



*MIT International Center for Air Transportation*

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# Observations of Departure Operations at Newark International Airport

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# Departure Observations

## ➤ Newark Site Visit – Thursday June 29, 2000

- ⇒ Middle of a difficult Summer
- ⇒ Thursday before July 4<sup>th</sup> Weekend
- ⇒ Large delays the previous day





# Map of Newark Airport (EWR)



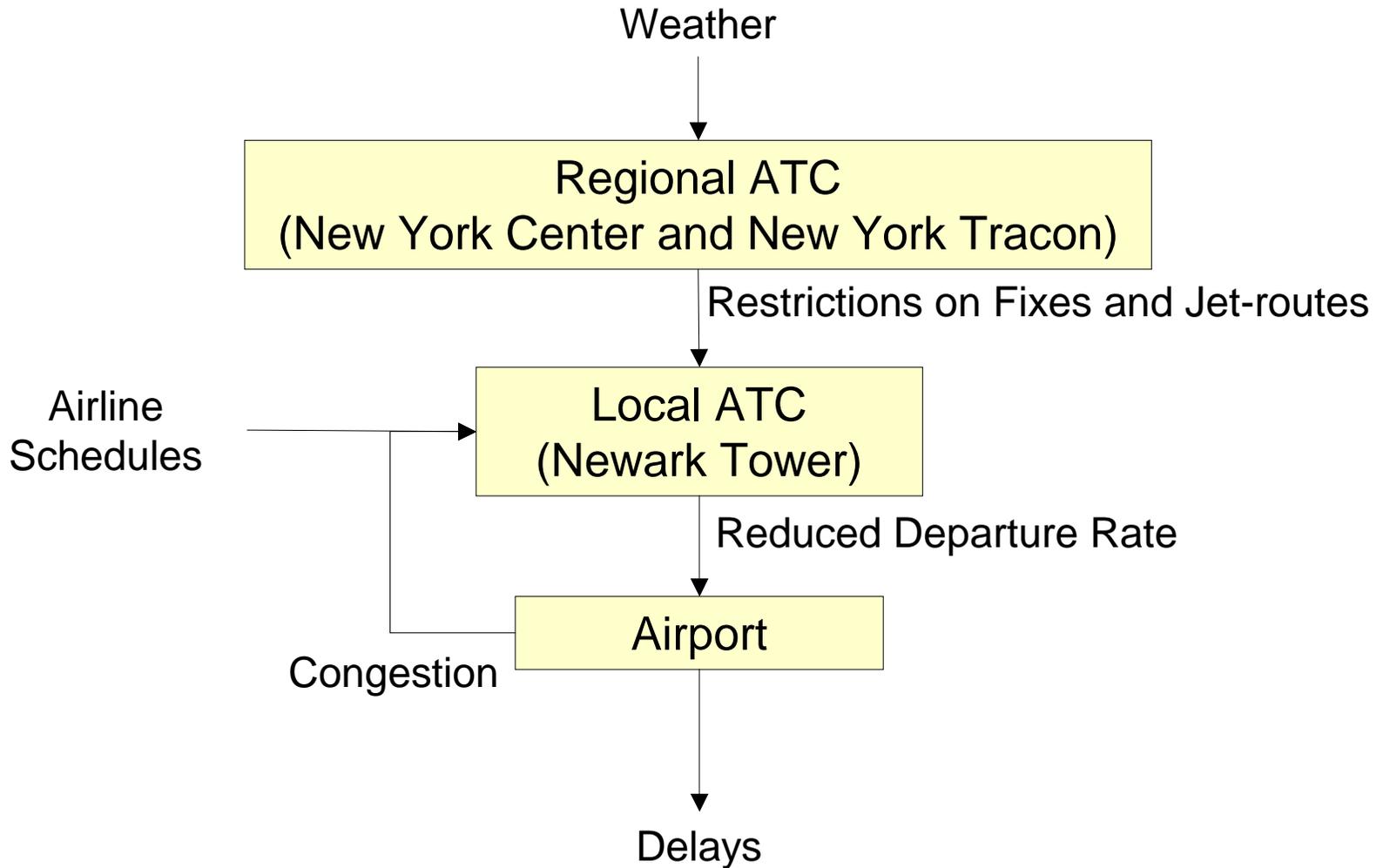


# New York City Airspace

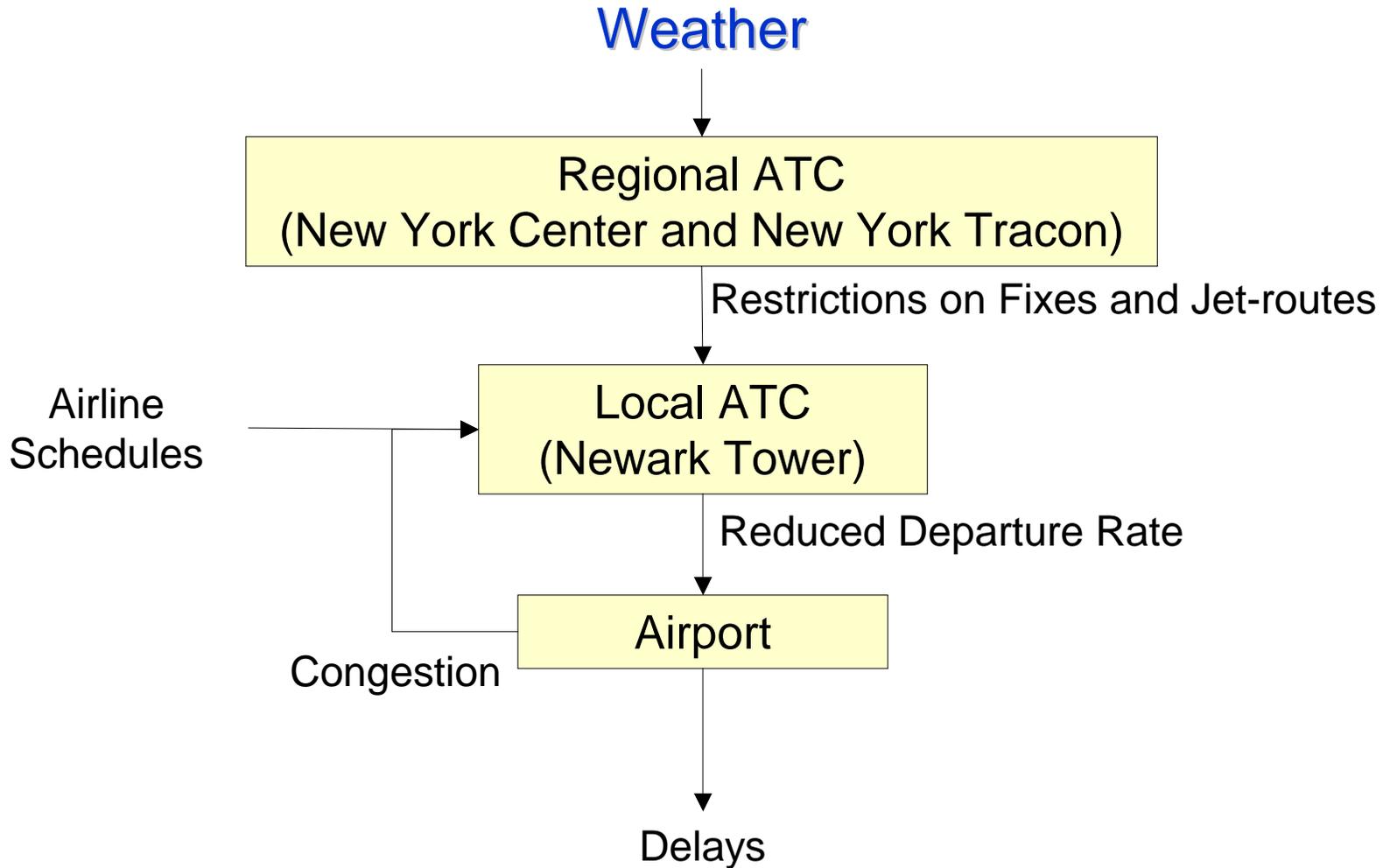
## With Primary EWR Departure Fixes/Jet-routes



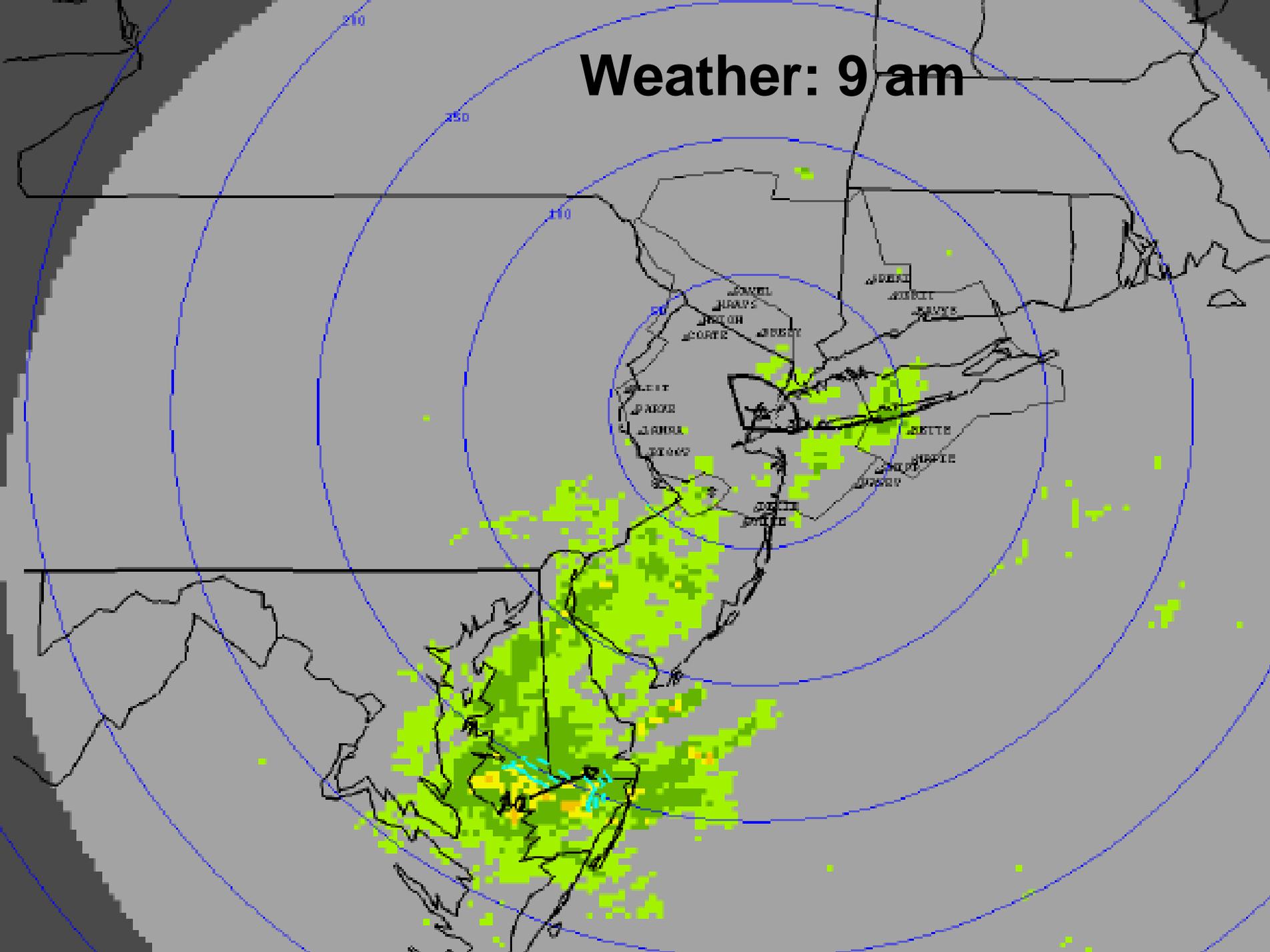
# Airport/Airspace Interaction



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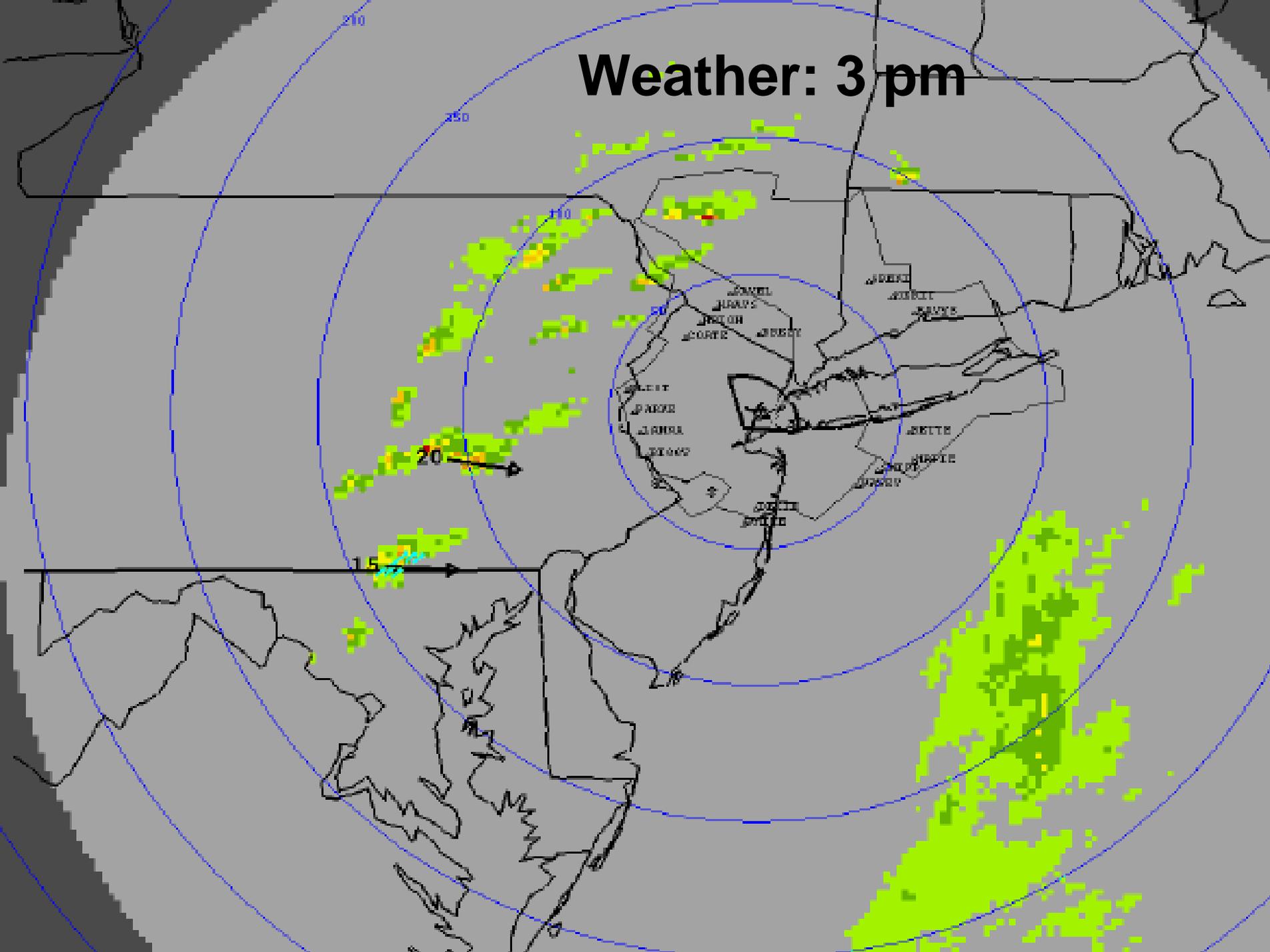


# Weather: 9 am

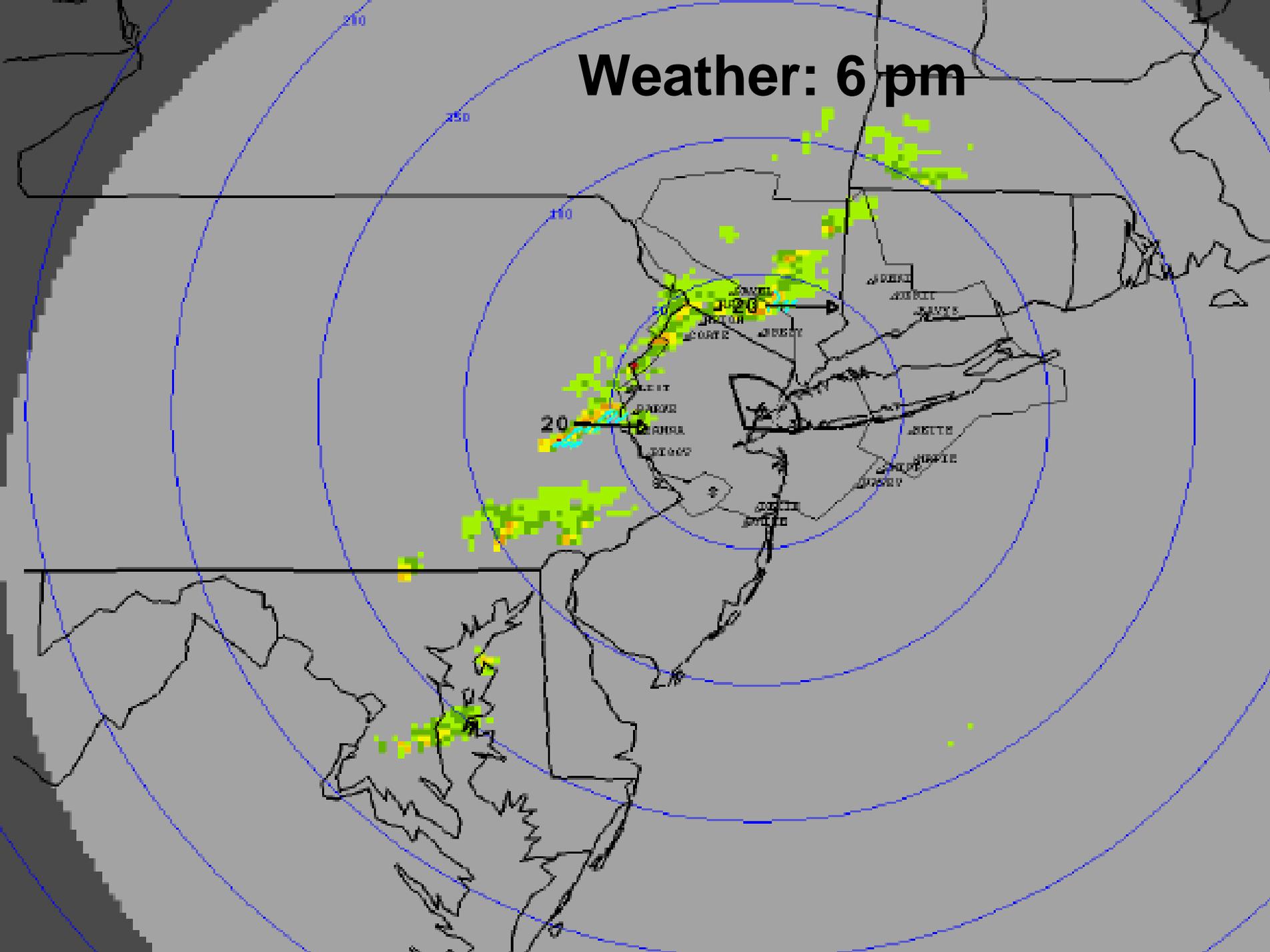




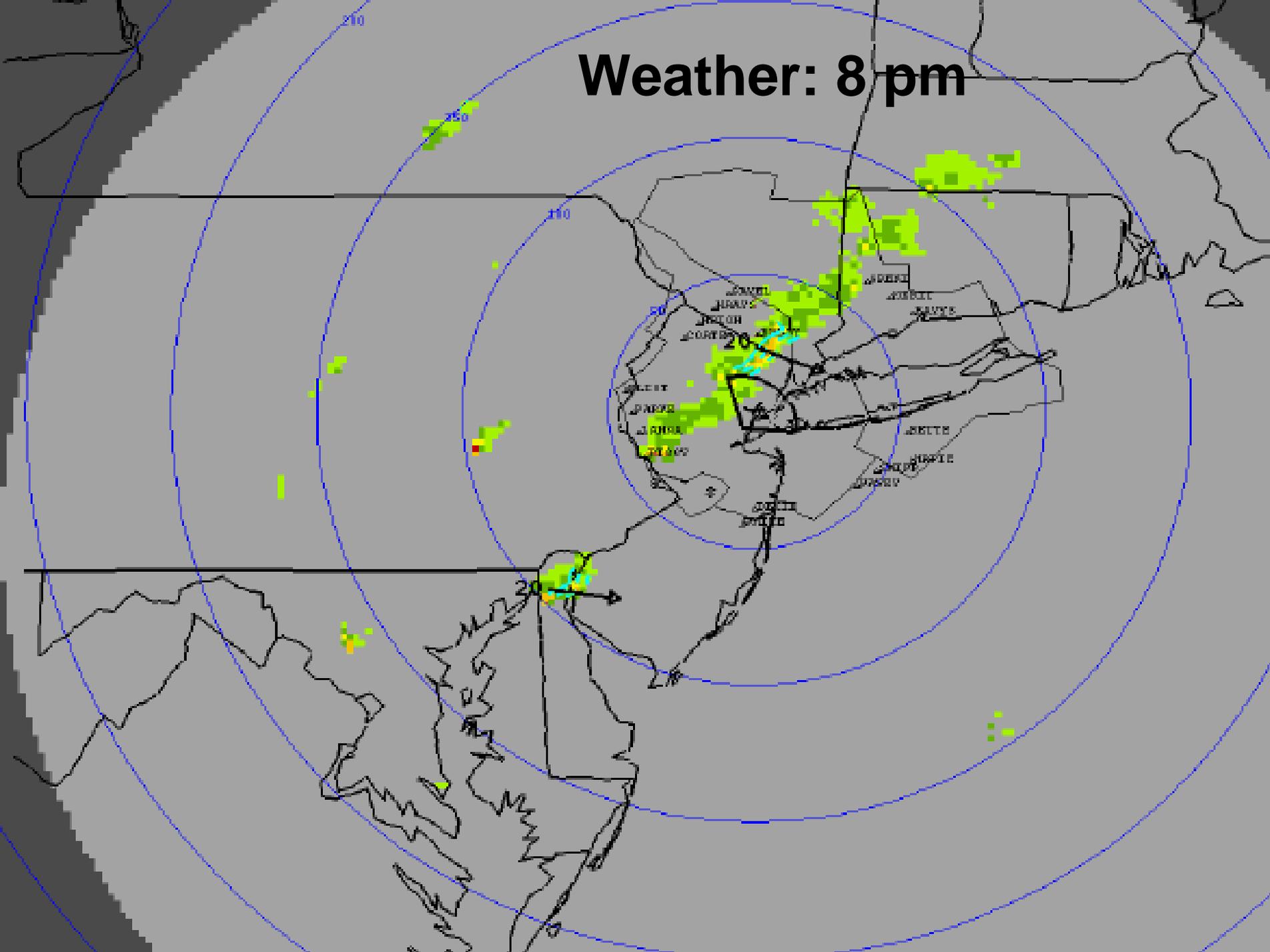
# Weather: 3 pm



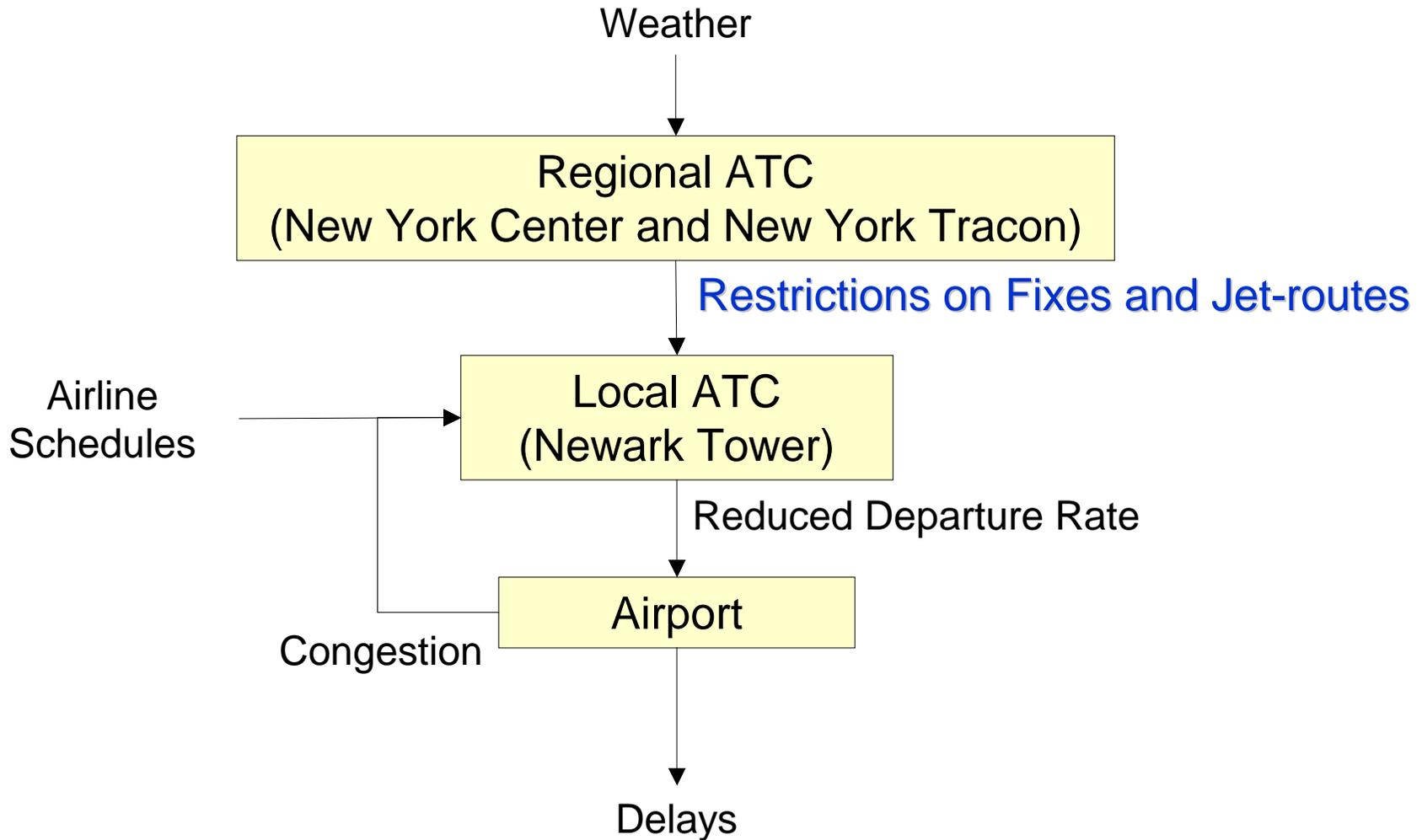
# Weather: 6 pm



# Weather: 8 pm

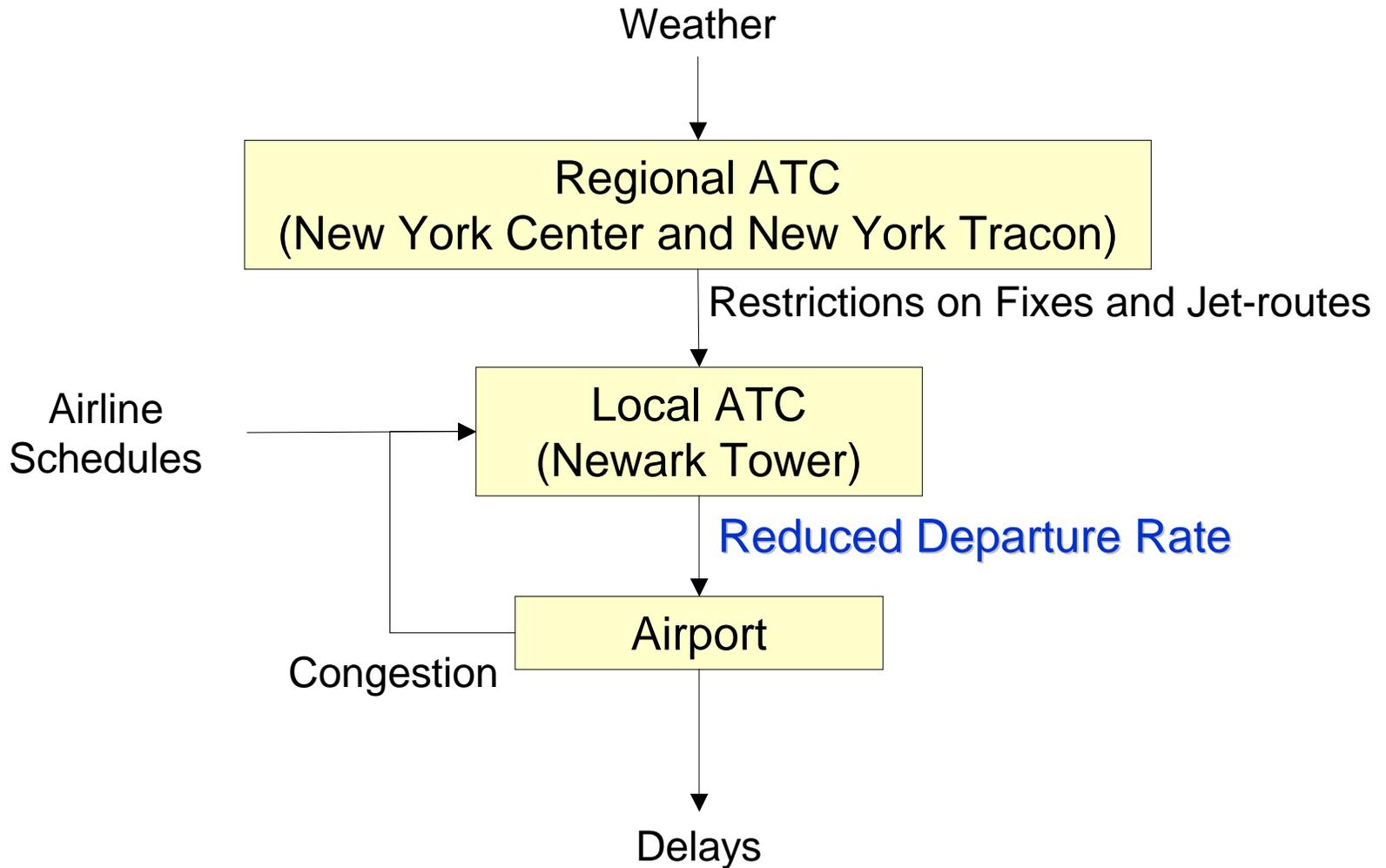


# Airport/Airspace Interaction





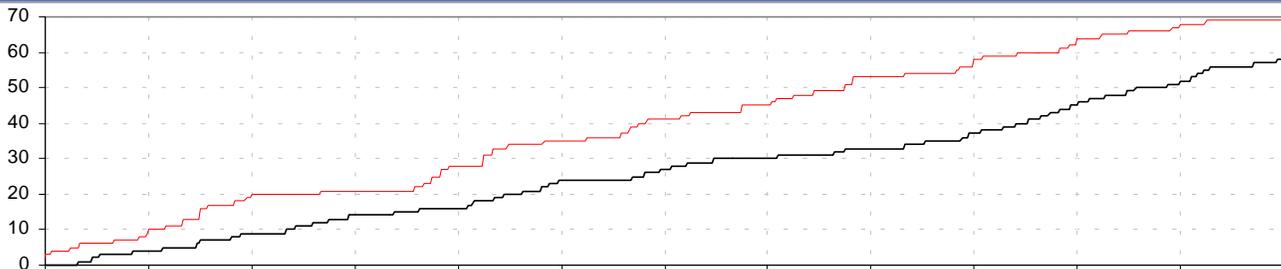
# Airport/Airspace Interaction



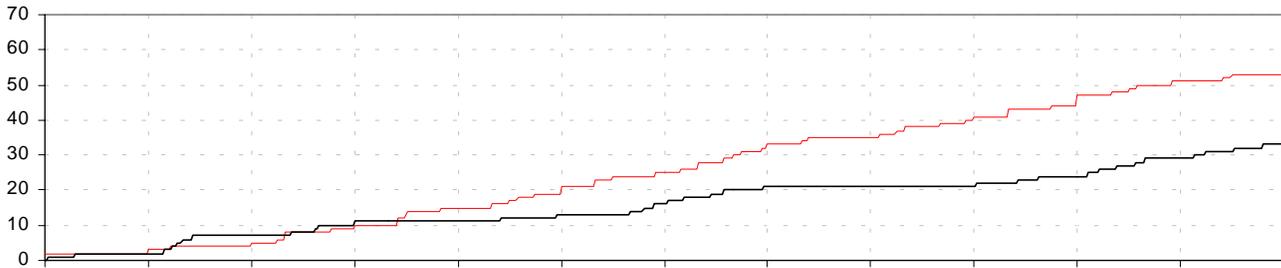


# Restrictions and Departure Rate: West Fixes

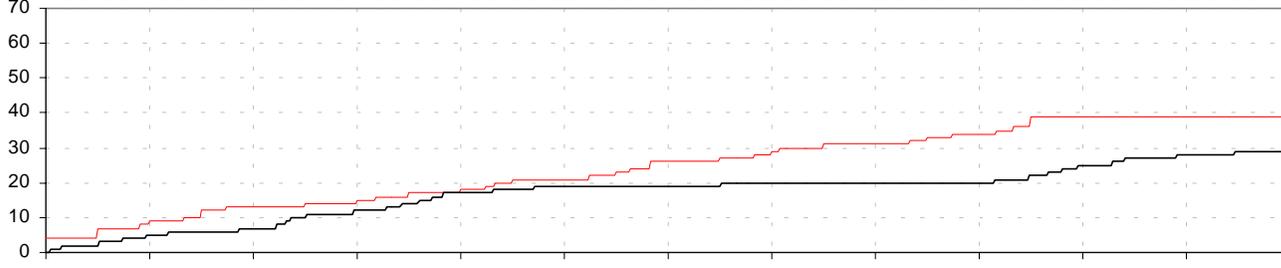
Cumulative Number of  
Flights for  
ELIOT



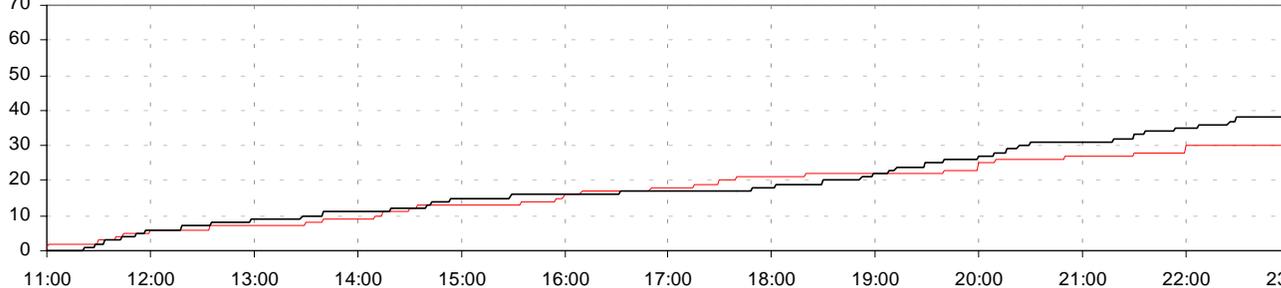
PARKE



LANNA



BIGGY



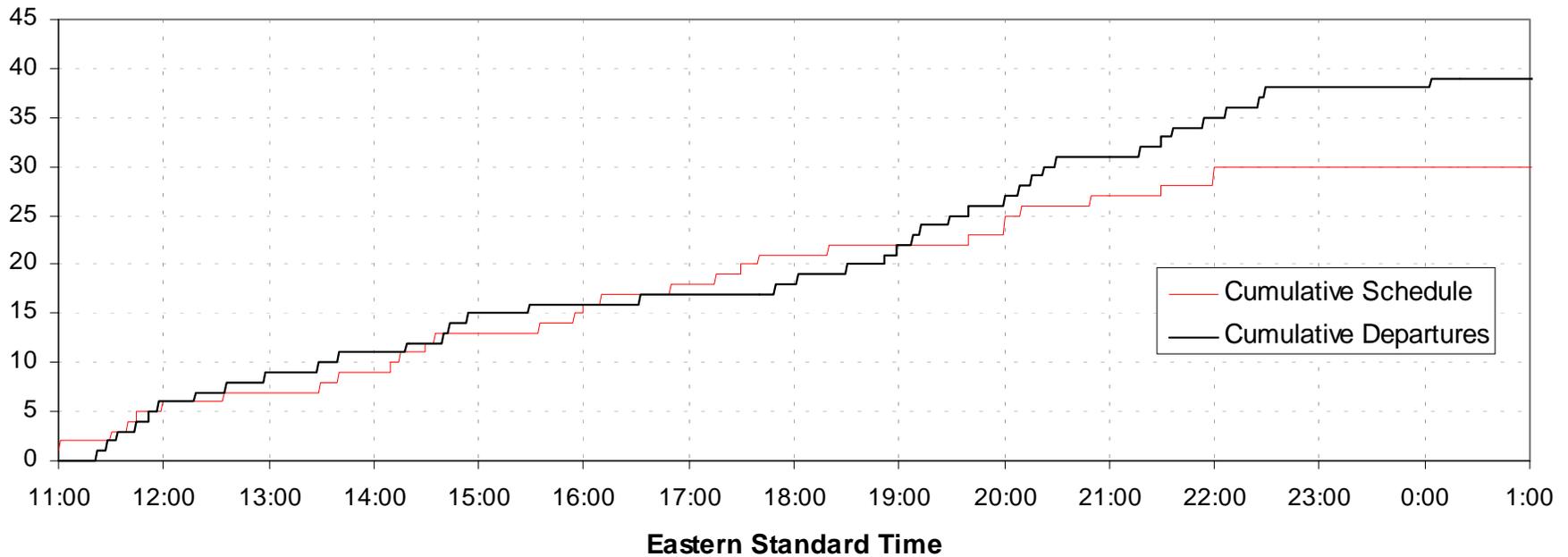
-- Scheduled Departures  
-- Actual Departures

Eastern Daylight Time

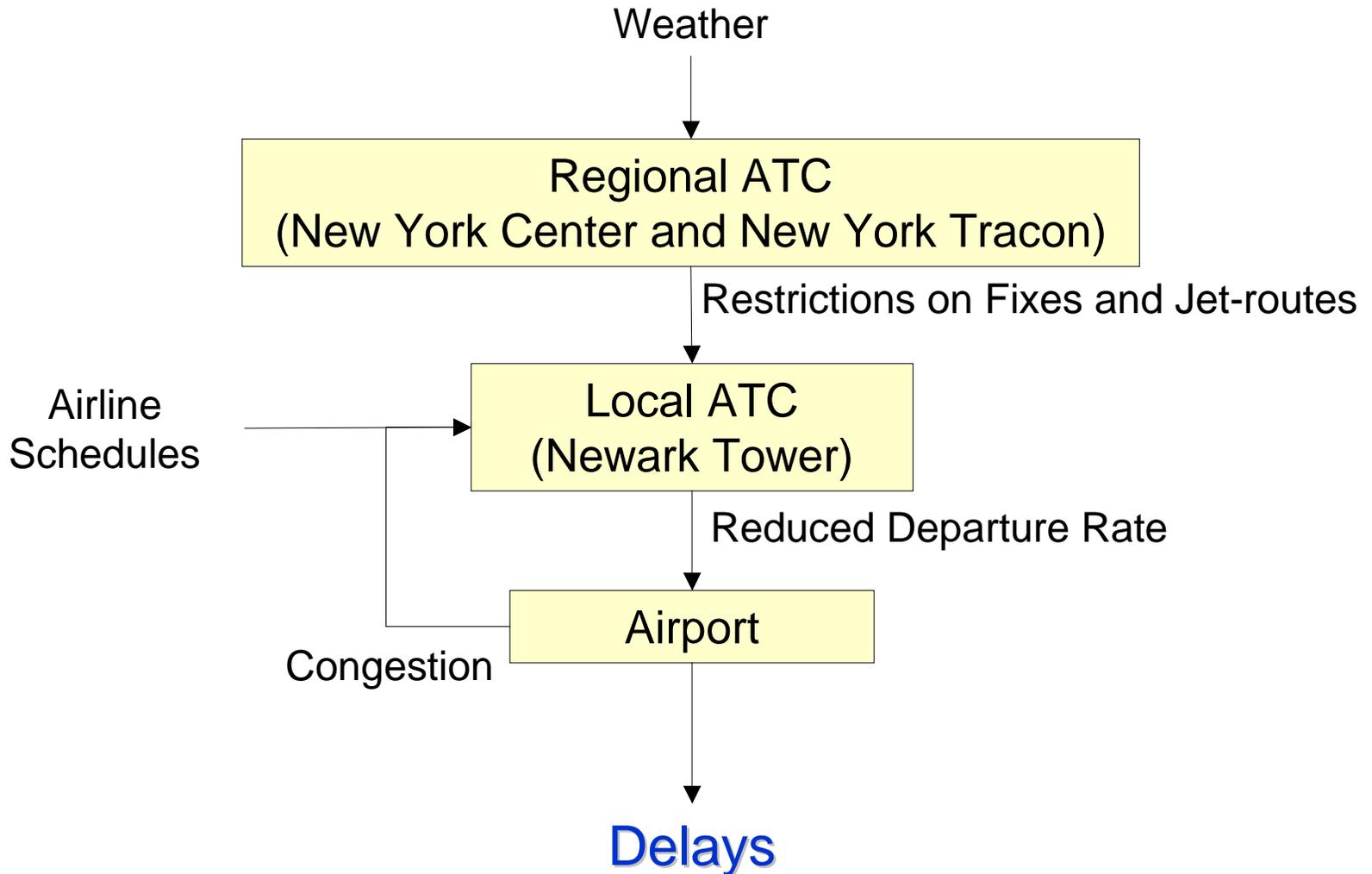


# Restrictions and Departure Rate: BIGGY

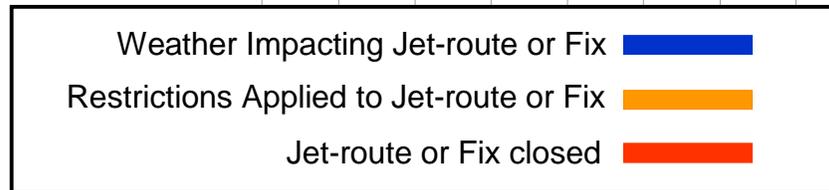
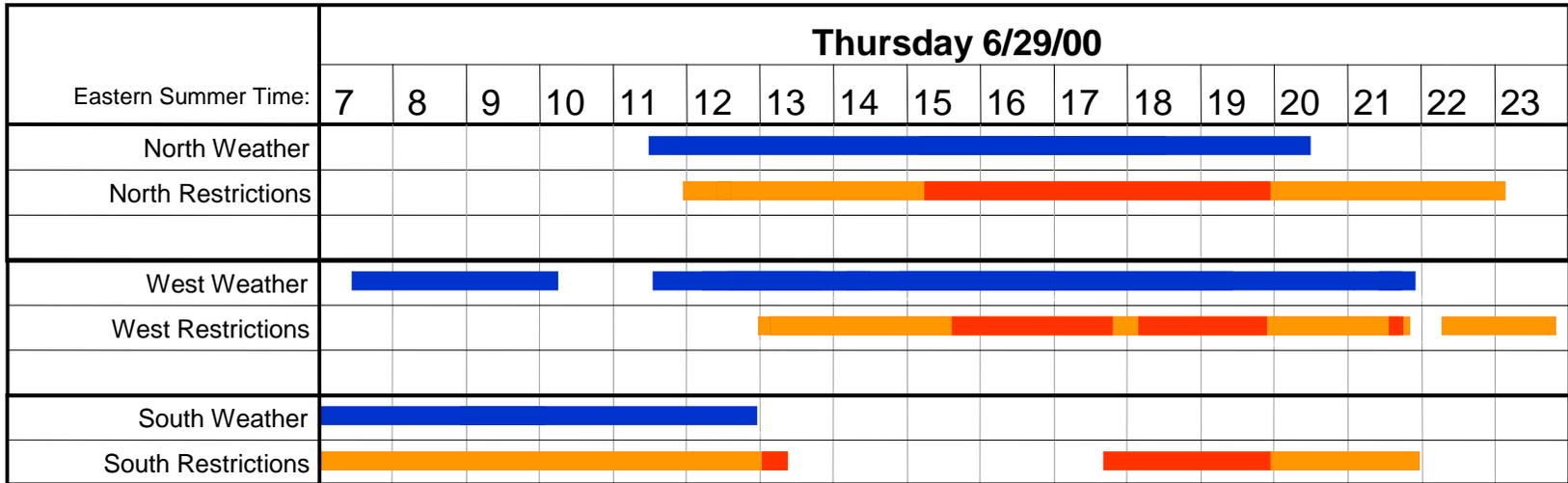
Cumulative Number of Flights



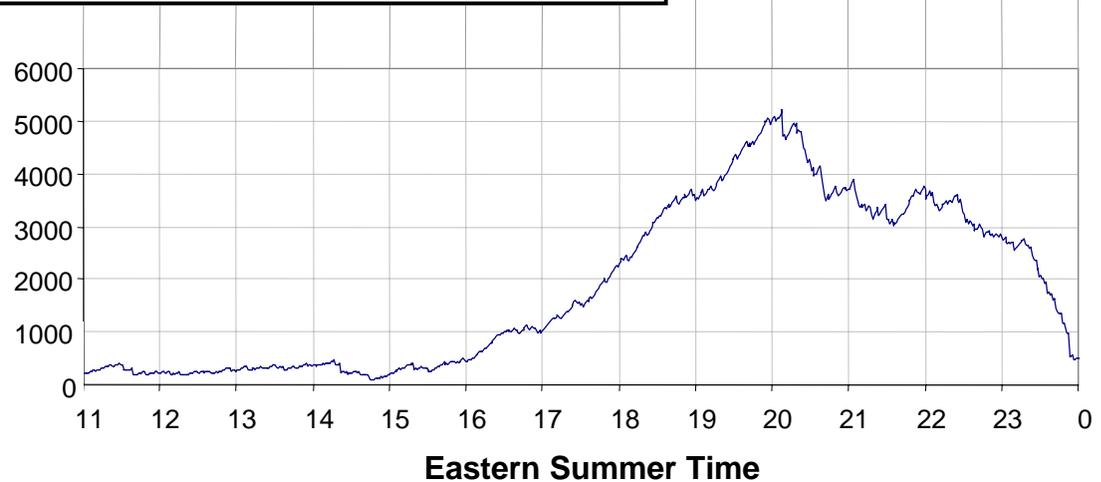
# Airport/Airspace Interaction



# Impact on Delays

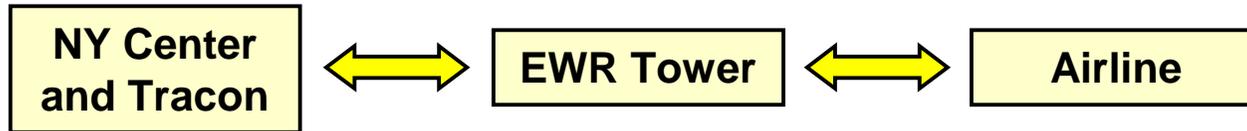


**Instantaneous Total Minutes of Departure Delay**

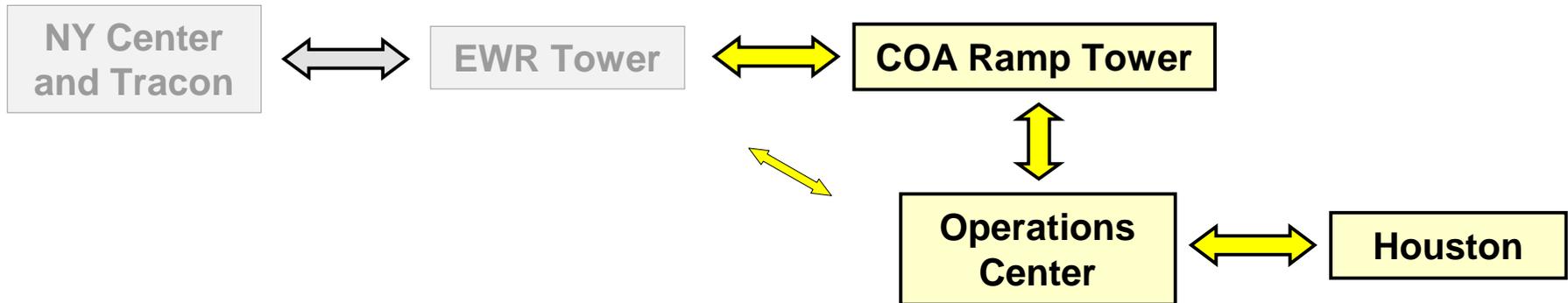


# Communication

➤ **Three way Communication System:**



➤ **Continental Airlines:**





# Summary of Key Observations

- **Correlations between Restrictions and Weather not Optimum**
  - ⇒ Some fixes restricted when unaffected by weather
  - ⇒ Capacity opportunity missed
- **Restriction/Re-route optimization required**
- **Ground delays result directly from airspace constraints**
  - ⇒ Not only ground operation problems
- **Communication**
  - ⇒ No feed-forward
  - ⇒ Delay reductions possible



# Future Work

- **In-depth study of communication within Continental Airlines**
- **In-depth study effects of schedule changes on delays**
- **Historical overview outlining growth in air traffic since deregulation**
- **Description of issues and challenges facing other airports**
- **Synthesis of most effective practices in addressing challenges faced**



# Summary of Day's Weather

EWR, June 29, 2000

- Morning: front passes EWR to the South – affects West and South routes
- Afternoon and Evening: front moves through from the North West – affects North & West routes
- Late Afternoon: front moves through the South – affects South routes
- Clear skies over EWR all day

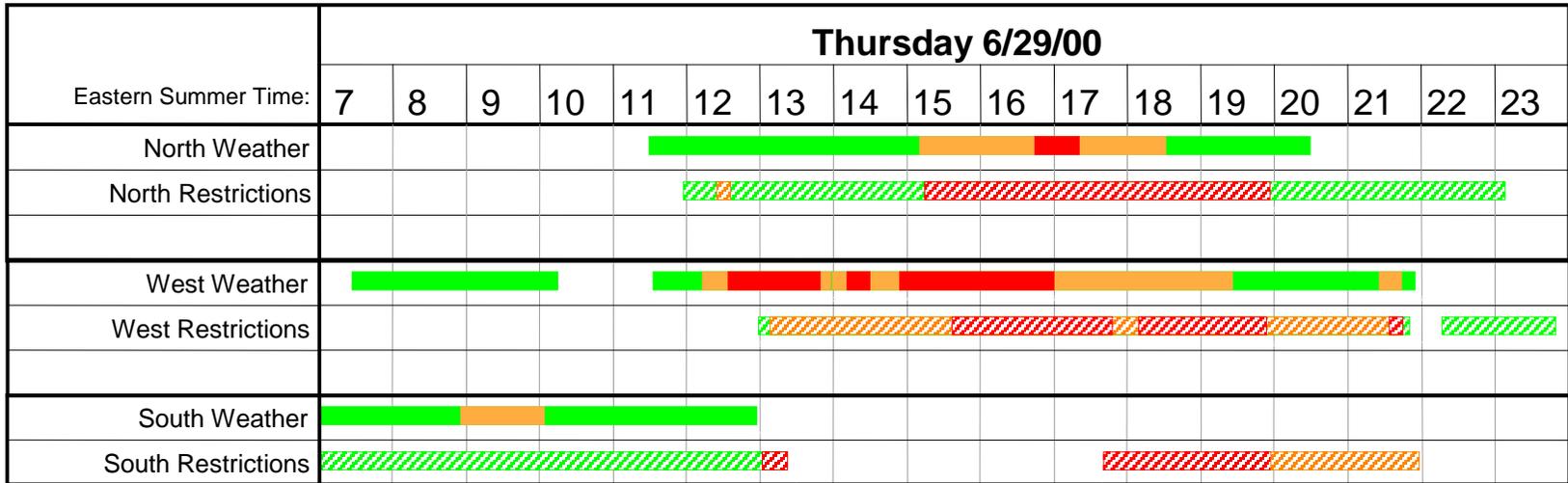


# Weather and Restrictions: West Routes

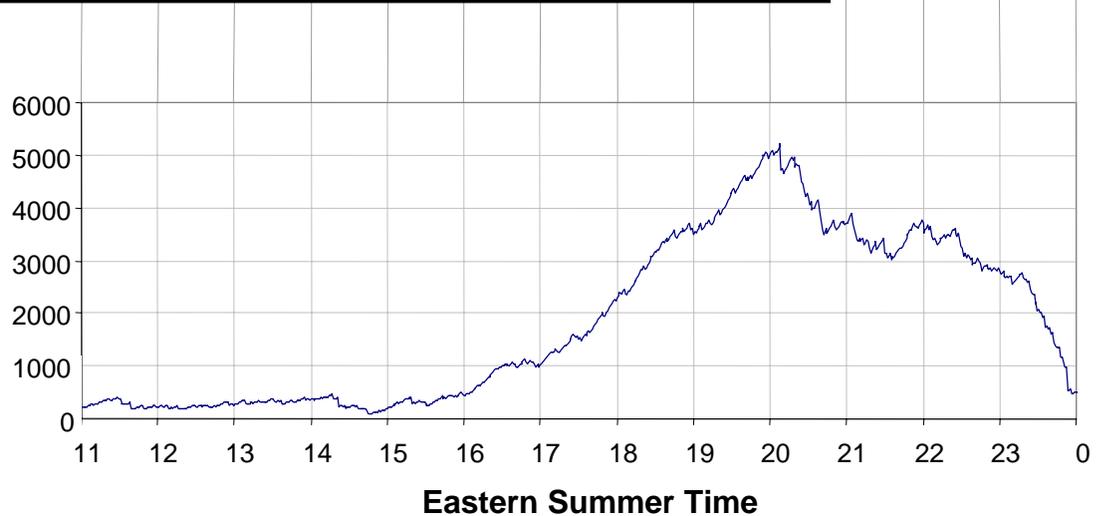
Eastern Summer Time:	Thursday 6/29/00														
	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
ELIOT/J60 Weather					Light Precipitation					Mild Precipitation	Heavy Precipitation	Ice			
ELIOT/J60 Restriction		10 MIT	15 MIT	20 MIT	30 MIT					20 MIT	30 MIT	40 MIT	30 MIT	20 MIT	10 MIT
ELIOT/J80 Weather										Mild Precipitation	Heavy Precipitation	Ice			
ELIOT/J80 Restriction		10 MIT	15 MIT	20 MIT	30 MIT					20 MIT	30 MIT	40 MIT	30 MIT	20 MIT	10 MIT
PARKE/J6 Weather				Light Precipitation						Mild Precipitation	Heavy Precipitation	Ice			
PARKE/J6 Restrictions		10 MIT	15 MIT	20 MIT	30 MIT					20 MIT	30 MIT	40 MIT	30 MIT	20 MIT	10 MIT
LANNA/J48 Weather				Light Precipitation						Mild Precipitation	Heavy Precipitation	Ice			
LANNA/J48 Restrictions		10 MIT	15 MIT	20 MIT	30 MIT					20 MIT	30 MIT	40 MIT	30 MIT	20 MIT	10 MIT
BIGGY/J75 Weather				Light Precipitation						Mild Precipitation	Heavy Precipitation	Ice			
BIGGY/J75 Restrictions		10 MIT	15 MIT	20 MIT	30 MIT					20 MIT	30 MIT	40 MIT	30 MIT	20 MIT	10 MIT

<u>Weather</u>	Light Precipitation		Mild Precipitation		Heavy Precipitation		Ice
<u>ATC</u>	10 Miles in Trail (MIT)	15 MIT	20 MIT	30 MIT	40 MIT	Closed	Re-route

# Impact on Delays



**Instantaneous Total Minutes of Departure Delay**



## ➤ Illustration of EWR Tower / Airline communication

- ⇒ COA167 to John Wayne Airport, Orange County, CA (SNA)
- ⇒ Scheduled Departure 6:50pm
- ⇒ 7:50pm Continental Airlines calls Tower
  - COA167 will miss curfew at SNA unless it leaves
- ⇒ Tower gives permission for COA167 to skip to front of departure queue
  - on condition another COA goes to back of queue
- ⇒ COA167 departs at 8:04pm  
(No COA is ever moved to back of queue)