

A MAGAZINE FOR AIRLINE EXECUTIVES

APRIL 2003

ascend

Taking your airline to new heights

MAKING EVERY DOLLAR COUNT

A Conversation with ...

Brett Godfrey,
CEO, Virgin Blue

INSIDE

New Approach to Cost
Reduction Provides
Benefits

Aeroflot Reshapes Itself

American Airlines
De-Peaks Its Hub and
Spoke Structure

Leveling the Peaks

American Airlines De-Peaks its Hub and Spoke Structure

■ By Stephani Hawkins and Scott Hunt | *Ascend* Editors

A few years ago, as airlines throughout the United States struggled with on-time performance and other operational issues, American Airlines gathered its top planning and scheduling experts and began a quest to devise “the perfect schedule” to increase the airline’s reliability.

What they found might just be the Holy Grail of flight scheduling — a schedule that decreases ground times, but improves dependability; that increases the number of departures, but decreases the number of gates; that implements standard fixed ground times

like those used by low-cost carriers, but maintains directional connecting complexes

found in a traditional hub and spoke structure; that increases unit revenues, but decreases unit costs.

“When someone first had the idea to do this, I said it’s impossible,” said Don Casey, managing director of capacity planning at American Airlines. “But, in fact, it is possible.”

Finding the Grail

The magic formula involves de-peaking the traditional hub and spoke structure by flattening the arrival and departure banks and reducing the dead time between peaks.

Typically, network carriers try to squeeze as many flights as possible

into peaks of arrivals and departures to maximize connection opportunities while minimizing passengers’ total travel time.

By spreading flights more evenly throughout the day, American combined the efficiencies of a low-cost carrier like Southwest Airlines with the increased number of destinations available through a traditional hub and spoke model.

Before implementing this new structure a year ago at its Chicago O’Hare International Airport hub, American, at some points, had more than 10 aircraft movements scheduled in a five-minute period during peak times — alone, more than the airport’s capacity.

The key to de-peaking was capping the number of aircraft arrivals and departures per minute, Casey said.

“In every three-minute interval there’s a maximum of two big jet movements and a regional aircraft movement,” Casey said. “We never exceed five movements in any five minutes. That’s a hard constraint. And that’s what creates the flattening of the schedule.”

Along with more evenly distributing flights, American applied another

concept used by low-cost carriers — standard fixed ground times.

Rather than idling on the ground for up to two and a half hours at the spoke waiting to fit into the return complex, the airplanes are immediately returned to the air where they produce revenue.

“The airplanes arrive in O’Hare, they spend a fixed amount of time there, and they go out to the spoke,” Casey said. “They spend a fixed amount of time at the spoke, and they come back to the hub.

“The airplanes go out in 51 minutes. It doesn’t matter when the passenger arrives at the airport, the airplane



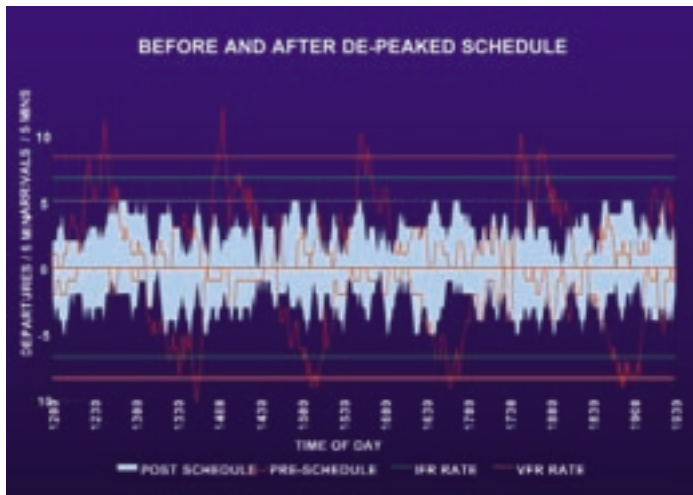
Before de-peaking its hub structure at Chicago O’Hare International Airport, American Airlines exceeded the airport’s operational constraints during peak periods. After de-peaking, the airline was able to operate its schedule with four less gates and five fewer aircraft.

always goes out in 51 minutes,” Casey said. “What we’ve done is basically uncoupled the passengers



and the planes. Here passengers come in and passengers go out, and airplanes come in and go out, and they're separate. That's how we create the efficiency of always turning an airplane in a fixed amount of time."

Even though American has introduced low-cost concepts into its model, it has still maintained its directional complexes.



A graphical representation of American Airlines' schedule shows a reduction in the "peaks" of a traditional hub structure.

"We've created hourly complexes at O'Hare. The flights arriving during a 60-minute period connect to flights in the following 60-minute period. It just alternates like that hour after hour all day long," Casey said. "We have created a directional structure within this de-peaked schedule. And we've found a way to maintain this structure and still have the planes operate at fixed turn times at both the hub and spoke. We sequence these flights so we can always operate directionally correct so the flight that leaves with the westbound bank heading to the west coast turns around at minimum turn time on the west coast and will always come back correctly in an eastbound complex. And likewise in the other direction."

Drinking from the Grail

As American continued looking at de-peaked schedules, the logic quickly became apparent.

"What happens is that although we traditionally scheduled peaks, we rarely operated them," Casey said. "Because the airports are incapable of handling the flights, the actual operation is flattened. So we said, 'If we operate that way, maybe we should schedule that way.'"

And by operating that way, American has realized a wealth of cost-savings and reliability improvements.

"Looking at the data in early 2001 was the impetus for us to start looking at these de-peaked schedules," Casey said. "It started as a dependability issue.

Eventually, as we got into it, developed it and designed it, it became a cost initiative."

By de-peaking the schedule, American needs fewer gates and fewer airplanes to operate the schedule.

"At O'Hare we can operate the same schedule and same number of departures with four less gates and five less airplanes," Casey said. "Using less gates and filling in the valleys when there was no activity meant you could operate the schedule with less people — there's not as many gates needing to be manned and not as much down time during the day. At hub and spoke complexes, people work like mad during the peak, and then they go over for coffee and wait for the next one. With a de-peaked schedule, it's basically continuous activity throughout the day. As a result, we were able to operate the same schedule with less gates, airplanes and people."

According to Casey, after de-peaking, aircraft productivity, measured by miles

per aircraft per day, was only about 3 percent less than Southwest's.

The impressive results at O'Hare led American to de-peak its Dallas/Fort Worth International Airport hub in November.

"At D/FW we saw basically the same results — about a 5 percent improvement in our staffing based on de-peaking," Casey said. "In addition, because we could operate the schedule on four less gates at D/FW, it allowed us to consolidate our operations down to two terminals from three. That added about another US\$4.5 million of benefits a year.

"De-peaking our D/FW hub has enabled us to remove 11 airplanes from the schedule while operating exactly the same number of departures," he said.

American also realized it could apply the same concepts to its spoke operations.

"We realized there was a secondary opportunity to de-peak spokes because

"... American has realized a wealth of cost-savings and reliability improvements."

the connecting complexes in the de-peaked structure tend to be wider," Casey said. "Because the windows are bigger, we could sequence the trips one after the other and still be directionally correct in the complex. And that worked out better than we anticipated. We were able to decrease our gate requirement at spokes by 12 percent, a substantial savings in real-estate expense and the people associated to do the work.

Smoothing out the schedule also achieved its original goal of improving reliability by reducing congestion at the hub and improving on-time performance.

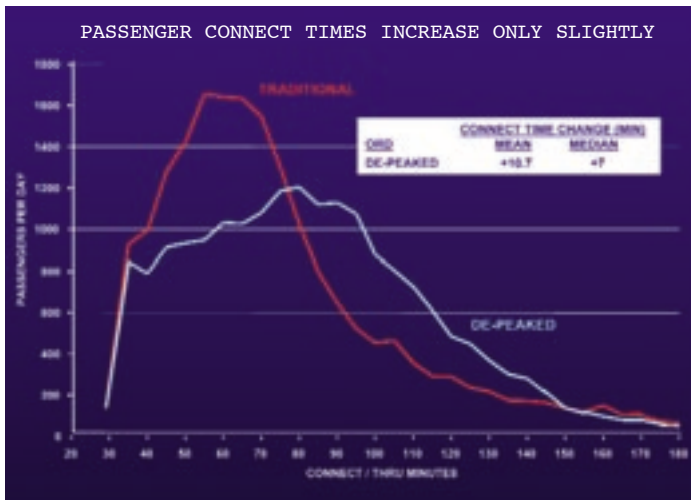
"With the operation running more reliably, we ended up with fewer *(continued on next page)*

misconnects,” Casey said. “Our dependability improved at O’Hare more than in the rest of the system.”

Trusting the Grail

Although de-peaking leads to an increase in passenger connect times, American found it was still competitive.

Casey said American has not received any negative feedback from customers because of the increased elapsed time.



Although the de-peaked structure “flattens” the schedule, American Airlines found the average passenger connect time increased by only 11 minutes. The airline also found the additional time improved reliability by giving more time to transfer baggage.

“We were pretty concerned about what de-peaking would do to connect times,” Casey said. “The average connect time increased 11 minutes at O’Hare. The median time increased by seven minutes. It doesn’t sound like a lot, but it may have significant impact potentially on our revenue. We’re coming from a scheduling environment, which looked at traditional schedules, and the traditional hub and spoke structures focused on elapsed time.

“We researched our exposure to lengthening average connect times. The conclusion we reached is that today, a longer elapsed time is much less of

a factor than it was four or five years ago. Other factors influence the decision on which airline to choose — price, corporate deals, frequent flyer programs, travel agency incentives, etc. Those aren’t elapsed-time driven. You have to have competitive elapsed times; you don’t necessarily have to have the fastest elapsed times. So for 11 minutes, those other criteria are going to drive the customers’ decision.”

The additional 11 minutes actually benefits customers.

“We’ve seen a decrease in misplaced bags and those kinds of measures because the operation is more dependable,” Casey said. “The additional 11 minutes also allows extra time to get the bags from one flight to the next.”

In fact, American’s local share at O’Hare improved after it de-peaked its schedule.

“Because in these de-peaked structures we actually have a little more flexibility in terms of where we

position the flights, we can tailor our schedule a little bit better in a local market,” Casey said. “So we’ve seen the benefits at O’Hare and have held on to our flow share as well; it’s up a little bit. We haven’t seen any deterioration in our flow performance and a little bit of improvement in our local share performance.”

Sharing the Grail

Although this is a relatively new concept for the airline industry, technology is already available that can help airlines de-peak their schedules, said Renzo Vaccari, product manager for planning and scheduling products at

Sabre Airline Solutions, who describes himself as “a big fan of de-peaking.”

“The good news is that technology provides you with the tools to evaluate this and assess for yourself if this is the right thing to do or not,” Vaccari said. “This speaks to a sophisticated, automated decision-support infrastructure suite.”

Vaccari said three key tools can help an airline successfully revamp its schedule structure:

- **A highly automated, highly graphical schedule development environment, such as the Sabre® AirFlite™**

Schedule Manager — a tool with multiple different graphical displays that enables airlines to view and manipulate schedules and update them very quickly. Specifically, the ideal tool provides a hub view that allows airlines to look at all inbound and outbound flights. It should include reporting capabilities to measure how many flights occur every 10 minutes, 30 minutes, hour, etc. It should also enable airlines to look at elapsed time and passenger connections.

- **A network profitability tool, such as the Sabre® AirFlite™ Profit Manager** —

a system that evaluates the impact making these changes has on profitability. Ideally the system would forecast traffic at the origin and destination level and then analyze a passenger recapture process to show how many passengers are expected to fly each of these legs. Then the system would give an overall profitability for the schedule, for a particular region, for a particular set of flights.

- **A fleet assignment tool, such as the Sabre® AirFlite™ Fleet Manager** —

a tool that completes the very complicated process of fleetting a de-peaked schedule. This optimization tool will try to match capacity to demand. This tool should provide a solution that includes both the network structure and the fleet.



Vaccari also suggested flight scheduling tools that provide “what-if” analysis.

“You can make minor changes and then run some incremental flights, or you can make macro, global or holistic changes and then analyze them to compare a new structure with an old structure,” he said.

Vaccari said he believes more carriers will begin to look at de-peaking their hubs based on American’s success.

“If you buy the argument that you will not lose a lot of the revenue, then you are getting potentially a ton of cost savings,” he said. “I would even argue that from the revenue side, you are not losing much at all because what you are trying to capture at a hub with a very peaked schedule is marginal passengers. A peaked structure is designed to try to capture the passenger traveling from small station to small station.

“The revenue that you get from this passenger, say a US\$400 fare, is just not worth it. To push a US\$400 passenger through one, two, three, four stops is just



By de-peaking its hubs, American Airlines has reduced congestion at its gates. At Dallas/Fort Worth International Airport, the airline was able to consolidate its operations from three terminals to two and removed 11 airplanes from its schedule while operating the same number of departures.

not cost effective. The counterargument is that you already have this capacity anyway — you might as well fly the planes to get the extra US\$400. I think the bigger, better idea is to match capacity to demand — solve that problem first rather than try to use this

extra capacity to chase after these marginal passengers.”

Casey said the de-peaked schedule has already exceeded American’s expectations.

“The more we examined this concept, the better it got,” Casey said. ■

News Briefs from Around the Globe

THE HIGH • LEVEL VIEW

News from the Middle East

Gulf Air will use the *Sabre® InformSM* mobile services to provide real-time trip information to its passengers 24 hours a day, seven days a week. The solution will enable passengers to check flight information via cell phones, e-mail and personal digital assistants.

The *Inform* services are a powerful customer service tool that proactively provides flight information such as schedule changes or delays, terminal and gate changes, and cancellations as well as airport, airline, city and country security updates.

“Travelers can register for a trip reminder service that provides real-time flight status from 72 hours up to one hour prior to departure time,” explained Tariq Sultan, assistant vice president, information technology for Gulf Air.

Services offered include:

- Schedule inquiries — providing information on the number of flights to destinations worldwide,
- Flight inquiries — providing information on individual flights, including arrivals and departures.

“Customers merely have to give their mobile numbers to the booking agent, call center or travel agent in order to obtain the service,” Sultan said. “This is an important proactive service capability for our customers, and it will make our operations more efficient by automating manual processes and reducing service impact on our valued customers.”

The *Inform* services represent the industry’s first low-cost, end-to-end branded notification service for airlines.

Gulf Air, the national carrier of Bahrain, UAE, Oman and Qatar, is the first airline in the Middle East to introduce such technology. ■