



A RELIABILITY-DRIVEN MODEL FOR AIRLINE CREW VACATION GRID OPTIMIZATION

Company Name:

Sabre Corporation

Product:

An optimization model/program and corresponding user manual.

The Problem:

Inefficiently scheduled airline crew cause poorly staffed flights, which lead to company risk and customer dissatisfaction.

The Solution:

A reliability-driven model, which optimizes airline crew vacation days and analyzes differences from changes in parameters or constraints including reliability level.

Team Members:

Madison Kiefer*

Douglas Graham

Rachel Grout

Devyn Heslep

Ingram School of Engineering

Texas State University

May 10, 2018



Background

Sabre Corporation, a company based out of Southlake, Texas, is a global technology leader in the travel industry. Sabre began in 1960 as a joint initiative between IBM and American Airlines to create a computerized airline reservation system. Being one of the world's largest software companies to date, Sabre's technology is utilized by more than a billion people across the world to plan, book and travel to their desired destination as efficiently as possible.

The Problem

The airline crew planning problem our team has been tasked with is to optimize the number of crew vacation days allocated annually. Airline crew scheduling is a complex and critical process in all airline operations, and it is necessary for airlines across the world to rely on efficient scheduling to optimize the utilization of their flight crews.

The Solution

A model using a grid system to allocate vacation days for airline crews was prototyped using the Python coding language and the Gurobi optimizer. A graphical user interface (GUI) was then developed to allow users to visually interact with the program. Finally, a user manual was formulated to describe how the GUI is used and to explain the underlying coding behind the mathematical optimization model. There is a trade-off between reliability and the number of vacation days allotted. A higher reliability level produces a lower optimal amount of vacation days. This complex problem is crucial to the airline industry as crew costs are the second highest airline expenditure, only behind fuel costs. On average, saving merely a few percent of overall expenditures can prevent the loss of millions of dollars.