EURODECISION
OPERATIONAL RESEARCH

AÉROPORTS DE PARIS

AEROPORTS DE PARIS (PARIS AIRPORTS)

« GRILLE » PROJECT: OPTIMIZE THE SERVICE ROSTER OF AIRPORT SUPPORT PERSONNEL

Objectives:

- Increase the profitability of stopover activities by finely adapting the presence of personnel to the workload.
- Build optimized timeslots to cover a variable load

Solution:

EURODECISION's LP-Shift and LP-Roster

Results:

- Better control over tailoring resources to workload
- Medium in negotiations to implement the 35-hour work week legislation.

Aéroports de Paris's (ADP) *Escale* (stopover service) division employs between 1,100 and 1,350 people depending on the season, distributed between the two airports of Orly and Roissy Charles de Gaulle. As early as 1991, ADP investigated the general overhaul of its airport support personnel scheduling with the main objective of improving the efficiency of this service. This was seen as a necessity, as ADP knew it would have to face other service providers in this market on the way to becoming very competitive.

On behalf of the airline companies, an airport support service manages all the operations related to aircraft layover. These activities are divided into three sections at ADP. The section in charge of Passage handles passengers and their luggage in the terminals: check-in, reception on arrival, baggage claims, etc. The other two sections, Operations and Runway, manage the physical, documentary and technical aspects of aircraft layover like cargo, loading and unloading baggage, flight plans, positioning the plane on arrival, cabling the aircraft to the ground, pushback on departure, etc. Operational personnel are divided into 8 distinct job functions, but some employees take on several job functions.

To better adjust to the IATA schedule, the support personnel schedule is completed redone twice a year, in September for the winter season and in March for the summer season. These rosters are prepared manually by a few ADP planners, which is a particularly complex task, hard to optimize due to the large number of constraints to be taken in. The planners try to cover the workload as best

possible by taking into consideration available human resources. It takes them half a day to two days to process about one hundred employees.

In the early nineties, the *Escale* division highlighted that significant efficiencies could be achieved by better matching resources to the daily workload. Furthermore, the manual process lacked flexibility, activity managers wanted to become involved in half-year planning and above all in day-to-day implementation.

Eurodecision, a leading resource optimization specialist, was selected to develop the critical part of this software, the service roster generation tool, simply called 'Grille' (the French word for roster). Incorporated into Maxim, a management application developed by Stéria for the *Escale* division, 'Grille' was developed in less than one year by Eurodecision using the successive prototyping method that allows users to validate and incrementally improve software functionality.

Deployed in about twenty PCs running under Windows 2000, the application was developed in C++ for the computation part and Visual Basic for interface management. It is based on Microsoft's Jet engine for database management. 'Grille' uses two Eurodecision business components, LP-Shift to optimize the coverage of the daily or weekly workload and LP-Roster to build the service rosters. These two components are respectively based on the Cplex linear programming solver and the ILOG Solver constraint-based programming solver.

Currently used by activity managers and section heads, 'Grille' computes all shifts –name given to worked periods– necessary to cover the workload over a cycle of x number of weeks. In less than one minute, it establishes for a job function and type of population (full time, part-time (1/2 or ¾ time)) an optimized service roster. The roster is the basic element representing a cycle of working shifts and rest days. At the end of this period, the cycle is reproduced.

The software must not only best match the workload that varies during the day and according to the days of the week, but it must also take into account a great many constraints related to labor law and the work pace. The work pace takes into account the fact that a full-time employee can go to the workplace 21 times a month to work 8 hours or 16 times a month to work 10 hours. This last point is an important element for roster optimization since the best solution taking into account this work pace must be found.

To cover the division's job functions and populations, no fewer than fifty rosters need to be generated and optimized. The rosters are generated in 10-minute steps. They are then dated, thus defining the service roster and work schedule for each employee.

Well accepted by users, once the initial apprehension of working with an IT tool was overcome, today 'Grille' has exceeded its objectives. The advantages appreciated by activity managers include system user-friendliness, computational power for quickly assessing down-graded or improved workload coverage, but also being able to manually ''force'' the automatically generated roster. 'Grille' also proved to be a precious, perfectly impartial working tool during negotiations on the implementation of the 35-hour work week directive in France.

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