Advance Planning
Through Schedule Analysis

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### Current NAS Scheduling Problem

- **Carrier A Schedule**
- **Carrier B Schedule**
- **Carrier C Schedule**
- **Carrier D Schedule**

**Airport capacity is 20 arrivals/hour**

**Collective Schedule At Airport**

**Demand exceeds capacity!**
Result

DEPARTMENT OF TRANSPORTATION
Federal Aviation Administration (FAA)
[Docket No. FAA--2004--16044]

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

PROPOSED DEMAND MANAGEMENT PROGRAM FOR
BOSTON LOGAN INTERNATIONAL AIRPORT
SUBMITTED IN ACCORDANCE WITH FAA'S AUGUST 2, 2000 GUIDELINE OF
DECISION ON THE LOGAN AIRPORT IMPROVEMENTS PLANNING PROJECT

Prepared for:
Federal Aviation Administration

Prepared by:
May 2004
Solution

FAA Oversight

Carrier A
Carrier B
Carrier C
Airpool Authorities

Schedule Collaboration

NAS Operations Within Capacity
Phases of Airline Planning

- **3 to 12 Months**
  - Tools and System Adaptation

- **3 Months to 24 Hours**
  - Assessment and Planning Methods

- **Day of Operations**
  - Schedule adjustments made here now!!!
Monitoring System

FAA Jupiter Sim

FAA
Airport Authority

Airline #1
Airline #2
Airline #3
Airline #4
This Is Done Now! – CDM

This is also done now! - Jupiter simulates ETMS
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

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A GDP is a slot-allocation system implemented when demand exceeds capacity!!!
Optimal Use of ORD Capacity?

Delay Per Flight By Time of Day

Using historical “average” summer capacity, schedule cuts decrease delay in afternoon but have no effect on morning delay!!

June/July 2004
- 34 GDPs
- 70% start at 1300+
- 12% start at 1000+

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

[Diagram showing delay per flight by time of day with various lines representing As Is, Move Flight, and Add Flight.]

- Total Delay (Min):
  - As Is – 3878
  - Move Flight – -15
  - Add Flight – +53

ADR = 54

7/13/2005
Already Working With Airlines

Several airlines have asked for our help in analyzing their future schedules
Dal changes ATL schedule

Flight delay by time of day

Delay (Minutes):
Nov 04 – 3844
Feb 05 – 2814
27% Decrease

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

1200 1227 1321 1345 1425 1513 1549 1635 1702 1753 1826 1909 1943 2014 2051 2123 2151 2224 2259 2343 0015 0053 0124 0154 0224 0315

Flight ETA (Zulu)

Minutes of delay per flight

Nov 04 1287 flights
Feb 05 1350 flights

7/13/2005
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.