West DDSO Office

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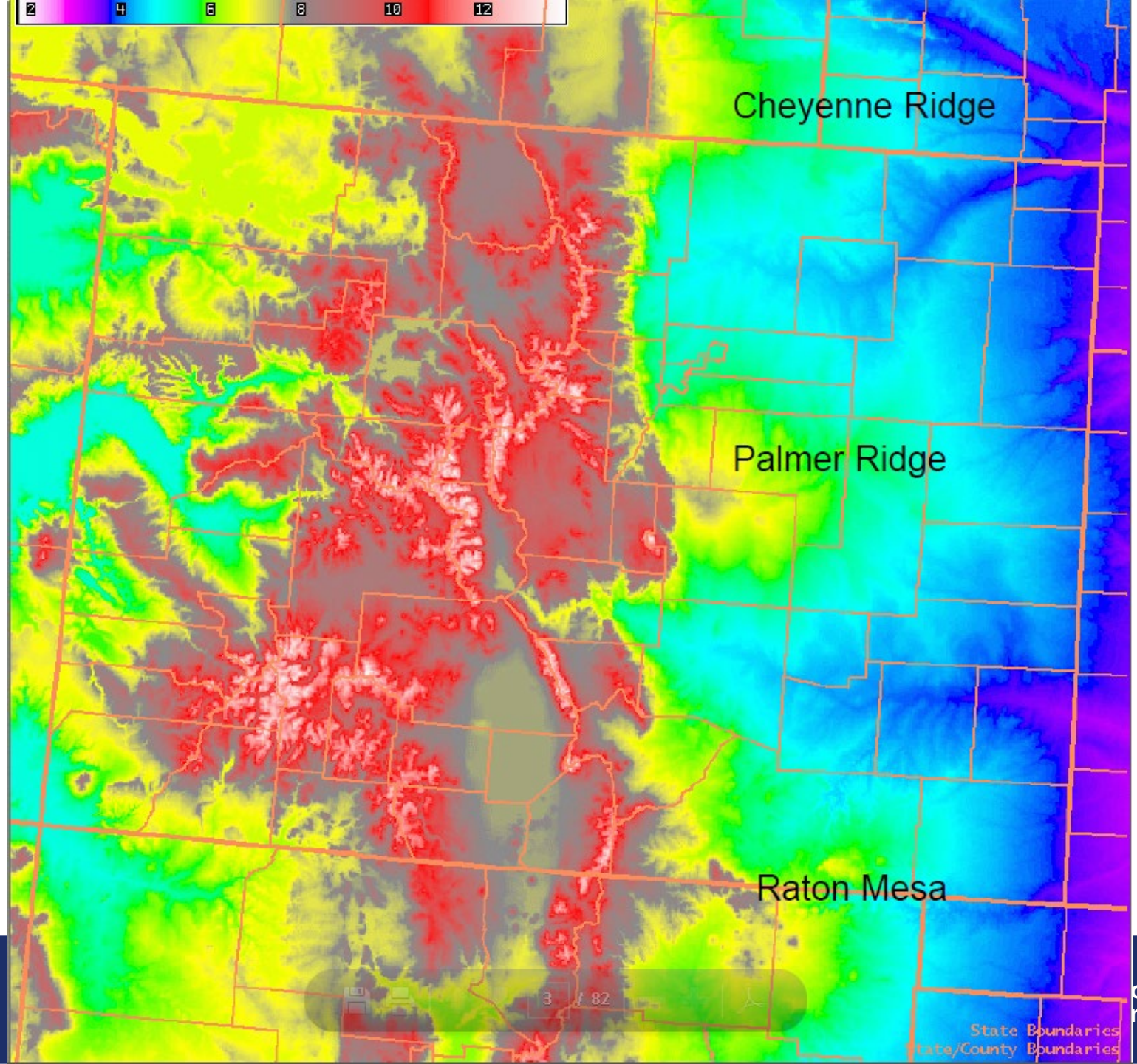
April 3, 2025

Federal Aviation Administration

Thunderstorm Season in Denver

Background

- DEN is located along a convergence zone: Cheyenne Ridge, Palmer Divide, and Front Range (Rockies)
- Daily TS Development from mid May to beginning of October
- Popcorn cells that are unpredictable but cause significant impacts to arrival/departure gates as well as direct airfield impacts: windshear, microburst, hail, lightning, and tornadoes.

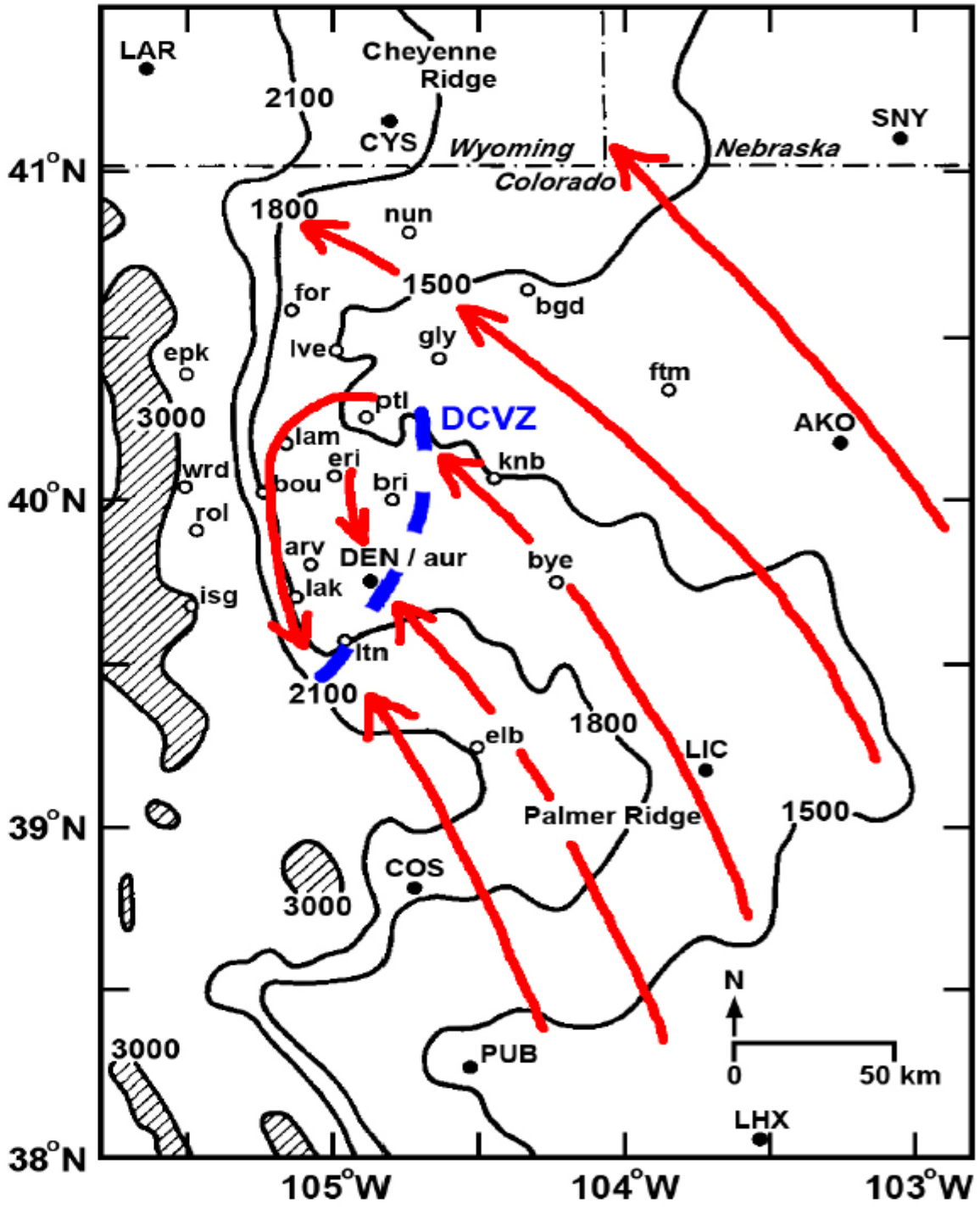

2
4
6
8
10
12
Cheyenne Ridge
Palmer Ridge
Raton Mesa
3 / 82
State Boundaries
State/County Boundaries

Schematic of the Denver Cyclone

South to Southeast flow passing over the Palmer Ridge under conditions with some (enough) lower level stability results in a downstream turning of the wind.

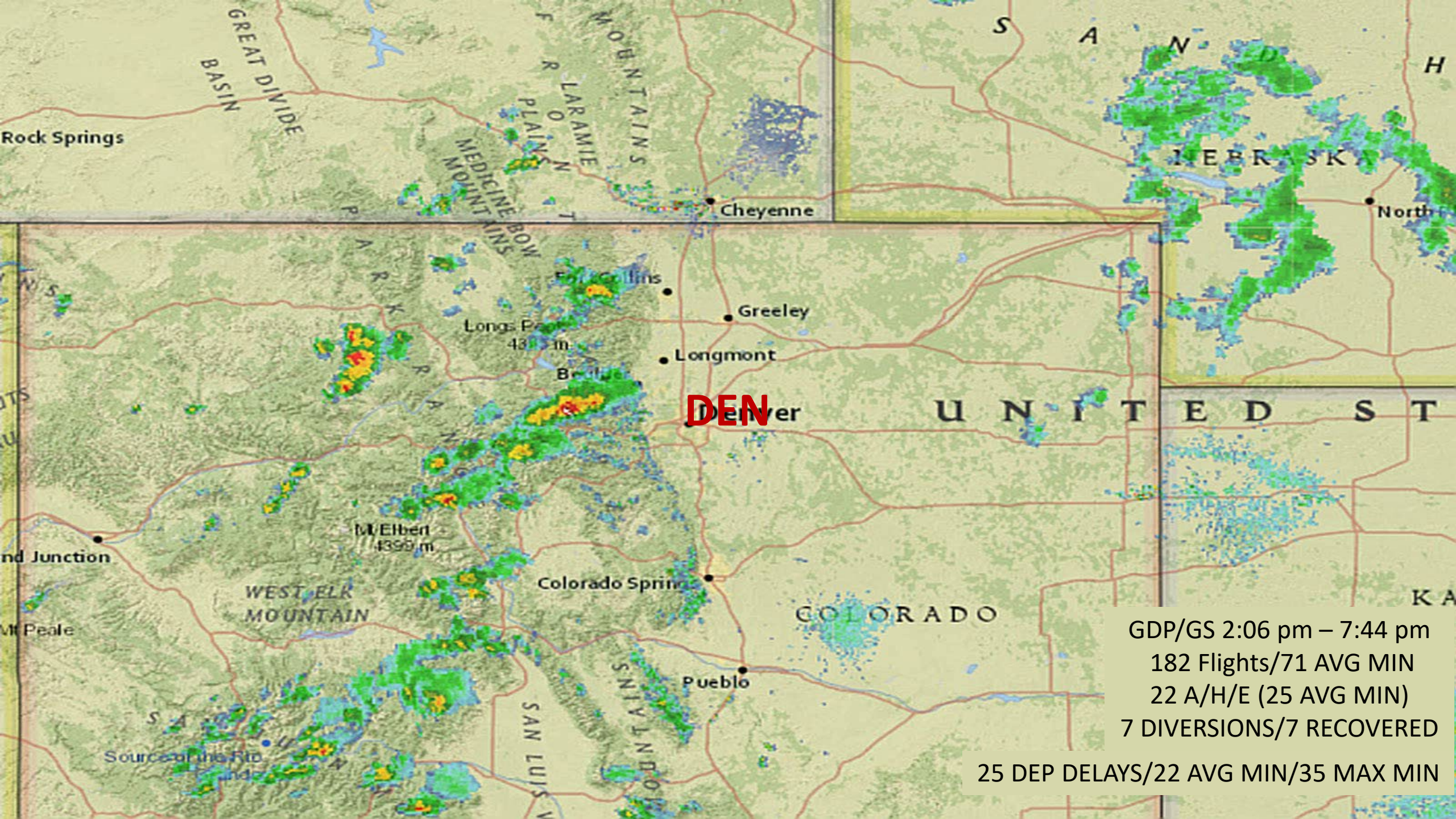
This forms a zone where the winds come together...often this zone is over DIA.

The zone can remain stationary or move very slowly, and as a result
1) the local environment is modified (deepening moisture) to increase the local chance of a storm
2) small scale circulations (vorticity) can form at low levels along the convergence zone (hence called the Denver Convergence-Vorticity Zone or DCVZ)

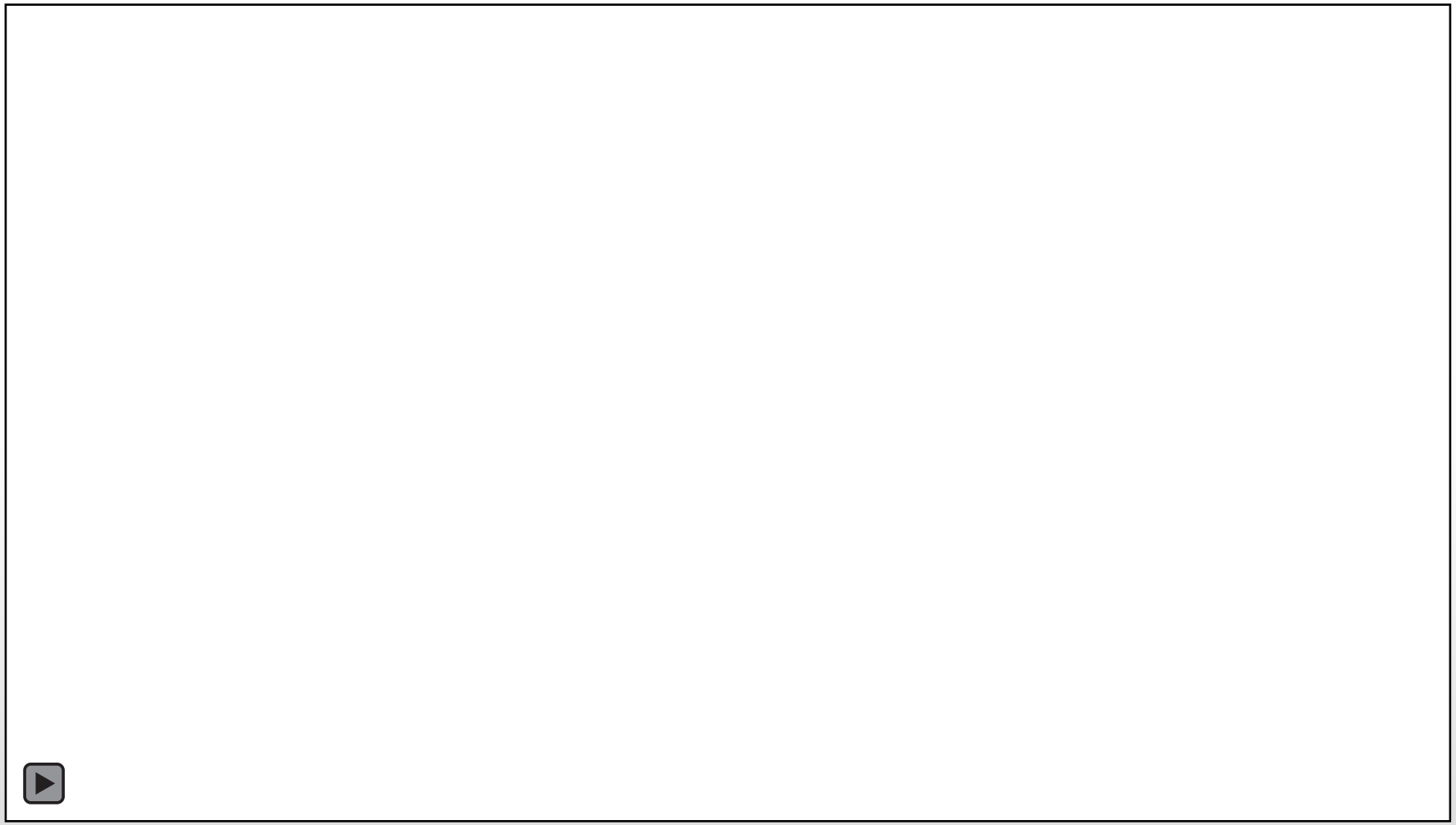


Convection in TWDV

- Thunderstorms born over the Rockies
- Unpredictable growth and movement
- Significant impacts on operations


Rock Springs
GREAT DIVIDE BASIN
MEDICINE BOW MOUNTAINS
LARAMIE
MOUNTAINS
Cheyenne
Greeley
Longmont
DEN
Denver
UNITED ST
Mt Elbert
4399 m
WEST ELK MOUNTAIN
Colorado Springs
COLORADO
Pueblo
SAN LUIS
Source of the Rio
GDP/GS 2:06 pm – 7:44 pm
182 Flights/71 AVG MIN
22 A/H/E (25 AVG MIN)
7 DIVERSIONS/7 RECOVERED
25 DEP DELAYS/22 AVG MIN/35 MAX MIN

DEN 6/26/24



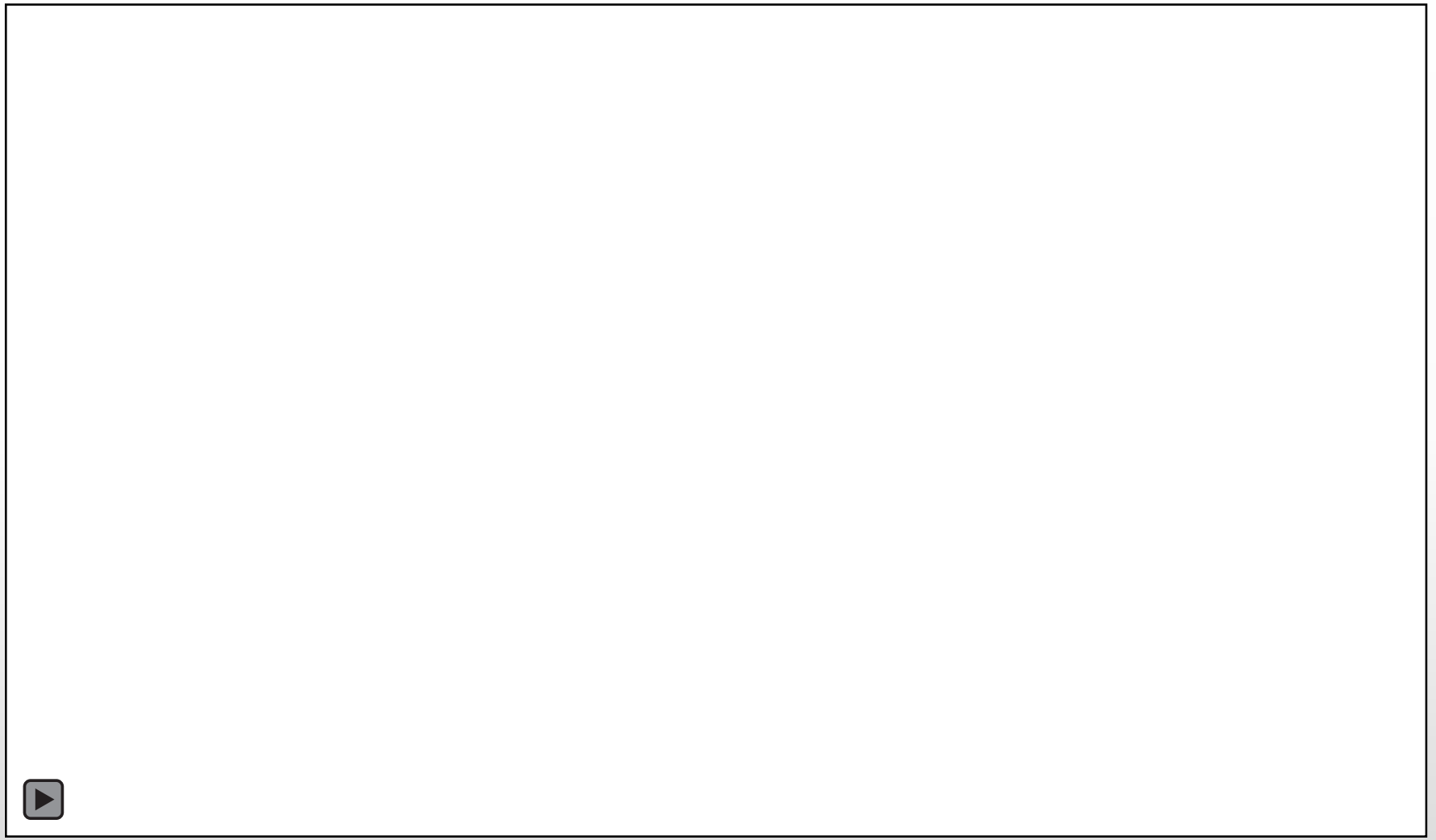
GS 2257-0041Z

33 TMI Delays for 1,778 min.

74 Airborne Holding Events for 2,078 min.

33 Diversions
18 D/D

DEN 7/17/24



GS 2105-2224Z
GS 0059-0114Z

20 TMI Delays for 791 min.

14 Airborne Holding Events for 241 min.

Strategies

- Collaboration & Communication between
  - FAA Facilities/Airlines/ CWSU-NWS
- CDRs and Re-Routes
- Capping/Tunneling
- Constant monitoring
- Tactical changes

Departure Strategies

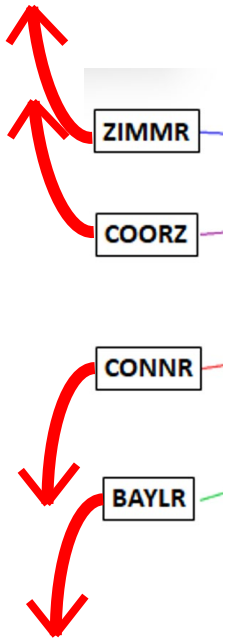
SWAP PROCEDURES GATE CLOSURES

Typically, when a gate is closed, the departures will be swapped in the direction that most closely corresponds to the direction of the arrival destination.

Adjacent gate closures and weather can impact DEN's ability to accommodate this. Sometimes, if the weather is closing multiple gates but is moving away form the airport, it may be better to have aircraft "wait it out" rather than fly excessive miles in the wrong direction.

SWAP PROCEDURES GATE CLOSURES CONT.

Example: West gate closed



ZIMMR/COORZ are ideally swapped north

CONNR/BAYLR are ideally swapped south

SWAP PROCEDURES GATE CLOSURES CONT.

Example: East and North gates closed

SMMUR/SUDDZ north gate is closed so they can be swapped south or “wait it out” at crew discretion

EEONS

EMMYS

EXTAN/EPKEE are swapped south

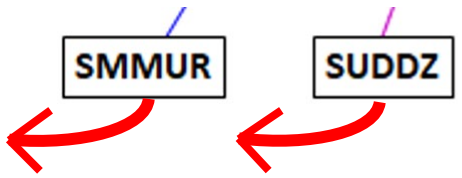
EXTAN

EPKEE

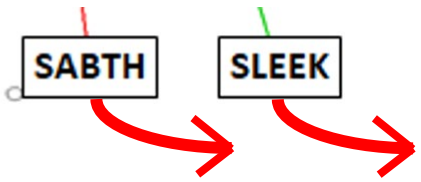
SWAP PROCEDURES GATE CLOSURES CONT.

Example: South gate closed

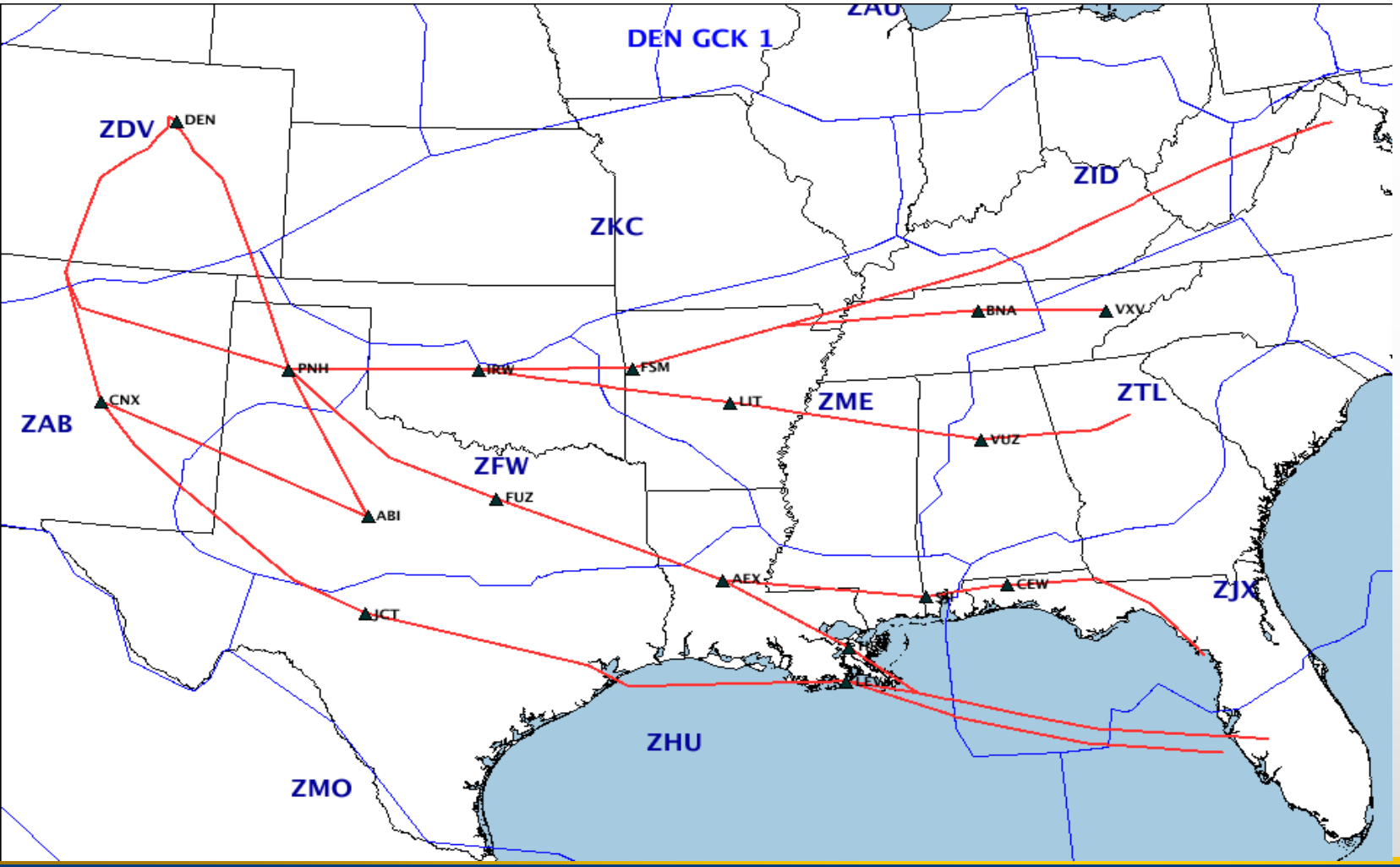
SMMUR/SUDDZ are ideally swapped west



SABTH/SLEEK are ideally swapped east



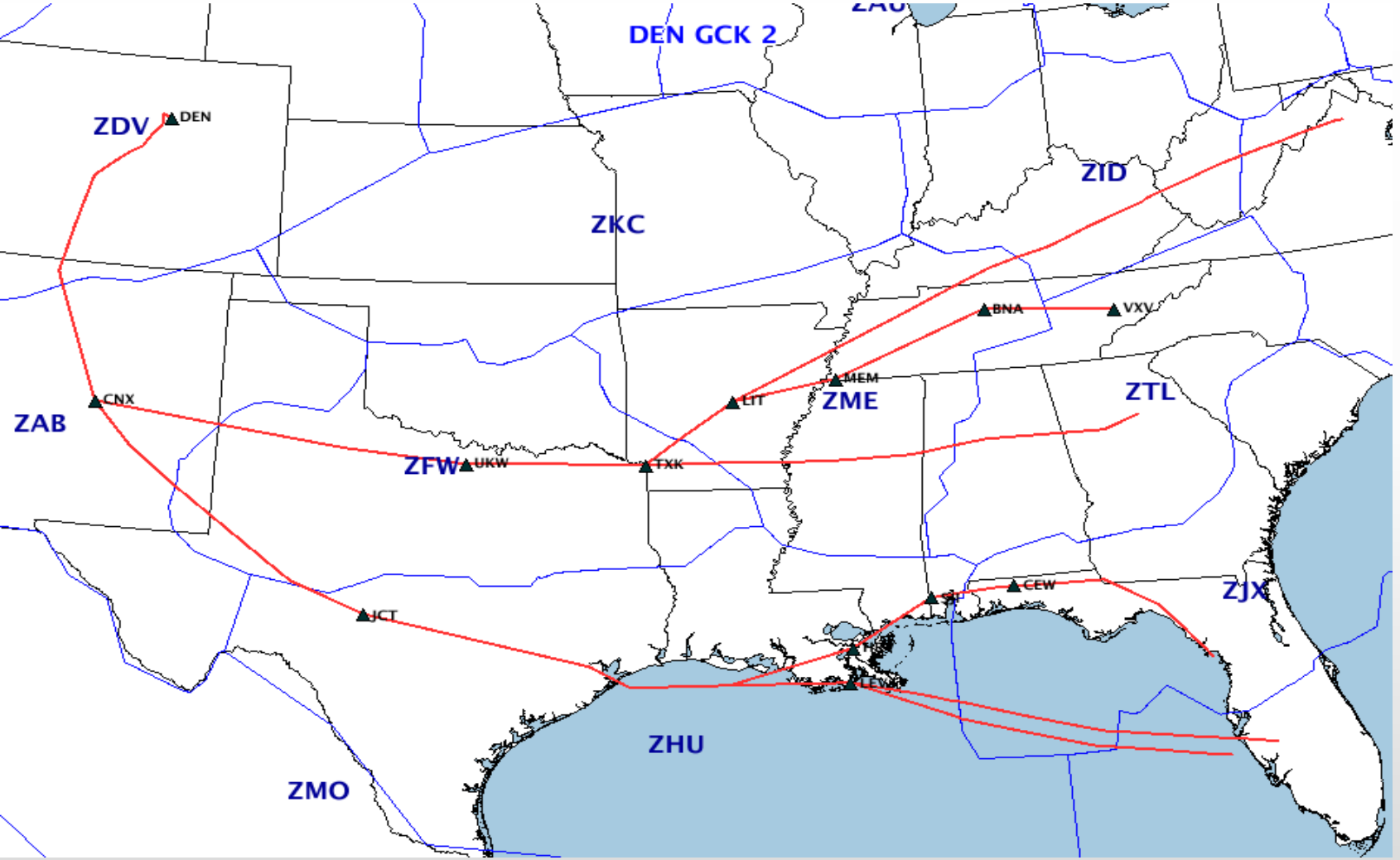
Arrival Strategies



Impacted Area or Flow: ZKC

Facilities Included:
ZDC/ZTL/ZME/ZFW/ZHU/ZJX/ZMA/ZAB/ZDV/ZID

Arrival Strategies



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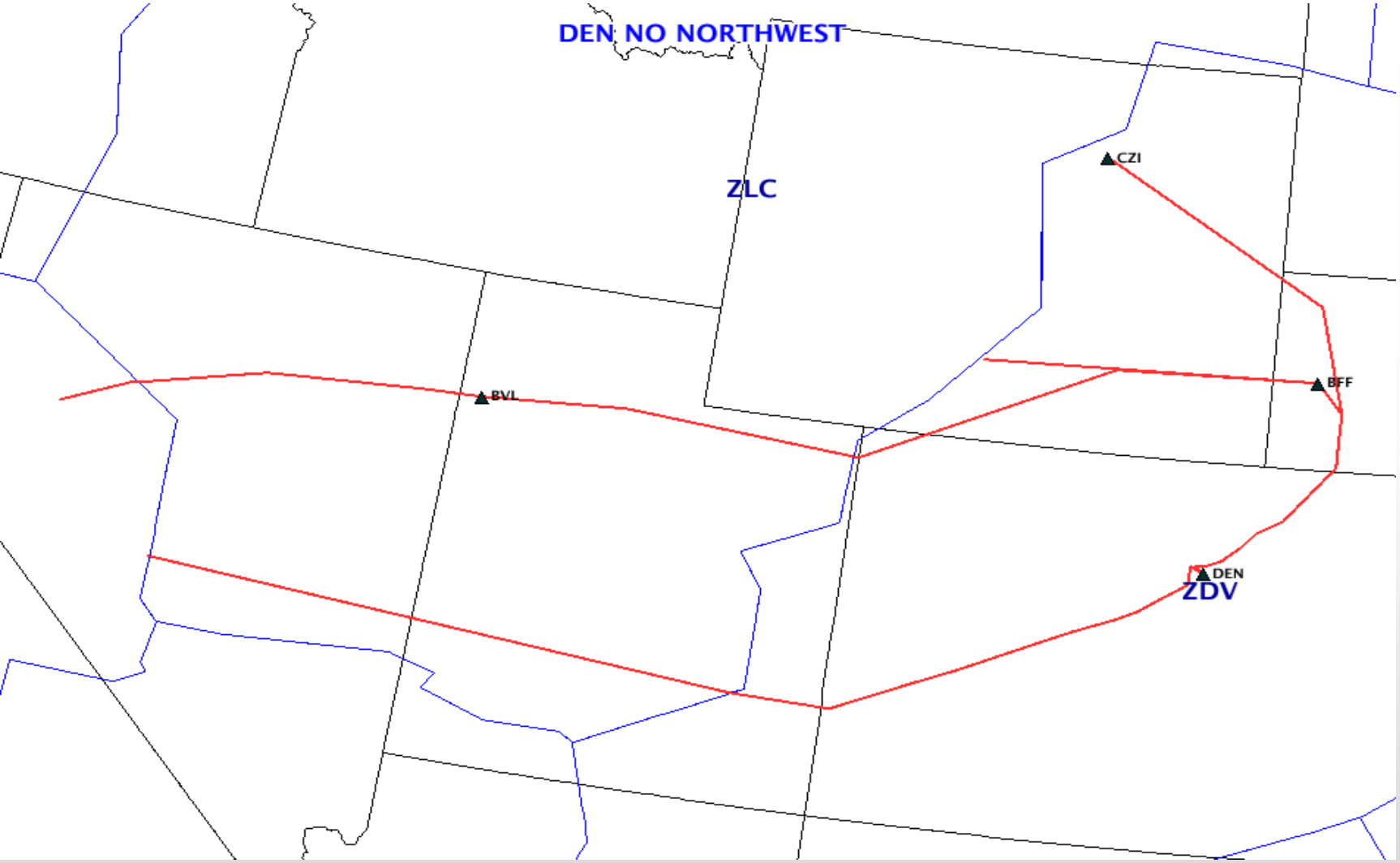
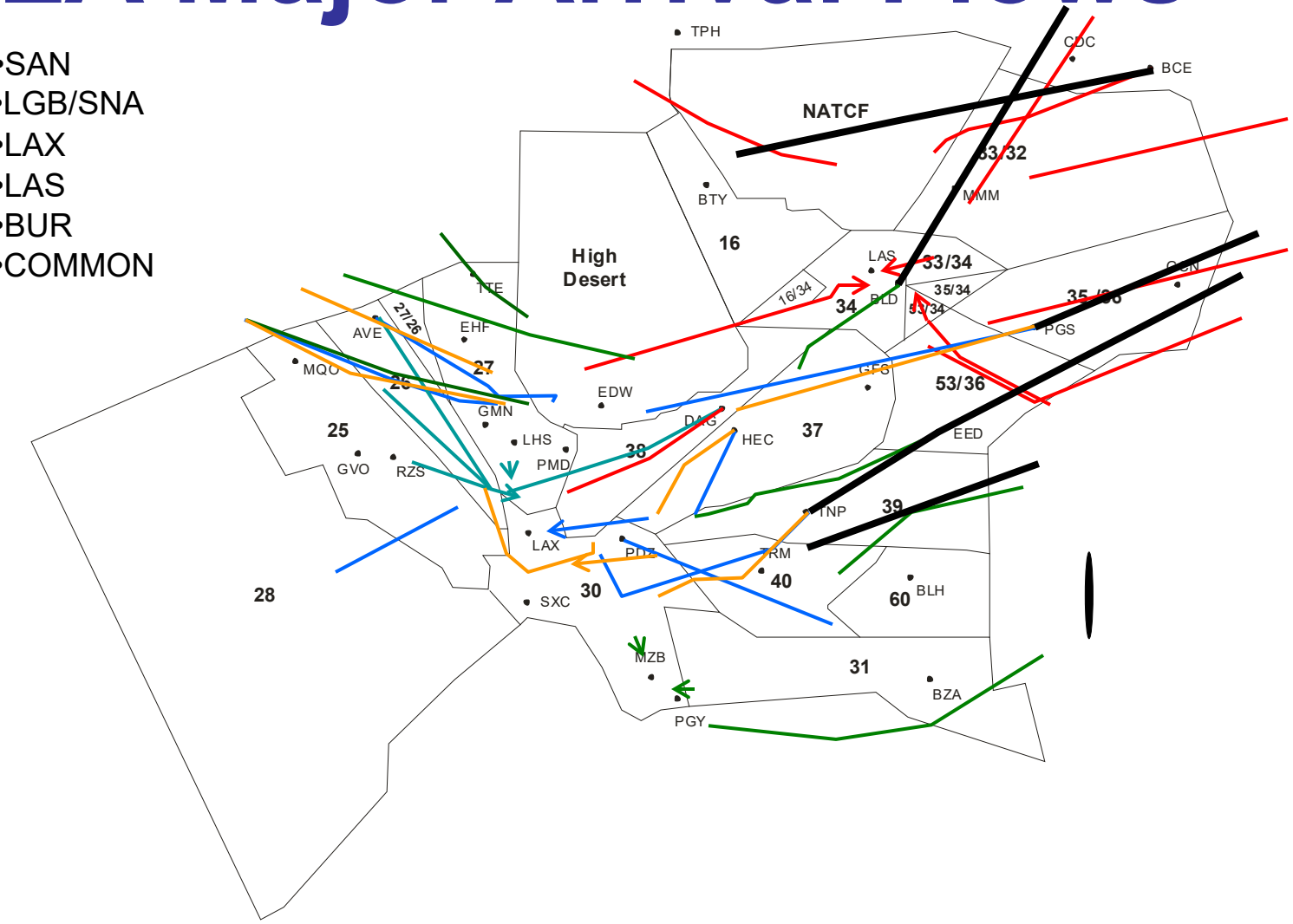


Impacted Area or Flow: FLATI AND LONGZ GATES IMPACTED

Facilities Included:
ZSE ZLC ZOA ZDV

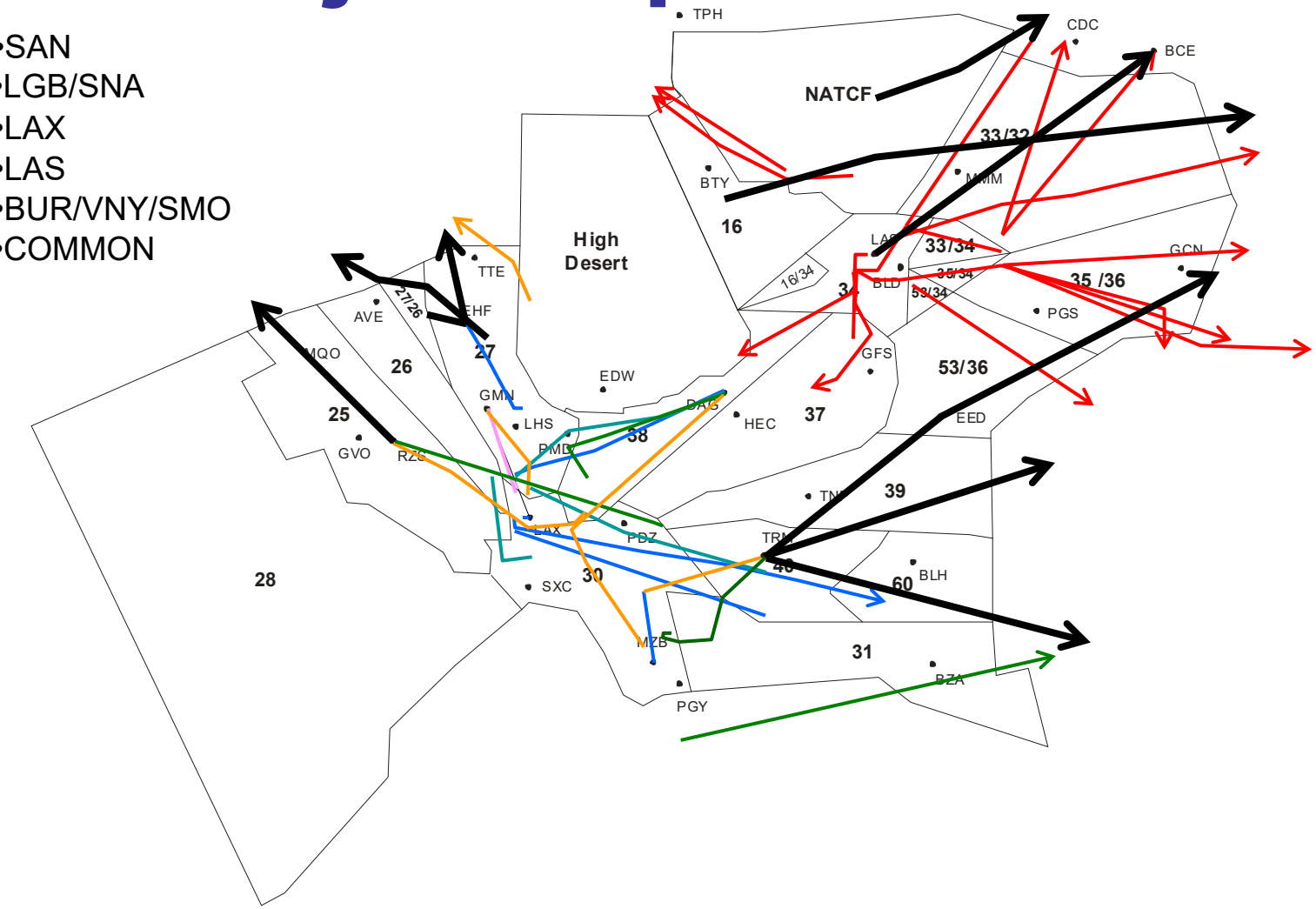
ZLA Major Arrival Flows

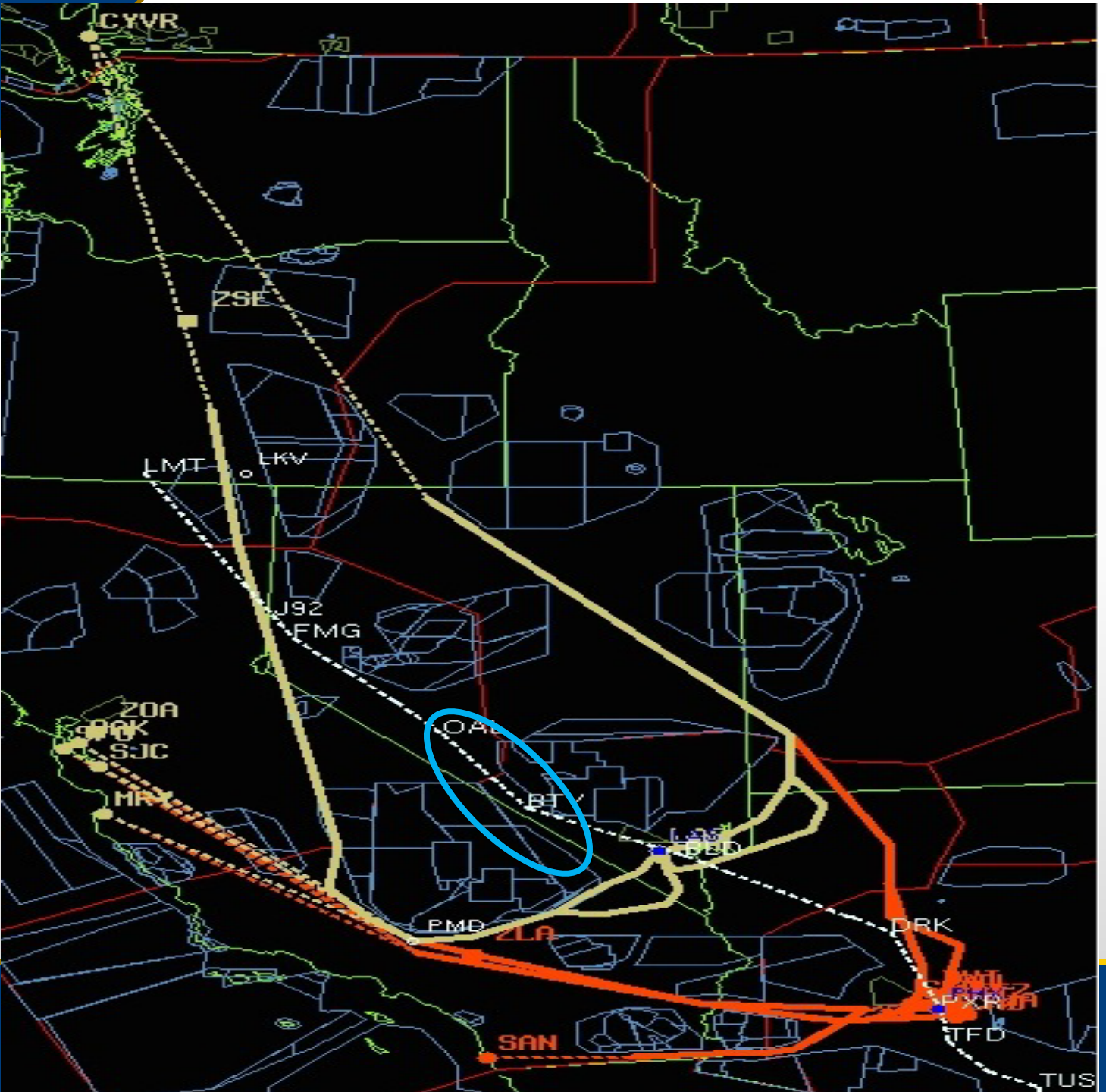
- •SAN
- •LGB/SNA
- •LAX
- •LAS
- •BUR
- •COMMON



ZLA Major Departure Flows

- •SAN
- •LGB/SNA
- •LAX
- •LAS
- •BUR/VNY/SMO
- •COMMON



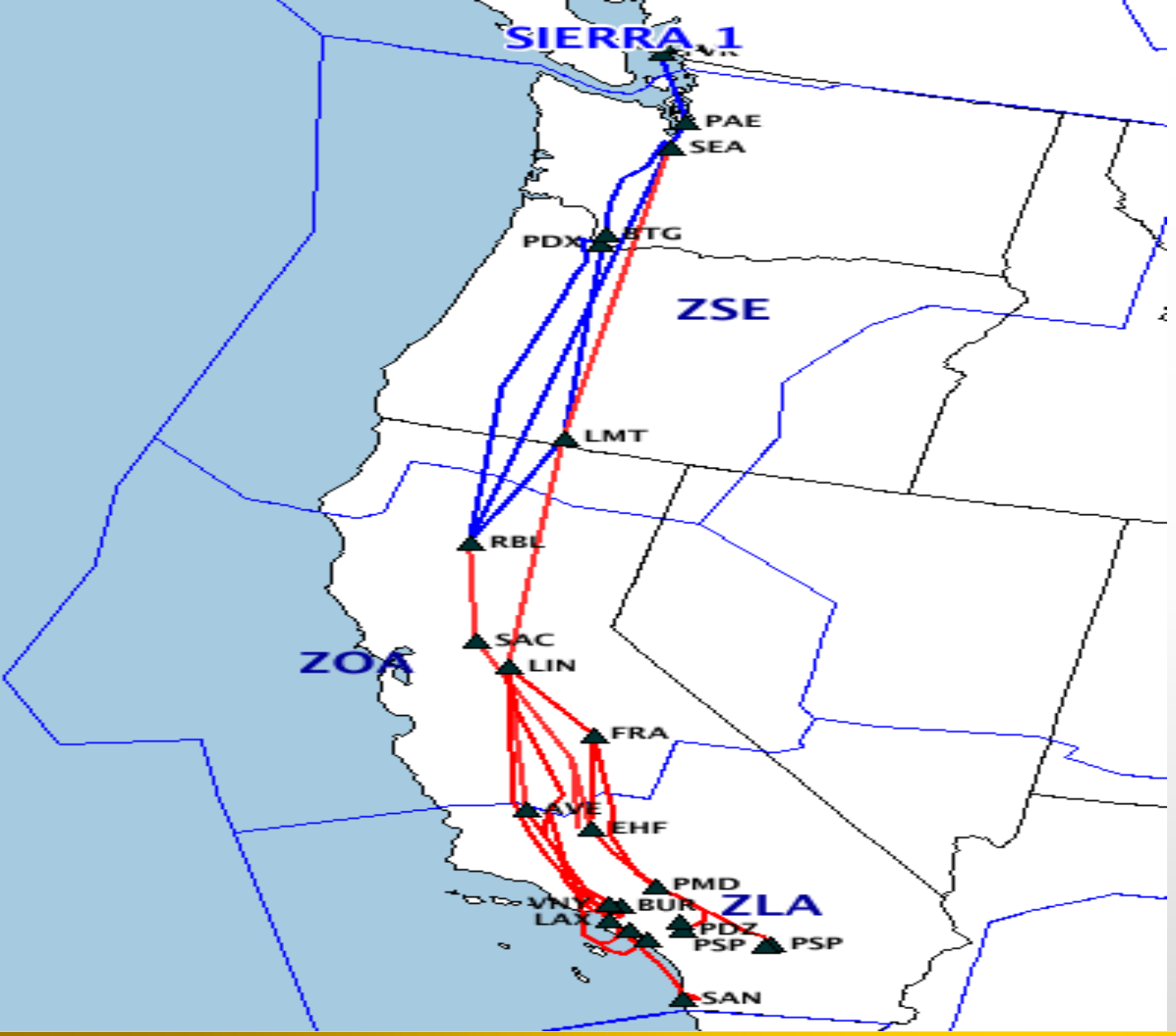


LAS & PHX
No J92

Blue area of constraint between SUA's

LAS Routes Gold.

PHX Routes Red



SIERRA1

Normally to avoid T-Storms Or Turbulence between LIN-FMG over the Sierra Nevada Mountains

Southbound Routes routed West over LMT instead of LKV.

Federal Aviation Administration

22

SIERRA2 Route

Sierra2 Southbound is normally requested if we are using Sierra1 North.

This takes the A/C Departing CYVR/SEA/BFI/PDX and moves them west over OED and RBL to keep from overloading ZSE14 (nose to nose over LMT northbound)

23

Questions?