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## **Air NZ's flight NZ8 cuts fuel burn and emission**

Geoffrey Thomas | September 19, 2008

**AIR New Zealand has once again raised the environmental bar for the airline industry after completing what was dubbed "one perfect flight" from Auckland to San Francisco last Friday.**

The flight -- NZ8 -- in a world first, used optimised procedures and flight routings to cut fuel burn and emission significantly.

"It exceeded all our expectations," was the way Air NZ general manager operations and safety David Morgan summed up the flight.

NZ8, renamed ASPIRE 1 (Asia and South Pacific Initiative to Reduce Emissions), used 4600 litres, or 4 per cent, less fuel than normal using a host of strategies to minimise fuel use.

That saving translated into 12 tonnes less CO<sub>2</sub>.

ASPIRE is a joint initiative between the Federal Aviation Administration, Airways NZ and Airservices Australia.

The partners have a long history of working together, including introducing Future Air Navigation Services (FANS) with airlines such as Air NZ and Qantas, Boeing and other industry partners in the 1990s.

Passengers on NZ8 were addressed by Captain Morgan before departure from Auckland and briefed on the significance of the flight from an environmental perspective.

FANS, using datalink through satellites, enabled air traffic controllers to give airlines more route options to save fuel.

For the ASPIRE flight, Air NZ used "just in time refuelling" to finalise the fuel load once the actual passenger and cargo load was known.

Captain Morgan said that until recently, most airlines had estimated -- on the high side -- the fuel required, resulting in aircraft arriving with fuel well in excess of regulatory requirements, which raised fuel burn because of extra weight.

Datalink was used where possible for ATC communications, and pushback approval and taxi clearance were received through datalink. Only take-off clearance was received by voice.

A near-full power climb was used to reach the initial cruise altitude of 33,000ft to save fuel and the aircraft was later cleared up to 39,000ft in three 2000ft steps.

Airlines use reduced power take-offs and climb to reduce time between overhaul on engines. But with the cost of fuel so high, the imperative is to climb to cruise altitude as quickly as possible, says Captain Morgan.

After takeoff at 0746 GMT off Runway 23L, Captain Mark Shepherd, Air NZ's air traffic management specialist, made a sharp right turn and was essentially free for any routing he required to San Francisco.

At 1024GMT, Captain Shepherd received a new flight plan using Dynamic Airborne Re-routing (DARP), which updates the weather and wind models on a global basis every six hours.

The new flight plan took the 777-200ER 100 nautical miles east of its initial track to pick up more favourable winds.

As the aircraft approached San Francisco, Captain Shepherd received approval from Oakland Centre for a tailored arrival into San Francisco's runway 28L.

A tailored arrival is a continuous descent at idle thrust to land and the Air New Zealand 777-200ER only applied slight power as it turned left to the ILS glideslope for runway 28L.

To complete the "perfect flight", Captain Shepherd used auto-land and touched down five minutes ahead of schedule at 12.35pm local time.

San Francisco is playing a leading role with tailored arrivals -- a joint venture between Boeing, NASA, the Federal Aviation Administration and the airport -- and, according to FAA acting administrator Robert Sturgell, "639 tailored arrivals had been undertaken at the airport -- 186 complete and 453 partial".

Four airlines -- United, JAL, ANA and Qantas -- are also using tailored arrivals.

Air NZ launched tailored arrivals into San Francisco in January and up to the end of May had saved 69,410kg of CO<sub>2</sub> emissions. United Airlines and Qantas will follow, with ASPIRE trials over the next few months.

After the flight, Ashley Smout, chief executive of Airways New Zealand, that country's air navigation service provider (ANSP), said the flight was "one small step for mankind". Mr Sturgell added it was a "great day for aviation".

But the problem for the industry is that while it was indeed a great day, it was just a small step and with air traffic control inefficiency adding between 12 and 18 per cent to airline's fuel bills and thus environmental damage, a great deal more needs to be done.

Globally, the two biggest problem areas are Europe and the US, where either too many ANSPs or an outdated system are causing enormous waste.

The International Air Transport Association estimates that when Europe's air traffic management is streamlined, it could cut airlines' fuel bills and thus emissions by 12 per cent.

In the US, Congress is moving slowly with funding of the Next Gen air traffic management system. Despite those funding restrictions, the FAA is making significant strides where possible.

Air NZ chief executive Rob Fyfe told media before the flight that it was no "PR stunt".

"When you start multiplying the savings just across our own network of flights and then apply that to other airlines, you get the real sense of the potential for cutting millions of tonnes of fuel and carbon dioxide emissions," Mr Fyfe said.

The Air NZ flight underscored that airline's environmental leadership role.

In December, the airline is due to fly a Boeing 747 jumbo jet partially powered by fuel refined from the seeds of the jatropha, a fast-growing plant that can survive in arid areas and does not replace food crops.

It is the only airline to have published plan to use jatropha for 10 per cent of its fuel needs by 2013.

Mr Fyfe said the airline had "three non-negotiable criteria" that any sustainable fuel must meet for its environmental program. He said: "It must be environmentally sustainable and not compete with existing food stocks. Secondly, the fuel must be at least as good as the product we use today and finally it should be significantly cheaper than existing fuel supplies."

*Geoffrey Thomas was a guest of Air New Zealand*

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