



Advance Planning Through Schedule Analysis

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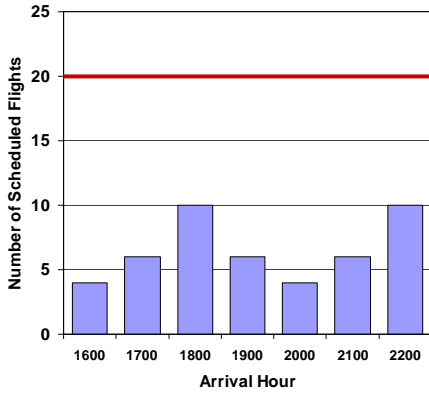
6th USA/Europe ATM 2005 R&D Seminar

Baltimore, MD, USA

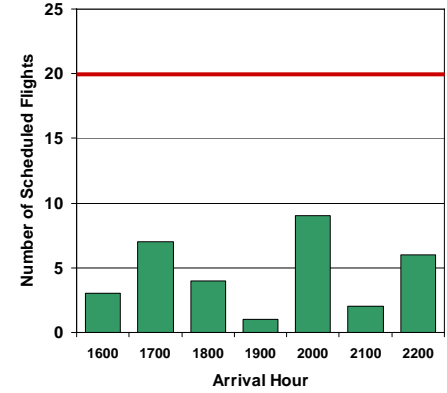
June 29, 2005

Current NAS Scheduling Problem

Carrier A Schedule

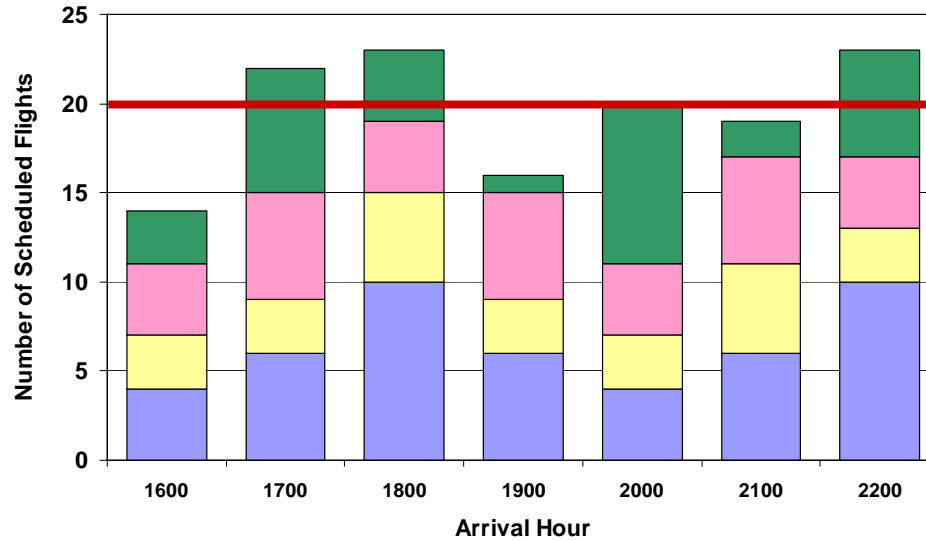


Carrier D Schedule



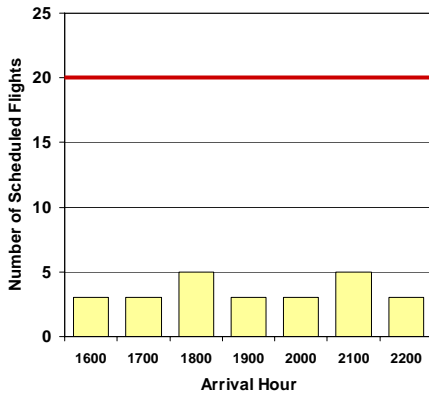
Airport capacity is 20 arrivals/hour

Collective Schedule At Airport

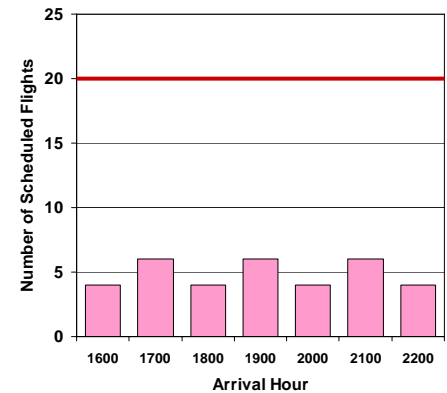


Demand exceeds capacity!

Carrier B Schedule



Carrier C Schedule



Result

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration (FAA)

[Docket No. FAA-2004-16944]

Operating Limitations at Chicago O'Hare International Airport

ACTION: Notice of scheduling reduction meeting and request for information.

SUMMARY: The FAA will conduct a meeting to discuss flight reductions at Chicago's O'Hare International Airport (O'Hare) to reduce overscheduling and flight delays during peak hours of operation at that airport. This meeting is open to all scheduled carriers,

Busiest Airports:

- 1) ORD
- 2) ATL
- 3) DTW
- 4) LAX
- 5) **IAD**
- ...
- 24) IAD



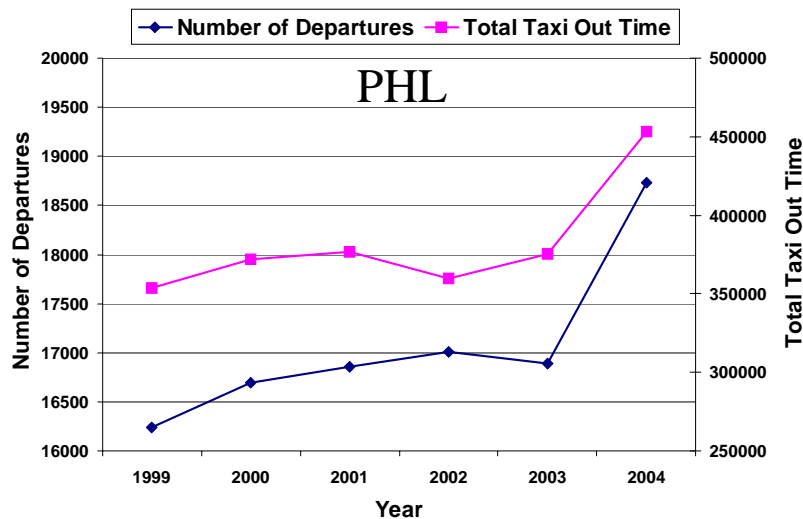
PROPOSED DEMAND MANAGEMENT PROGRAM FOR BOSTON LOGAN INTERNATIONAL AIRPORT

SUBMITTED IN ACCORDANCE WITH FAA'S AUGUST 2, 2002 RECORD OF DECISION ON THE LOGAN AIRSIDE IMPROVEMENTS PLANNING PROJECT

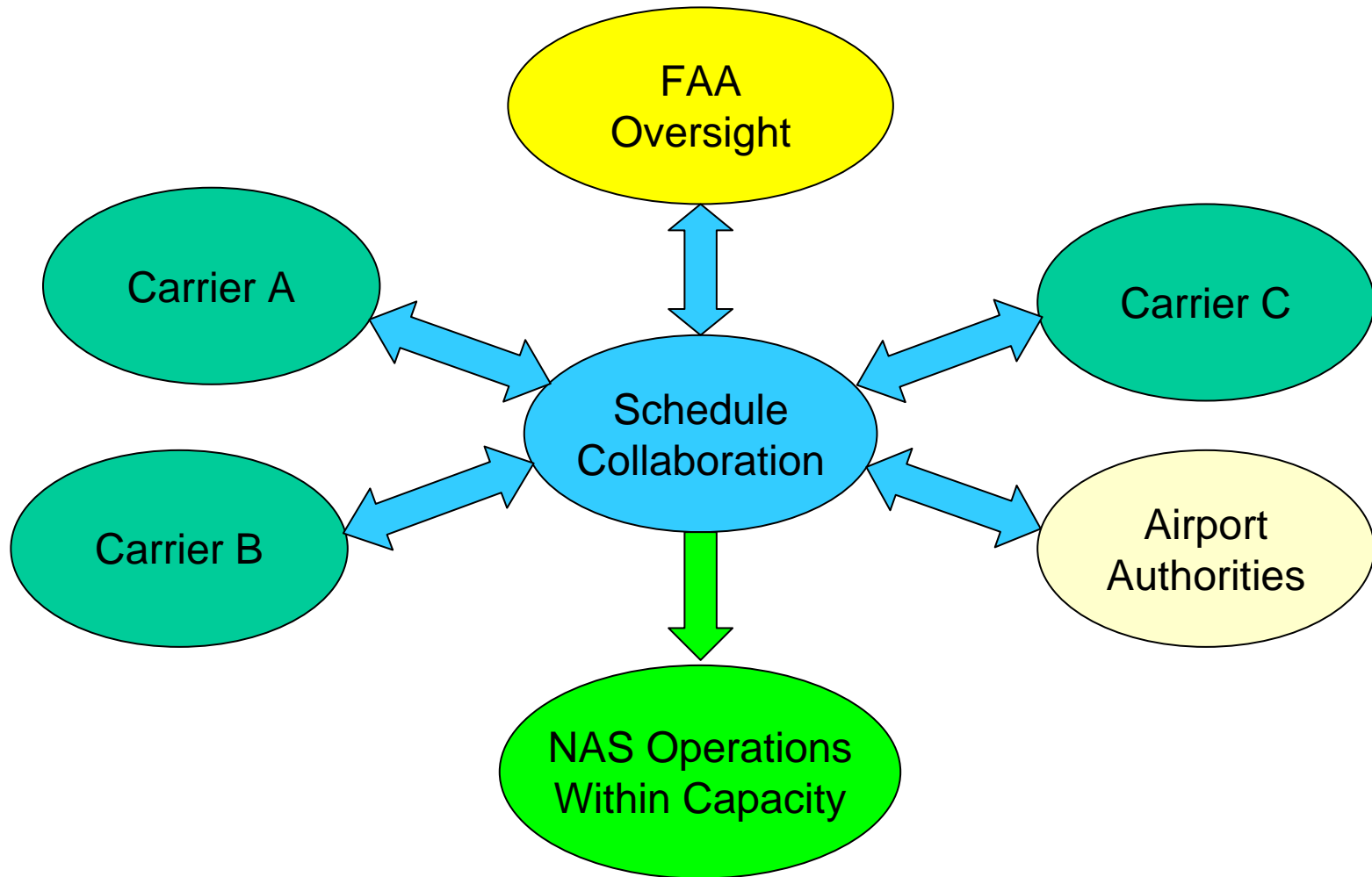
Prepared for:
Federal Aviation Administration

Prepared by:

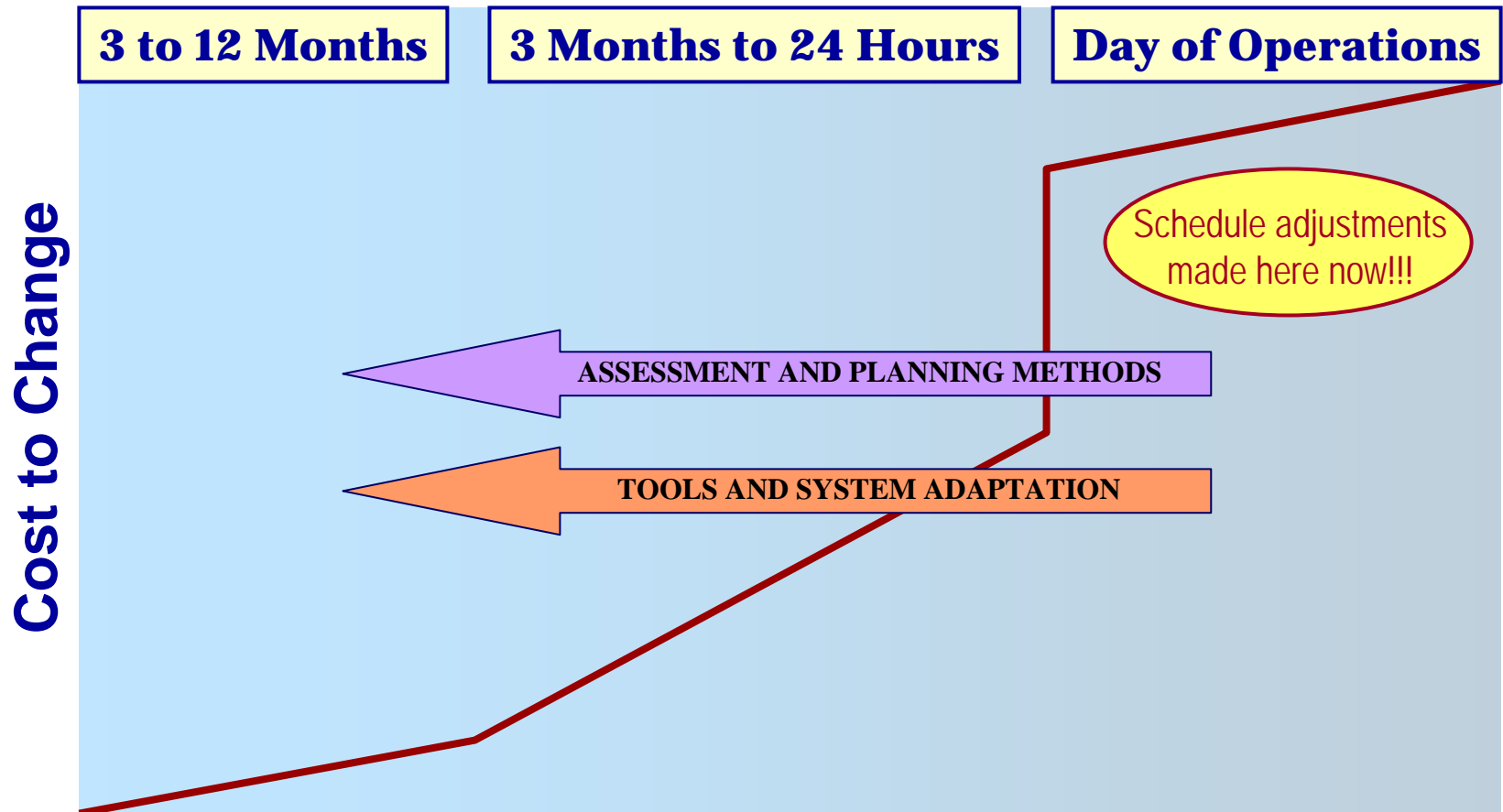

May 2004



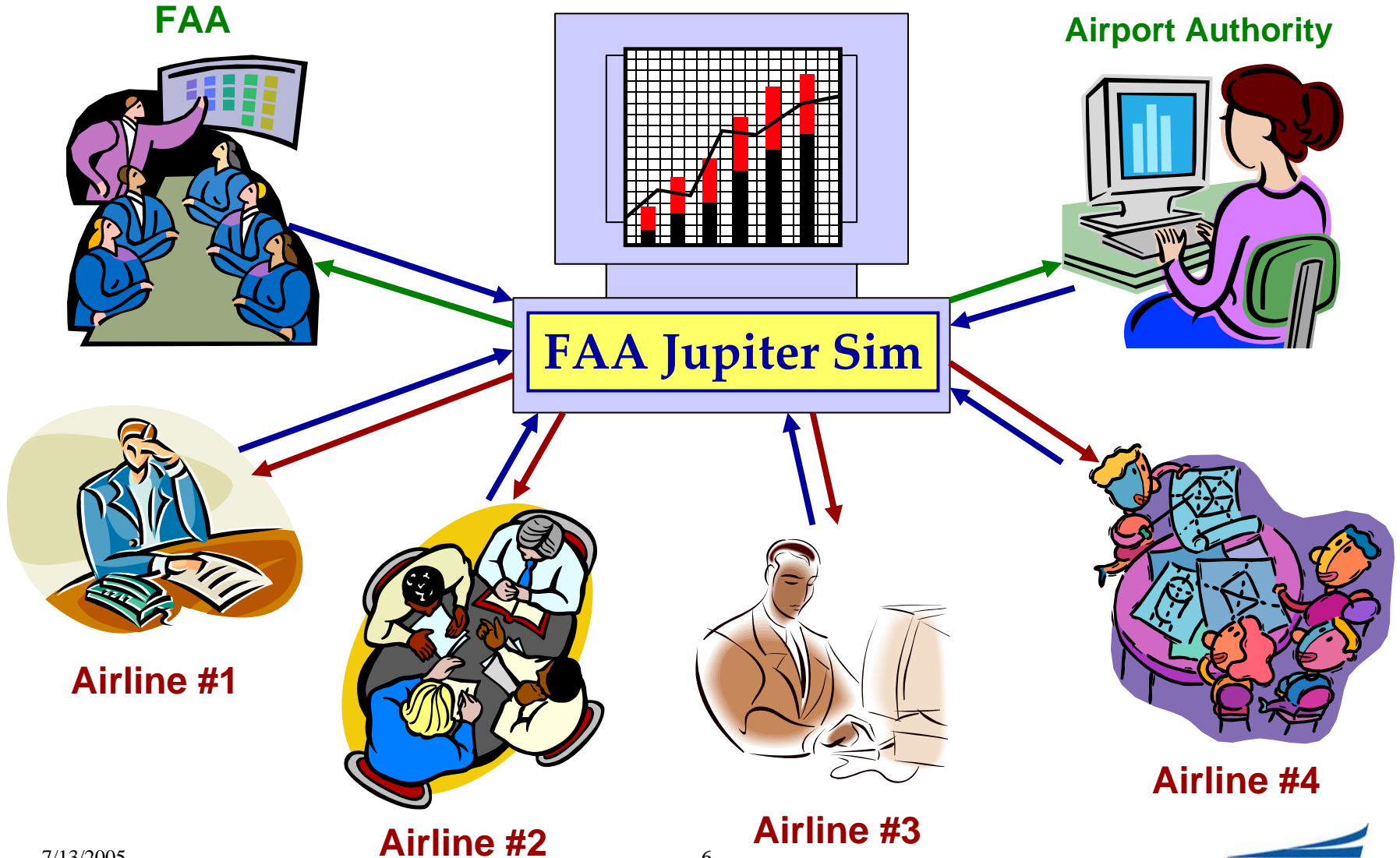
Solution



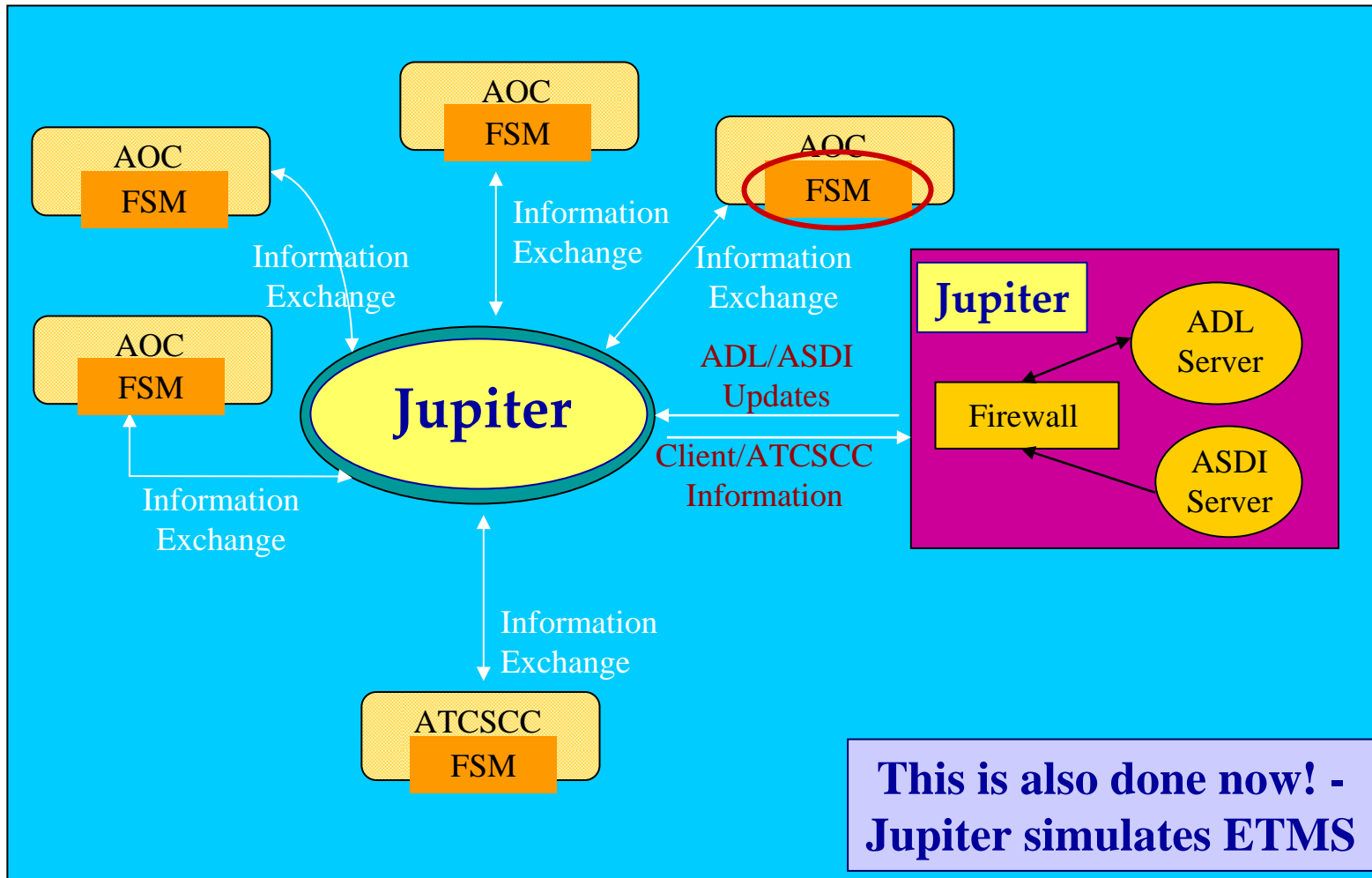
Phases of Airline Planning



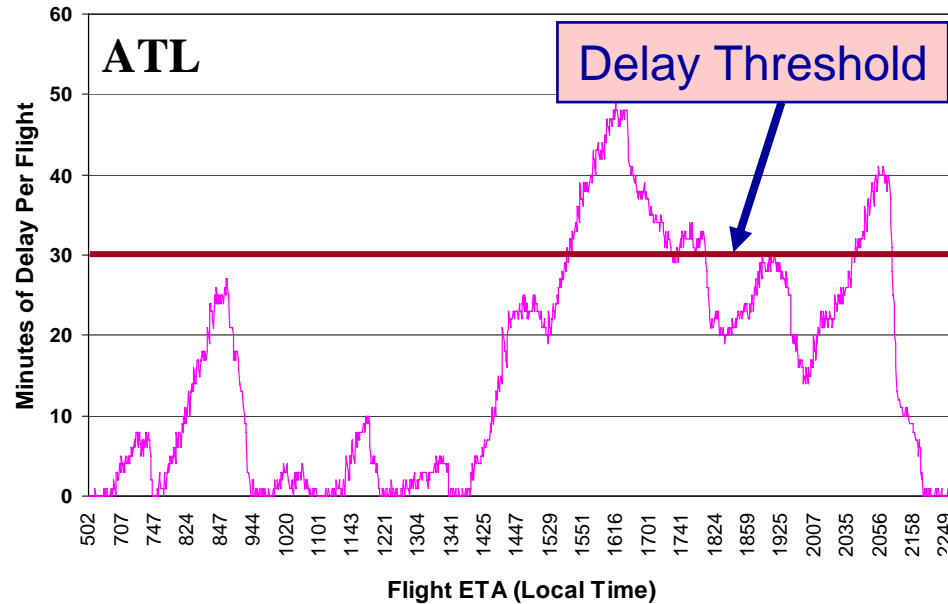
Monitoring System



This Is Done Now! – CDM

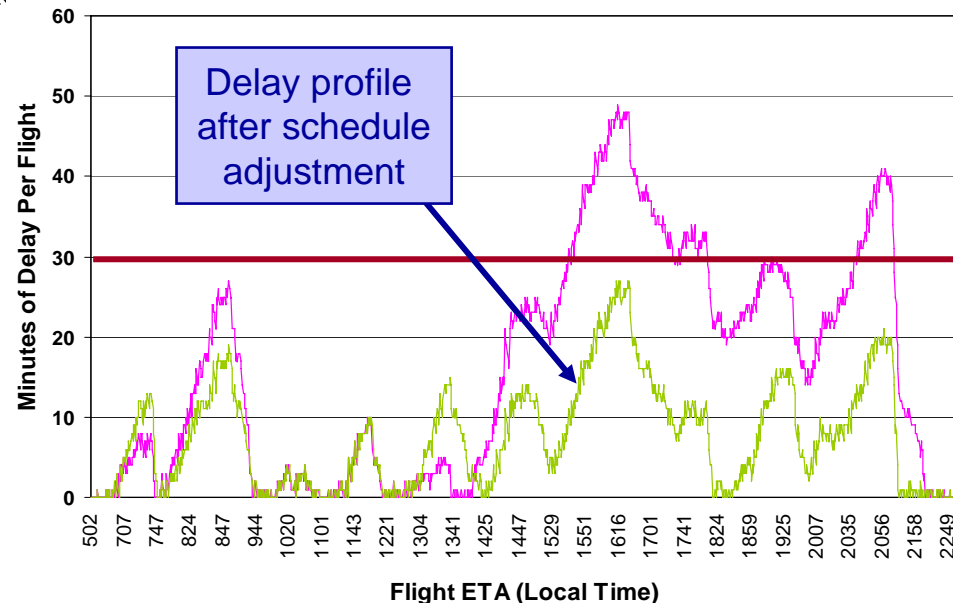


Schedule Analysis and Adjustment

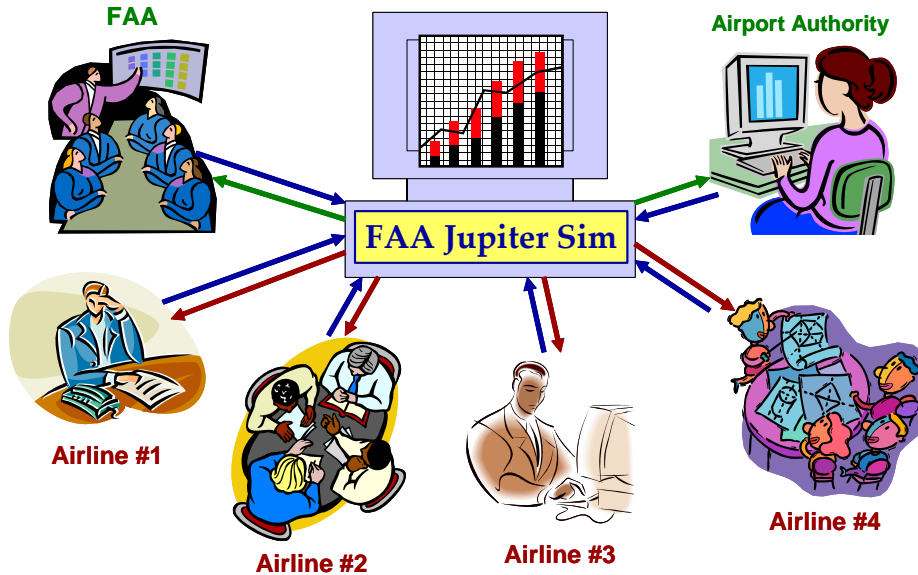


- 1) Calculate delay profile.
- 2) Determine if delay threshold is exceeded.

3) Airlines can adjust own schedules to bring delay profile below delay threshold.



Market-Based Solutions

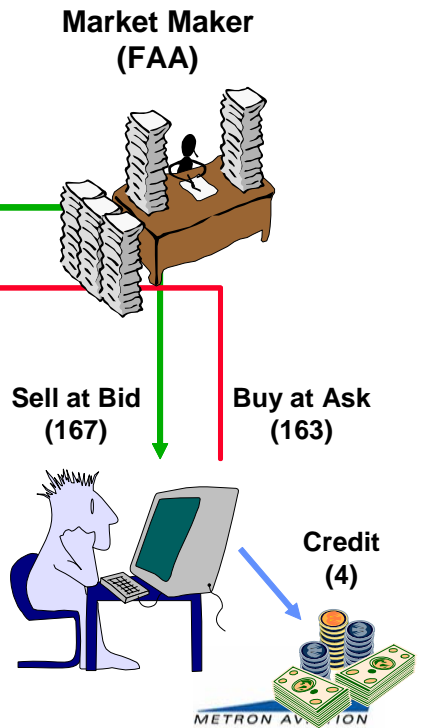


What if a solution cannot be had by airline schedule adjustments?

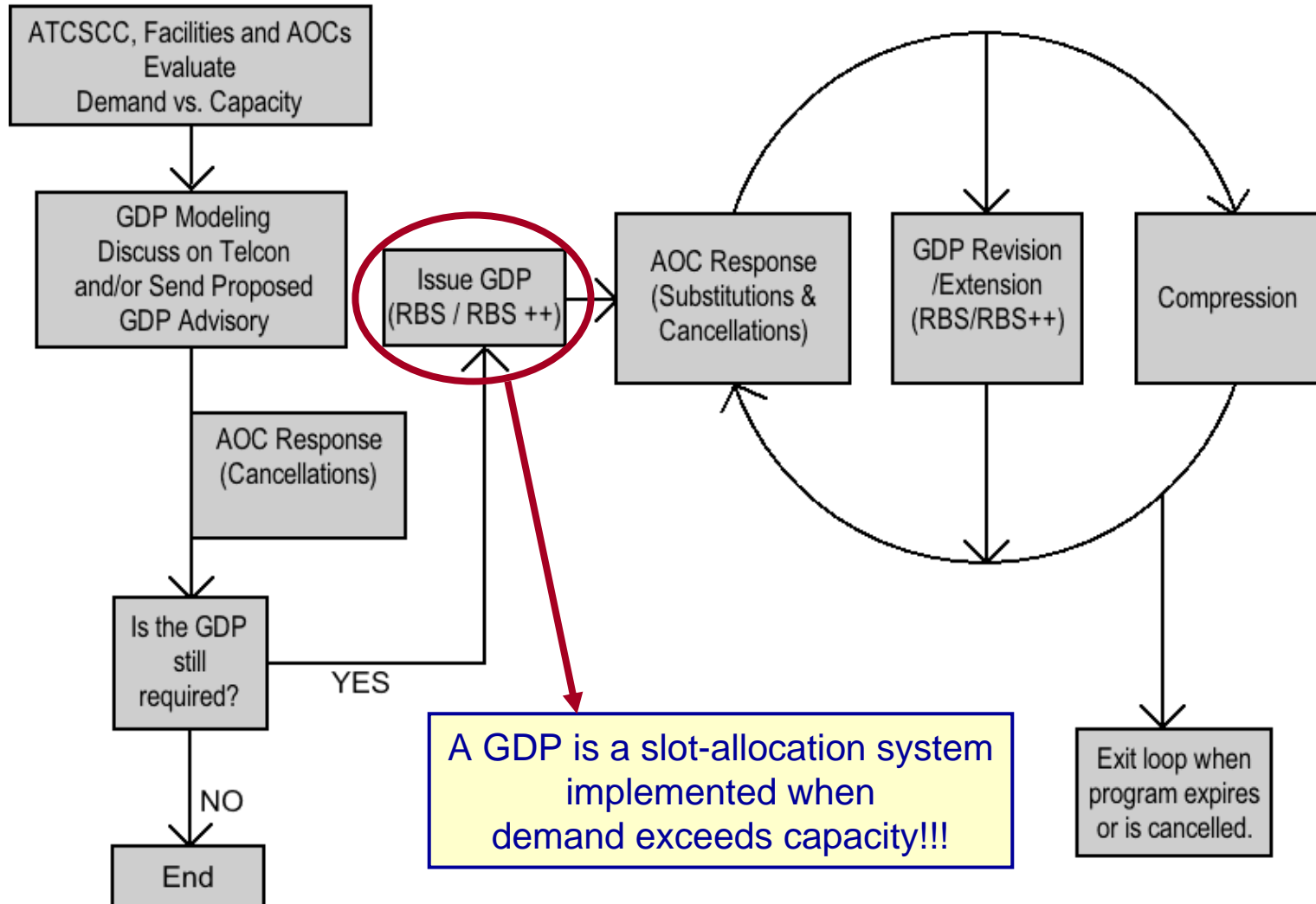
Implement market-based solutions to over-scheduling

Results from first stage are valuable input for second stage

Before		
Slot	Bid	Ask
1800	100	110
1801	99	105
1802	98	99
1803	97	99
...		
1815	80	90
1816	80	83
1817	79	85
1818	78	80
...		
1830	55	56
1831	54	55
1832	54	60
...		
1845	15	17
1846	15	16
1847	14	17
...		



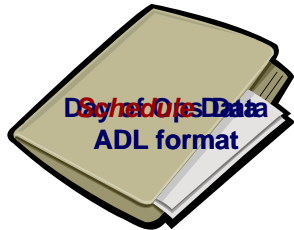
CDM GDP Process



Use FAA Tools & Techniques



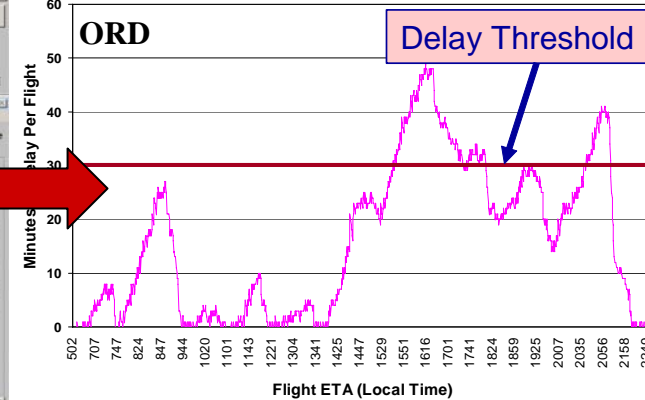
Oct 05



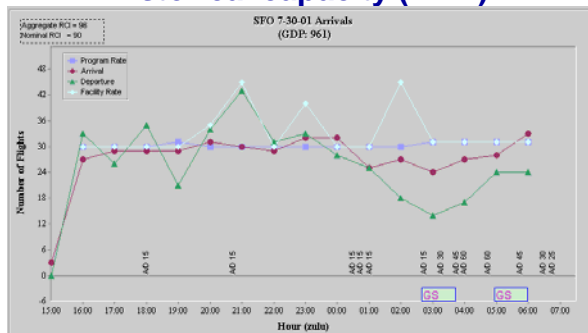
Oct 05



Daily Report



Historical capacity (AAR)



Runway Openings/Construction



Airport Authority

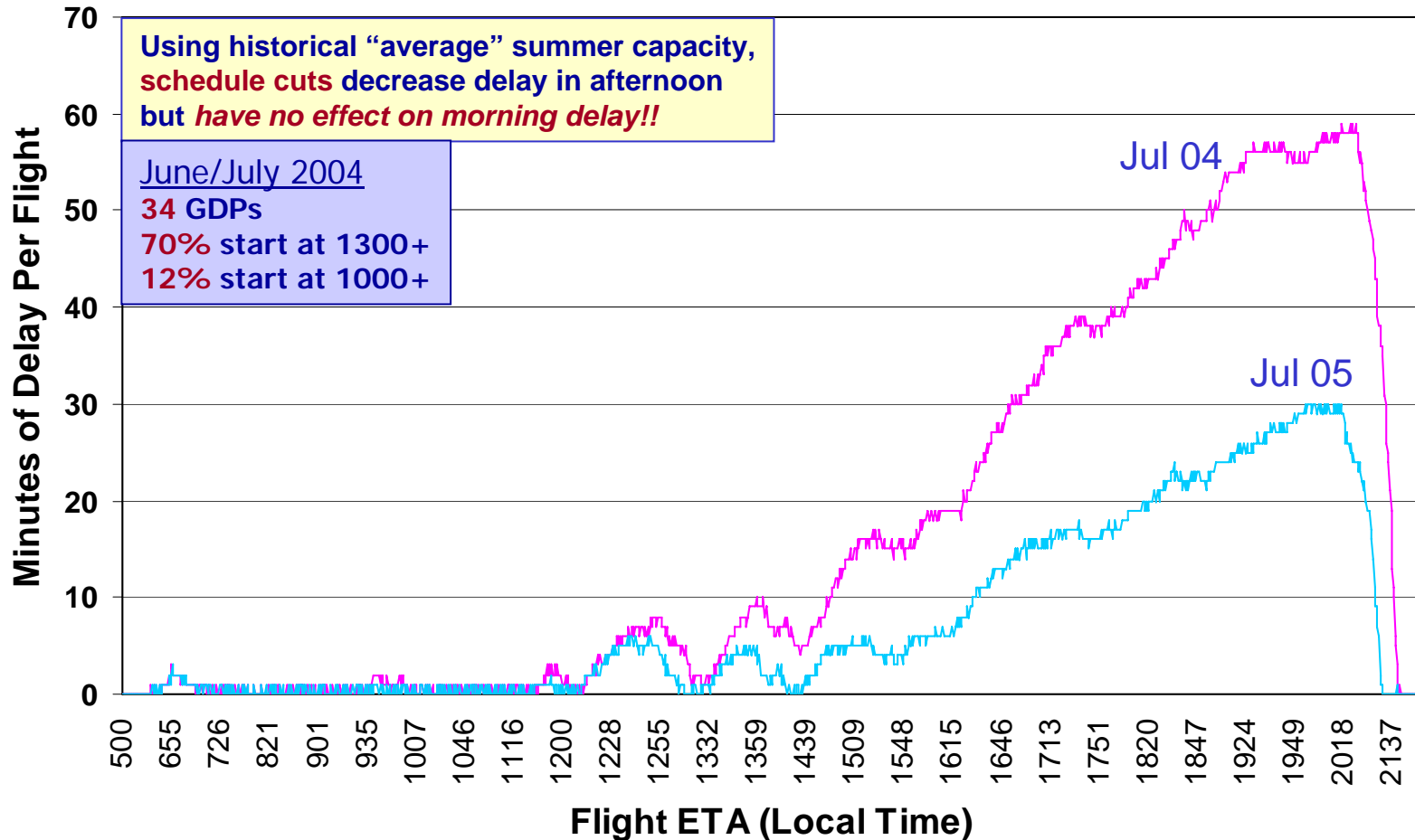


7/13/2005



Optimal Use of ORD Capacity?

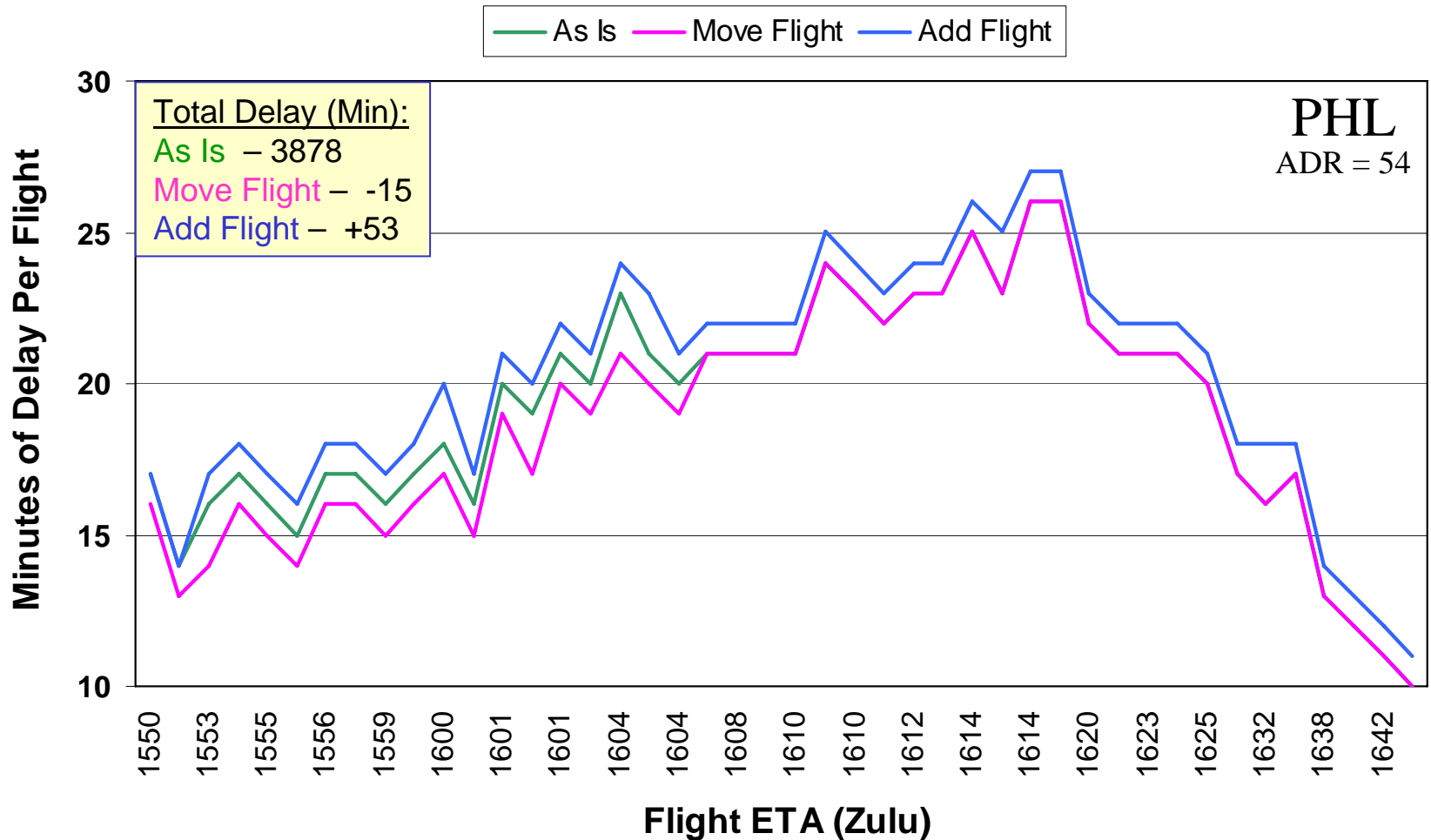
Delay Per Flight By Time of Day



Assuming a GDP in place from 1300 to 2030 at 85 Rate, 100 rate rest of day

The “Cost” of A Single Flight

Delay Per Flight By Time of Day - 11 Nov 04



Already Working With Airlines

Several airlines have asked for our help in analyzing their future schedules

 U.S. AIRWAYS

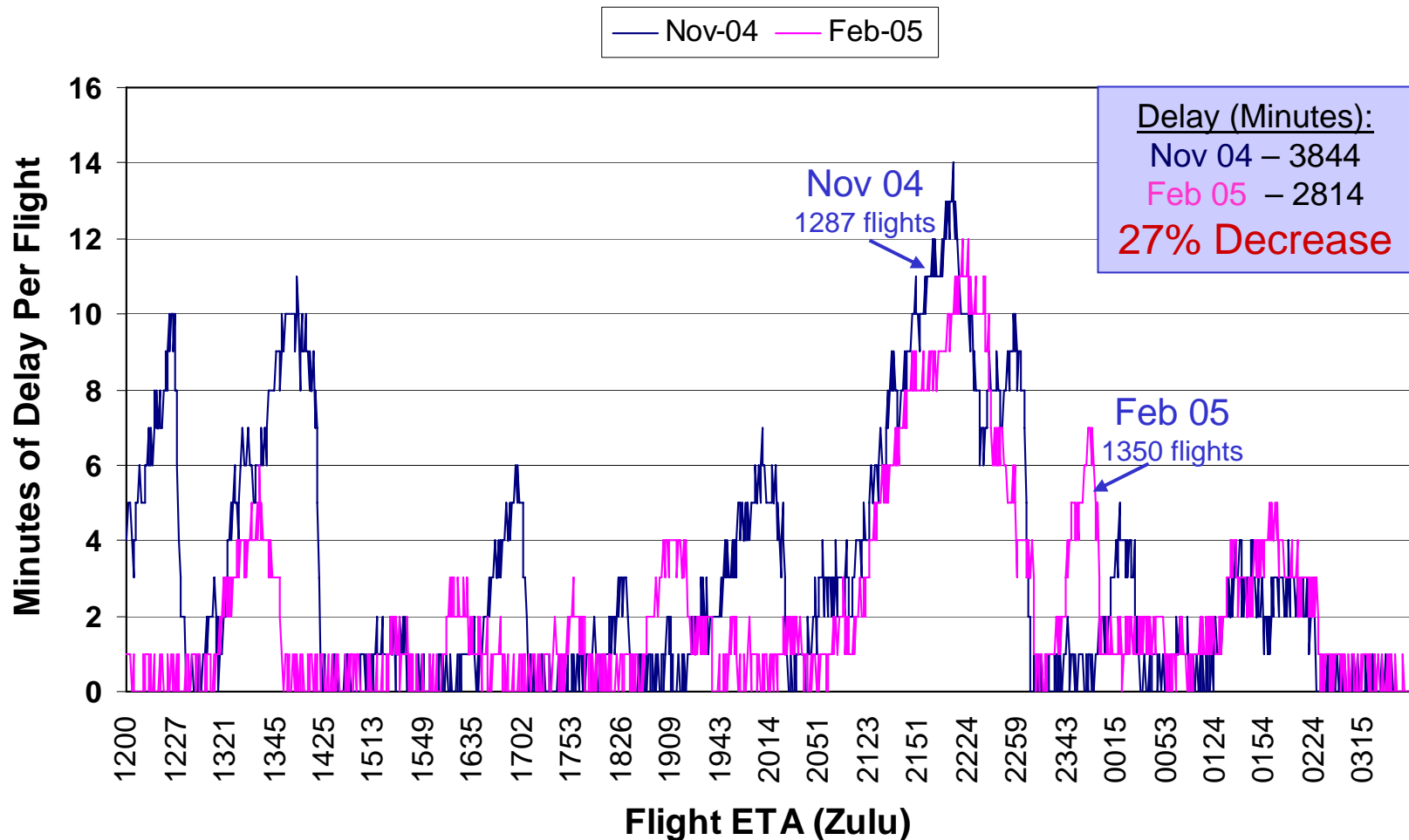
 Delta

jetBlue
AIRWAYS®


Delta
Connection

DAL Changes ATL Schedule

Flight Delay By Time of Day



Assuming a GDP in place from 1800Z to 0030Z at 86 Rate, 94 rate rest of day

Airline Feedback



“We are extremely pleased with the [FSM schedule data file] you provided us.”

“We have found it very helpful in estimating the impact of different arrival rates on our future schedule into ATL.”

Benefits

- Airport use is *optimized* by dynamic monitoring of scheduled demand vs. airport capacity (both change).
- By doing this prior to the day of operations, airport is not over-scheduled, and unused capacity is reallocated.
- Lower cost to airlines – account for capacity changes, e.g. runway closures, before schedules even set. (Today handled with GDP on day of operations).
- Identify unintended consequences of congestion management initiatives (i.e. ORD scheduling issues)
- Proactive, not reactive! Cannot afford to evaluate capacity gains/losses after the fact!!!

Steps to Implement

1. Have airlines submit schedules, combine in central repository (data is protected). Look for unused capacity or local peaking.
2. Detailed historical capacity analysis and incorporate known capacity increases/decreases into more accurate assessment of available airport capacity.
3. Simulate effect of any congestion management solution prior to implementation, admin or market-based mechs.
4. Expand monitoring to all NAS airports – foresee/mitigate future over-scheduling and/or wasted capacity.
5. Schedule monitoring system becomes interactive and dynamic. Airlines submit schedule updates and see aggregate demand. Capacity and demand regularly monitored for optimal airport capacity utilization.