Twenty Ninth Meeting of the
Informal South Pacific ATS Co-ordinating Group
(ISPACG/29)

Santiago, Chile
4-6 March 2015

Agenda Item [6.2]

Dynamic Airborne Reroute Procedure (DARP) Automation

Presented by The Boeing Company and Air New Zealand

SUMMARY

This paper presents the operational concept and preliminary results of research being conducted by Boeing and Air New Zealand in automation of the existing Dynamic Airborne Reroute Procedure.

1. Introduction

1.1. The ability to re-optimise the route of a flight once airborne, Dynamic Airborne Reroute Procedure (DARP), based on latest winds and accurate zero-fuel-weight has the capability to reduce fuel burn.

1.2. One of the consistent issues experienced by airlines implementing DARP is the Flight Planning/Despatch workload involved in identifying DARP opportunities and carrying out the flight planning processes to achieve a successful DARP.

1.3. Boeing and Air New Zealand have been conducting research and development on an automation system called OCEANS to reduce airline workload associated with a number of these processes and to encourage the adoption of DARP.

1.4. This paper presents the operational concept and preliminary results of such an automation system – Optimal Conflict-Evasive Airborne Reroute Notification System (OCEANS).

1.5. Air New Zealand and Boeing will continue development and more information can be obtained from Boeing.

2. Discussion

2.1. DARP has proven to reduce airline operational costs via fuel saving.

2.2. A growing number of ANSPs in the Asia Pacific region offer DARP in their airspace to operators of suitably equipped aircraft.

2.3. A significant impediment to a widespread implementation of DARP is the airline dispatcher/flight planner workload associated with the identification and execution of post-departure optimal rerouting.

2.4. OCEANS automates and enhances the DARP process for an airline, without changing the existing procedure from the ANSP perspective.

2.5. OCEANS interfaces with the airline and aircraft, using currently available data and messaging, to automatically monitor flights with an oceanic, remote, or polar segment.

2.6. OCEANS interfaces with ANSP and NOAA to automatically monitor airspace for changes in winds, temperature, severe weather, and airspace constraints.

2.7. OCEANS proactively identifies fuel saving reroute opportunities and computes dynamic, in-flight, and (where possible) conflict-free reroutes.

2.8. The OCEANS graphical user interface advises dispatchers of optimal reroutes and associated fuel savings which, if deemed acceptable, are uploaded automatically into an airline's flight planning system utilizing a standard TDM format message. The rest of the process stays the same as the existing DARP.

2.9. Currently, Boeing and Air New Zealand are performing trials to validate reroutes and associated fuel benefits of OCEANS. So far, the OCEANS generated reroute advisories have not been sent directly to the flight crew to execute a DARP. The plan is to achieve live flight trials in 2015.

2.10. Preliminary results have validated that OCEANS can provide multiple fuel saving reroute opportunities during a 12-hour flight at a significantly faster rate than is possible with a manual process. The OCEANS graphical interface allows an airline dispatcher to review, analyze, and accept (or reject) an OCEANS computed reroute advisory with the click of a few buttons.

2.11. Figure 1 shows the potential fuel benefits predicted by OCEANS for a set of Air New Zealand flights between New Zealand and North America

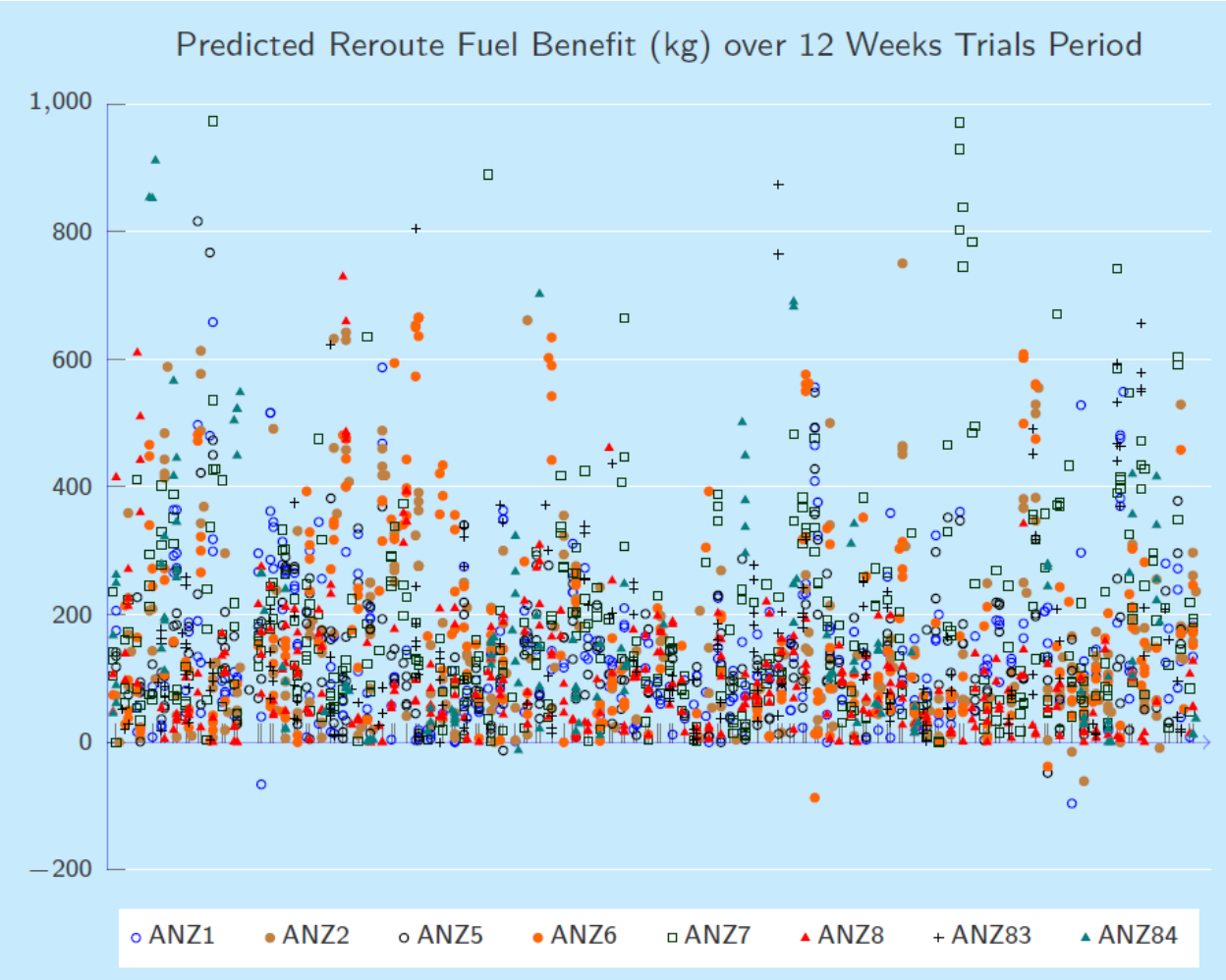
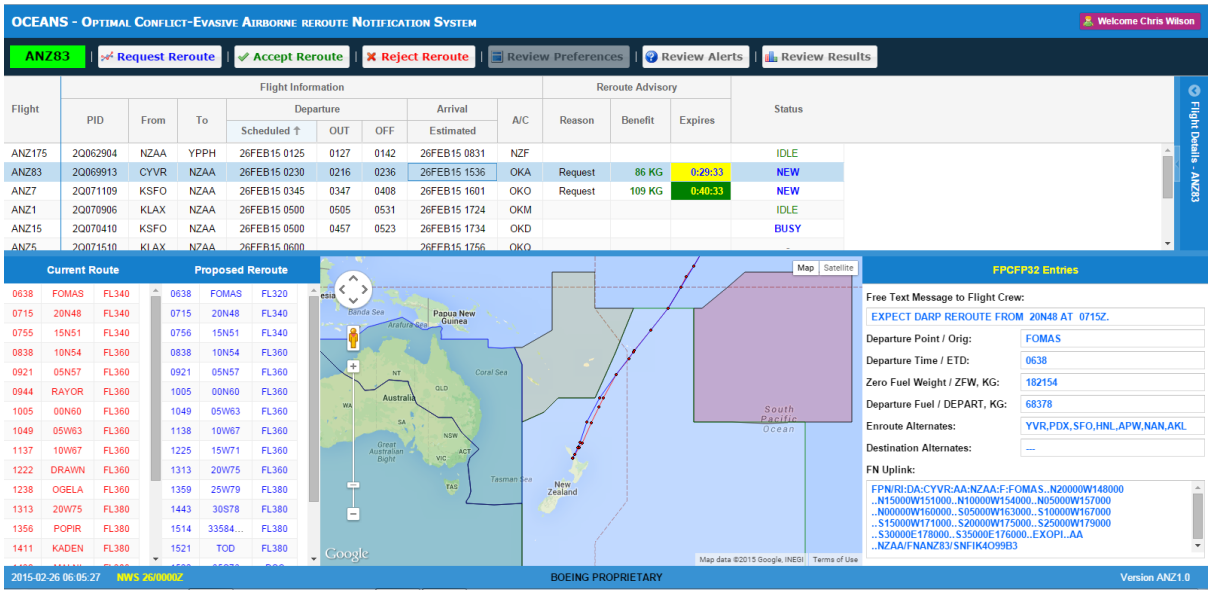


Figure 1 OCEANS predicted fuel benefits for a set of Air New Zealand flights between New Zealand and North America.

2.12. Further flight trials are due to start in March 2015 to validate reroute benefits, to exercise end to end testing of OCEANS with flight planner and flight crew in the loop. During this time Air New Zealand will be using OCEANS as its DARP tool, replacing its current manual procedures to create routes.

2.13. Screenshot of OCEANS UI



2.14.Demonstration of the User Interface by Boeing.

3. ACTION BY THE MEETING

3.1. The meeting is invited to note the information provided.