range. just recall from years past that we stay higher than forecast in south/southwest flow. That said, it would take a cig of greater than 15k to allow the use of 3rd runway. i think we get a break in precip after 00z with another spike in the 03-06z time frame.**

(12/5/2014 11:28:20 PM) nws-ZME-nick. uebelhor: <http://www.srh.noaa.gov/zme/?n=OvernightBriefing>

(12/5/2014 11:48:26 PM) nws-ZME-nick. uebelhor: Evening MEG. Based most of my convective forecast on the HRRR which placement is not bad on placement of that area. For actual TS at any spot is on the low end of that likely just wanted to show where I thought the best chances would be. But we have been getting more lightning in that area in W AR. Cigs look pretty close there and slow lift in the cigs from when FROPA occurs looks good. MEM currently South 60 AAR.



# Nightly Cargo Ops Planning



Collaborative Effort between three major partners

- CWSU
- WFO

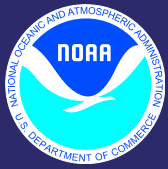


- ARTCC
- TRACON
- ATCSCC



- FedEx Meteorology
- FedEx Dispatchers

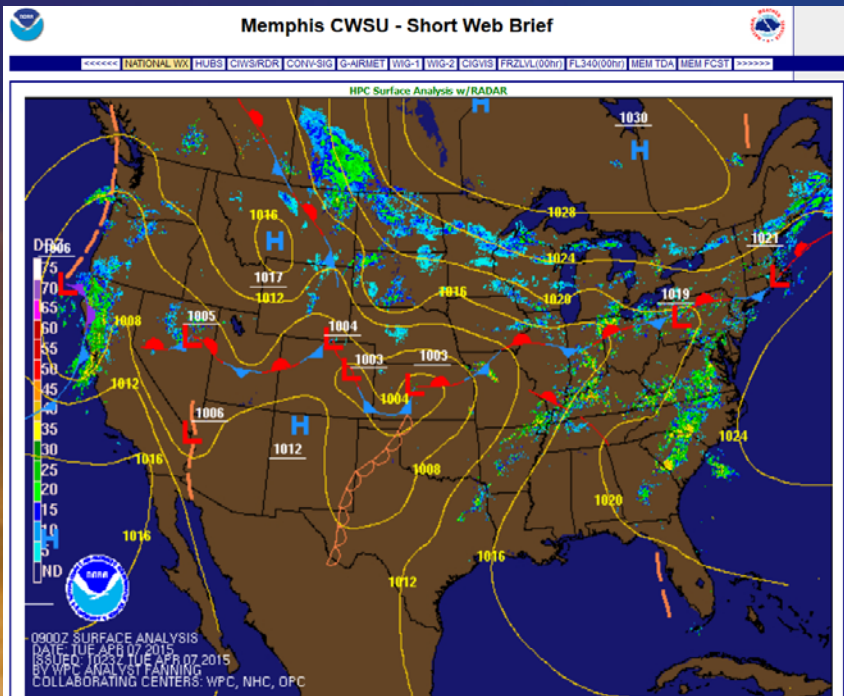




# Cargo Ops Planning Timeline



- 12-1pm: FedEx issues ATC Overnight Outlook
- 3pm: CWSU standup briefing to traffic managers
- 3pm (4pm CDT): 21Z TAF Amendment (WFO)





# Cargo Ops Planning Timeline



- 4-5pm: CWSU issues TRACON Overnight Briefing
- 4-6pm: CWSU / FAA / FedEx coordinate plan for airport configuration and routing
- 6pm (7pm CDT): 00Z TAF issued
- 6:15pm: National planning call with Command Center
- 6:30pm-9:30pm: Weather watch, updates if needed

**MEMPHIS TRACON OVERNIGHT BRIEFING**  
 \*\*\*for air traffic planning purposes only\*\*\*  
 Memphis TRACON area only--valid from 10:00 PM through 4:00 AM

VALID: 03Z-09Z

	10 PM	11 PM	12 AM	1 AM	3 AM
SFC WIND	18020G30KT	18020G30KT	19020G32KT	21020G30KT	24015G25KT
SKY/CIG	SCT030 BKN040	SCT025 BKN035	SCT015 BKN020	0VC015	SCT010 0VC015
SFC VIS	10SM	10SM	10SM	10SM	10SM
SFC WX	VCTS	VCTS	+TSRA	+TSRA	+SHRVCCTS
1000 FT WINDS	18043KT	19044KT	20043KT	21040KT	24027KT
2000 FT WINDS	19059KT	20060KT	21059KT	22056KT	25035KT

<b>FNCHR</b> 10P   11P   12N   1A	<b>ROBYE</b> 10P   11P   12N   1A ALL TIMES LOCAL (CST)	<b>LTOWN</b> 10P   11P   12N   1A
<b>CONDR</b> 10P   11P   12N   1A		<b>MONAA</b> 10P   11P   12N   1A
<b>TAMMY</b> 10P   11P   12N   1A	<b>SOUTH</b> 10P   11P   12N   1A DATE 11-27-2019 TIME 03:00Z	<b>MASHH</b> 10P   11P   12N   1A
WINDSHIFT TIME(S): Unlikely (0X-250)    Chance (00X-599)    Likely (600-999)		

**MISC:**  
 Beginning of the push TS expected mainly over the western portions of the TRACON area. Near solid squall likely to move over the area near midnight-1am timeframe. LUGSH is most likely not to be impacted until over terminal.

Issued Monday-Friday only. To update 0300-1000Z, contact Memphis WFO or refer to latest TAF and MET during those hours.  
 This product supports ATIS planning for overnight operations in Memphis Center and is reflective of conditions across the entire Memphis TRACON airspace.





# Operational Takeaways



- Determine local thresholds for FAA decision-makers (runway configuration, arrival rates, gate impacts, etc)
  - *Winds, thunderstorms, winter weather, ceilings, and visibility*
- Determine thresholds for customers at major airline hubs
  - *Meet with customer & see their operations*

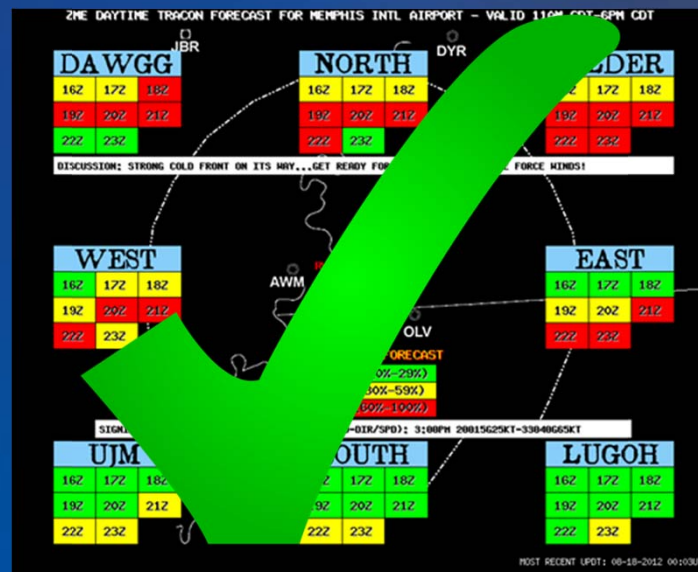
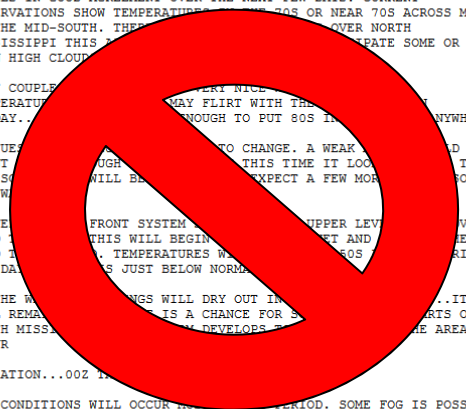


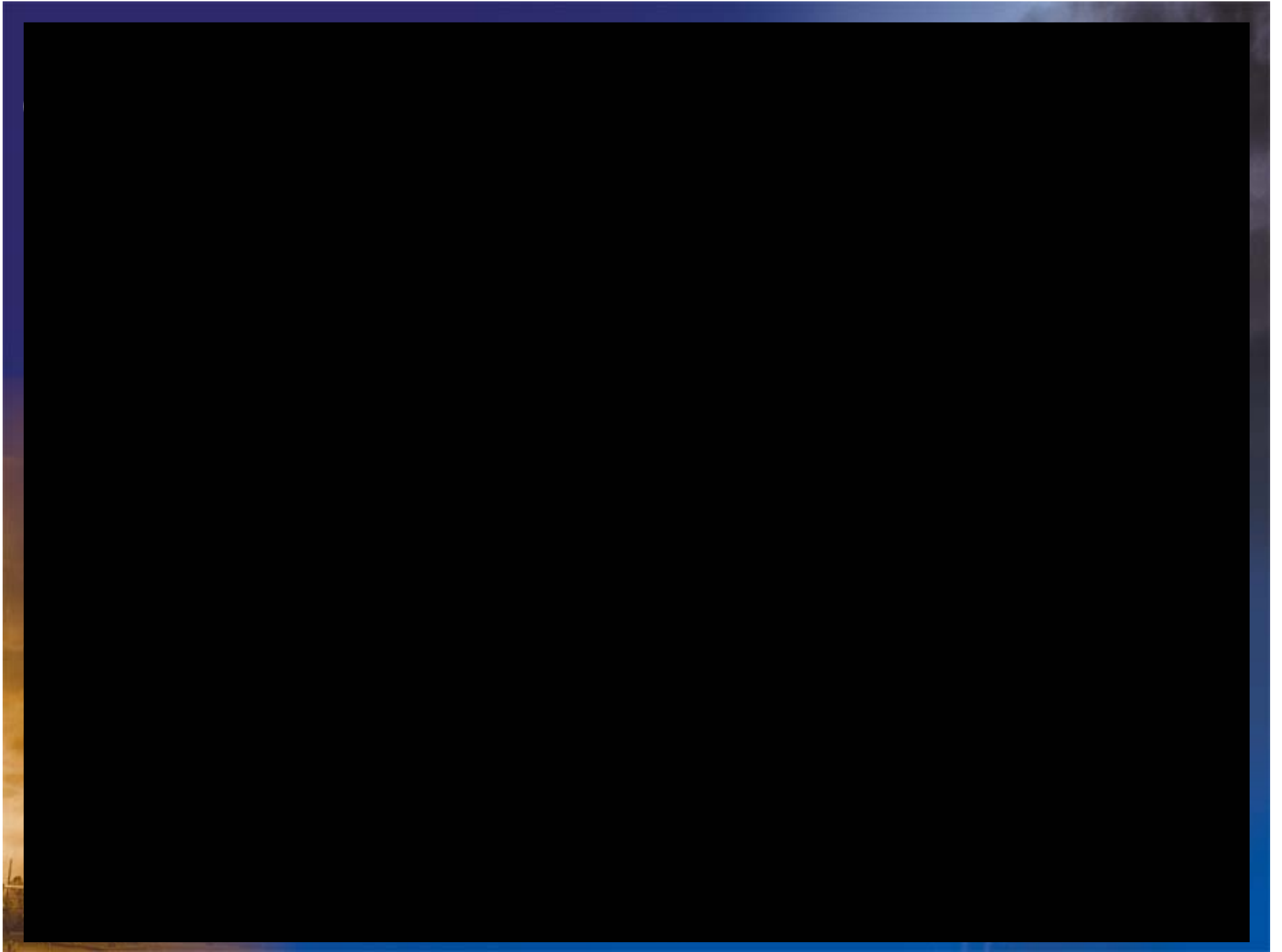


# Operational Takeaways

- Develop a relationship with the TRACON & Tower
- Use arrival demand chart ([www.fly.faa.gov](http://www.fly.faa.gov))
  - Forecast to expected push times
- Think outside the product box
  - Create new graphical services, perhaps web-based

.PREV DISCUSSION... /ISSUED 344 PM CDT SUN MAR 15 2015/  
 DISCUSSION...  
 MODELS IN GOOD AGREEMENT OVER THE NEXT FEW DAYS. CURRENT OBSERVATIONS SHOW TEMPERATURES IN THE 60S OR NEAR 70S ACROSS MOST OF THE MID-SOUTH. THE TEMPERATURES OVER NORTH MISSISSIPPI THIS AFTERNOON WILL BE WARMER THAN SOME OR BE THIN HIGH CLOUDS.  
 NEXT COUPLE DAYS WILL BE VERY NICE. TEMPERATURES WILL BE IN THE 70S AND 80S. WINDS WILL BE LIGHT TO MODERATE. THERE IS A CHANCE FOR A FEW SHOWERS OR THUNDERSTORMS ON MONDAY.  
 ON TUESDAY THE WEATHER WILL BE SIMILAR TO MONDAY. A WEAK FRONT WILL BE MOVING THROUGH THE AREA THIS TIME IT LOOKS LIKE THE DRY SIDE OF THE FRONT WILL BE TO THE WEST. EXPECT A FEW MORE SHOWERS OR THUNDERSTORMS ON TUESDAY.  
 ON WEDNESDAY THE WEATHER WILL BE SIMILAR TO TUESDAY. A WEAK FRONT SYSTEM WILL BE MOVING THROUGH THE AREA. TEMPERATURES WILL BE IN THE 70S AND 80S. WINDS WILL BE LIGHT TO MODERATE. THERE IS A CHANCE FOR A FEW SHOWERS OR THUNDERSTORMS ON WEDNESDAY.  
 BY THE END OF THE WEEK THE WEATHER WILL BE DRY AND PLEASANT. IT WILL REMAIN IN THE 70S AND 80S. THERE IS A CHANCE FOR A FEW SHOWERS OR THUNDERSTORMS ON THURSDAY AND FRIDAY.  
 .AVIATION...00Z  
 VFR CONDITIONS WILL OCCUR THROUGHOUT THE PERIOD. SOME FOG IS POSSIBLE LATE TONIGHT AND EARLY MONDAY MORNING REDUCING VISIBILITIES TO 3-5SM. LIGHT NE WINDS BECOMING NEAR CALM TONIGHT. WINDS MONDAY MORNING SW 4- 5 KTS.







# Acknowledgements

- **Federal Aviation Administration:**
  - *Memphis ARTCC, Memphis TRACON*
- **Erik Proseus - FedEx Meteorology Group**
- **NWS Memphis WFO**
- **Memphis International Airport**



Questions?

**Stephen Kearney**

**[stephen.kearney@noaa.gov](mailto:stephen.kearney@noaa.gov)**

**National Weather Service - Memphis CWSU**

**(901) 368-8167**

**[www.weather.gov/zme](http://www.weather.gov/zme)**

**[www.facebook.com/CWSUMemphis](http://www.facebook.com/CWSUMemphis)**

