Fleet Assignment Model (FAM)

Topics Covered

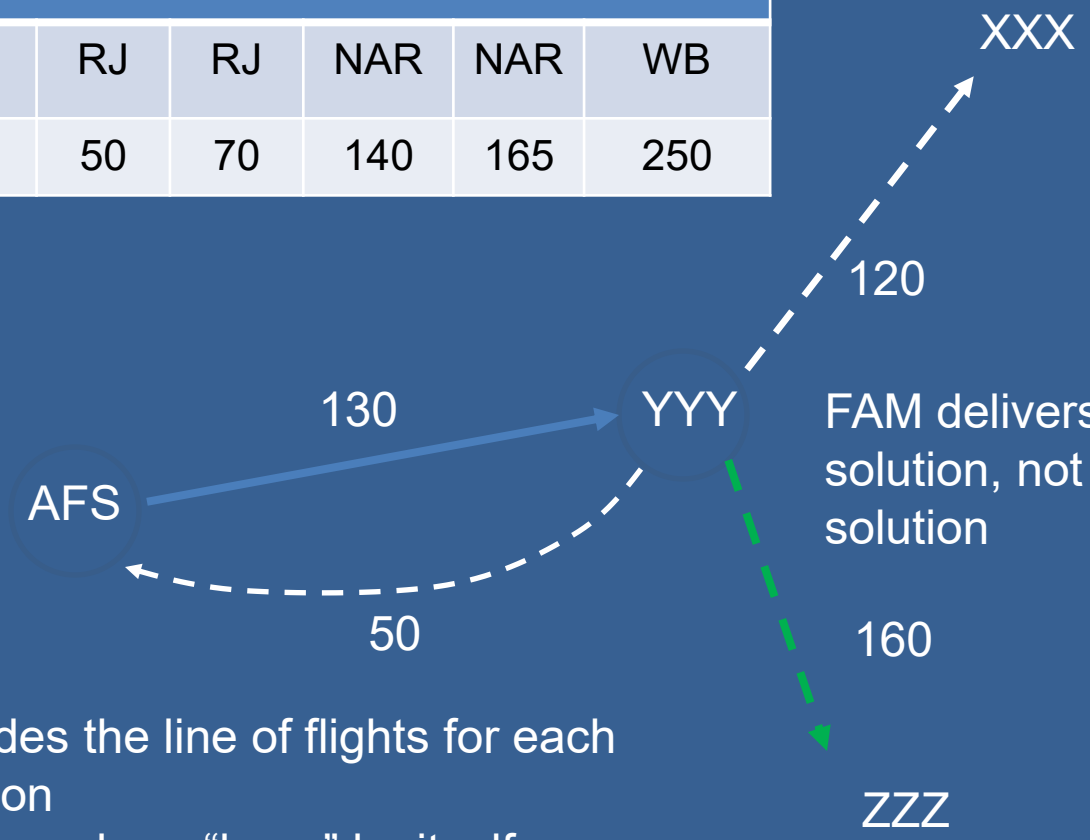
- Why FAM ?
- Basic Concept of FAM
- Importance of Accurate Forecasting
- Usages of FAM
- Flight Retiming in FAM
  - Heuristic forecast in FAM
- FAM Constraints and Incentives

Why FAM ?

- One crucial condition to build profitable schedule is the ability to match capacity to demand
- Especially important for carriers which manage a mix of equipment that has a range of seat capacities
- How can FAM decide optimum capacity for each operation?

Basic Concept of FAM

Total Dmd	130					
Equipment	T	RJ	RJ	NAR	NAR	WB
Capacity	46	50	70	140	165	250



FAM delivers network solution, not myopic local solution

FAM implicitly decides the line of flights for each aircraft in the solution
A single operation may be a “loser” by itself
Yet the complete line the operation belongs to contributes positively to the system profit

FAM Requires an Accurate Forecast

- FAM produces profitable schedule only if the Forecast Model provides good demand, revenue, and profit forecast values

- Complaints of questionable equipment swaps or frequency changes are often due to questionable forecasts
  - External factors (forecast input such as market size)
  - Internal factors (deficiencies in forecast methodology)
    - Modeling competition with OA (market share)
    - Predicting correct yields for flight operations at different ToD
  - FAM related factors
    - Predicting yield variation as capacity changes
    - Modeling passenger recapture when down gauge or cancel flight

Usages of FAM

- Strategic Planning and Studies
  - Selection and De-selection of Hubs
  - Hub Bank Structure
  - Profitability Impact by changing Aircraft Ground Time or Passenger Connection Time
- Fleet Planning
  - Optimum Fleet Plan
- Operational Plans
  - Recommend capacities and non-stop frequencies

Flight Retiming in FAM

- Re-timing of flights is required
  - To bring schedule back to count after block time changes
  - To resolve gate conflicts
  - To adjust schedule because of equipment swaps
  - To optimize profit

- *But thoughtless re-timing can break O&D connections.*

- Need the ability to efficiently and accurately forecast the profit impact of re-timing flights

Heuristic Forecasting in FAM

- Determines the system demand revenue impact when a flight is re-timed assuming every other input remains unchanged

- Converts the demand into observed and computes FAM revenue change

FAM Constraints / Incentives

FAM Constraints

- Model needs Operational constraints:
  - Aircraft Count
  - Block Time
  - Gate Count
  - Minimum Ground Time
  - Airport Curfews
  - Aircraft Range
  - Station and or Segment Aircraft Restrictions

FAM Constraints

- Model needs Structural Constraints
  - Fleet Assignment
  - Frequency Level
  - Market Protection
  - Flight Protection
  - Remain on Input Fleet Retention
  - Directional Symmetry
  - Retime Parameters

FAM Incentives

- Schedule Continuity
  - Existing flights are given a revenue incentive to remain within their body type
  - Calculated based on mileage and a table of multipliers
- Airport Presence Isolation
  - Based on flights revenue contribution to rest of system