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A conversation with ...

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Reigning in the Fleet

By using close-in re-fleeting techniques, Lufthansa German Airlines has been able to realize monthly benefits of up to €5 million.

■ By Murray Smyth | *Ascend* Contributor

Like many airlines around the world, Lufthansa German Airlines tries to leverage all opportunities to increase profitability. During the last couple of years, the carrier has taken advantage of dynamic planning and scheduling technology to gain efficiencies in its fleet initiatives and significantly boost revenues. This new approach is known by various names, but it is most commonly referred to as close-in re-fleeting. CIRF and similar processes are used by several large airlines, but it has been implemented with distinct operational precision by Lufthansa. CIRF, which holds great potential for many different types of airlines, represents a new way of maximizing profitability through both revenue improvements and cost reductions.

Challenging Times

In recent years, the airline industry has been reeling from the effects of wildly variable passenger demand. Markets that were traditionally consistent performers have seen declining demand while new markets have experienced rapidly increasing demand. In addition, the increase in low-cost carrier capacity in Europe has changed traffic patterns and put added pressure on profits. These fluctuations in passenger demand have shaken the traditional planning practices of many airlines.

Most traditional planning processes begin with an examination of historical results to project future demand. Once the future demand is predicted, capacity is assigned in a

manner that enables the airline to obtain maximum profitability from its aircraft resources within the parameters of its desired market share in particular markets. Aircraft are assigned to specific routes the airline predicts will deliver the highest demand at the highest yield and at the lowest unit costs. This assignment typically occurs one year in advance of the actual execution of the schedule and no less than one season in advance of schedule execution. This has been the approach of airlines for many years, but it has been challenged in the past few years because of the unpredictability of demand in certain markets.

With the constant rise and fall of demand, the traditional process of scheduling

Seven Days Out

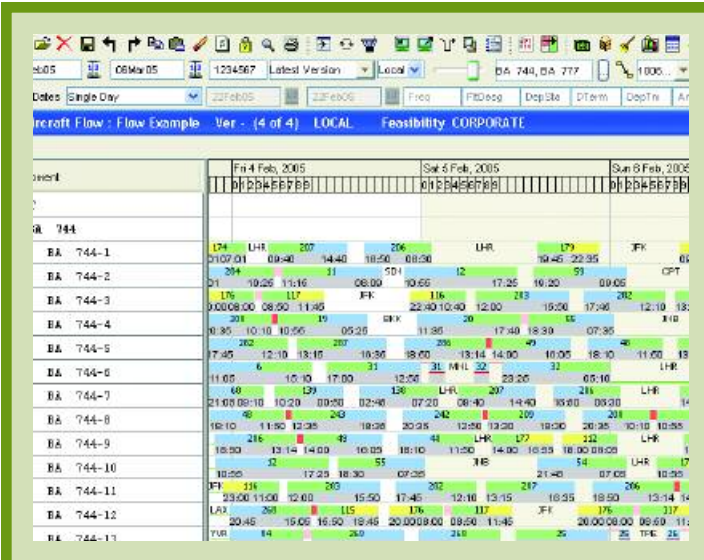
An airline's ability to use optimizing technology to re-fleet its schedule as close in as seven days prior to departure has a considerable positive impact on profits.

■ By Hari Subramanian and Kevin Stupfel | *Ascend* Contributors

Achieving strong financial results continues to be a challenge in the airline industry. One promising area for boosting revenues being explored is allocating resources based on demand variability by day of week. To maximize profitability, many airlines utilize state-of-the-art technology to increase their optimization capabilities by “re-fleeting” their schedules closer to the day of departure.

Until recently, the most successful airlines strived to maintain a stable schedule for the two months prior to operations. Stability in the schedule allowed for optimal crew and maintenance rotations. Stable schedules also provided predictable itineraries and lev-

els of service for passengers, and thus a product that was easier to sell. In the last two years, however, conditions have changed. First, labor contracts are now more flexible. Second, price now drives flight choice with consumers adjusting to changing schedules. These market-driven factors combined with new technology have opened the door to enable more dynamic allocation of capacity. Today, airlines can re-fleet a schedule anytime between two months to seven days before the day of departure. Close-in re-fleeting can boost profitability by accounting for demand changes that the most advanced forecasting algorithms cannot predict.



After completing a schedule optimization in *Schedule Manager*, analysts can review upgrades and downgrades in the Gantt chart and make appropriate adjustments. Through the Gantt chart, each flight can be customized to display the information the scheduler wants to review.

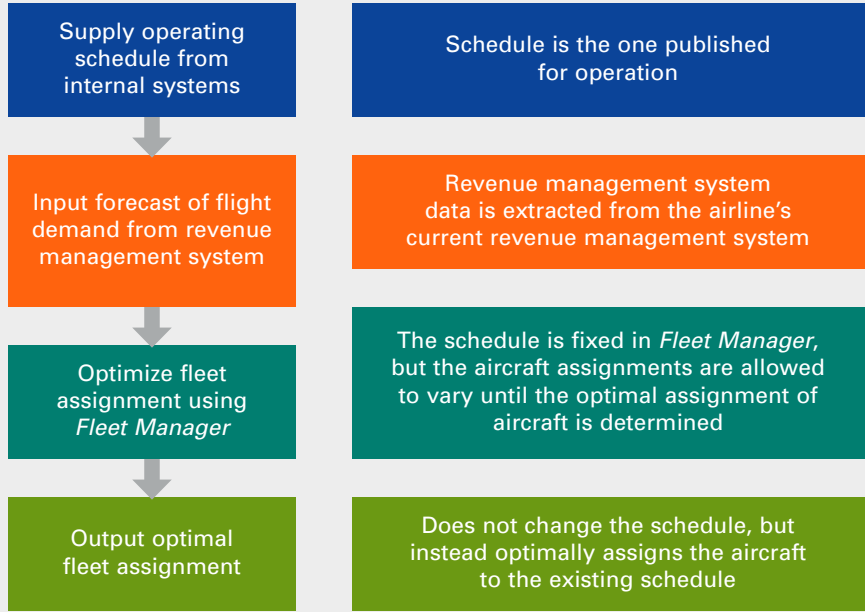
operational constraints in the model. Any schedule optimization within two months of departure is worthless unless the changes can be operated by the airline. The technology must be robust enough to enable the scheduler to craft solutions that maximize profitability given the scheduling realities.

Since the accuracy of the forecast is critical for this optimization, an airline's revenue management system is the only viable source of passenger demand in this timeframe. For airlines running an origin and destination revenue management system, such as the *Sabre® AirMax® Revenue Manager*, the ability to optimize capacity based on the O&D passenger itineraries is essential to maximize the impact of the changes. Tight integration between planning and revenue management systems will make this process easier to execute and efficient to include in the day-to-day business process. The ability to display revenue management booking data in a schedule editor, such as the *Sabre® AirFlite™ Schedule Manager*, will provide a quick way to validate schedule changes. The optimization must trade off profit improvements and the airline's operational constraints to suggest the best set of changes that can be implemented. This is guaranteed if the model employs a global optimization technique.

Optimal Fleet Assignment

Through CIRF, Lufthansa has realized a monthly gain of €2 million to €5 million.

Photo courtesy of Lufthansa



Using *Fleet Manager* for CIRF, the demand forecast is provided by an airline's revenue management system and used in *Fleet Manager*, which then processes and outputs an optimal schedule. The processes only differ in their source of the demand forecast.



To ensure the changes can be absorbed into the operations, schedulers must have a high degree of control through the business constraints supported by the optimization tool. One important factor is the ability to limit capacity to crew compatible fleets. The optimization must look for capacity changes within fleets that are crew compatible while ensuring the total number of aircraft and other feasibility parameters are met. Many times, the optimization will make capacity changes with small incremental value to the airline. In these cases, the intangible cost will not justify the value of the change. The ability to control the optimization to seek only top changes is essential. This can be measured in the total value to the airline or by choosing to make the 10 most profitable changes.

Airlines successfully implementing close-to-departure re-fleeting procedures are most successful if they perform the optimization on a frequent basis, i.e. weekly. To perform frequency optimization on a rolling six-week window, a system must be able to optimize fully dated schedules taking into account the aircraft posi-

tions at the beginning and end of the analysis period. This provides minimized disruption to the operation.

All of the techniques of close-to-departure re-fleeting have been successfully implemented by airlines of various size using the Sabre® AirFlite™ Fleet Manager. With a rigorous close-in re-fleeting process, airlines can generally expect net gains of up to 3 percent of their revenue base. A tool set such as the Sabre® AirFlite™ Planning and Scheduling Suite can quickly optimize the schedule and display the results graphically for review and publication. **E**

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“By utilizing *Fleet Manager* for close-in re-fleeting, Lufthansa has realized substantial revenue gains while driving costs downward.”

Instead of using the fleet assignment model one year in advance, Lufthansa uses it much closer to departure when the demand forecast is more accurate. About seven weeks prior to departure, Lufthansa optimizes the fleet assignment to its operating schedule using the demand forecast from its revenue management system feeding into *Fleet Manager*.

Because the process is closer to departure, the forecast is more accurate. Given that most demand, however, materializes for flights in the weeks leading up to departure, the assignment of optimal capacity at seven weeks prior to departure has many advantages:

- Crew assignments are not negatively impacted because assignment of aircraft to the schedule is performed before crew assignments are made.
- Operational impact is minimized because maintenance constraints are already input into the schedule.

- Plenty of time exists to sell extra seats on high-demand flights that receive larger pieces of equipment.
- Time remains for cancellations to remove any potential denied boarding situations due to smaller pieces of equipment being assigned to a flight.

This means Lufthansa assigns its largest aircraft to flights that can still sell the extra seats and assigns its smaller equipment to flights with lower demand. Because *Fleet Manager* optimizes for profitability instead of just revenues, the output results provide the fleet assignments where revenues are maximized and costs are minimized. The process is vigorous and operates well in this fashion even though *Fleet Manager* was not originally designed to operate this close to departure.

The Results

By utilizing *Fleet Manager* for close-in re-fleeting, Lufthansa has realized substantial revenue gains while driving costs downward.

According to a 2003 article in *TOURIS-TIK* report, the fleet optimization solution has contributed — including cost reductions — a monthly improvement of €2 million (US\$2.6 million) to €5 million (US\$6.5 million). The results speak for themselves; Lufthansa is able to improve its profits dramatically each and every month by using close-in re-fleeting.

The Outlook

Other airlines can benefit from using the same process as Lufthansa. When the CIRF process is used in conjunction with an optimal schedule, the results can be even more dramatic for airlines. **E**

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