



The Computerworld Honors Program

Honoring those who use Information Technology to benefit society

Final Copy of Case Study

YEAR:
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STATUS:
Laureate

Organization:
Sabre Airline Solutions

Organization URL:
www.sabreairlinesolutions.com

Project Name:
Sabre Advanced Flight Planning Solution Reduces Airline Fuel Consumption, Emissions and Delays

What social/humanitarian issue was the project designed to address? What specific metrics did you use to measure the project's success?

Enable airlines to operate as efficiently as possible and to provide a reduction in both fuel consumption and CO2 emissions. Ever since the first oil crises in the 1970s, the airline industry has started to realize a serious fact: over-exploitation of fossil fuels will lead to the extinction of many players in the airline business. While other industries can more easily switch to alternative energy sources, due to the state of technological advances, air transport will have no choice of alternative fuel resources for many years to come. Fuel is the number one cost for most airlines today. The ability for airlines to properly manage fuel consumption will have a profound impact on both the travel industry and the environment. In addition to reducing fuel consumption, airlines face a series of daunting challenges to maintain profitability while operating in an environmentally sustainable manner, including: carbon emission taxes and compliance schemes; delay costs, scrutiny from governing bodies has intensified with the result that increasing passenger compensation is levied on airlines; airspace congestion and impending airspace management regulations via new traffic flow concepts (such as SESAR in Europe and NextGen in the United States); capacity-limited aircraft systems (mainly aircraft flight management system components); legacy airline flight planning systems without any built-in cost optimizing capabilities. The answer to dealing with these complex challenges and achieving an economical and environmentally friendly airline operation is a modern approach to flight cost management with cost optimized flight planning. Our solution, Sabre AirCentre Flight Plan Manager, offers airlines substantial cost-

savings capabilities, including reduction in fuel burn, emissions and delays. Metrics measured by our solution include: cost savings (per flight leg), fuel savings (per aircraft type per year), and emissions reduction (per year).

Please describe the technologies used and how those technologies were deployed in an innovative way. Also, please include any technical or other challenges that were overcome for the successful implementation of the project.

Flight Plan Manager uses the most advanced and innovative approach to dynamic flight optimization in the world. Automatic route optimization capabilities resolve all operational cost factors simultaneously to calculate an optimized 4-dimensional flight path. The most important step in developing our optimization engine was recognizing that airlines like most companies are interested in minimizing costs. Previous approaches had focused on minimizing time or minimizing fuel, and then amended them to come to a good balance; however, these approaches did not directly address the essence of overall cost reduction. The challenge was to define a correct cost function and fit that optimization into the reality of today's restricted airspace. Appendix 1 shows the entire airspace infrastructure and all of its complexities our solution takes into account when optimizing the route for a flight from Vienna, Austria, to Dublin, Ireland. Appendix 2 illustrates an example of how our solution calculates a minimum cost program for a given flight plan. The "eye" in the middle of the visual indicates the least expensive area to operate in based on the given conditions (speed, weight, temperature, wind). Additionally, our Data Services department plays a pivotal role by constantly monitoring data from various sources and making sure that airspace and airport restrictions are properly represented in the system. And last but not least, it requires training and education at the airline. Pilots and dispatchers need to understand and trust the flight plans produced by the system to achieve the savings in reality.

Please list the specific humanitarian benefits the project has yielded so far.

Flight Plan Manager has a proven record in cost optimization and cost savings, providing significant reduction in both fuel burn and emissions for airlines. Actual airline experiences include an analysis of Airbus A320 and Boeing 737-800 operations. With 90-minute average flights (3,000 flight hours per year), there was a savings of 75,000 U.S. gallons of fuel per year (3 percent savings). This translates to US\$190,000 of reduced fuel costs and 700 tons lower emissions of CO2 per aircraft per year. In addition to fuel and emissions reduction, Flight Plan Manager has a direct impact on the management of delays. Delay costs are recognized by every airline, but unfortunately, they are rarely considered for flight planning purposes. For example, in case of a delay with a high number of connecting passengers on board, the dispatcher may be tempted to re-plan the flight with high-speed cruise to make up lost time. The problem, however, is more complex. For example, in case of an arrival delay, delay costs could rise sharply at 5 minutes of delay, 11 minutes of delay and 27 minutes of delay. These are the points where passengers miss their connections (as depicted in Appendix 3). In this example, there is no benefit in reducing the delay from 24 to 17 minutes, as this will not allow passengers to get to their connecting flights on time. However, a further reduction down to 10 minutes could save a certain amount of delay costs as one group of passengers will then be able to make their connections on time. Decisions like these often have to be made in seconds. Flight Plan Manager includes capabilities that enable quick analysis of delay situations and ultimately helps reduce delays. Fewer delays equal cost savings and more satisfied customers.

Please provide the best example of how the project has benefited a specific individual, enterprise or organization. Feel free to include personal quotes from individuals who have directly benefited from the work.

In one benchmark study, a single Boeing 747-400 using 25,000 U.S. gallons of fuel on a 4,000-nautical-mile trip showed a 3 percent savings, or a savings of 360,000 U.S. gallons per year. This translates to US\$900,000 of reduced fuel costs and 3,400 tons of lower CO2 emissions per year. Many airlines are realizing value from our solution today. It is our hope that continued adoption of the solution will enable airlines to operate more efficiently, reduce fuel consumption and CO2 emissions and ultimately create better travel for a better world. "Switching flight planning, management, crew scheduling and reservations to Sabre will have several million dollars in upfront costs and will be cash-flow positive within 12 months. The savings on fuel alone by just having more efficient flight planning and management will pay for itself in a year." - David Cush, CEO, Virgin America (Source: Bloomberg).