AIRLINE OPERATIONS MANAGERS: AN INTRODUCTION TO THE THIRD LEG OF THE NATIONAL AIR TRANSPORTATION SYSTEM

Karen Feigh & Amy Pritchett
Georgia Institute of Technology

6th FAA/EUROCONTROL ATM R&D Seminar
June 29th, 2005
Outline

- Airline Operational Managers (AOM)
- Introduction to Contextual Inquiry
- Cognitive Models
  - Flow Model
  - Physical Models
  - Artifact Models
  - Cultural Model
  - Sequence Models
- AOM Impact on NAS Performance
Airline Operational Managers

✦ Primary Task
  ✦ maintain the airline’s published schedule
  ✦ ensuring that the on-time arrival and departure rates are within acceptable limits

✦ Techniques
  ✦ Canceling flights or segments
  ✦ Delaying flights or segments
  ✦ Adding additional flights or aircraft
  ✦ Swapping aircraft, pilots, crew

✦ Experience
  ✦ 20+ years in company
Contextual Inquiry

- Interviewing technique described by Beyer & Holtzblatt

- 4 Guiding Principles
  - Context – interview must be conducted in context
  - Partnership – adopt a mentor-mentee relationship
  - Interpretation – observations should be transformed into a set of cognitive models
  - Focus – interviewer should be an active observer: asking questions and steering conversation
Cultural Model

Federal Agencies
- TSA “Feds”
- FAA
- ATC

Airline Customers
- Don’t overload us
- Strategic plans for the next 2 hours
- Please don’t cancel my flight
- I’ll try to accommodate you later today
- Please give me enough time
- Don’t over tax
- Please leave me with a clear game plan
- Help each other out
- Grow a thicker skin
- Targets/Wall of shame

Inside Airline
- Ground Crew
- Crew
- Other Shifts
- Other Sector Managers

Airline Corporate
- Financial solvency
- Don’t cancel profitable flight

Airline
- Corporate
- Customers

Financial solvency
Don’t cancel profitable flight

Don’t cancel profitable flight

Grow a thicker skin

Security, security, security

Help each other out
Flow Model

FAA/ATC -- overall traffic flow

Sector Operational Manager
-- decides when to delay aircraft
-- decides which aircraft to delay
-- decides which segments to add

Current Delay Stats
Weather
Current Delta status
News
ATC Status

FAA Plans for next 2 hours

Big Screen Displays

Status Updates
Requests

Announcements
Flight Status
Projected Ground Time
Flight History
Crew Situation

Desktop Computer System

Printer

Status Updates
Requests

Handover Report

Maintenance

Flight Controllers

Phone System

Cordless Phones

Tower

Security Delay

Other Sector Managers

Overall Airline Control

Current Delay Stats

Strategic Plan Report

Current Delay Stats

Future Delay Stats

Requested Changes

Status Updates
Requests

Requests

Requests

Requests

Requests
Artifact Model: Desktop

W1:4 Weather windows
TB1:4 Text based windows

Lit when on phone

Each phone has a distinctive ring tone

W1
W1
W3
W4

TB1
TB2
TB3
TB4

Radar Screen

Phone Display (touch-screen)

Reconfigurable

Keyboard

Note pad

Printer

CTV of the Tarmac
Artifact Model: DLTERM32

- Old text-based interface
- Primary interface used
- Primary source of information
- Requires memorization of text commands much like Unix or Linux
- Typos are a frequent problem
Artifact Model: ODT

- List of flights ranked by arrival time
- Serves as a primary cue
- Has 3 views, but only Duty Roster seems to be used
- Weather and NOTAM are provided by other packages
Artifact Model: Predicted Airport Demand

Tool provided by the FAA via the web

- Shows previous airport demand
- Current airport demand
- Predicted airport demand

• Predicted demand exceeds capacity
• Cue to sector manager
Sequence Model: Get plane in ahead of other traffic

• Trigger: Airline Tower Call
  – Indicated that an aircraft was significantly behind its scheduled arrival time
• Intent: Verify that aircraft is behind lots of other traffic & if so plot solution

• Intent: Aircraft will be OK if it can be brought in ahead of all other Airline traffic

• Intent: Make sure that the passengers make their connections even if it means holding other aircraft for a few minutes

• Intent: Keep the Airline Tower up to date
• Intent: Make sure that the plane has a place to go when it gets down

• Checked graphical location of aircraft on radar display
• Pulled up info on aircraft on the text-based window

• Got up and went to talk to the FAA SOM to ask if the aircraft can have priority
• FAA contact will talk to his counterpart with the commuter airline

• Calls dispatcher to tell them about connections so dispatch might hold the planes and allow the connections to be made

• Calls Airline Tower back and updates him of current status
• Checks the gate availability
Sequence Model: Fuel Delays

- Trigger: Using the ODT, East SOM noticed that a plane out of Raleigh was late for no apparent reason.
- Intent: Find out what might be causing the delay.
- Intent: Ask for tankering out of Hub to minimize overall system delays caused by Raleigh.
- Intent: To inform Raleigh that the request had been denied and why.
- Intent: To inform his fellow sector managers and to find out if any of them knew, and how he managed not to know about the fuel shortage.
- Intent: To inform follow on crews about the fuel shortage and Raleigh delay issues.

- E-SOM used TERM32 to review aircraft’s history and found that something had happened at Raleigh when he was not on duty.
- Called a Raleigh to find out what was holding the plane up.
  - Found out that an F-18 had crashed by the fuel farm and the wreckage was blocking the road to get fuel trucks to and from the terminal, causing delays.
  - Asked to tanker at Hub for the weekend.
- Walked to the Duty Director to see if it would be possible to tanker out of Hub for the weekend.
  - No, Hub has a fuel shortage problem.
- Called Raleigh back to tell bad news that they will just have to take the delays.
- Shouted over to Hub & Central SOM stations to tell about Hub fuel shortage.
- Wrote down the Hub fuel shortage and the Raleigh tanker delay problems in the SM activity report.
AOM Impact on NAS Performance

- AOMs minimize disturbances from requiring ATC intervention
  - 2004 Re-routing of all Tampa Bay area air traffic
- AOMs implement ATC flow control measures
  - Managing airline’s response to GDPs and GSPs
  - Response in turn influences duration and effectiveness of GDPs & GSPs
  - Coordinate with dispatchers to ensure adequate fuel for playbook re-routes
Conclusions

- NAS has 3 main players
  - ATC
  - Pilots
  - Airlines that employ the pilots – AOMs in this context
- AOMs serve as an extension of ATC flow control
- AOMs play a large role in the ability of air traffic to recover after operational disruptions
- R&D is needed to enable speedier airline responses to schedule disruptions
Comments & Questions

The Floor is Now Open