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*Capt. Goh Kah Kheng,
Vice President Flight Operations (Technical),
Singapore Airlines*

The optimum route to significant savings

Like everything else at Singapore Airlines, flight operations follow strict quality standards. For optimizing the routes of all its flights, the carrier uses Lido/Flight from Lufthansa Systems.

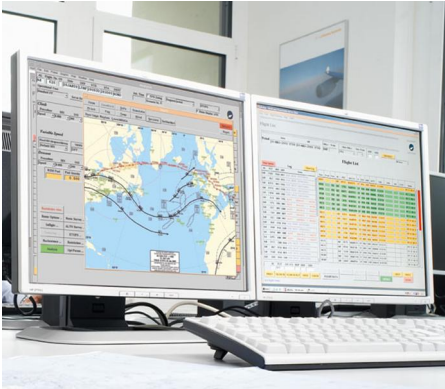
Careful planning creates savings. This is especially true in flight operations. Selecting the optimum route for a flight has a significant influence on its costs. With Lido/Flight, Lufthansa Systems offers airlines one of the most powerful and effective flight planning and dispatch solutions worldwide. It is used by a growing number of airlines around the globe, among them industry leaders like Singapore Airlines.

When the carrier replaced its own mainframe-based flight planning solution back in 2002, it selected Lido/Flight and in summer 2010, it extended the contract for another three years. The solution is also used by its subsidiaries Singapore Airlines Cargo and SilkAir. “Lufthansa Systems provides an excellent product that meets our requirements”, says Capt. Goh Kah Kheng, Singapore Airlines’ Vice President Flight Operations (Technical).

With its fleet of more than 100 passenger aircraft including, among other types, the Airbus A380 of which it was the launch customer, the super long-range A340-500 and the Boeing 777, the carrier runs a sophisticated long-range operation, which includes regularly polar routes and ETOPS operations across the North Pacific.

The dispatch process is a fundamental part of an airline’s flight operations. To ensure the safety of each flight, the dispatchers must analyze a variety of parameters, for instance air traffic, airspaces, airports, and the weather, as well as aircraft performance data. For every flight, an individual flight route has to be calculated and optimized.

Airlines usually use a set of company routes, or standard pre-defined routes that are defined by each carrier based on its network. These company routes form the basis for the actual operational flight plan (OFP) on the day of departure. To calculate the amount of fuel needed, dispatchers typically use the standard performance data provided by the airplane manufacturer which can differ from the performance data of each individual aircraft. By closely tracking individual aircraft performance, in generating an OFP, Singapore Airlines is able to factor the difference between standard and individual aircraft performance.



Optimization according to company priorities

In contrast, Lido/Flight gives dispatchers a wide range of optimization options. For example, different wind speeds and altitudes will affect fuel consumption and flying time. Furthermore, over-flight fees will influence the overall cost of a flight. The computer can do in minutes what would take a human being several days – calculating hundreds of possible routings in order to find the optimum solution, be it shortest flying time, lowest cost or lowest fuel consumption. When compiling the most efficient routing, Lido/Flight automatically considers regulations as well as all valid flight restrictions that are NOTAMS.

The planning of the routes is based upon Lufthansa Systems' own navigation database which contains aeronautical data available worldwide. It meets the most stringent requirements regarding precision and data integrity. It contains the departure, approach and arrival procedures of nearly 10.000 airports plus 11.000 airway segments and 129.000 waypoints.

“Because of the automatic interpretation of weather data and NOTAMS by Lido/Flight, our dispatchers have fewer items to check,” says Capt. Goh. “For this reason, they are able to dispatch more flights per shift, improving their productivity.”

Another advantage from the airline's perspective is the solution's ability to integrate with other systems. “Lido/Flight connects to our central scheduling, load planning and crew management systems. This level of integration reduces the workload and potential transposition errors as required data are automatically picked up by Lido/Flight,” explains Capt. Goh.

Sophisticated route calculation in free flight airspaces

A very important module for Singapore Airlines is FreeFlight which can optimize routes in free flight airspaces like the North Pacific, where airlines are no longer restricted to airways. This opens up almost unlimited options to calculate the most efficient routing, but it also increases the demand on flight planning systems significantly. The highly complex procedure of calculating the most efficient trajectory in terms of distance, flight altitude, wind direction and speed in free flight airspaces requires highly intelligent optimization algorithms as well as high-performance software procedures. As an industry first, the FreeFlight module of Lido/Flight can optimize flight paths by using geographical co-ordinates instead of waypoints and radio beacons. The method of trajectory-based flight plan optimization improves the fuel efficiency of every flight.

On January 31st, 2010 Singapore Airlines used Lido/Flight including FreeFlight to calculate a demonstration flight which was part of the ASPIRE (Asia and Pacific Initiative to Reduce Emissions) program. The Boeing 747-400 flew from Los Angeles to Singapore via Tokyo using User Preferred Route and Dynamic Airborne Reroute Procedures. It achieved a reduction in flight time of about 30 minutes and fuel savings of more than ten tonnes, of which Capt. Goh attributes about four tonnes to the optimization by Lido/Flight. According to a study by the International Air

Transport Association, optimising flight paths and other improvements to air traffic management could reduce aviation-related emissions by as much as 12 percent. Capt. Goh added that there are several agencies that are developing ways to include fuel saving initiatives from the demonstration flight into daily operations.



Singapore Airlines regularly checks the calculation of Lido/Flight, which uses the performance data of the individual aircraft, against the actual fuel burn. "We are pretty happy with the results. It gives our crews confidence that the calculated amount of fuel is accurate. Our crews do not uplift extra fuel unnecessarily and as a consequence, additional fuel burn is kept to a minimum," says Capt. Goh. "Lufthansa Systems has proven to be a reliable partner. They deliver a very precise system. And it is particularly important to us that Lufthansa Systems has maintained the quality since we started using the product."



Lufthansa Systems

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Lufthansa Systems AG
Corporate Communications
Am Weiher 24
65451 Kelsterbach
Germany

Tel. +49(0)69-696 90776
Fax +49(0)69-696 90777
publicrelations@LHsystems.com
www.LHsystems.com