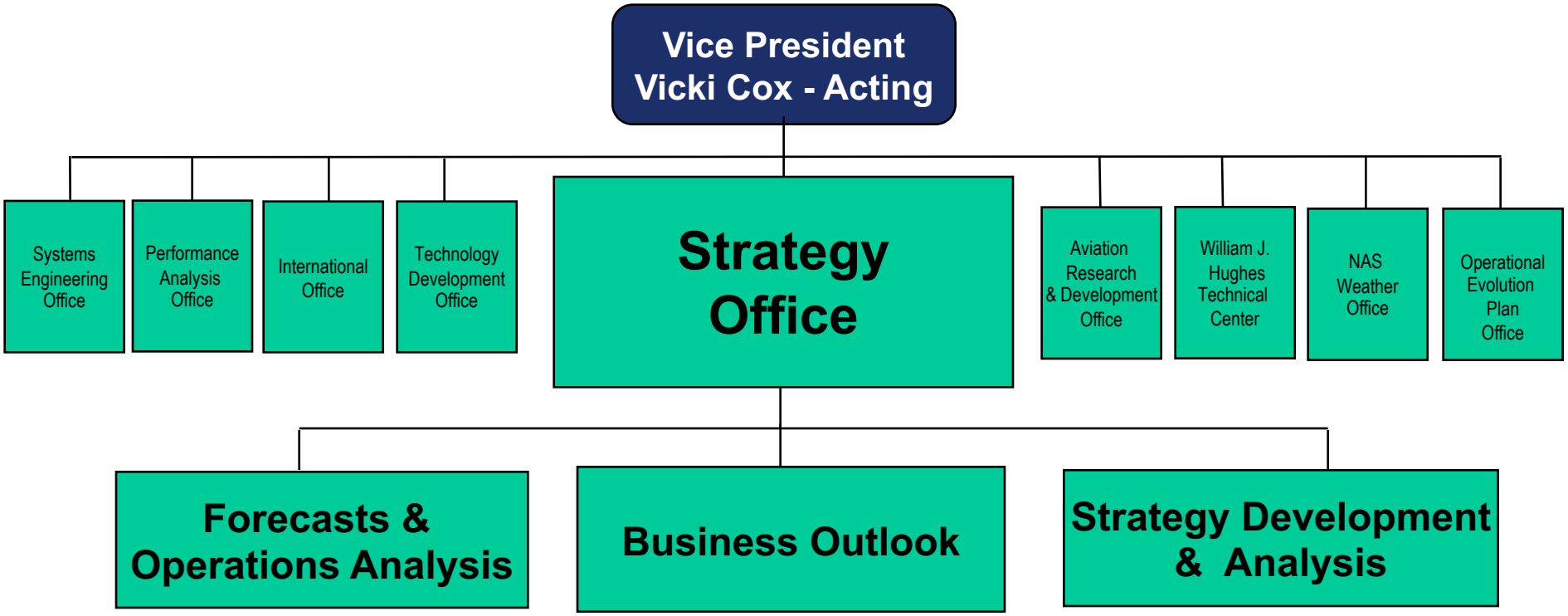
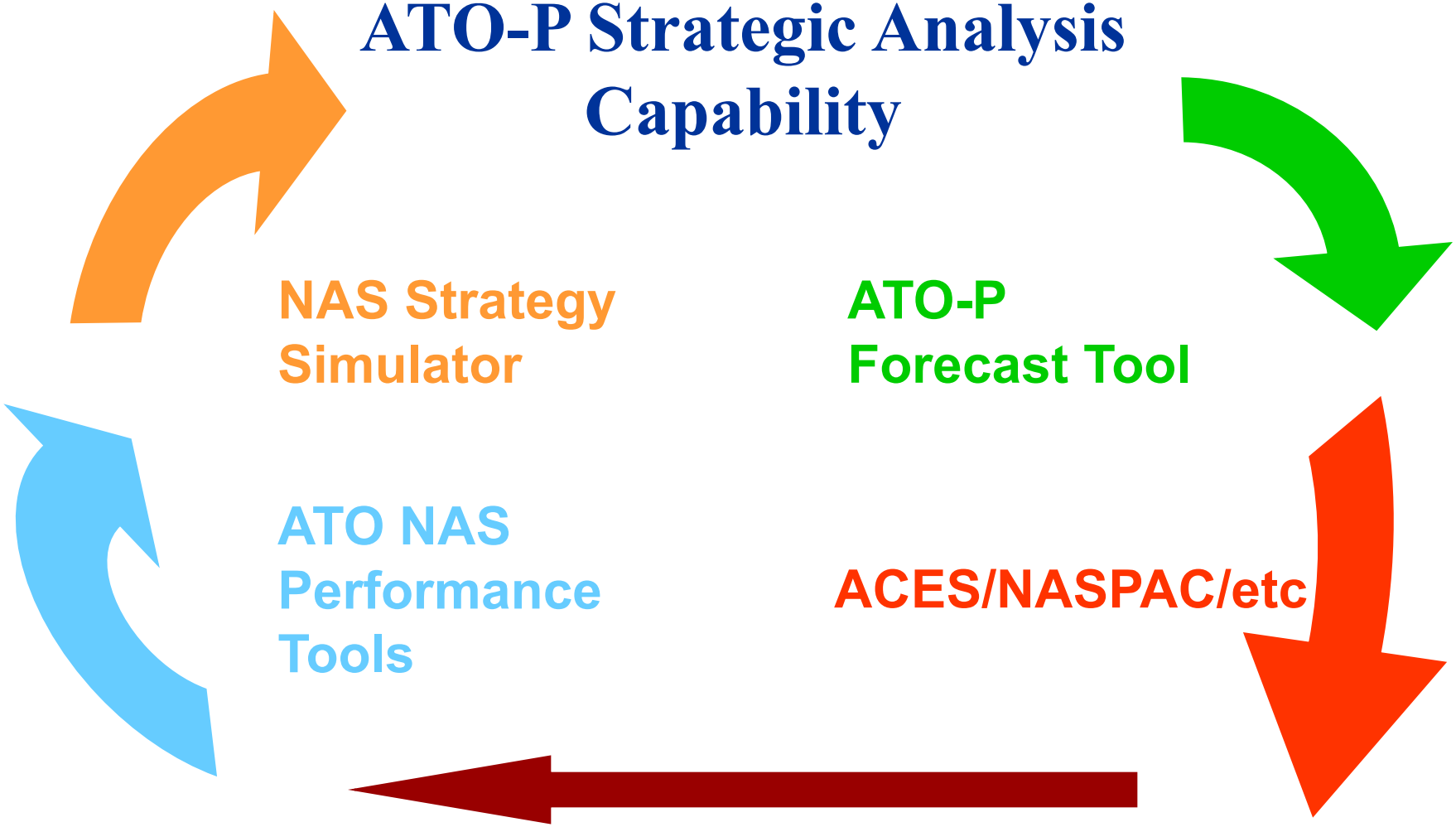
NAS Operational Analyses and Challenges to Modeling the Future

Operations Planning



ATO Strategy and NAS Performance

ATO-P Strategic Analysis Capability

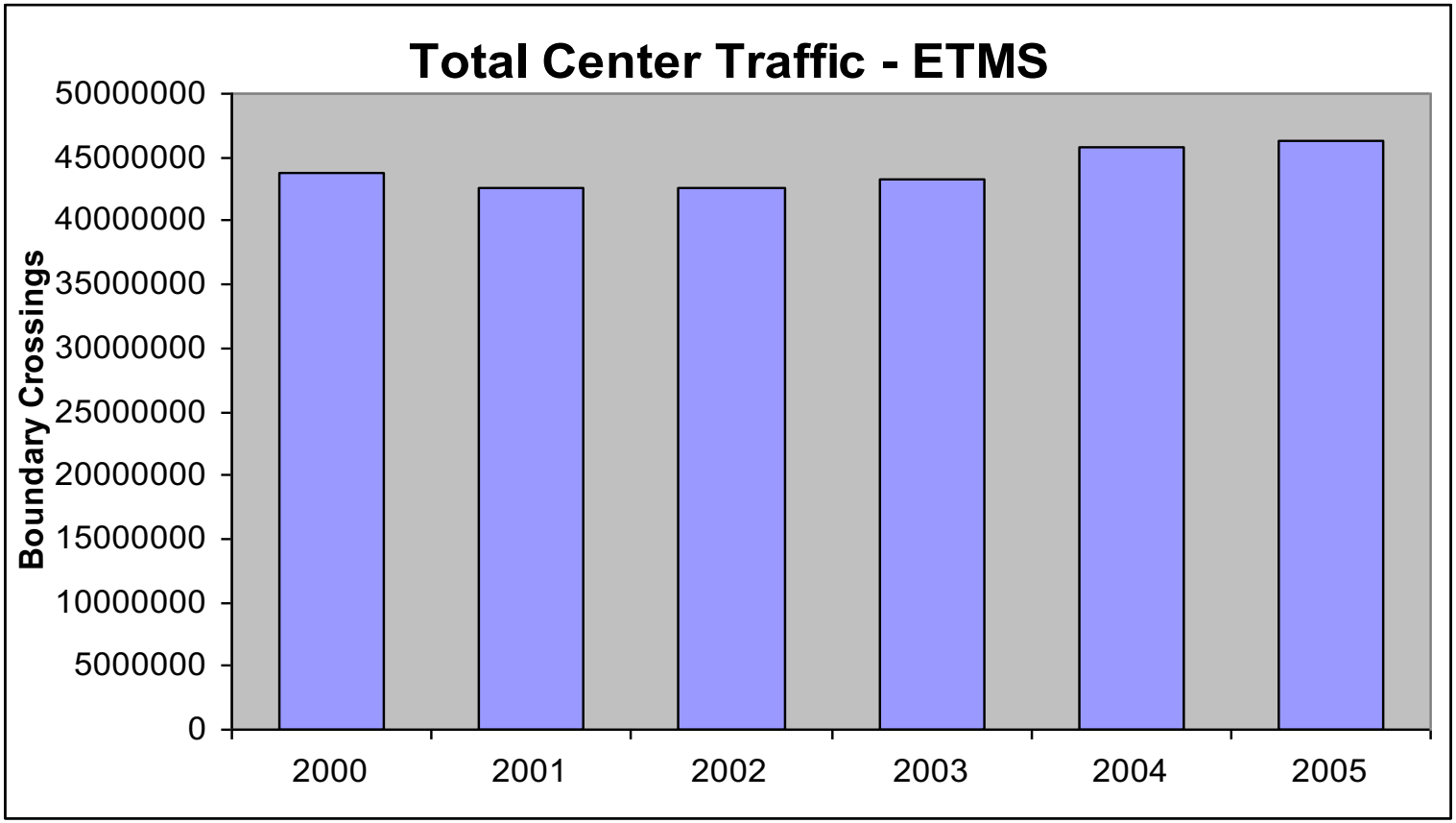


Why have Trajectory Based Forecast?

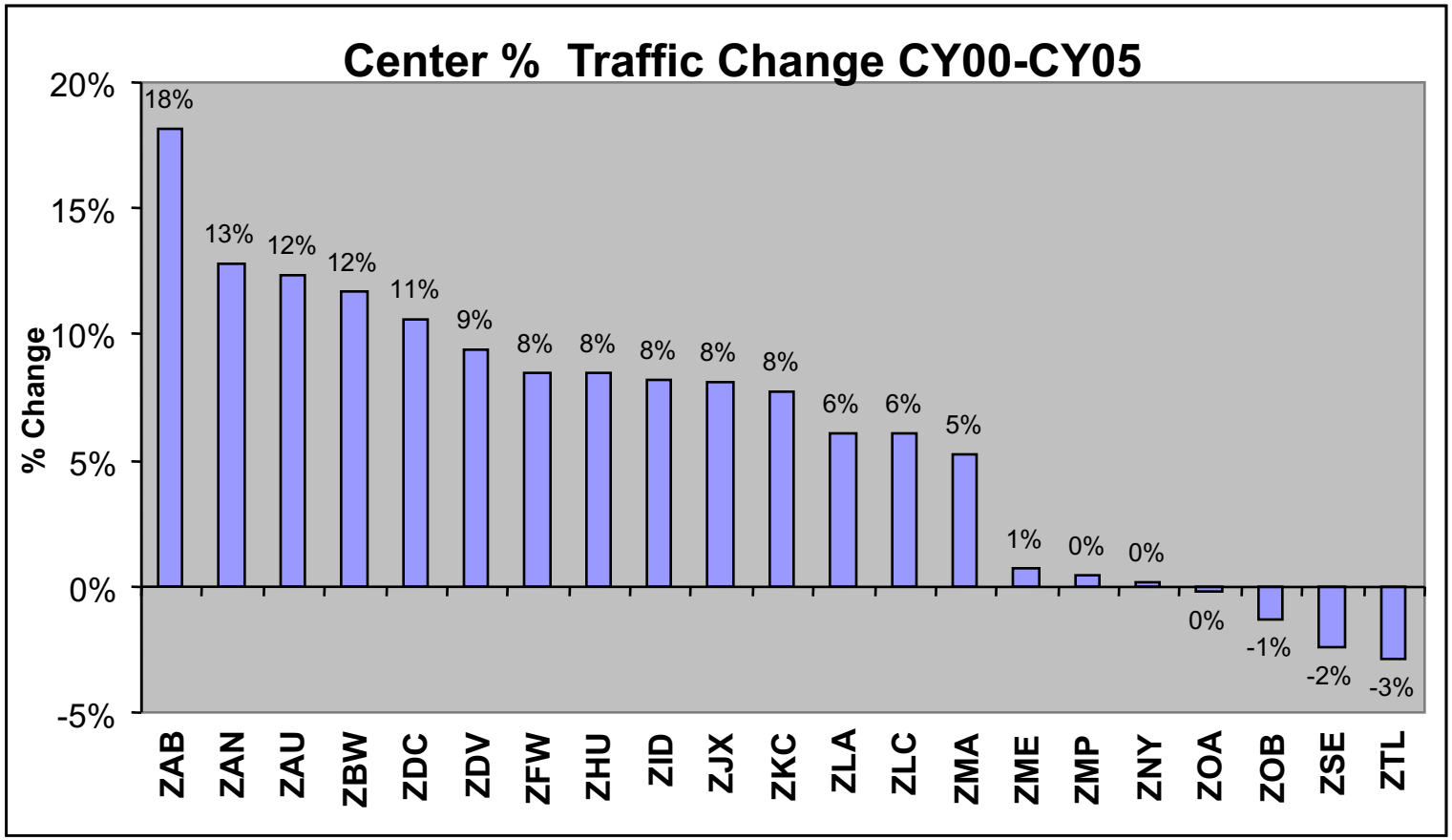
- Keeps lots of O.R. analysts in business!
- Drives focus on flows and en route constraints
- Helps revenue estimates

Annual NAS Traffic Change

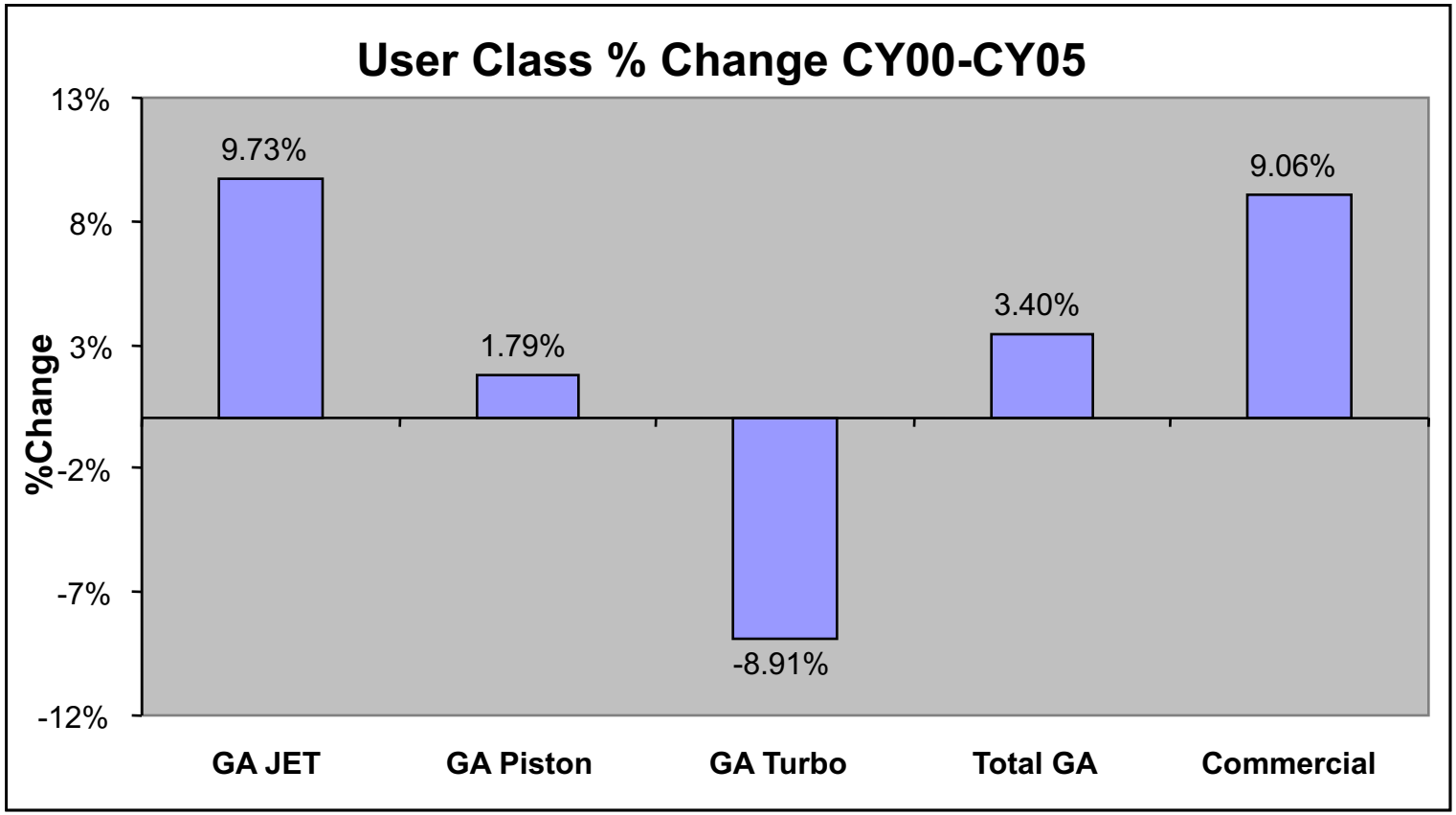
– Traffic increased 5.9% from CY00 to CY05.



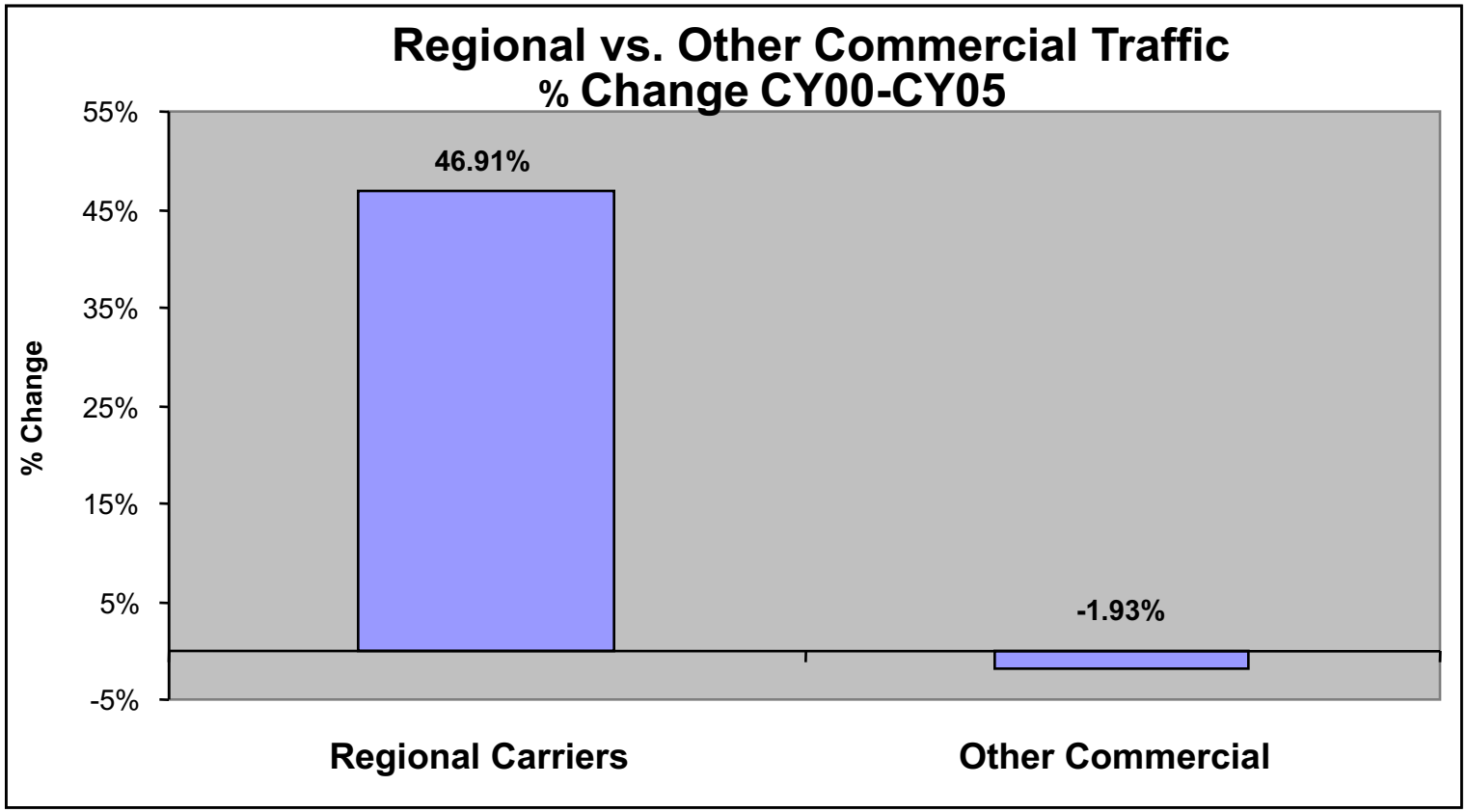
Center Level Changes



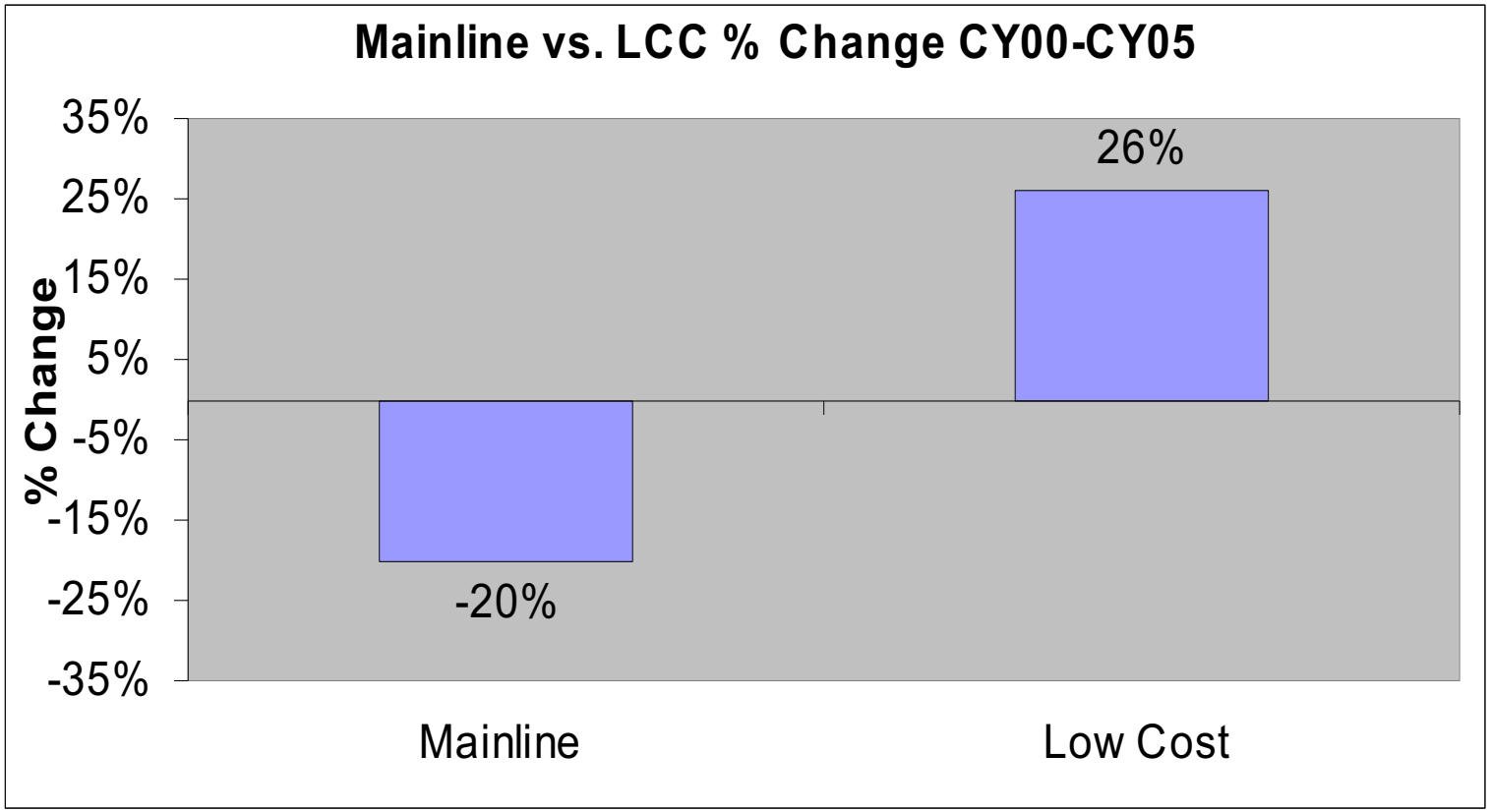
User Class Changes



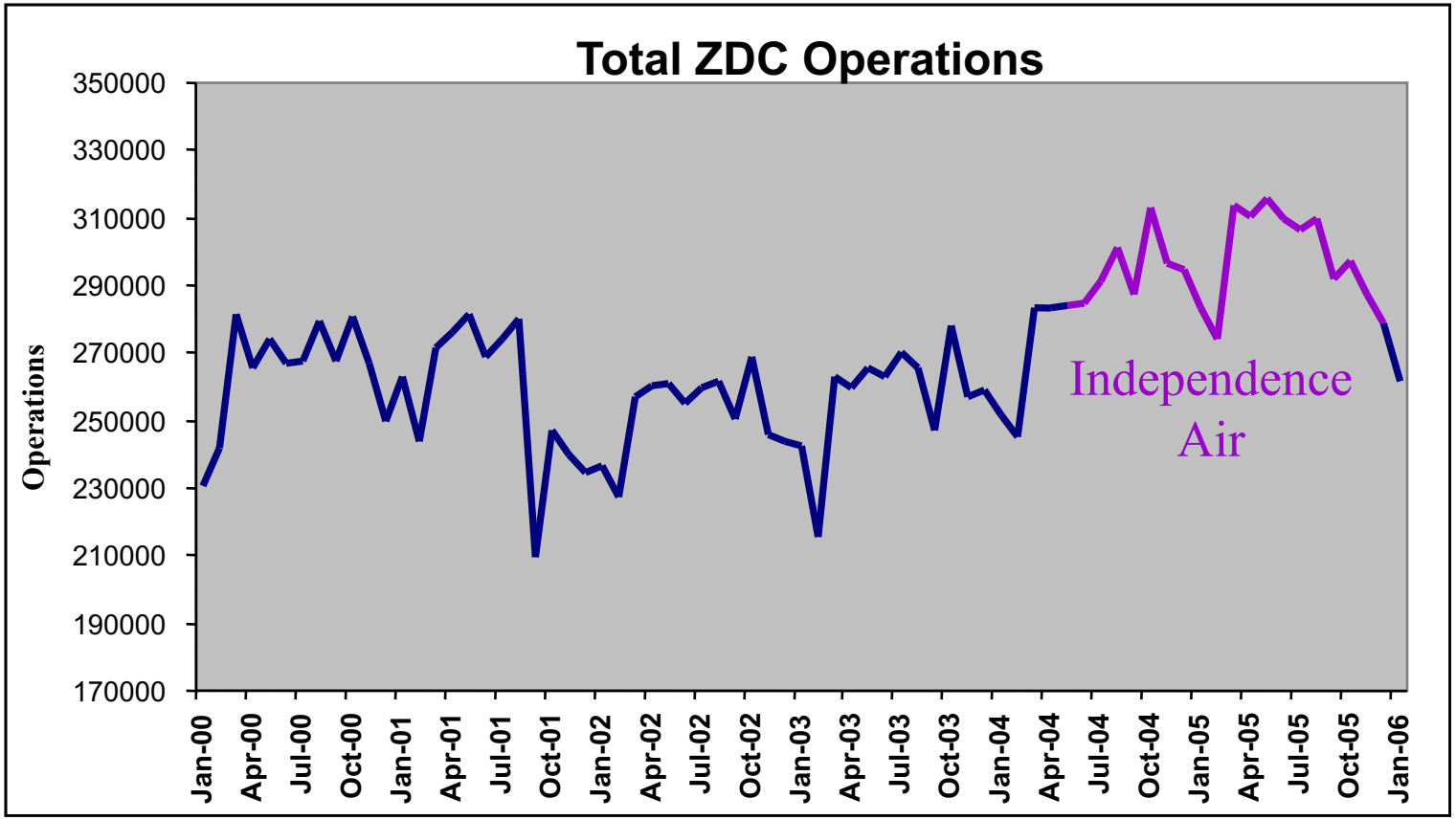
Regional Carrier Changes



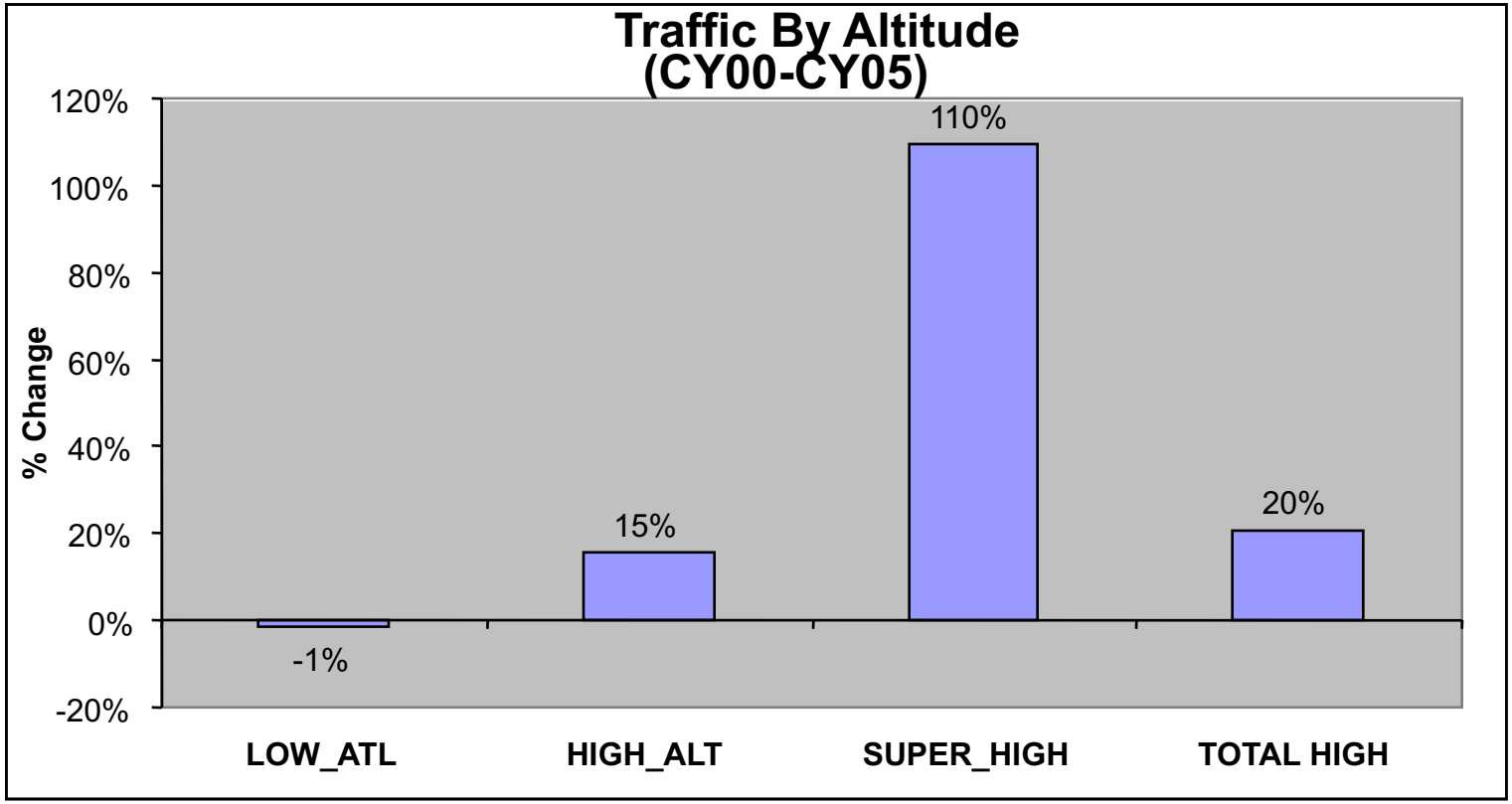
Commercial Mainline vs. LCC



Independence Air at ZDC



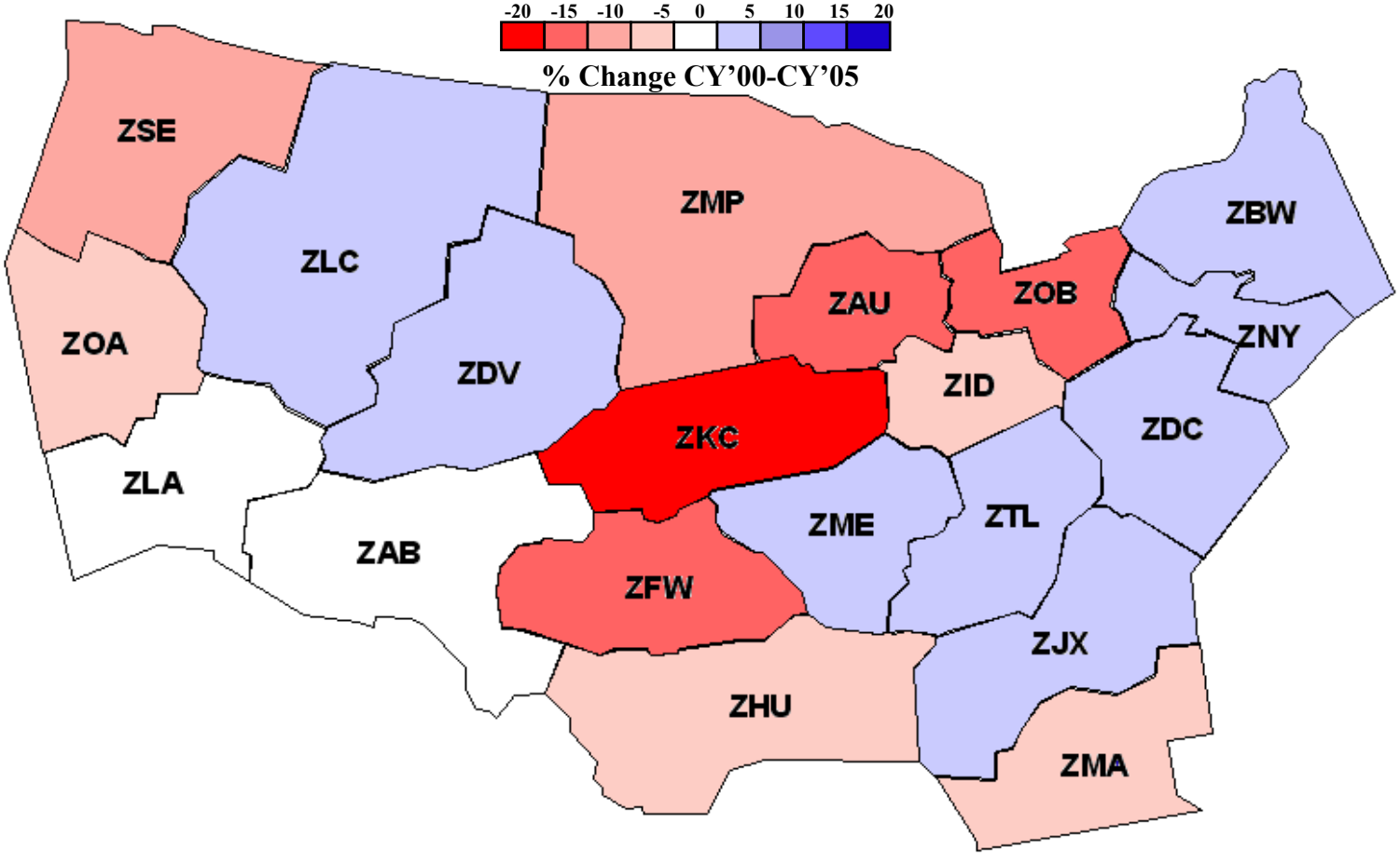
Flight Level Workload Changes



Low: <280 High: >= 280 and <= 390 Super High: >390

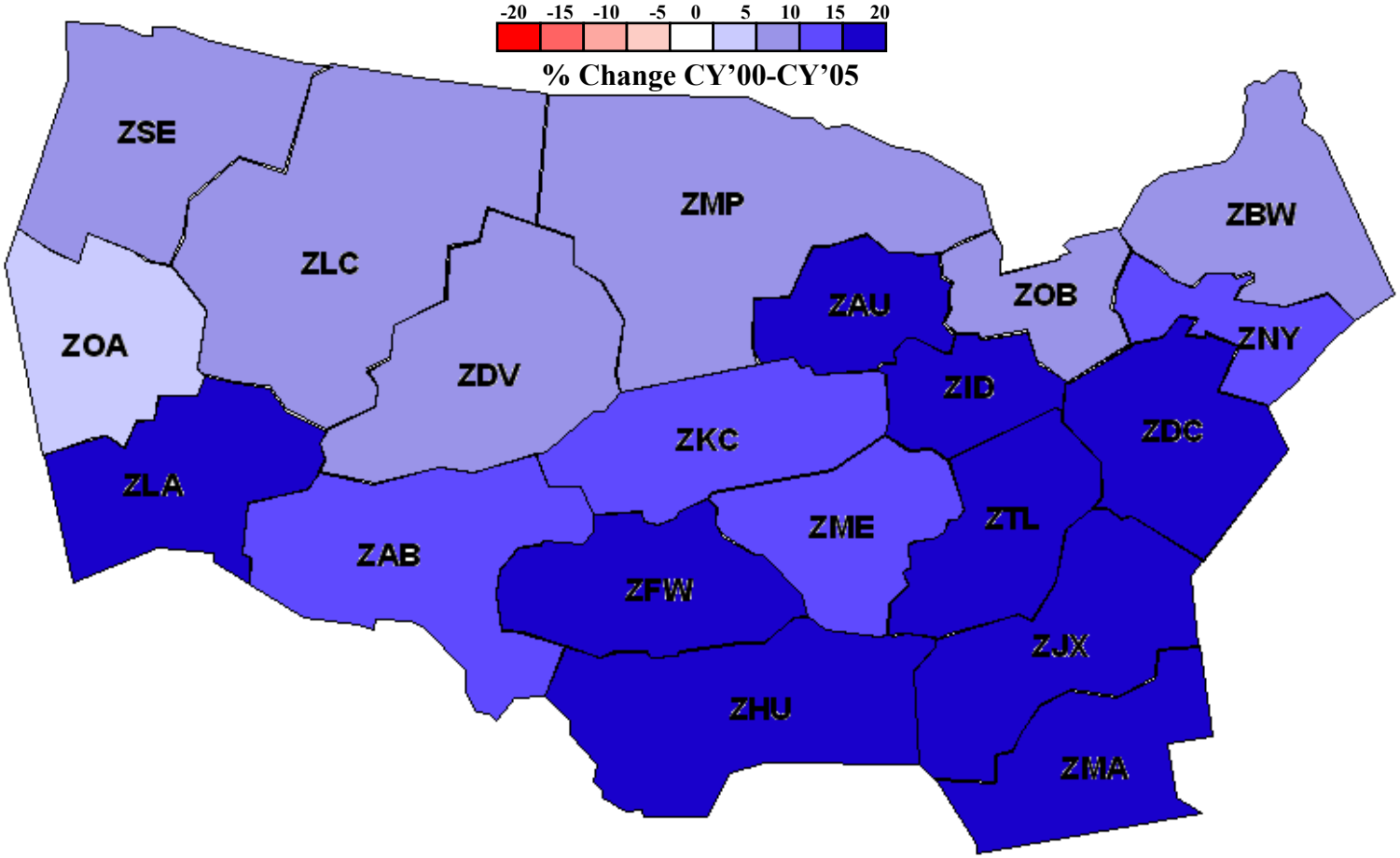
Low Altitude Workload Changes

(By Center)



High Altitude Workload Changes

(By Center)

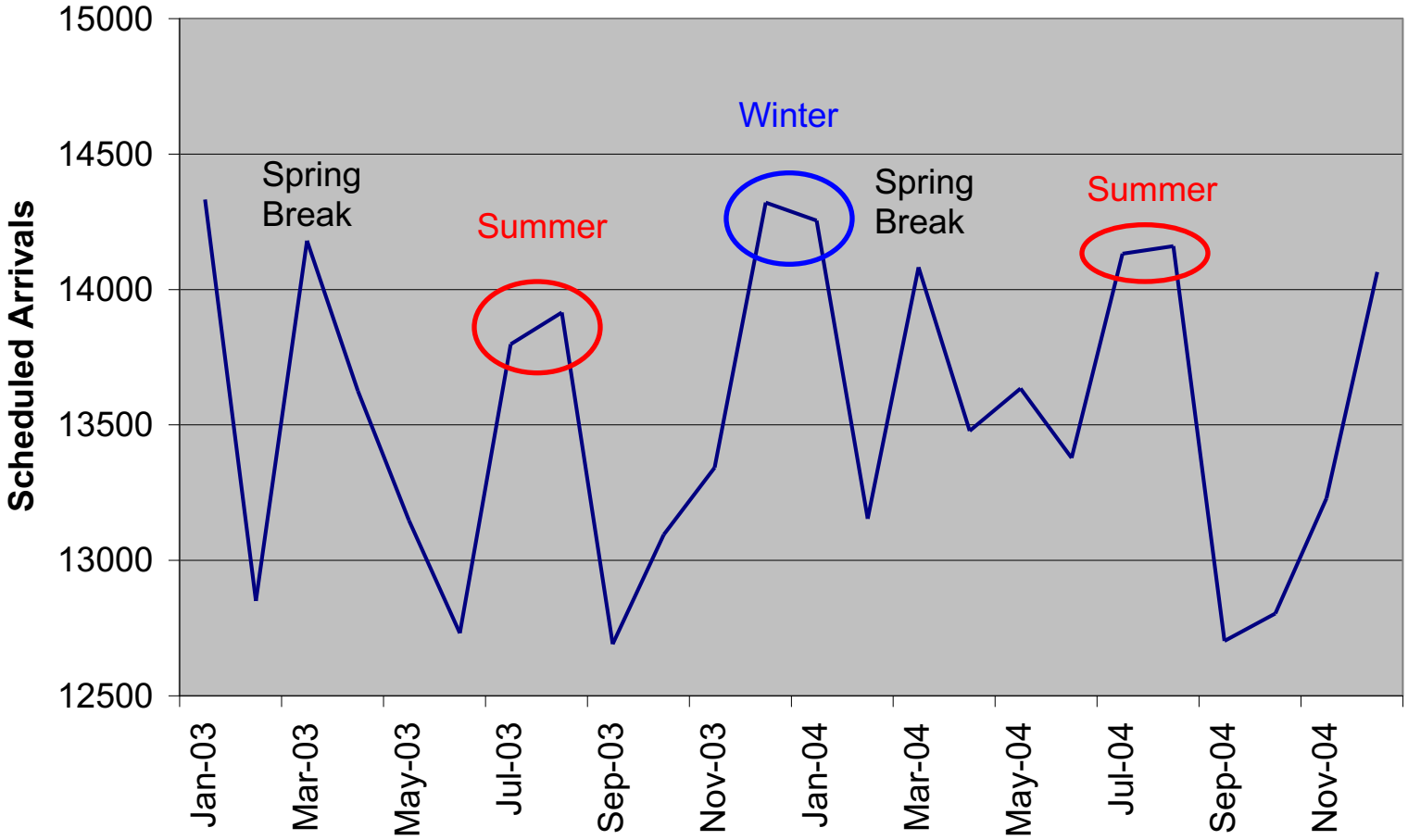


Why have Seasonal Forecasting?

- **Demand**
  - Seasonal schedules
  - Peak vs. Low traffic months
  - Seasonal impacts on workload

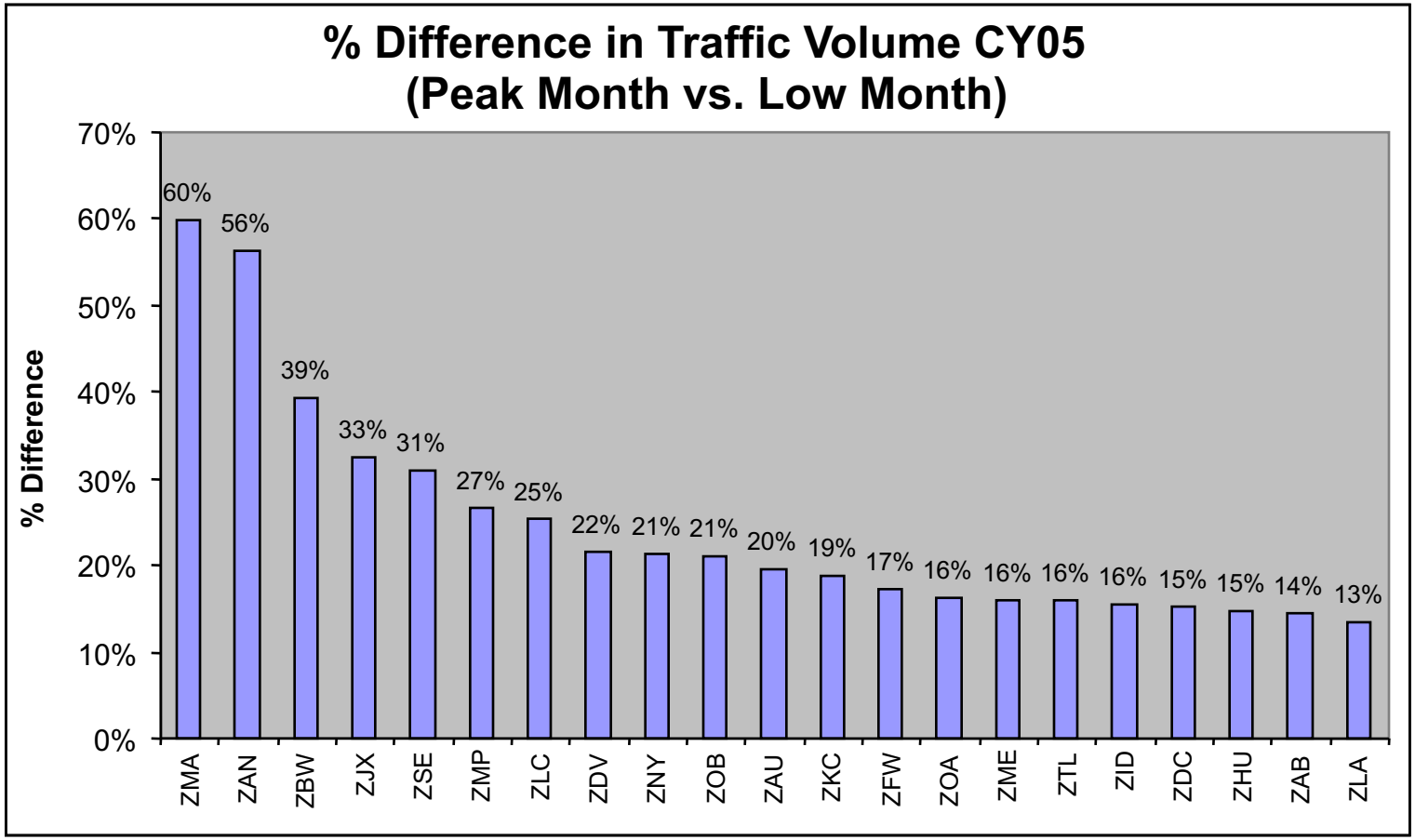
- **Operational Constraints**
  - Seasonal constraints
  - NAS delay procedures

Seasonal Schedules

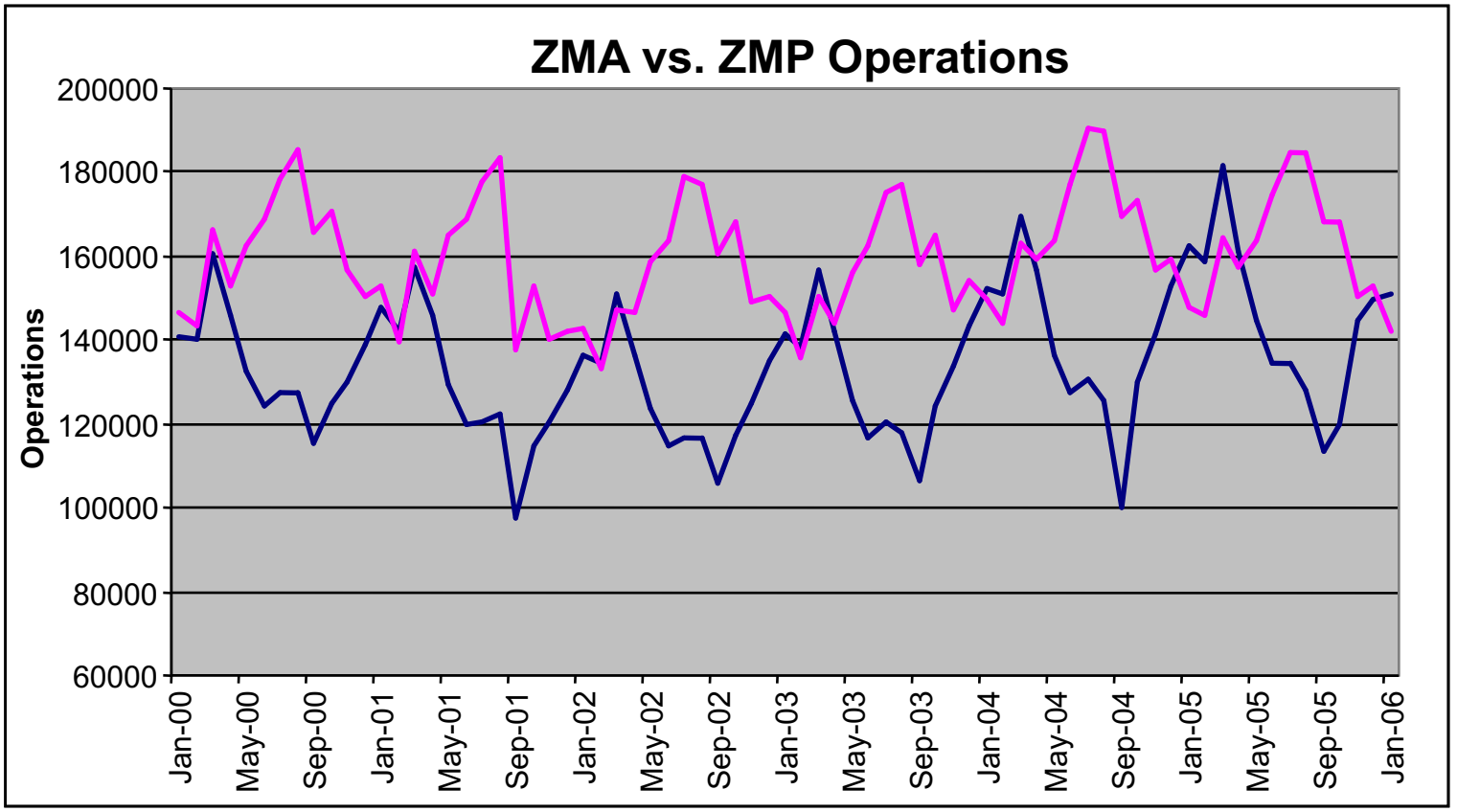


Data: MIA (ASPM)

Peak vs. Low Traffic Volume



Seasonal Impacts on Workload

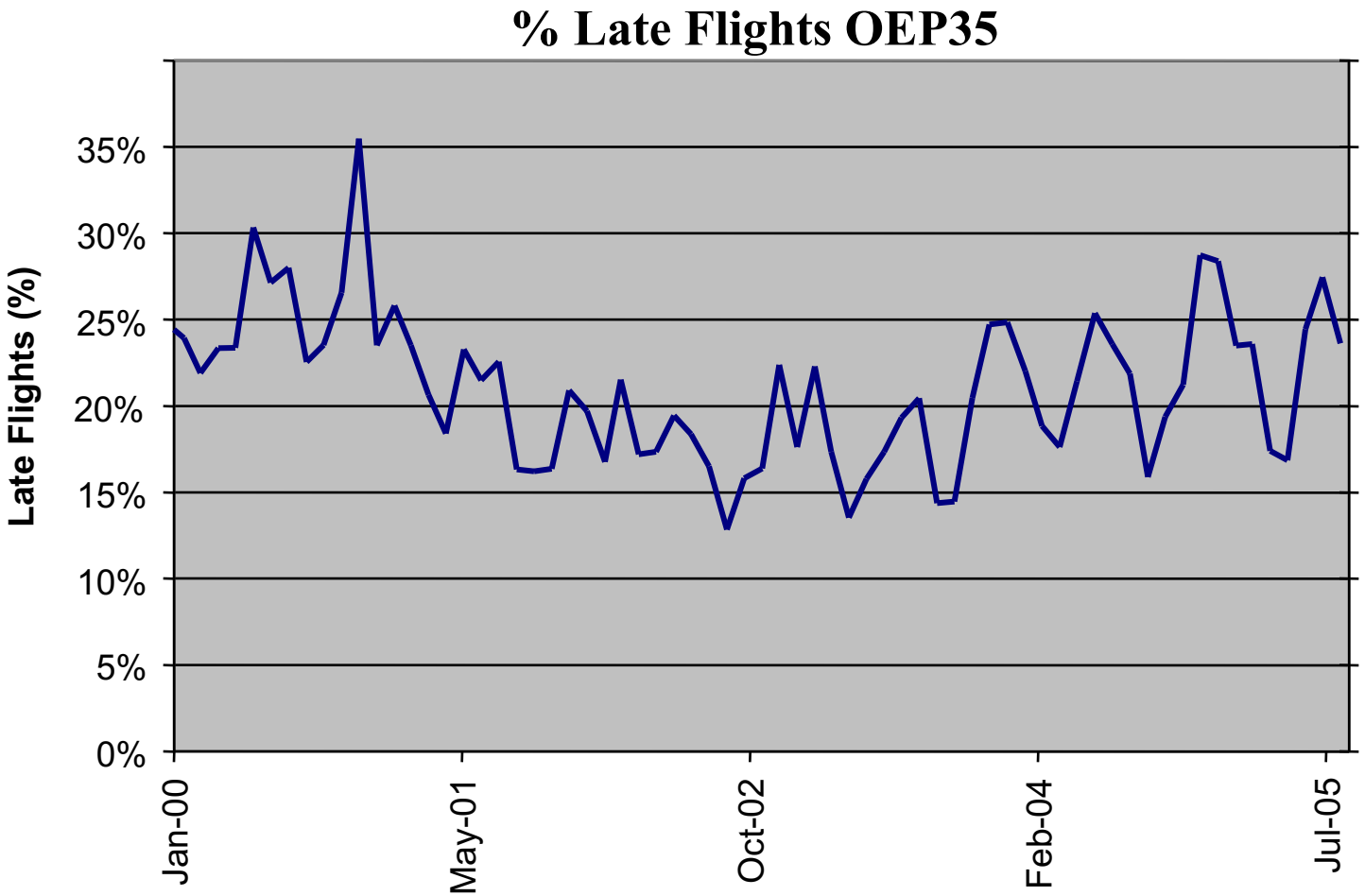


Importance of Seasonal Forecasting

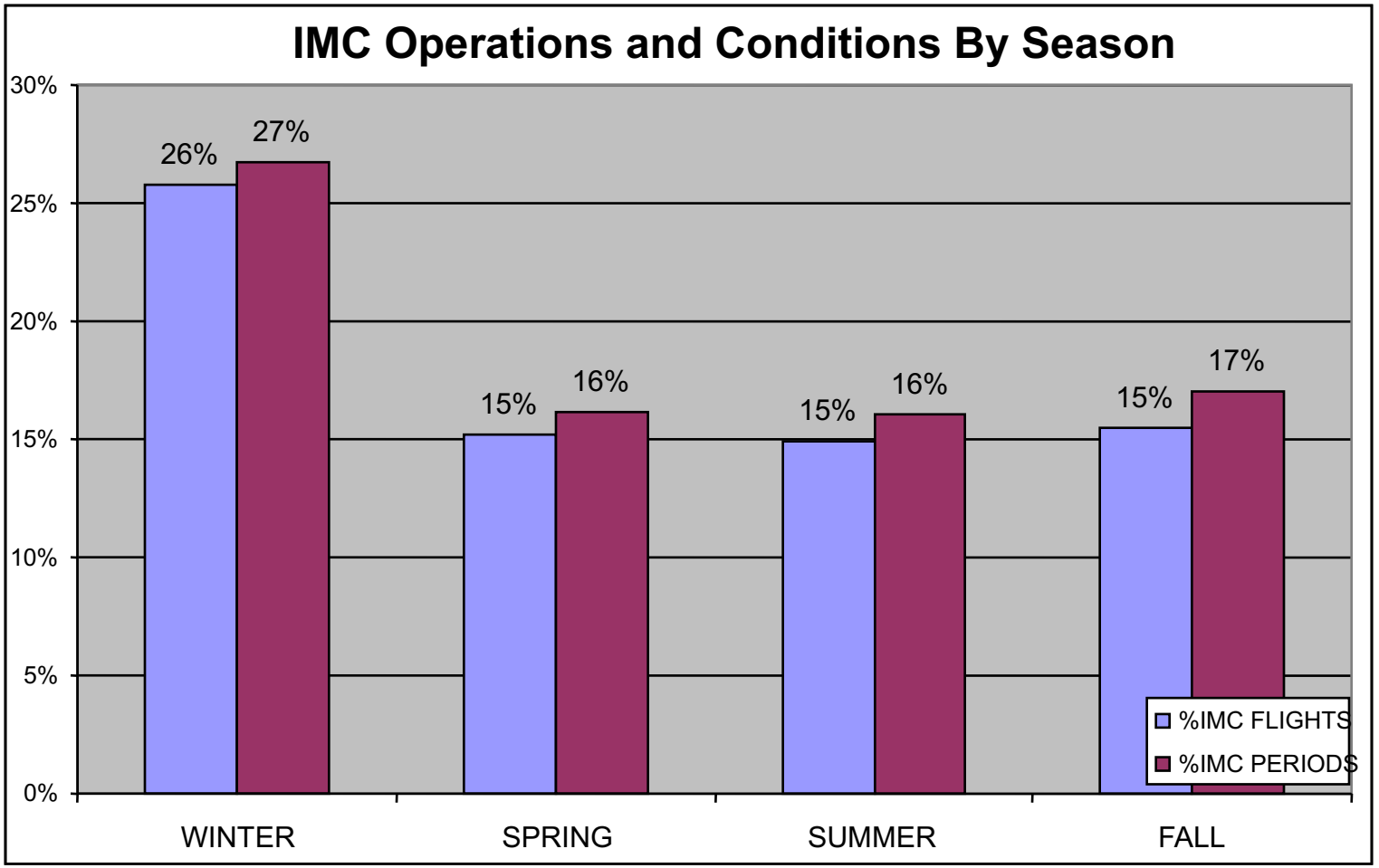
- **Demand**
  - Seasonal schedules
  - Peak vs. Low traffic months
  - Seasonal impacts on workload

- **Operational Constraints**
  - Seasonal constraints
  - NAS delay procedures

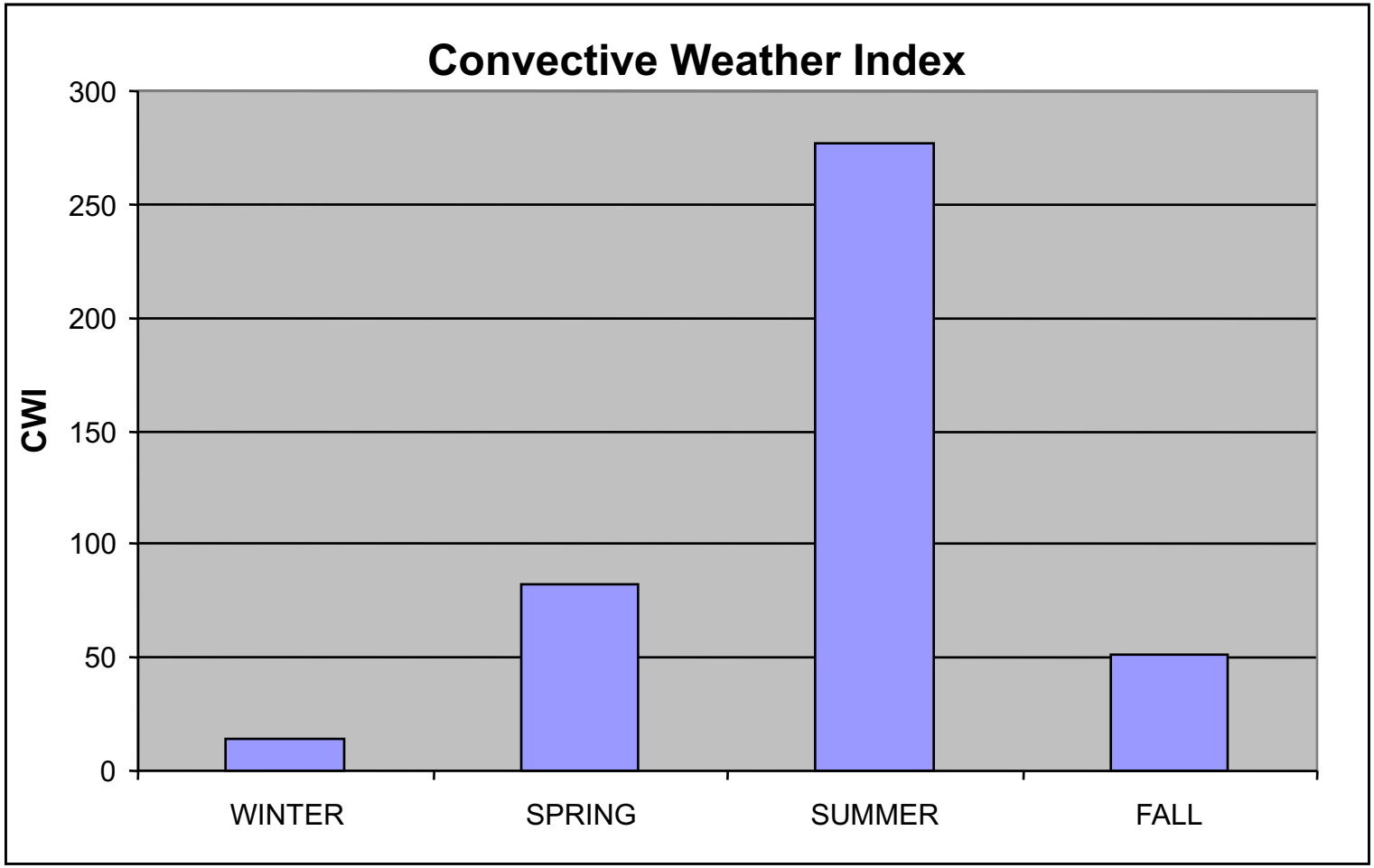
Seasonal Change in Constraints



Seasonal Constraints



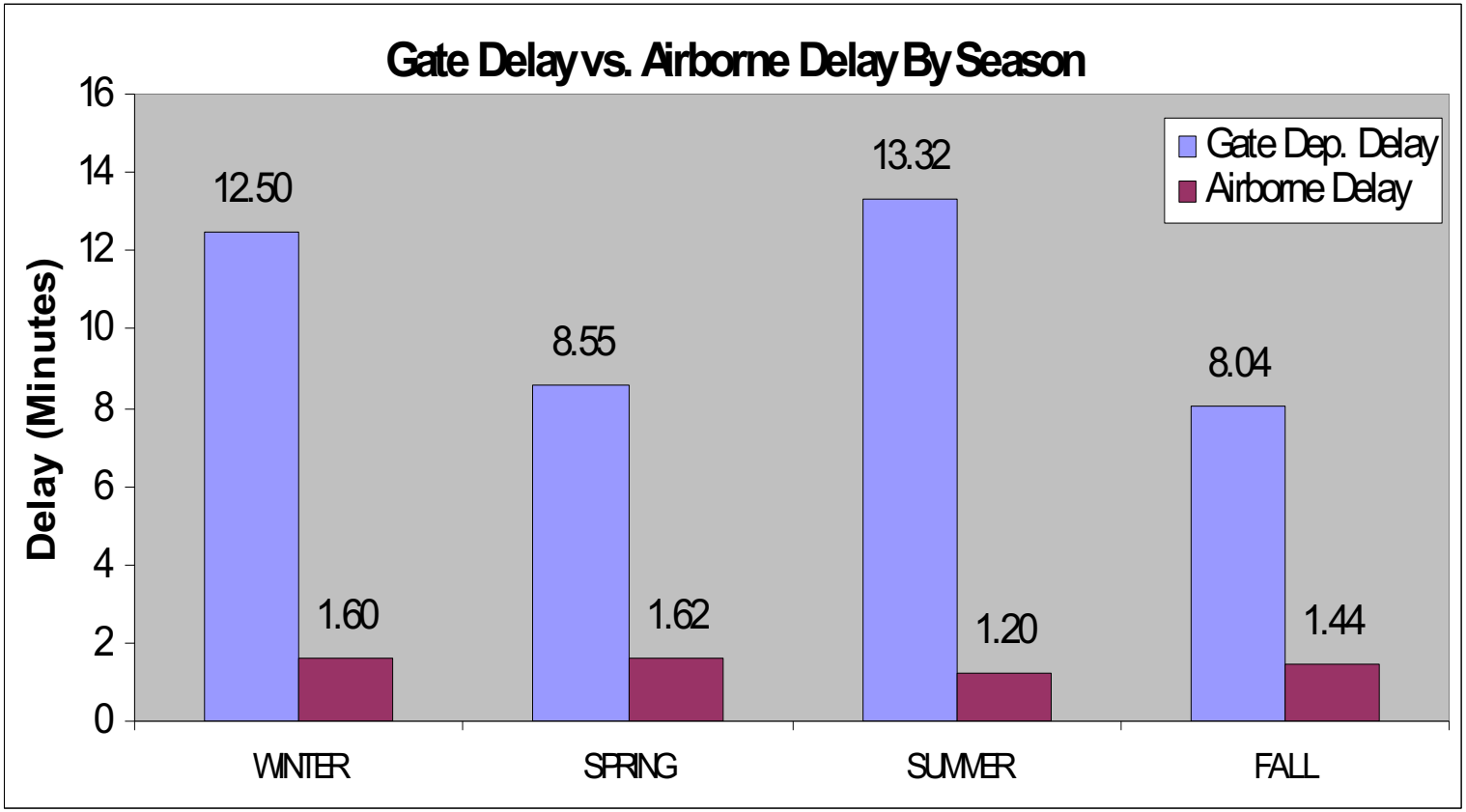
Seasonal Constraints



Modeling Challenges

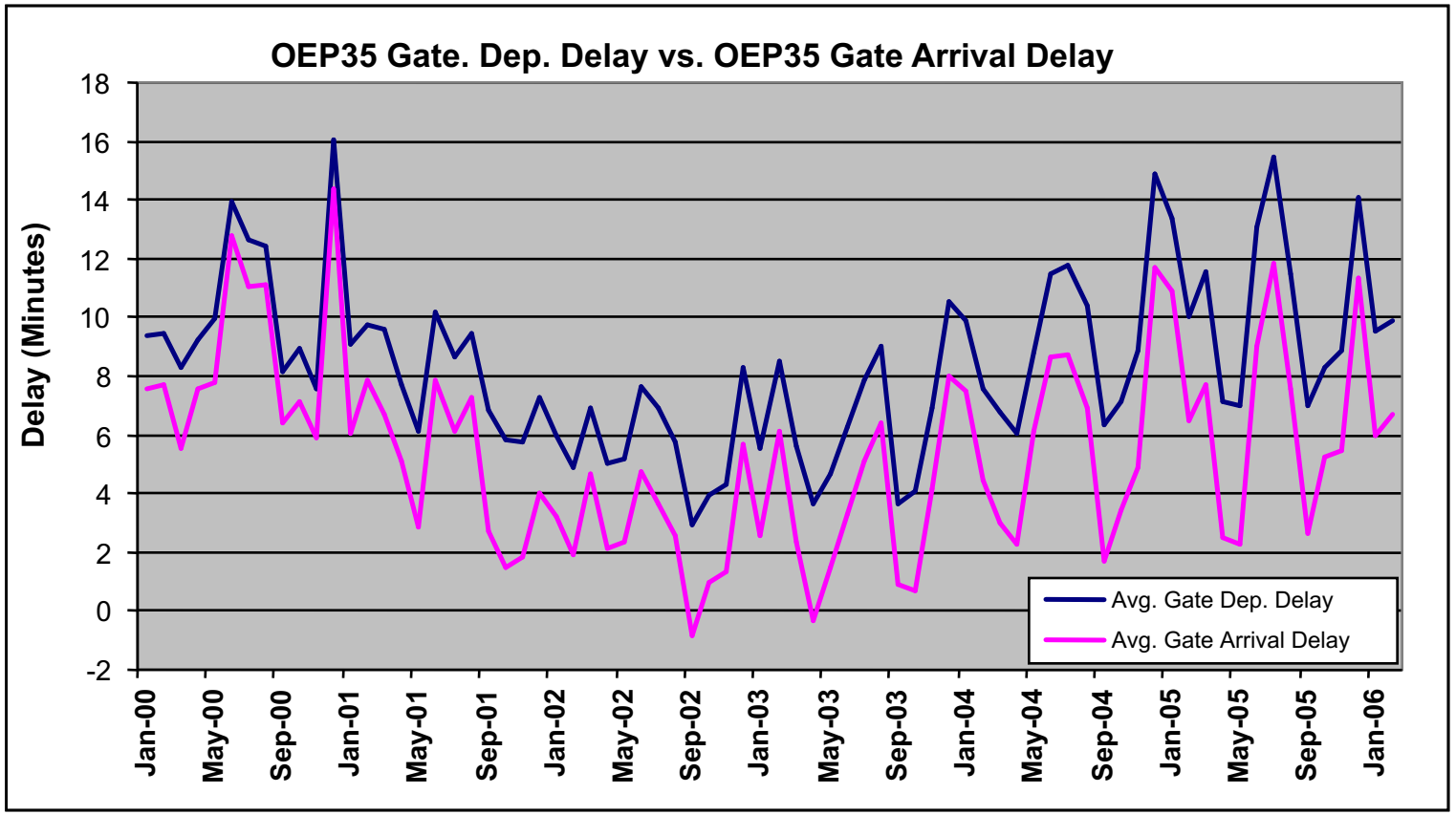
- Where delay is taken vs. cause of delay
  - En route congestion
- Convective weather case
- Annualizing results
- Interconnectivity of delay
- Uncertainty in demand

Where Delay is Taken

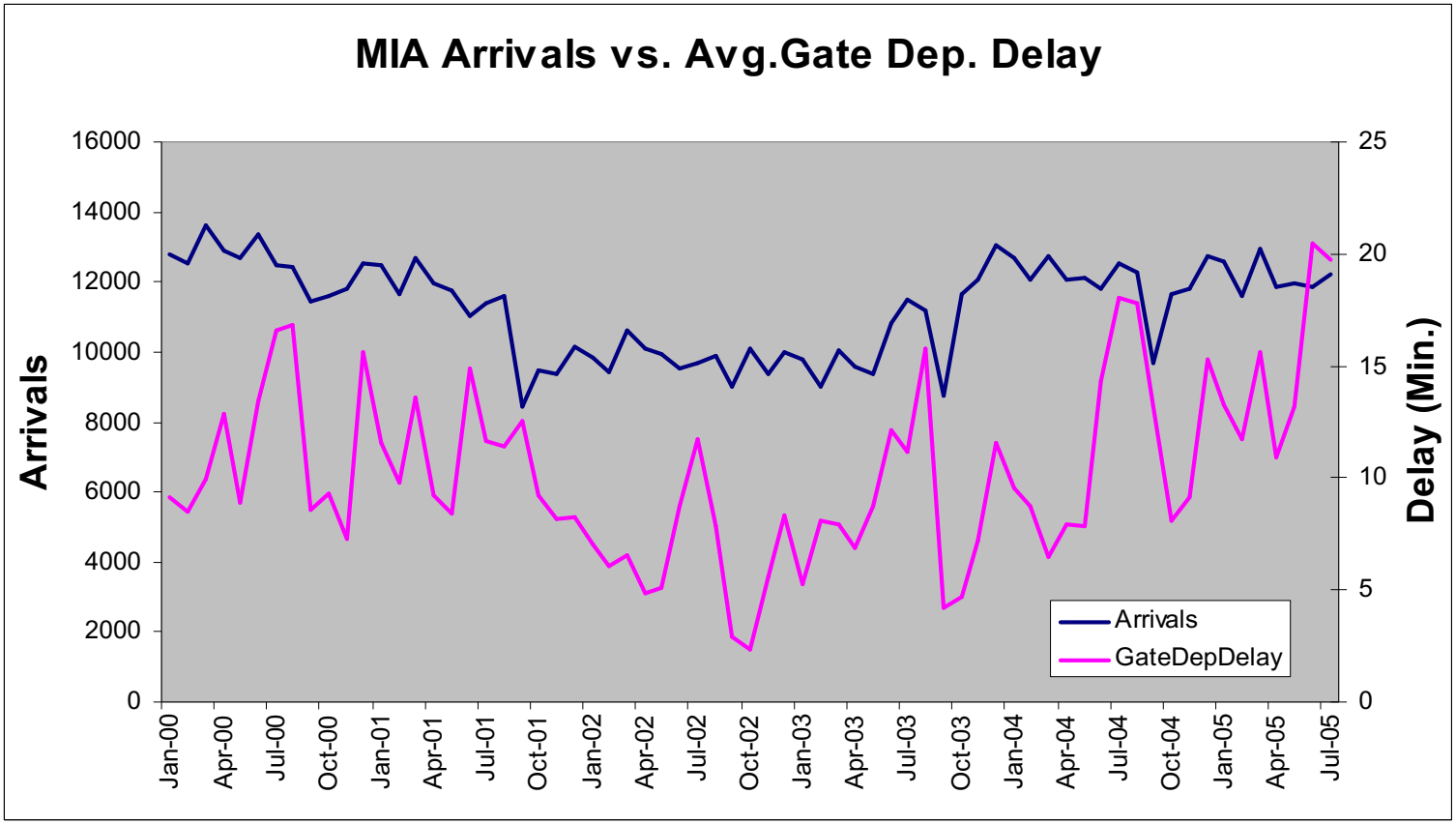


Gate vs. Total Delay

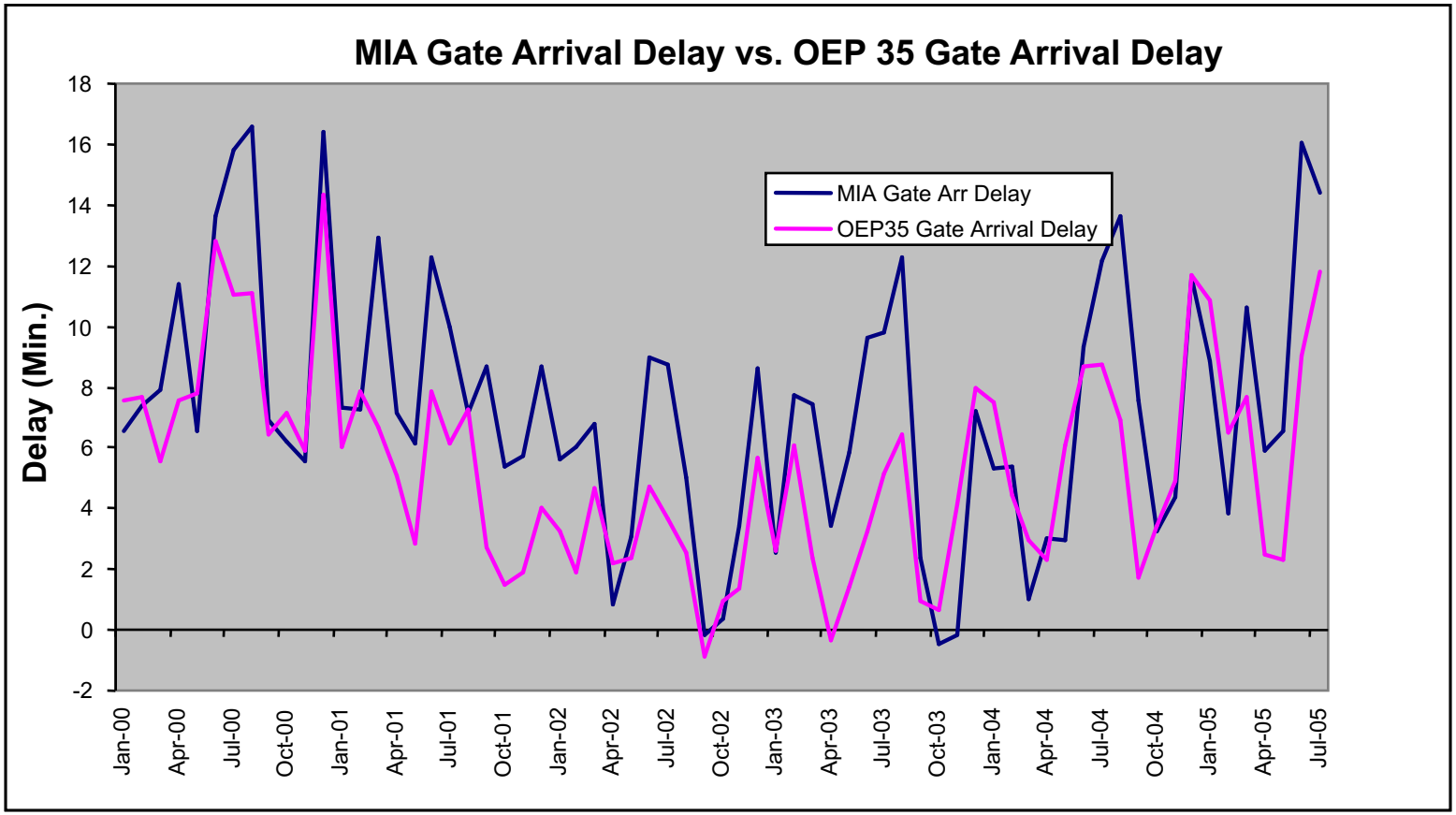
- How much is driven by en route/convective congestion?



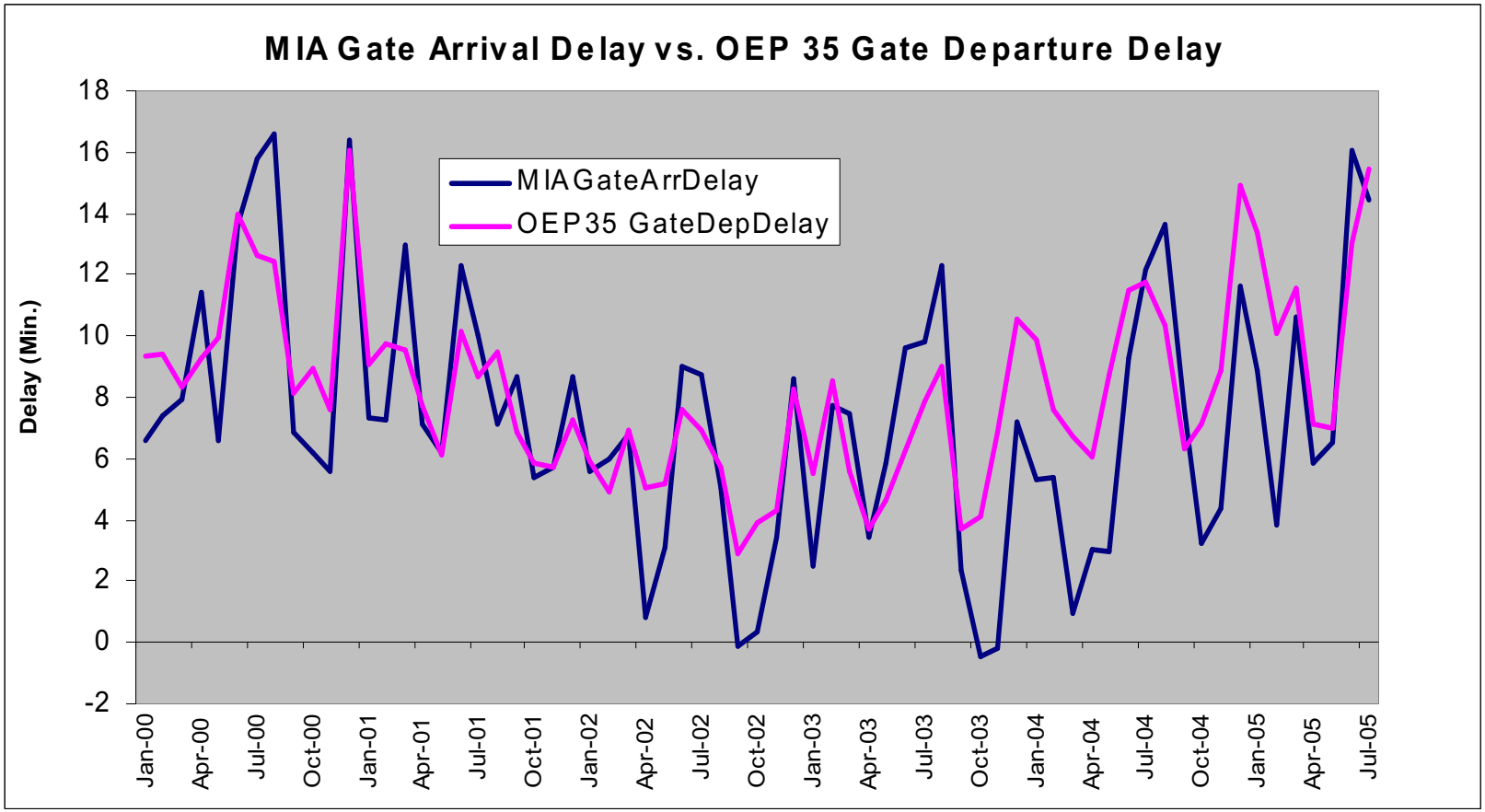
MIA Arrivals vs. Gate Delay



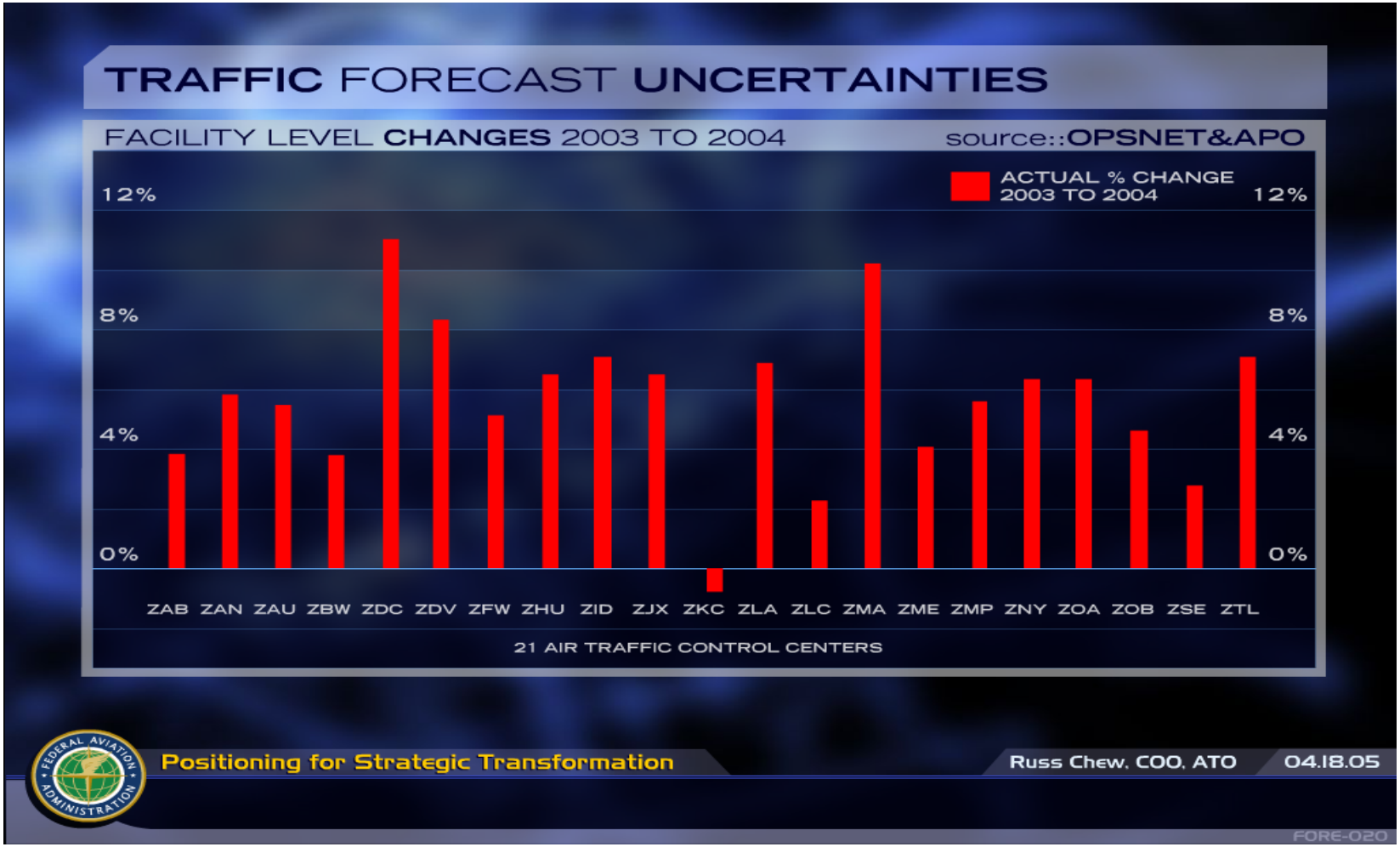
Interconnectivity of Delay



Interconnectivity of Delay



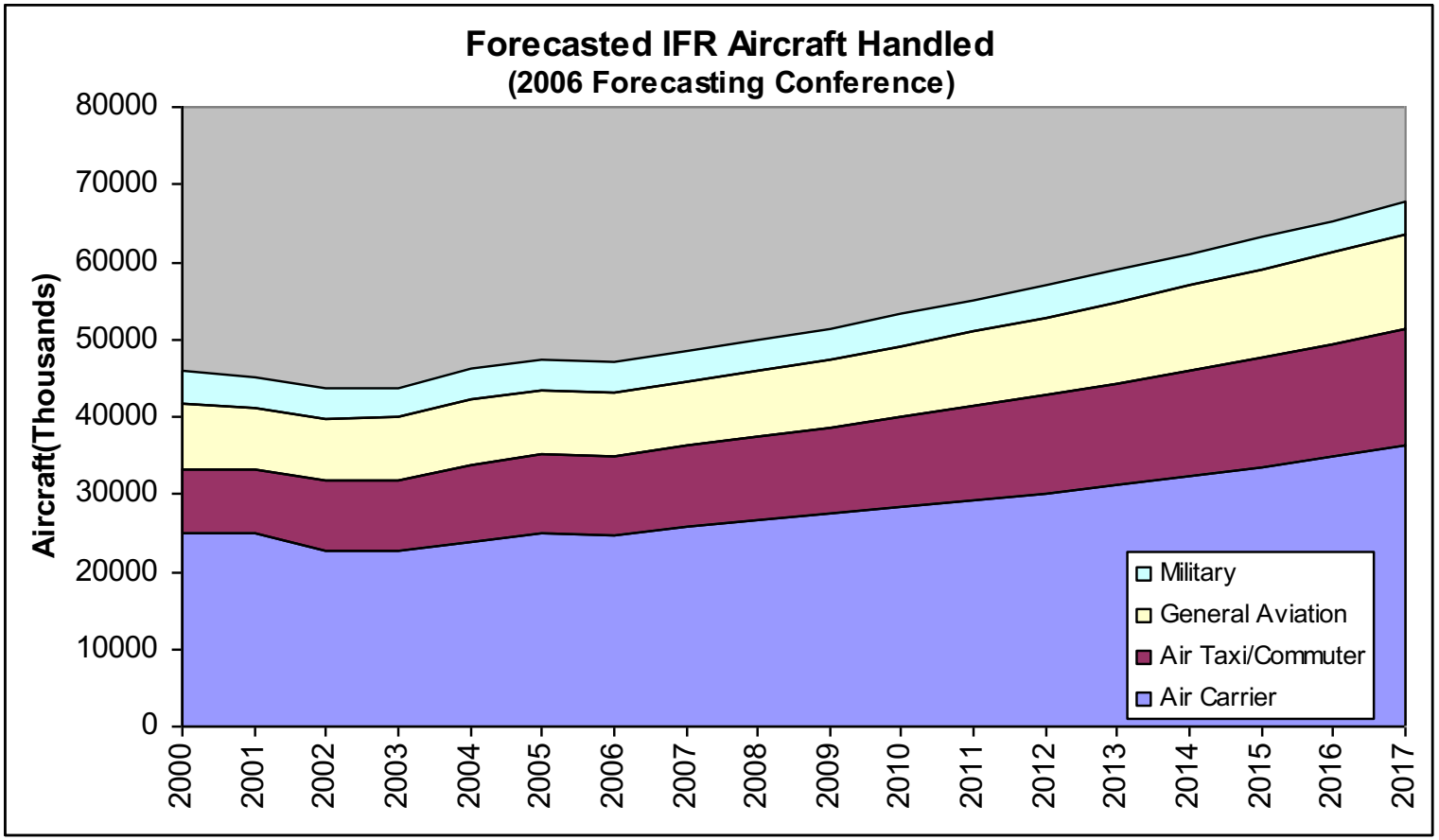
Forecast Uncertainties



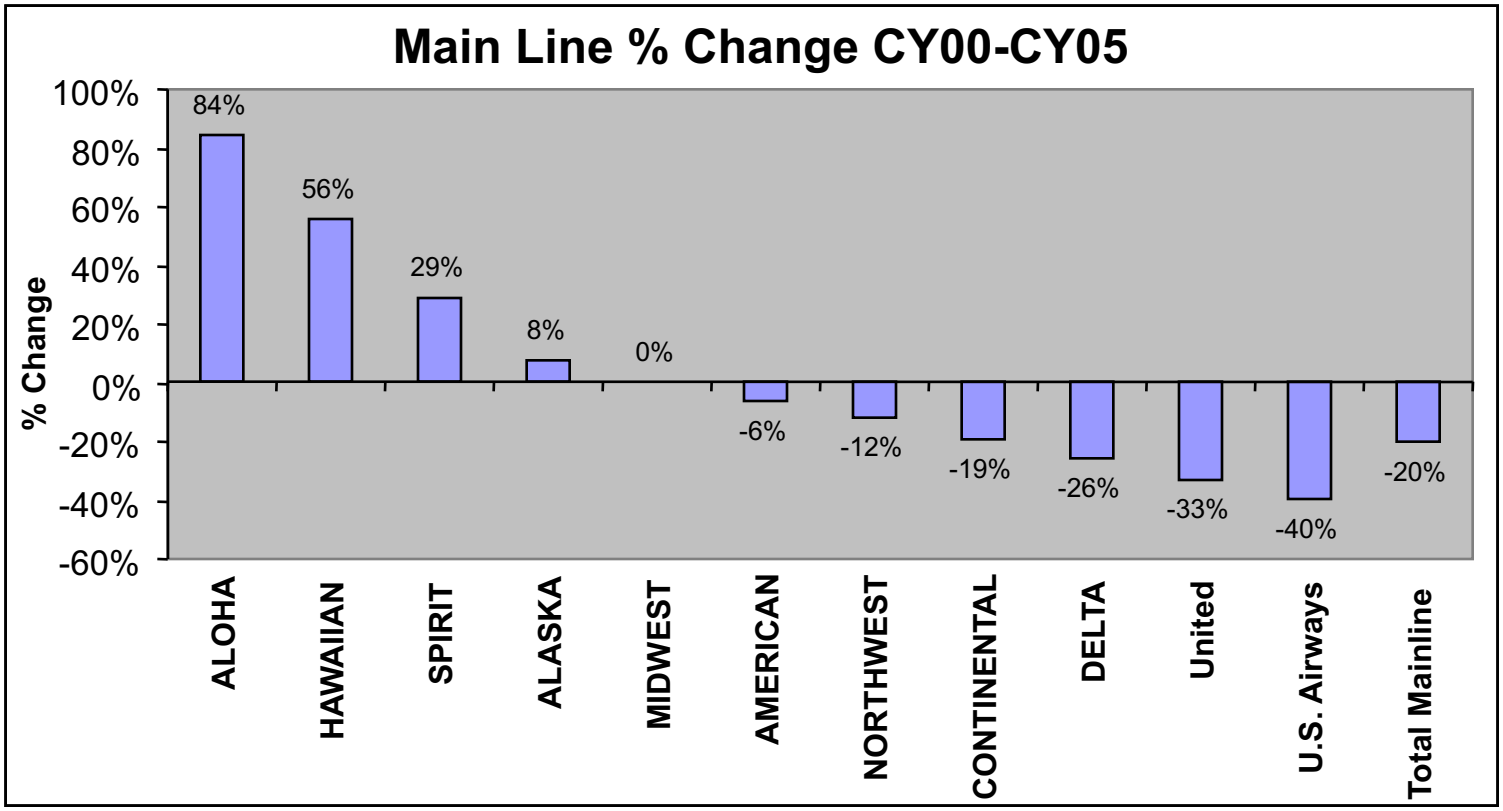
Summary

- Current FAA forecasts provide annual activity levels
- Current FAA forecasts assume aviation business models stay the same
- Actual demand varies seasonally, daily, and hourly
- Aviation industry is fundamentally changing
- Understanding these changes is essential to preparing for the future

Current Demand Forecasting

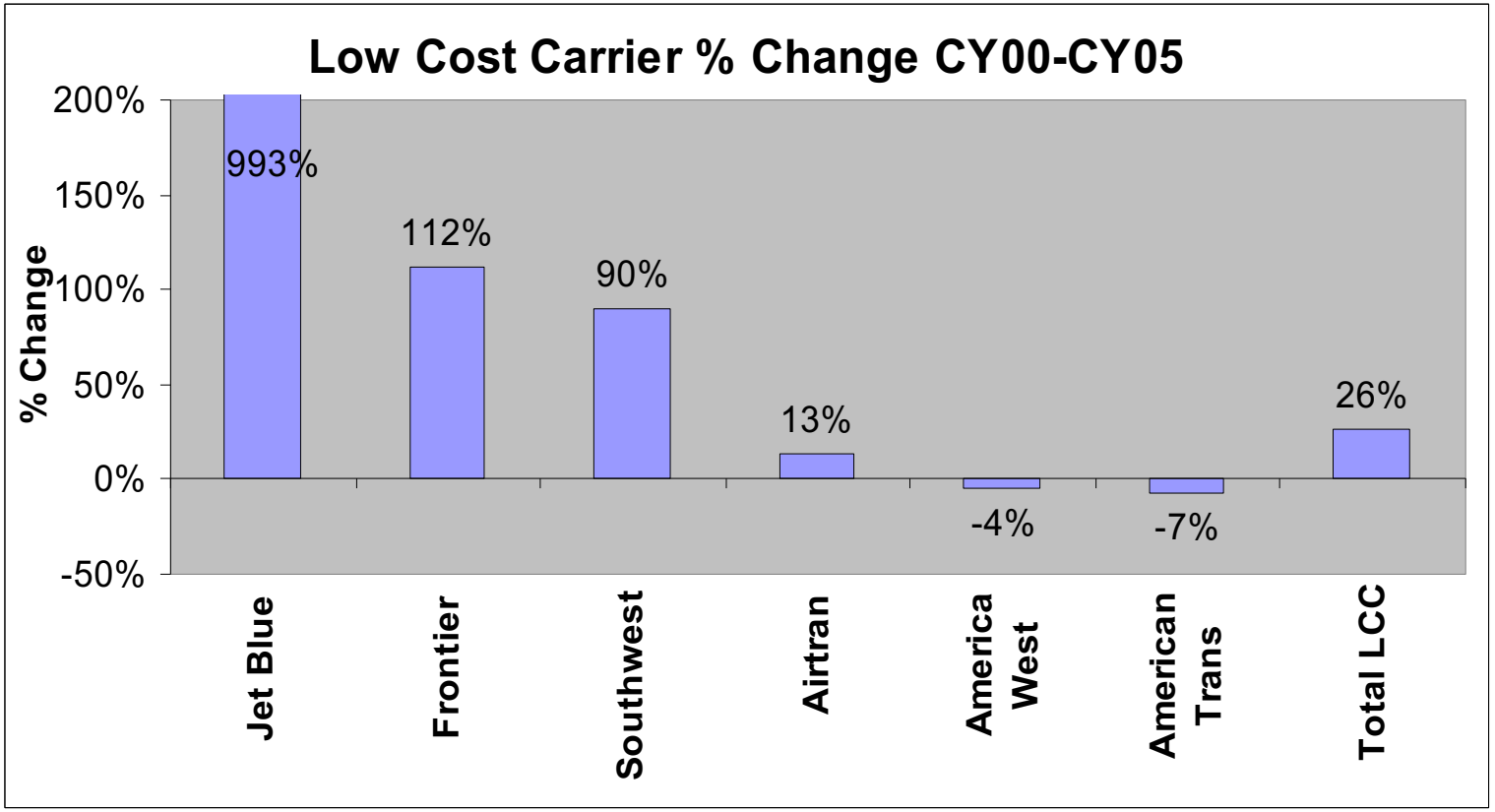


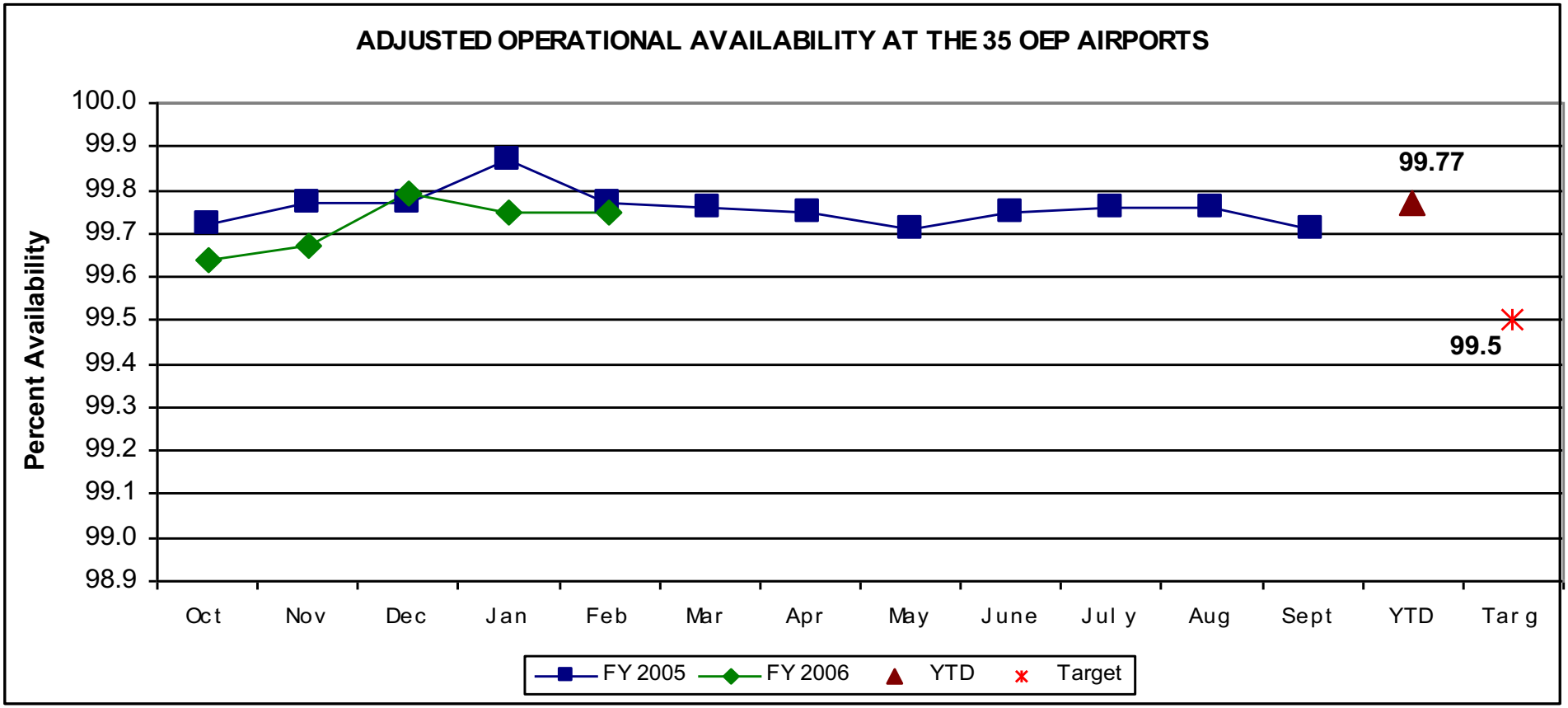
Mainline Legacy Carriers

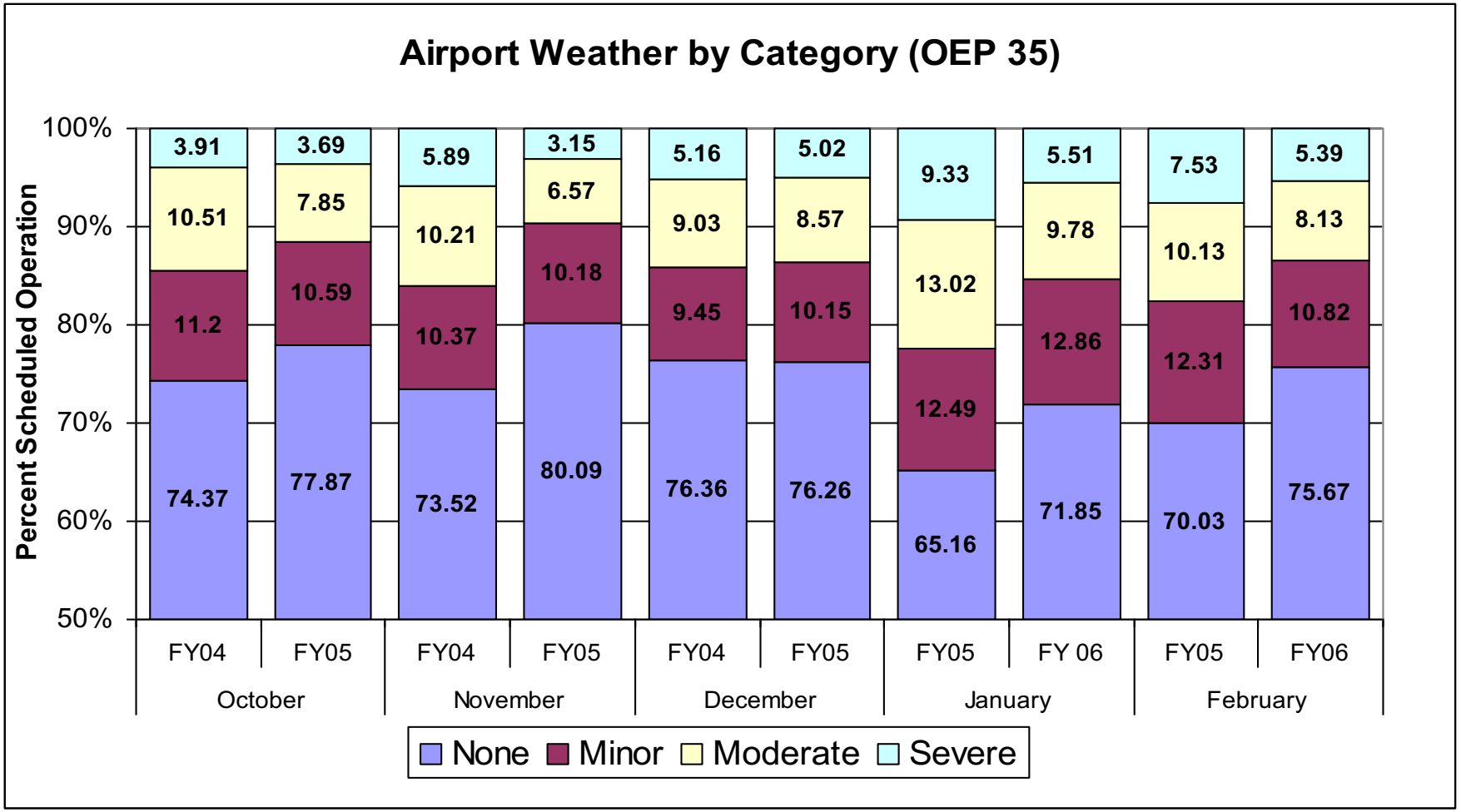


Low Cost Carriers

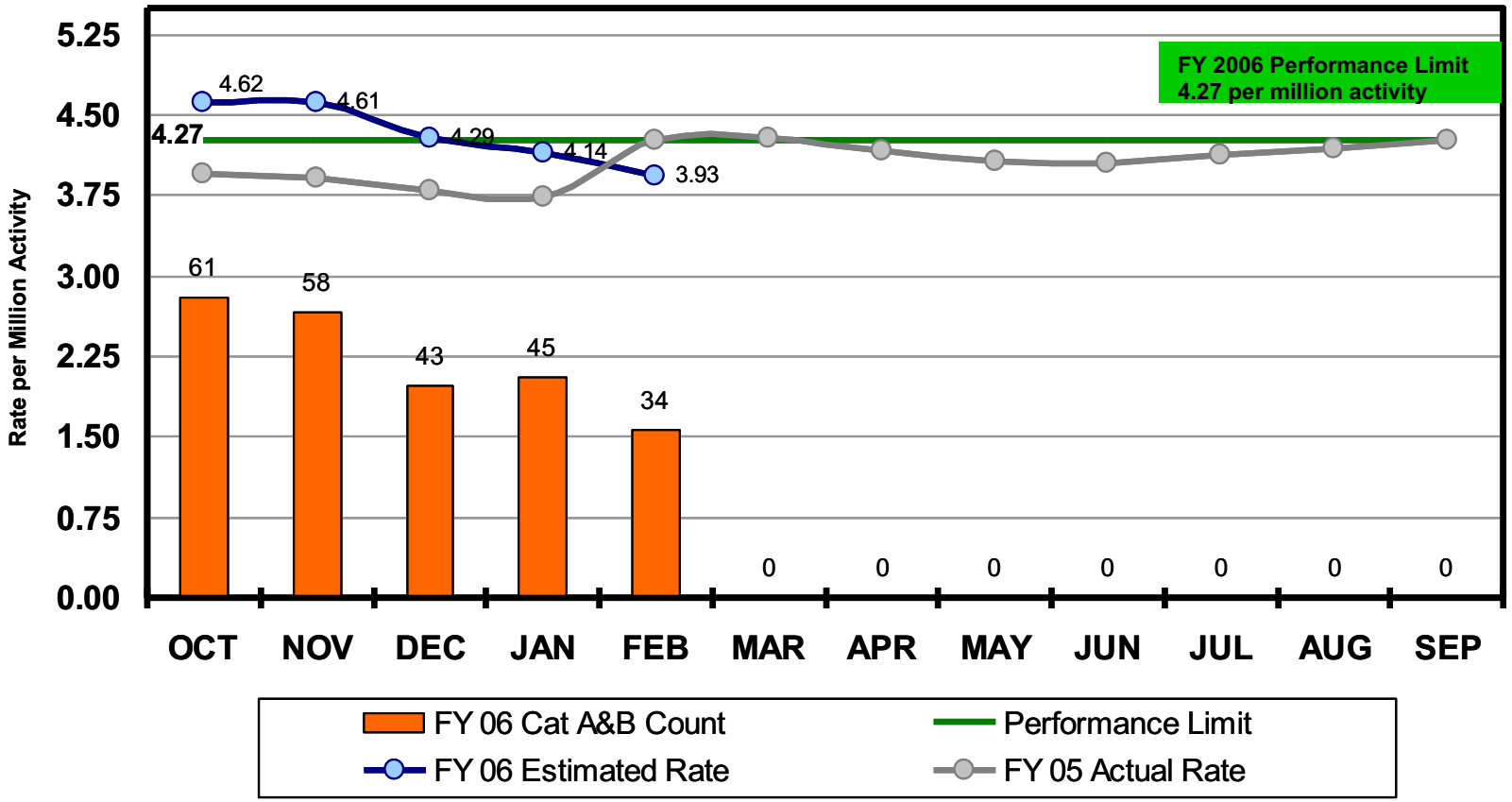
– Independence Air began flying in 2004.



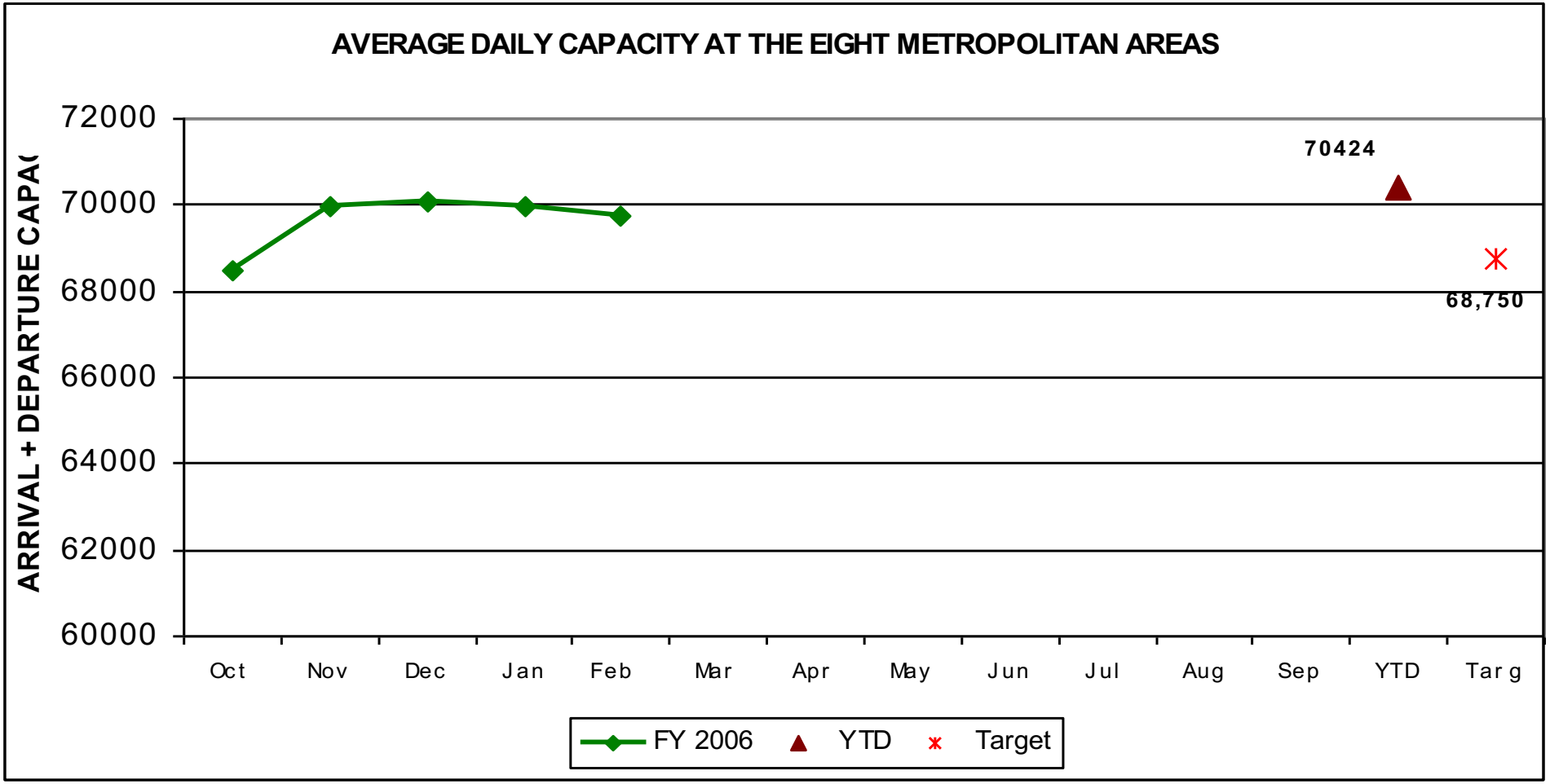

ADJUSTED OPERATIONAL AVAILABILITY AT THE 35 OEP AIRPORTS
Percent Availability
100.0
99.9
99.8
99.7
99.6
99.5
99.4
99.3
99.2
99.1
99.0
98.9
99.77
99.5
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
June
July
Aug
Sept
YTD
Targ
FY 2005
FY 2006
YTD
Target

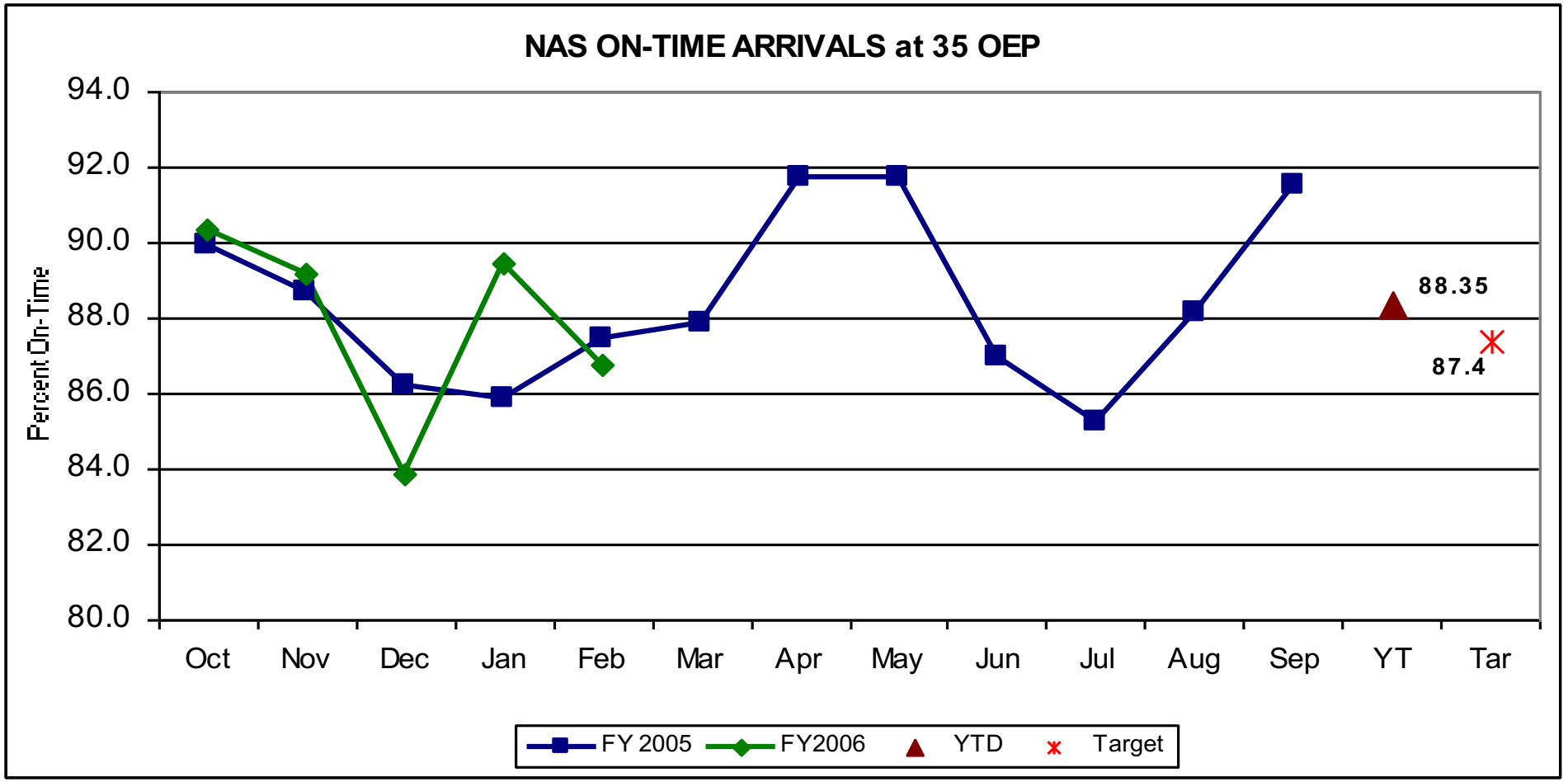

Airport Weather by Category (OEP 35)
Percent Scheduled Operation
100%
90%
80%
70%
60%
50%
3.91
10.51
11.2
74.37
3.69
7.85
10.59
77.87
5.89
10.21
10.37
73.52
3.15
6.57
10.18
80.09
5.16
9.03
9.45
76.36
5.02
8.57
10.15
76.26
9.33
13.02
12.49
65.16
5.51
9.78
12.86
71.85
7.53
10.13
12.31
70.03
5.39
8.13
10.82
75.67
FY04
FY05
FY04
FY05
FY04
FY05
FY05
FY 06
FY05
FY06
October
November
December
January
February
None
Minor
Moderate
Severe

FY 2006 Category A&B Operational Errors
(Counts & Rates)

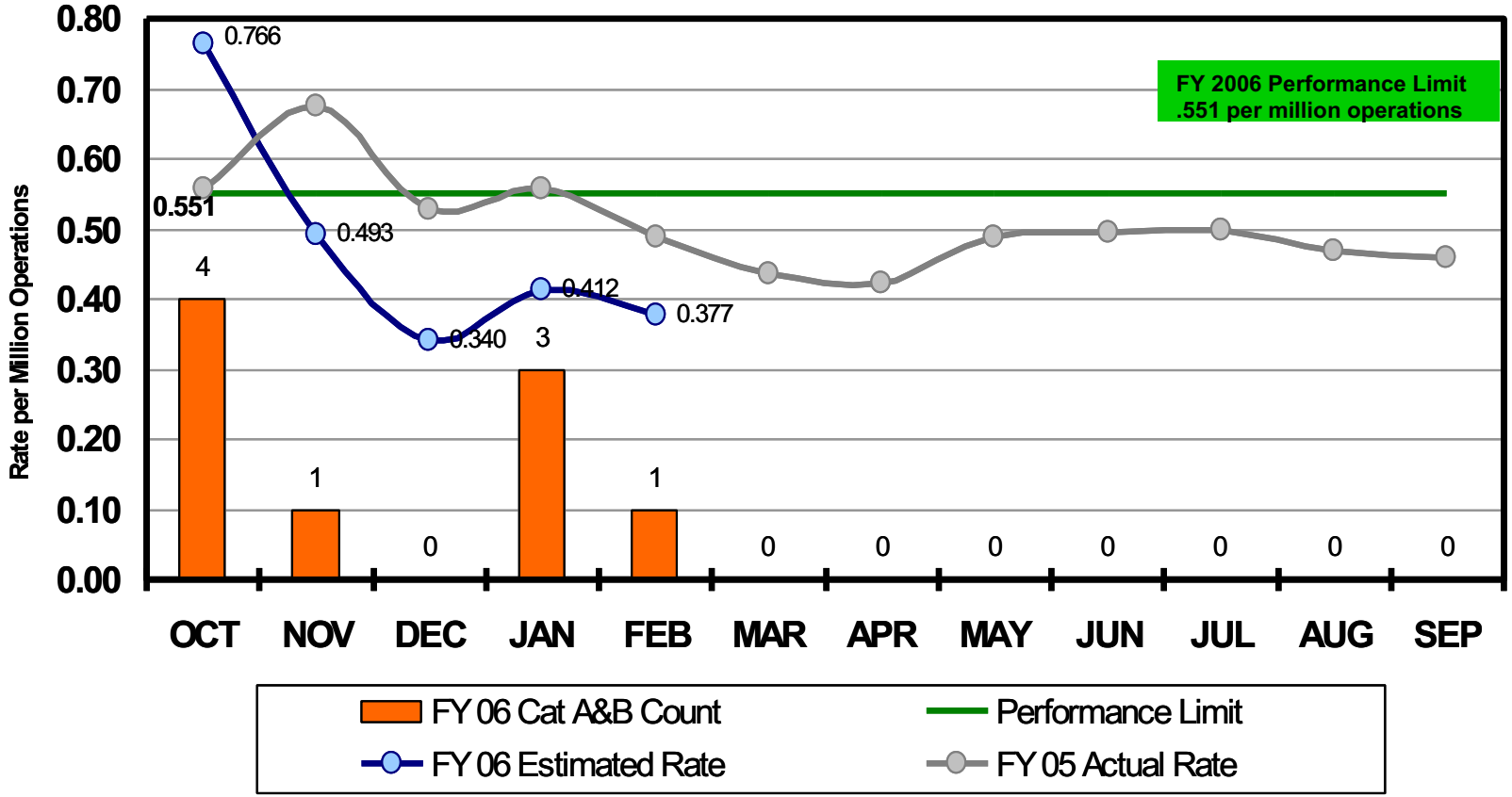


* FY 2006 Rates may contain estimated activity counts. The Rate is cumulative from month to month

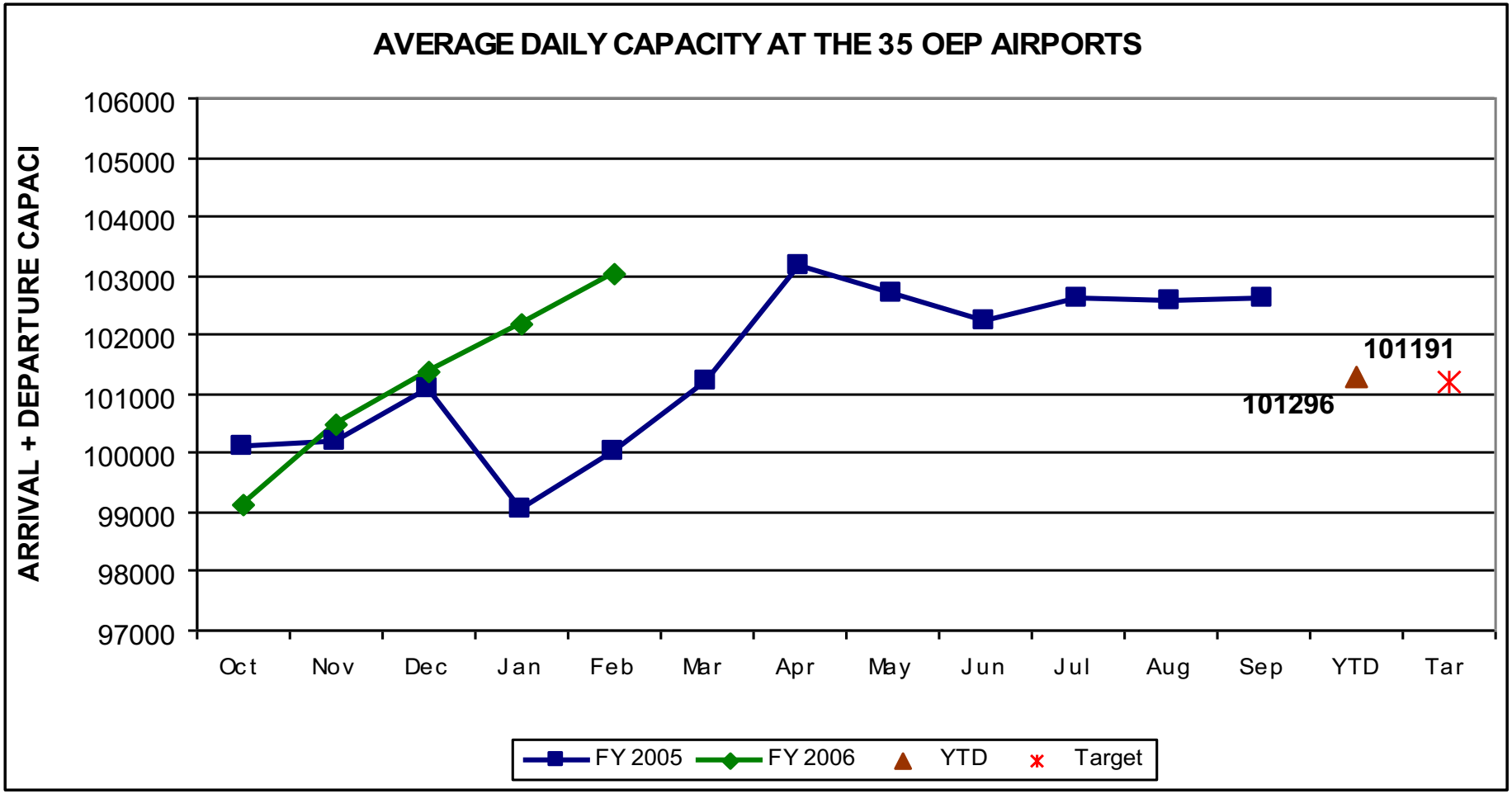

AVERAGE DAILY CAPACITY AT THE EIGHT METROPOLITAN AREAS
ARRIVAL + DEPARTURE CAPA
72000
70000
68000
66000
64000
62000
60000
70424
68,750
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
YTD
Targ
FY 2006
YTD
Target


NAS ON-TIME ARRIVALS at 35 OEP
Percent On-Time
94.0
92.0
90.0
88.0
86.0
84.0
82.0
80.0
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
YT
Tar
88.35
87.4
FY 2005
FY2006
YTD
Target

FY 2006 Category A&B Runway Incursions
(Counts & Rates)



* FY 2006 Rates may contain estimated operation counts. The Rate is cumulative from month to month


AVERAGE DAILY CAPACITY AT THE 35 OEP AIRPORTS
ARRIVAL + DEPARTURE CAPACI
106000
105000
104000
103000
102000
101000
100000
99000
98000
97000
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
YTD
Tar
101191
101296
FY 2005
FY 2006
YTD
Target

OE: FY06 Critical Acquisitions on Schedule and Budget

- **FY06 85% Acquisition Target**
  - Cost Target: Ensure 85% of major baseline Capital Investment programs are within 10% of budget.
  - Schedule Target: Ensure 85% of major Capital Investment programs meet established activity milestone schedule dates
  - Status
    - Current FY06 Cost targets are within their 10% budget thresholds.
    - 100 % of the 85% Schedule milestones are on schedule.
      - Nine (9) of the 39 Final milestones (23%) have been completed on or ahead of schedule through the December reporting period.
      - Eight Interim milestones (57%) have also been completed through December
    - 39 milestones are being tracked against 31 programs for the FY06 85% Acquisition Goal
    - Fourteen (14) interim milestones are also tracked and not included as part of the 85% Acquisition Performance Goal Metric
    - A total of 53 milestones will be statused each month (the 39 + the 14)

OE: Critical Acquisitions on Schedule and Budget

– Four Final milestones are due in January.