

ISyE 4803
Advanced Supply Chain Logistics
Fall 2008

Reading Assignment 10

Due Date: November 13, 2008

Read the materials below in preparation for discussion in class. The questions are intended to guide your reading and thoughts, but are not the only aspects that will be discussed in class.

1. Rosenberger, J.M., Schaefer, A.J., Goldsman, D., Johnson, E.L., Kleywegt, A.J., and Nemhauser, G.L., "A Stochastic Model of Airline Operations," *Transportation Science*, vol. 36, nr. 4, pp. 357–377, 2002.
 - (a) List the sequence of problems that form part of the optimization of airline operational plans.
 - (b) Describe the flight scheduling problem. Be sure to clearly specify the decision variables.
 - (c) Describe the fleet assignment problem.
 - (d) Describe the aircraft rotation problem.
 - (e) Describe the crew scheduling problem.
 - (f) Describe the crew assignment problem.
 - (g) The problems that form part of the optimization of airline operational plans are typically solved sequentially. That is, one problem is solved first, and its output forms part of the input of the next problem. However, often significantly better overall plans could be obtained if all these problems could be solved simultaneously. (Usually the overall problem is intractable.) Explain why better solutions can be obtained if these problems are solved simultaneously. Be very specific in your explanation.
 - (h) List the problems that form part of the optimization of airline recovery operations.
 - (i) Describe the input of the model of airline operations in the paper.
 - (j) Describe the state of the airline operations process.
 - (k) Describe the events that result in a change of the state of the airline operations process.
 - (l) Describe the airline operational decisions. For each of these decisions, give an example of a typical form that the decision takes. For example, if the decision is the number of cans of Coca-Cola to put on the flight, the form of the decision could be to choose a fixed percentage, based on historical usage data, such as 20%, and put a number of cans of Coca-Cola on the flight equal to 0.2 times the number of passengers on the flight.

- (m) Explain the operational performance measures discussed in the article.
- (n) Propose operational performance measures not discussed in the article. Be very specific.
- (o) Explain the 4 types of schedules evaluated with SimAir.
- (p) Compare the performance of the 4 types of schedules evaluated with SimAir.