

A decorative graphic on the left side of the slide shows a portion of a globe with a grid of latitude and longitude lines. A white airplane is depicted flying across the sky, leaving a white contrail that extends across the globe. The background is a light blue sky with soft white clouds.

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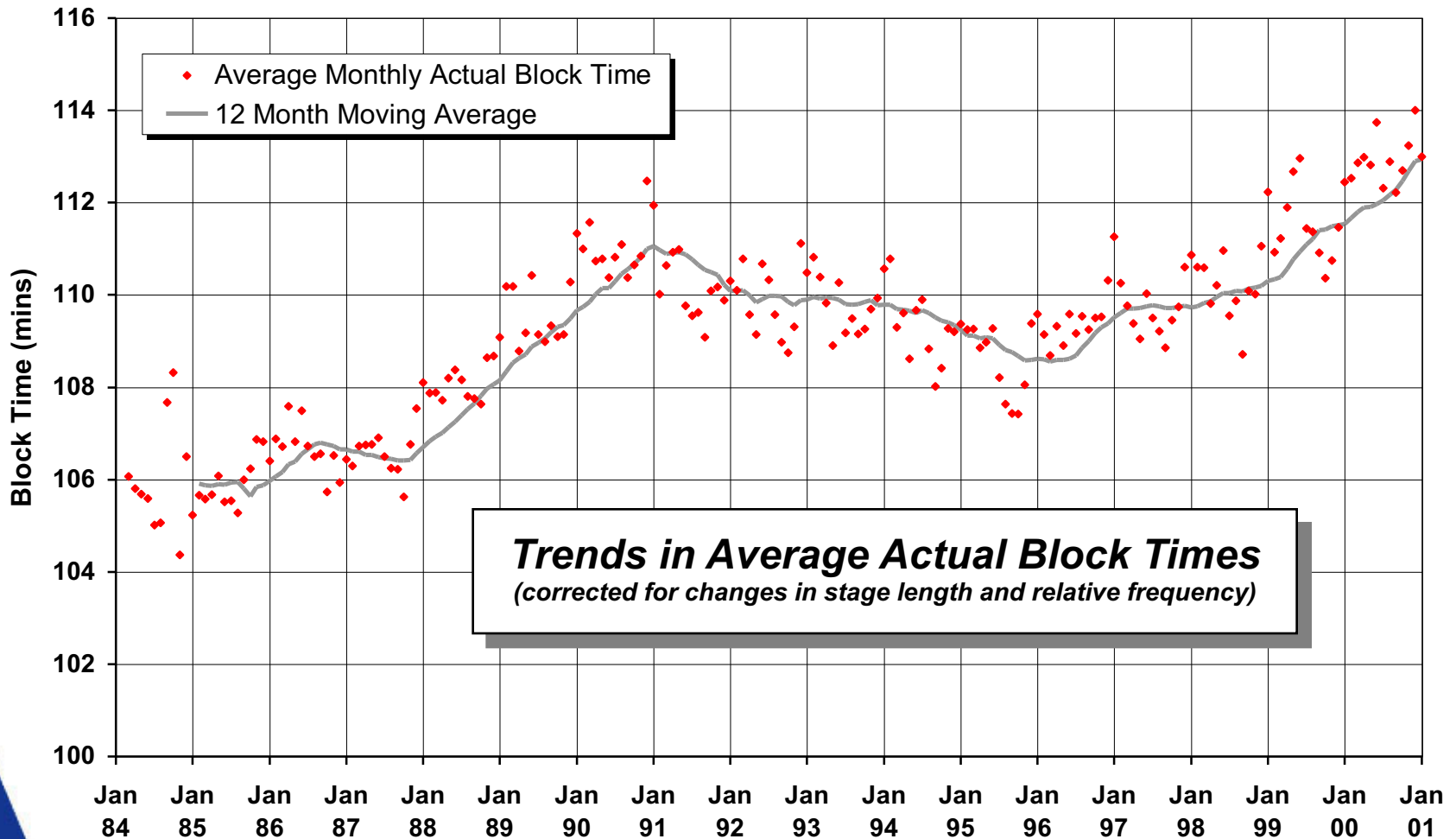
# **Economic Effects of Congestion and Delay**

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**Joe Sinnott**

**March 2002**

# Trend in Actual Block Times



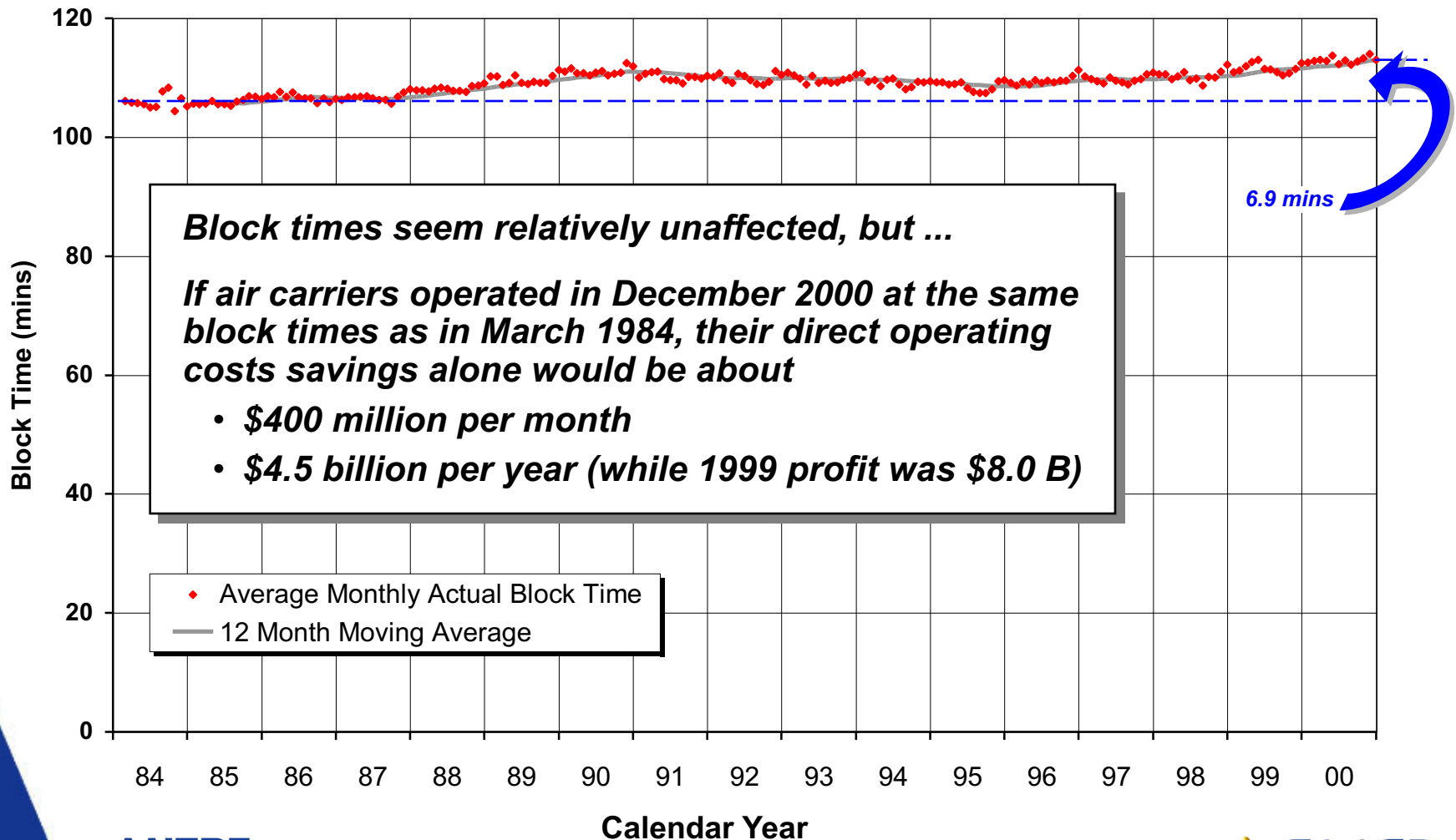
# Some Thoughts on Scheduled Block Times

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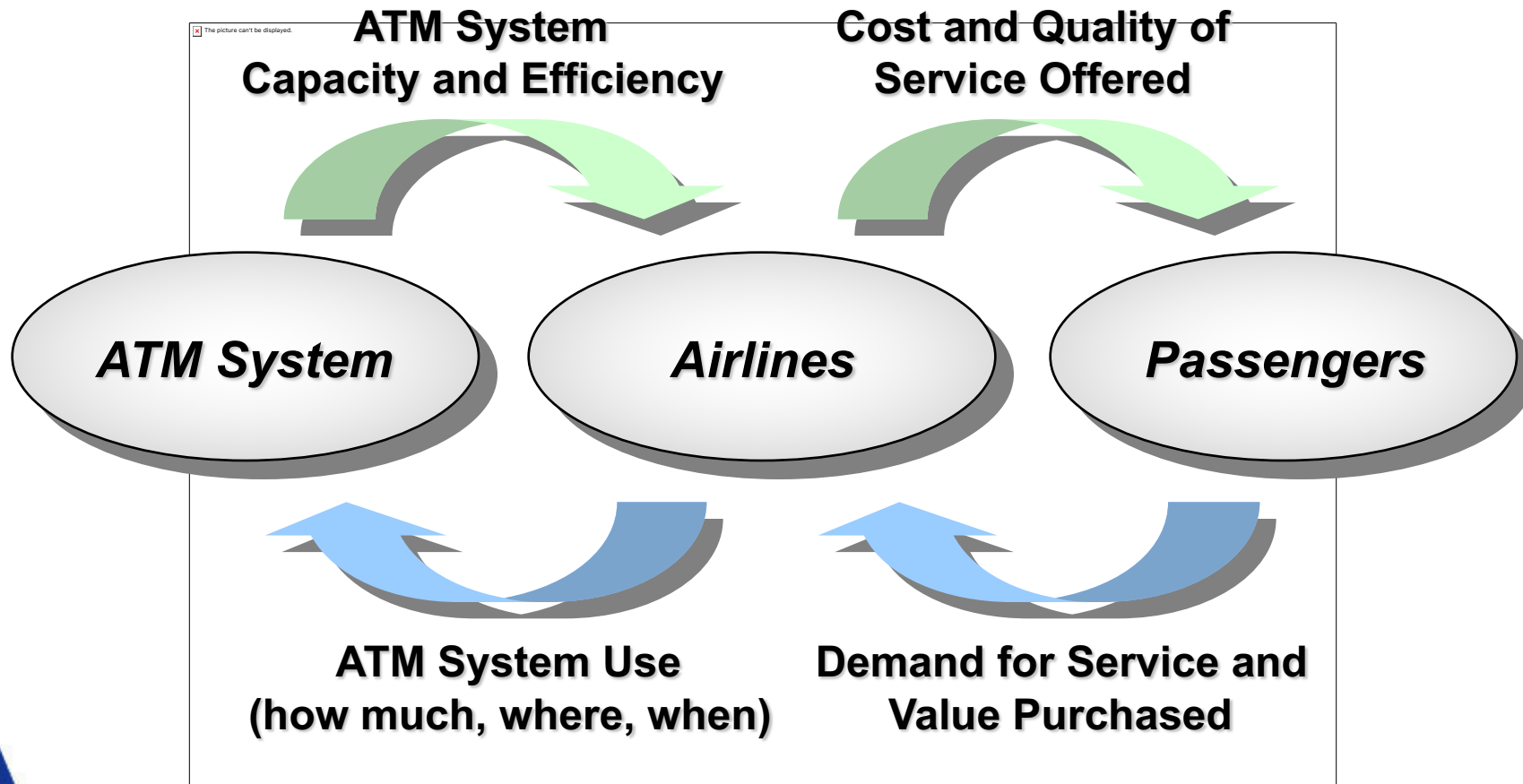
- **Some suggest that airlines can and do adjust scheduled block times simply and easily to suit their needs**
  - **Yes, airlines do**
  - **But these adjustments are significant decisions affecting**
    - **Operating costs**
    - **Capital costs**
    - **Revenue**
    - **Market share**
    - **Markets served**
  - **They are not made lightly**

# Trend in Actual Block Time

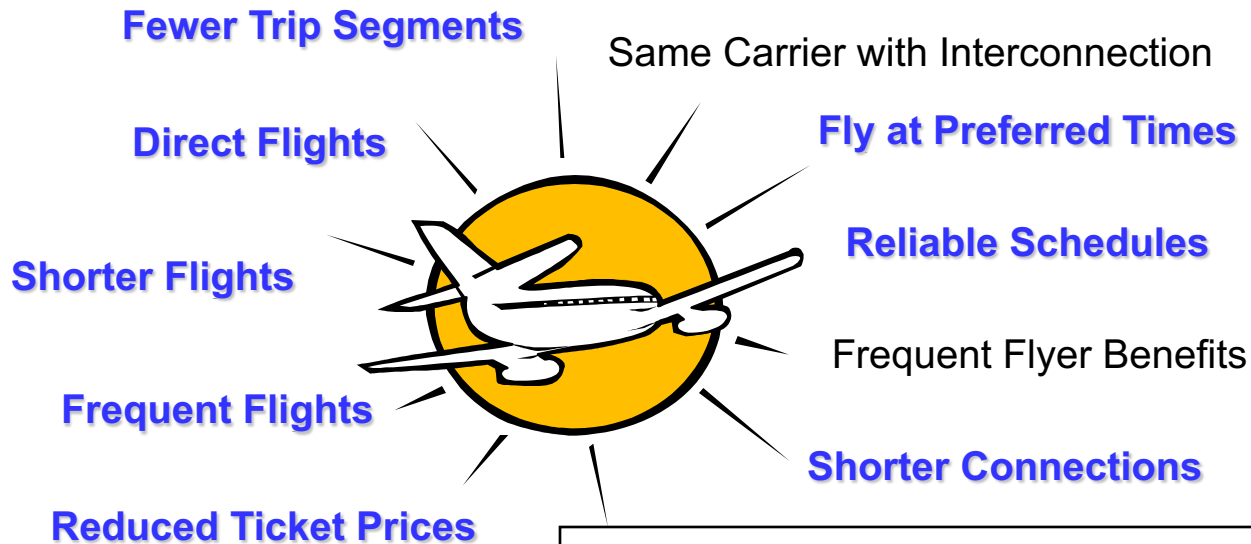
## *Implications of Small Changes in Actual Block Times*



# Key ATM System Relationships: ATM System, Airlines ... and Passengers



# Passenger Perspectives: What Adds Value and Creates Demand



<u>Performance Factor</u>	<u>Change</u>	<u>Change in Demand</u>	
		<u>Percent</u>	<u>RPMs (B)</u>
On-Time Performance	1% <b>Increase</b>	0.4%	1.7
Flight Duration	1% <b>Decrease</b>	0.8%	3.2
Average Number of Trip Segments	1% <b>Decrease</b>	1.6%	6.9
Flight Frequency	1% <b>Increase</b>	0.2%	0.75
Ticket Price	1% <b>Decrease</b>	0.5%	2.0

# Airline Decision Processes Related to ATM System Performance

Decision Making Time Frame and Process	Time Frame	Key Decision Process Products
<b>Strategic Planning Time Frame</b>		
• Capital Planning Decisions	2-5 years	Markets, Network, Fleets, Facilities
<b>Schedule Development Time Frame</b>		
• Schedule Planning, Resource Planning (manpower, training), Operations Analysis	1-2 years	Markets, Networks, Schedule, Staffing Requirements, Planned Aircraft Type
• Schedule Planning, Capacity Management, Operations Analysis	2-3 months	Aircraft and Crew Assignments
• Schedule Adjustment, Resource Adjustment, Operations Analysis	30 days	
<b>Flight Planning Time Frame</b>		
• Schedule Integrity, Company Delay & Cancellations Programs	18 hours	Departure Times, Flight Plans, Cancellations, Aircraft and Crew
• Flight Planning Optimization, Load Planning, Gate Usage	4 hours	
• Flight Planning Commitment, Load Planning, Gate Usage	90 minutes	Assignment Modifications
<b>Flight Operations Time Frame</b>		
• Systems Control (dispatch)	30 minutes	Departure Times, Flight Plans, Reroutes, Cancellations, Diversions, Flight Operations
• Flight Operations (aircraft management)	Departure	
• Flight Operations, Systems Control	En Route	
• Flight and Airport Operations (passenger ramp)	Arrival	
<b>Operations Analysis Time Frame</b>		
• Operations Analysis (cost, block performance)	Post Flight	Information and Conclusions (feedback to other decision processes)
• Financial Analysis (profitability, cost)	Ongoing	

# Illustrative Analysis: Impact on Fleet Utilization/Productivity

*Flight time reduction of 1 percent has a significant impact*

## Impact on Air Carrier\* Fleet Requirements

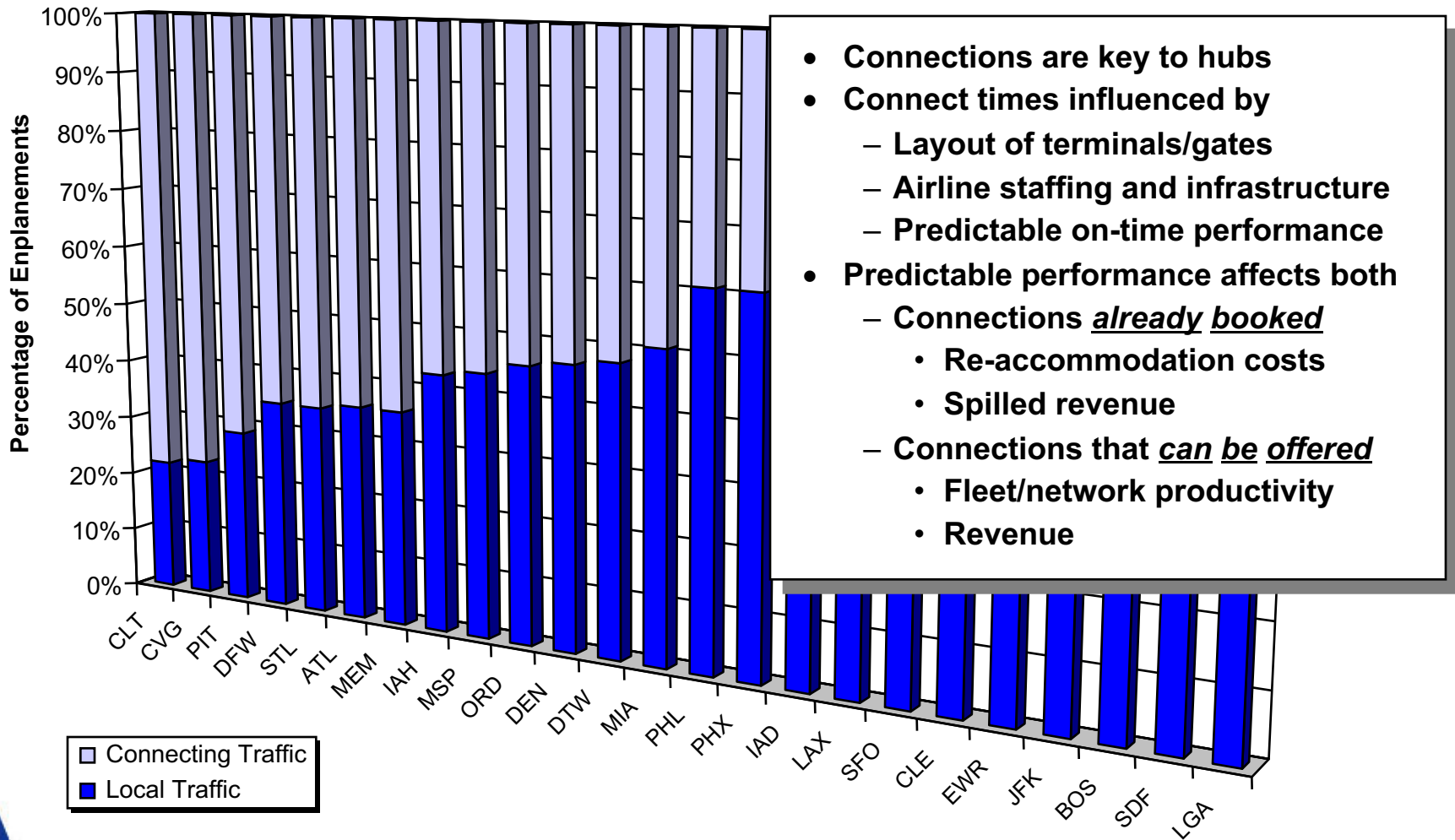
Fleet Requirement Reduction	19 aircraft (0.5%)
Value of Reduction ( <i>one time</i> )	
NPV of Lease Cost	\$450 M
Replacement Cost	\$940 M

## Impact on Air Carrier\* Revenues

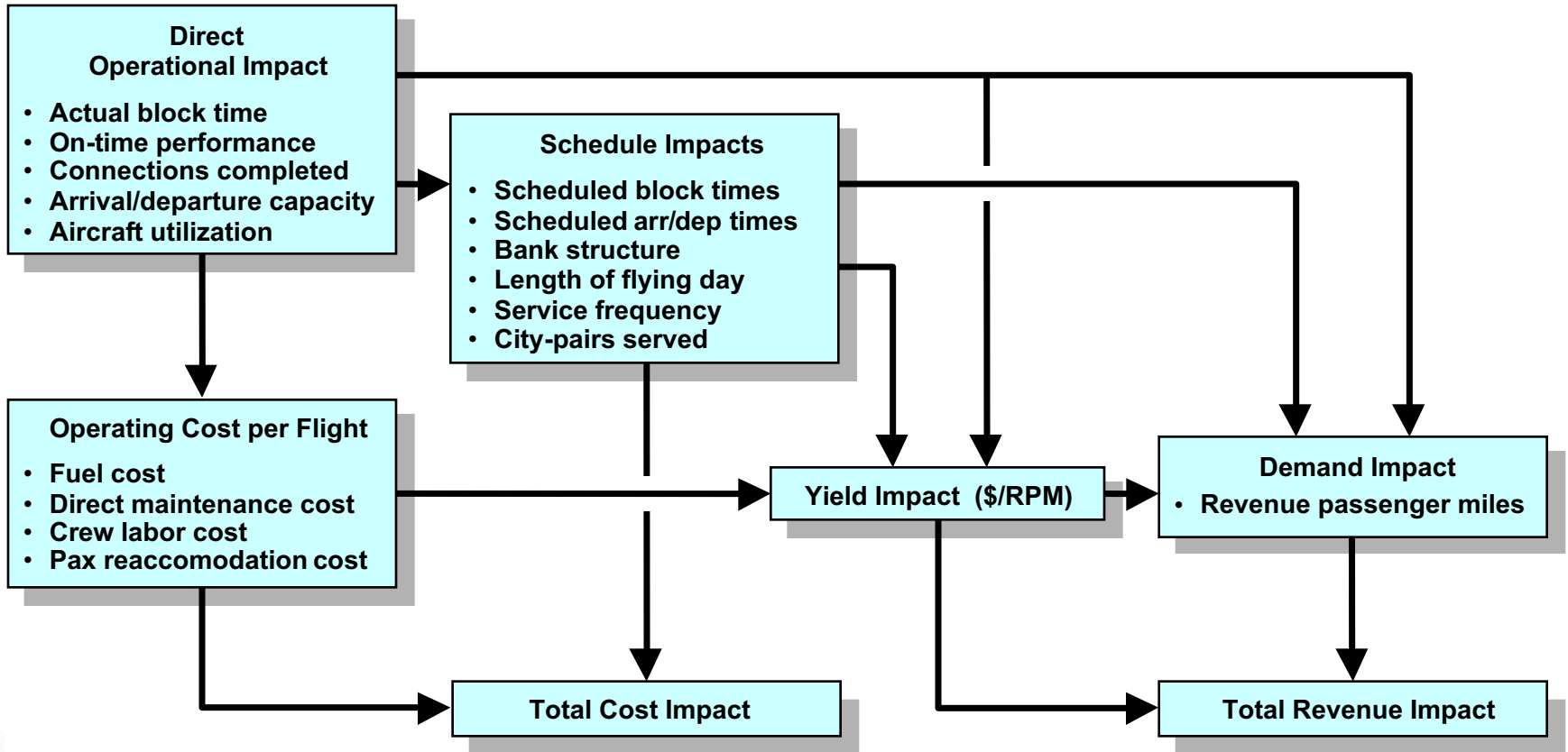
	Constant Yield	Constant Load Factor
RPMs	0.4%	0.5%
Yield	0.0%	-0.1%
Revenue Increase	\$235 M (0.35%)	\$275 M (0.45%)



# Implications of Hub Operations: Local vs. Connecting Traffic at Hubs

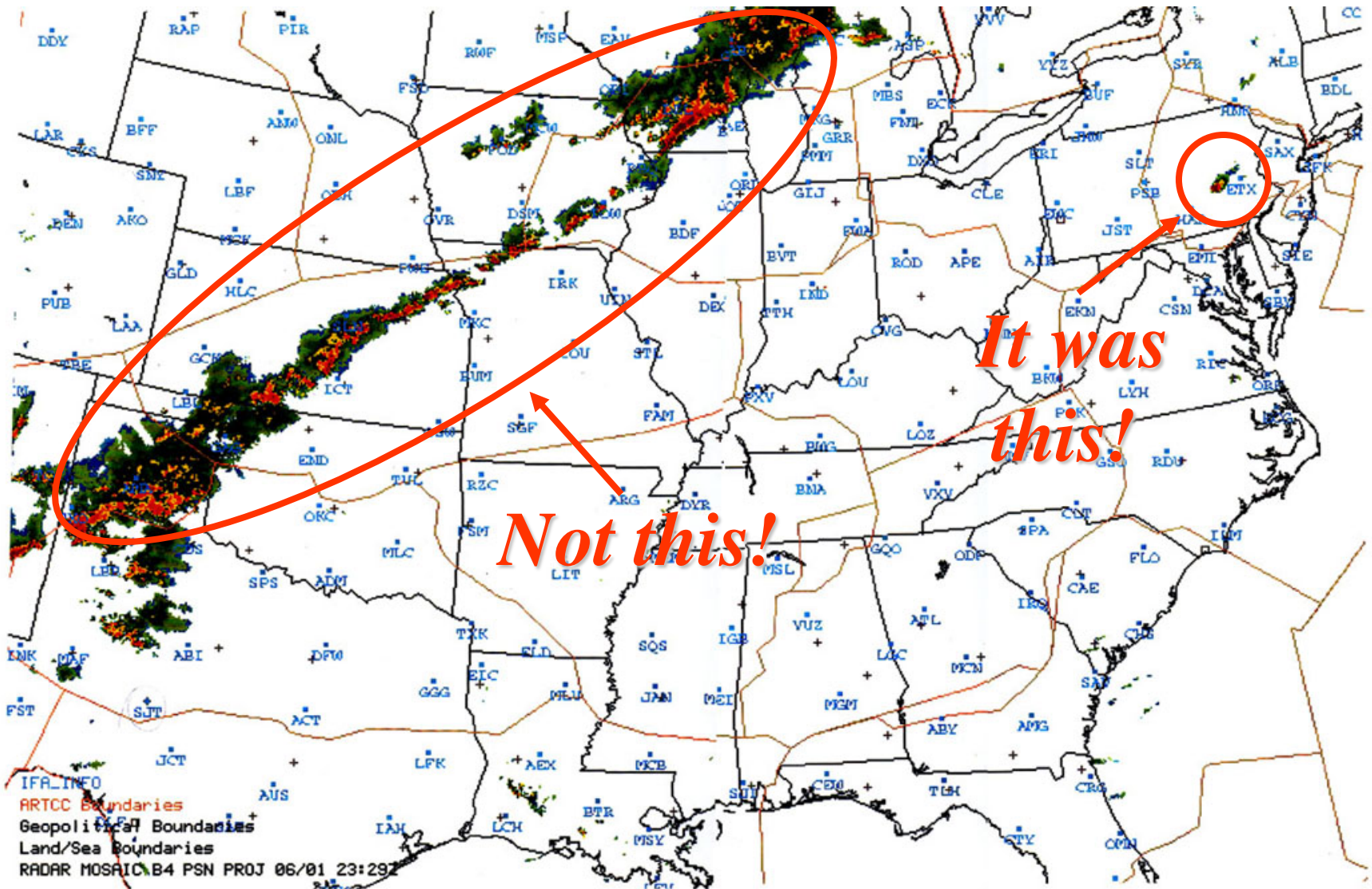


# Intermediate-Term Effects of ATM System Performance Changes



# What was the major operational issue?

*Scenario courtesy of Jack Kies (FAA)*



# Where Are We Going?

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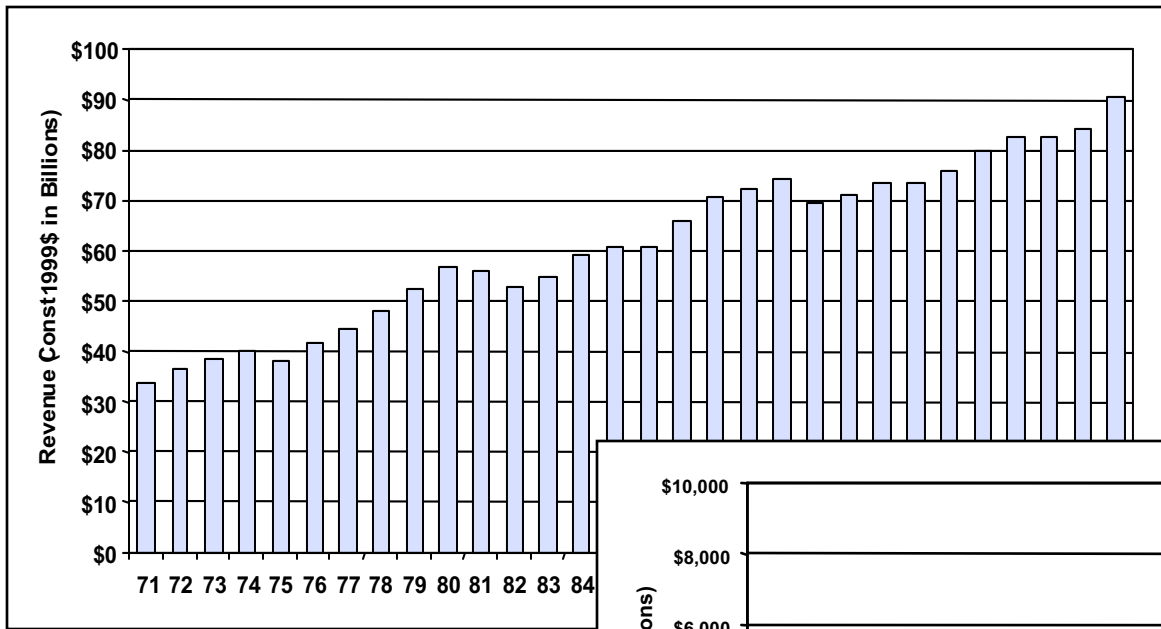
- **Traditional major hubbing carriers**
- **Low cost point-to-point carriers**
- **Regional carriers**
- **Turboprop commuter carriers**
- **Corporate or “high-end” GA**
- **Fractional ownership**
- **Air taxi service**
- **Charter operations**
- **Personal use or “low end” GA**





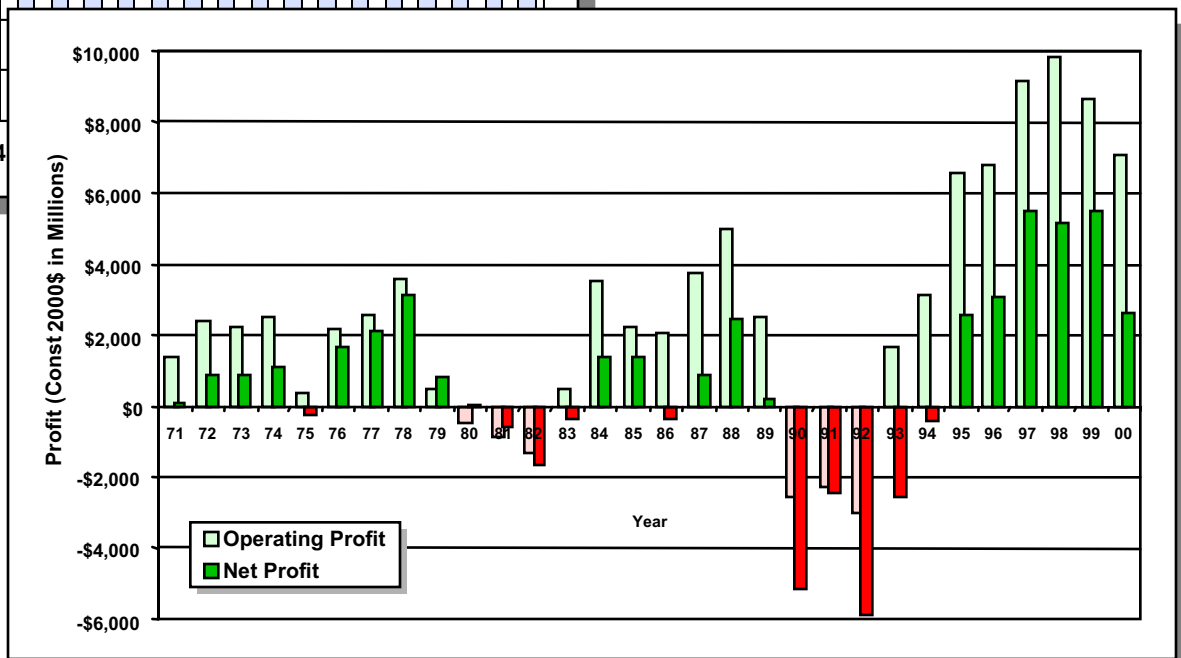


# What's the Effect on Airline Revenue and Profitability?

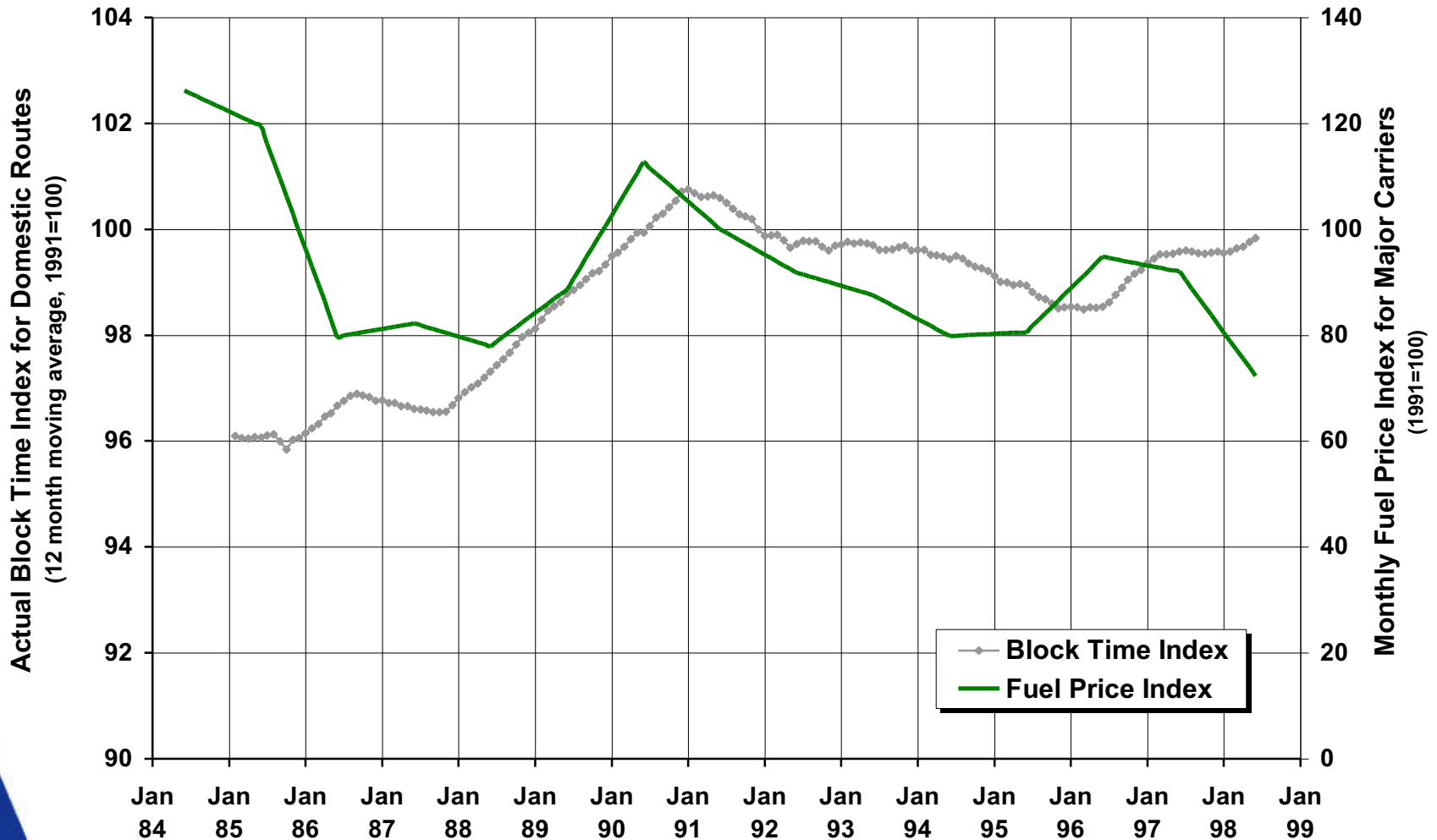


Revenue for Scheduled Services by U.S. Airlines

Operating and Net Profit by Scheduled U.S. Airlines



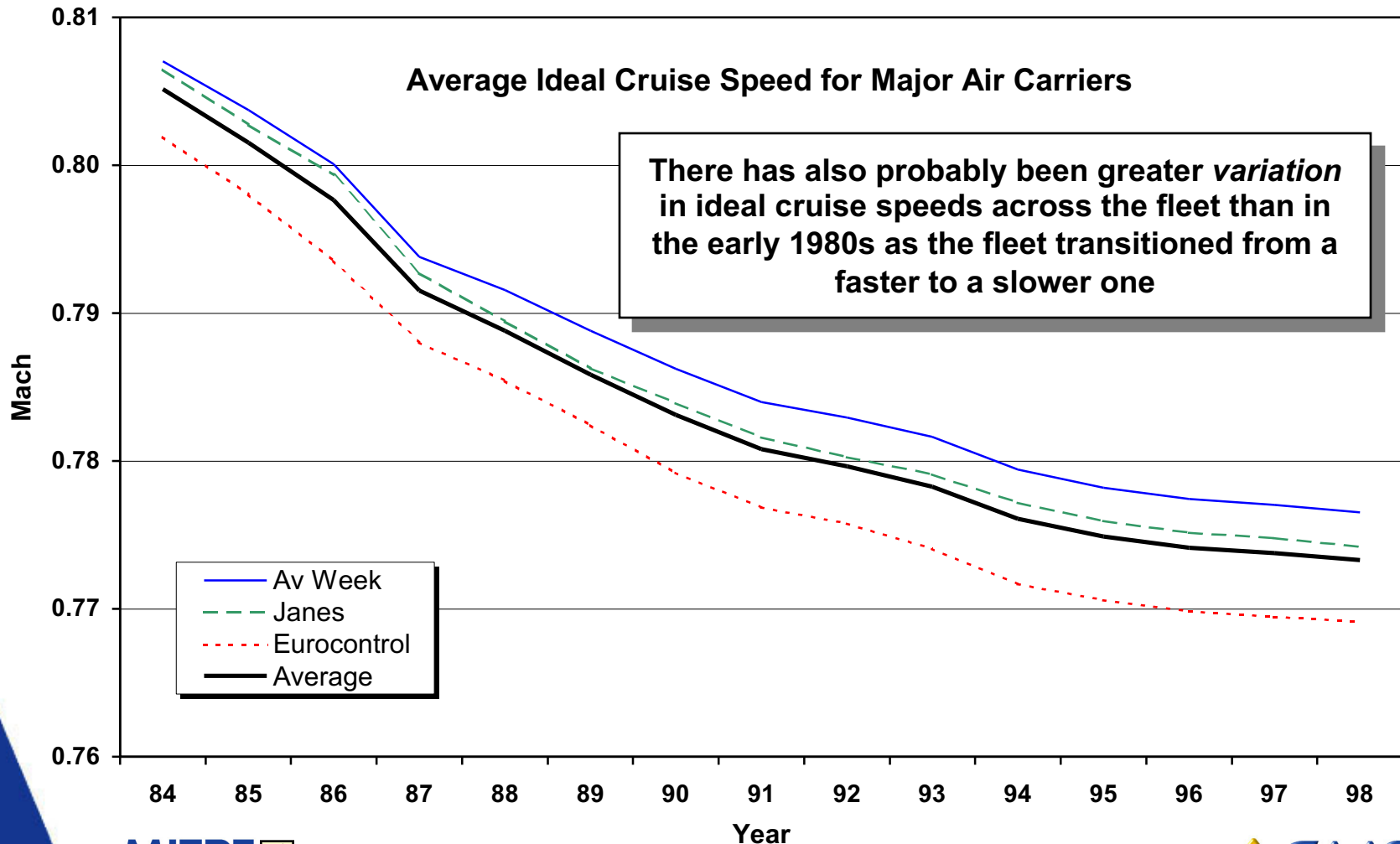
# Does Fuel Price Affect Actual Block Time?



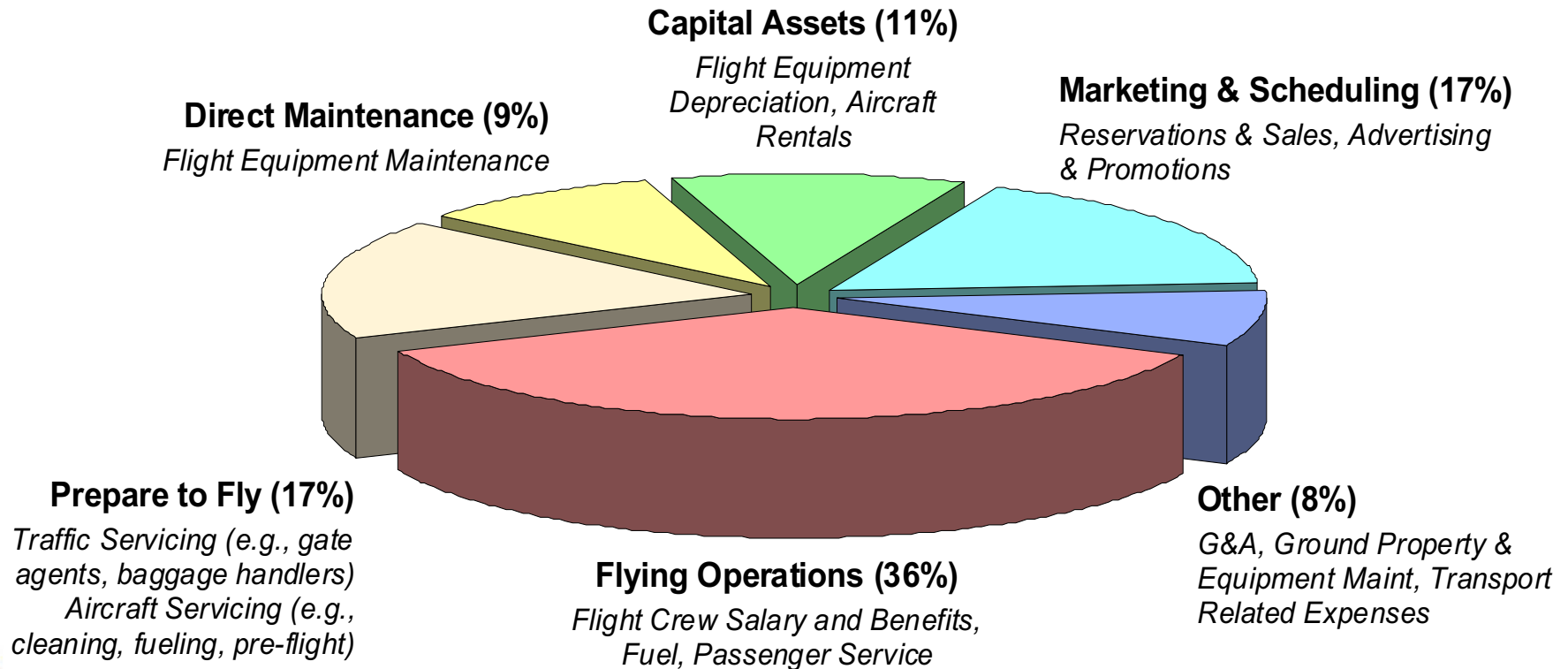


# Trend in Fleetwide Ideal Cruise Speeds

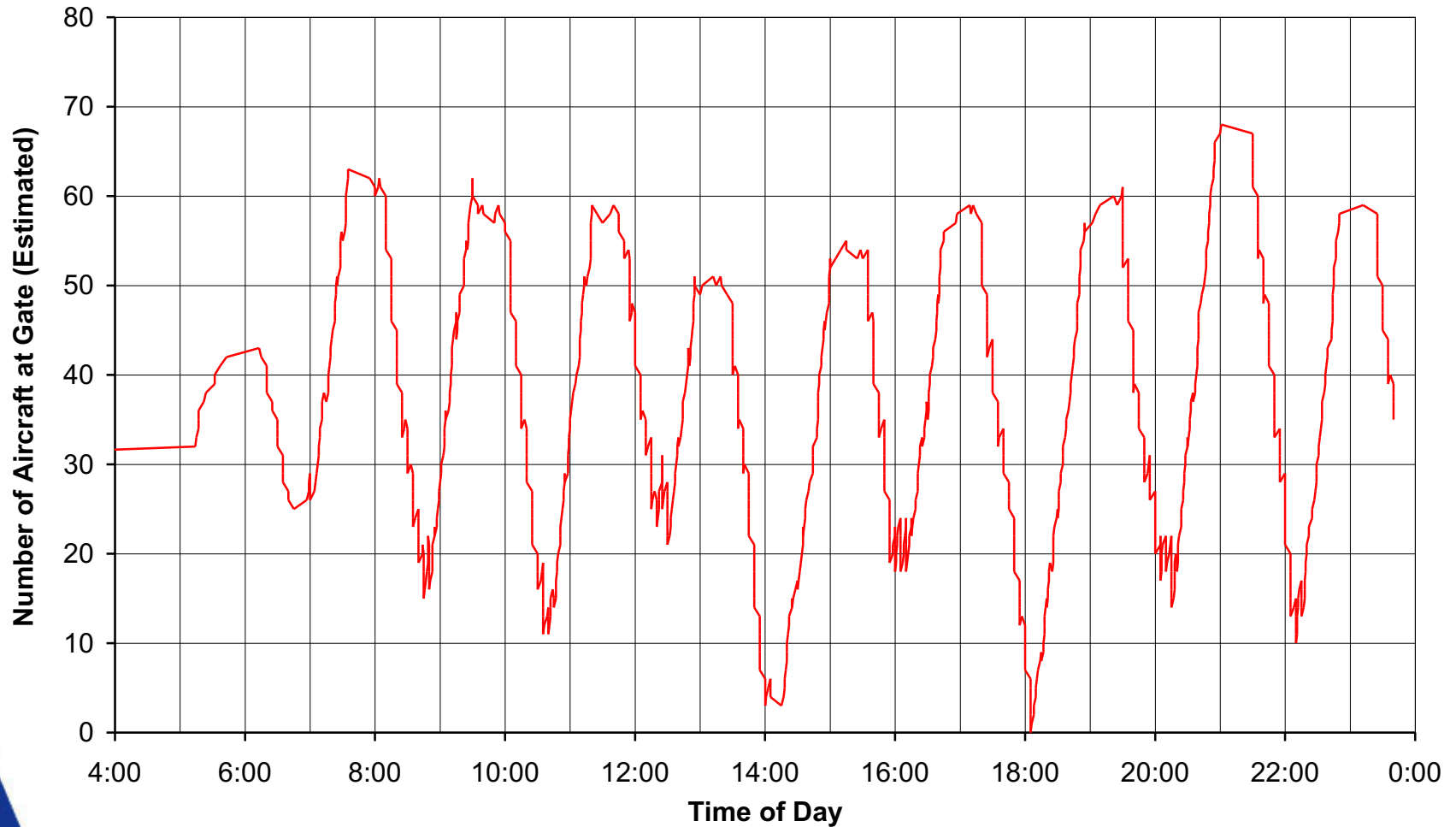
## Do They Affect Actual Block Times?



# Overview of Airline Costs

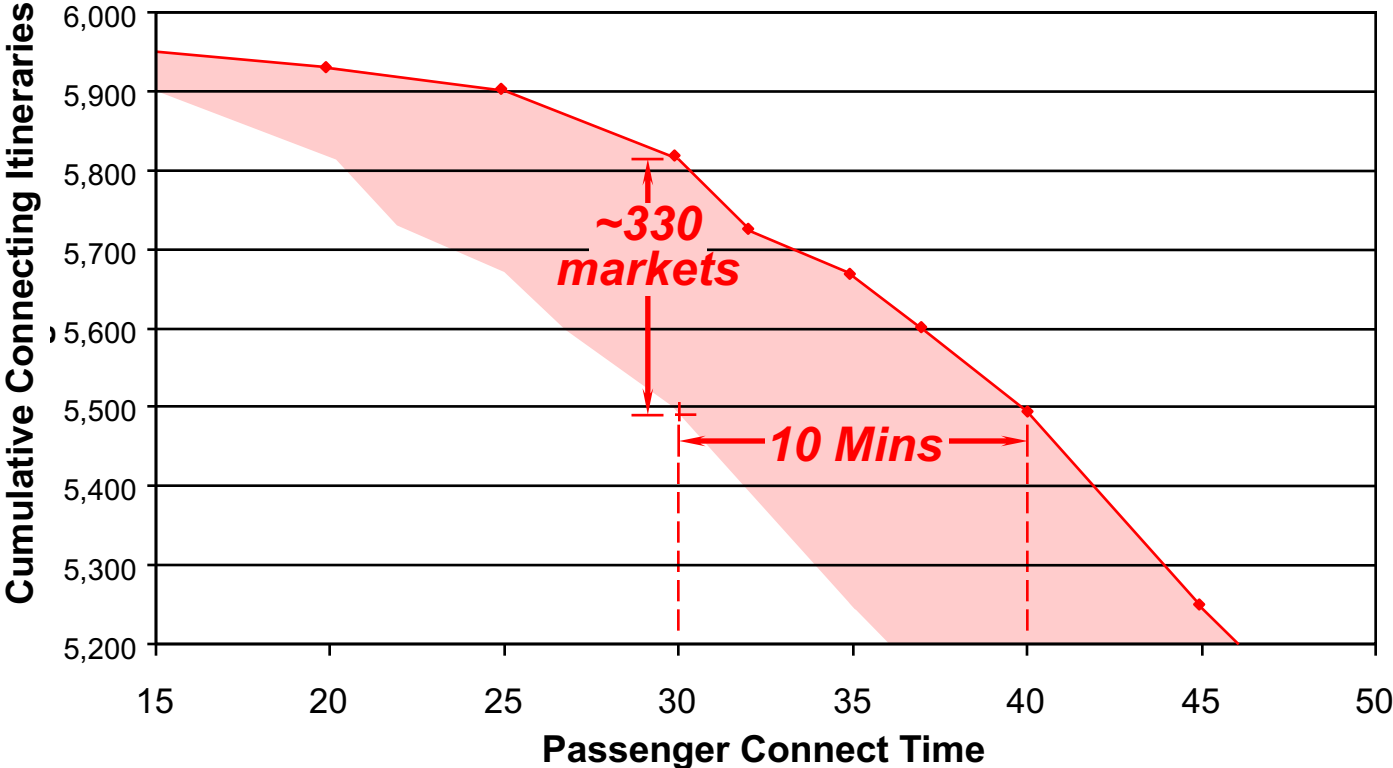


# DAL Schedule at ATL (1998)



# Implications of Connections

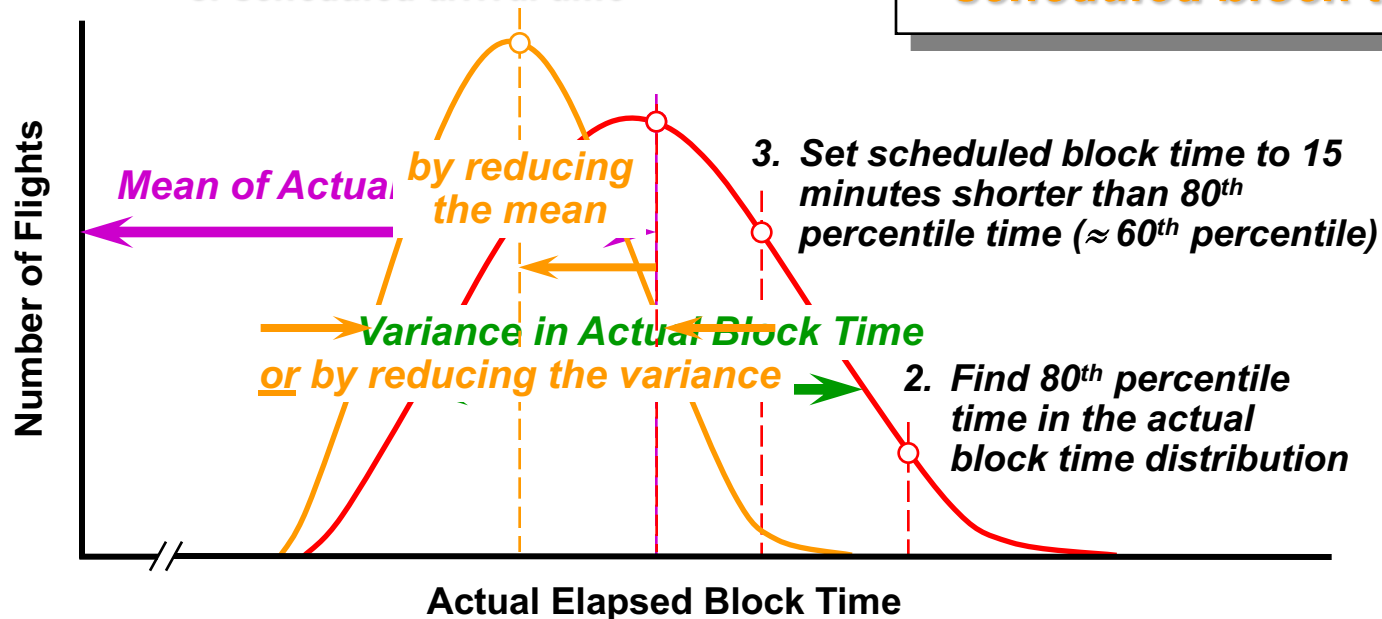
## Connecting Itineraries vs. Connection Times



# Illustration: How Airlines Set Scheduled Block Times

1. Set the on-time performance goal  
~ 80% of flights within 15 minutes  
of scheduled arrival time

So, how can ATM system improvements affect scheduled block times?



**Scheduled Block Time =**

**f ( On-Time Performance Goal, Mean<sub>Actual Block Time</sub>, Variance<sub>Actual Block Time</sub>, ... )**

# Implications of Irregular Operations

