



**Twenty Second Meeting of the
Informal South Pacific ATS Co-ordinating Group (ISPACG/22)**

Papeete, Tahiti, 10 March 2008

Agenda Item 4: Review Progress on Open Action Items

User Preferred Routes

(Presented by the Federal Aviation Administration)

SUMMARY

This working paper provides background on the Federal Aviation Administration (FAA) joint efforts to expand the use of User Preferred Routes in the Pacific.

1. Introduction

- 1.1 In support of the International Civil Aviation Organization's (ICAO) efforts to reduce operator costs and ecological impacts due to aircraft engine emissions, the Federal Aviation Administration (FAA) and the other South Pacific Air Navigation Service Providers (ANSP) have been supporting User Preferred Routes (UPR) since December 2000. UPRs have proven to be a very cost effective means for airspace operators to flight plan.
- 1.2 The UPR concept is a method of flight planning that allows airspace operators to choose optimum (random) routes based on individual flight requirements. UPRs are not constrained in the same manner as fixed oceanic Air Traffic Service (ATS) routes. This allows operators to maximize individual route efficiency during flight planning.
- 1.3 Once an airline decides that they would like to flight plan a UPR route, they must consider the Air Traffic Control and airspace restrictions, weather, upper wind patterns and aircraft profile before filing their Flight Plan (FPL). For example, a dispatcher that was going to plan a UPR would consider the following items:
 - Preferential departure and arrival routings
 - Filing an appropriate Oceanic entry/exit point
 - Complying with any ANSP requirements (e.g., Guam CERAP requires aircraft to be on an ATS route within their airspace)
 - Avoiding any restricted airspace reservations
 - Avoiding any adverse weather conditions
 - Analyzing the wind patterns

After considering these and more factors the dispatcher would file the FPL on the most favorable route for their flight. The facility that issued the flight's departure clearance would clear the aircraft on their FPL route. The aircraft will fly the air

traffic control (ATC) cleared routing and will not deviate from the routing without an ATC clearance just as any other flight would do.

2. Discussion

- 2.1 Oakland ARTCC in conjunction with the airspace operator community began UPR trials in the Central East Pacific (CEP) between California and Hawaii to determine if UPRs would provide savings. To evaluate the feasibility of expanding UPR routes in the CEP, United, Continental and American Airlines have conducted several paper trials and flown UPR trial flights. The trials have shown savings of up to 12 minutes flying time and over 3000 pounds of fuel.
- 2.1.1 Though initial trials indicate that a savings can be achieved, it is yet to be determined that a total UPR environment in the CEP will maintain the efficiency levels afforded by the current ATS route structure. While it may be possible to allow unrestricted UPRs in the CEP airspace, the impact would be lower altitude assignments which would most likely erase any UPR savings. En route step climbs would also be impaired by the increased number of aircraft conflicts.
- 2.1.2 The FAA has commissioned a study to determine the feasibility of changing the current CEP ATS Route structure into some sort of flexible route system. Flexible routes would allow airspace operators to take advantage of changing upper wind patterns yet still maintain the current CEP efficiency levels. The initial data from the study indicated a fuel burn savings of 0.8 percent. That would equate to an annual savings of over 6.8 million kilograms of fuel. The study raised many questions that have not been answered yet.
- Will an overall benefit be obtained as the wind changes throughout the day?
 - The routes are generated between KLAX/KSFO and PHNL. What is the impact on flights between other city pairs?
 - The flexible tracks are generated using the B767 model. What benefit/impact do the generated tracks provide other aircraft types.
- 2.1.3 Many changes are occurring to the CEP ATS Routes on April 10, 2008. These changes are being driven by the revision of the Honolulu Control Facility Boundary. The Dynamic Oceanic Tracking System Plus (DOTS+) CEP track generation networks are being revised to reflect these changes. After the changes to the CEP are effective, the next step will be to run a paper trial with the operators. Oakland would generate flexible tracks on a Monday for a four week period and transmit Track Coordination Messages (TCM) to the operators for analysis. An additional paper trial may be required utilizing different seasonal weather conditions. If the analysis determines that a benefit is possible, the paper trials would evolve into operational trials.
- 2.2 The UPRs between New Zealand/Caledonia and Japan have presented no significant operational issues for the FAA and Japan Civil Aviation Bureau (JCAB). Air New Zealand presented a paper at the 27th Meeting of the Informal Pacific ATC Coordinating Group (IPACG/27) in Japan, in which they projected an annual fuel savings of 1,090,000 kilograms (kg) and a reduction in carbon dioxide emissions of 3,444,400 kg.

- 2.2.1 Air traffic control constraints are limiting the UPR benefits between New Zealand/Caledonia and Japan. Currently the two major constraints are the requirements to be on an ATS route within Guam's airspace and to be on an ATS route west of A337 in the Fukuoka FIR. Removal of these restrictions would increase the fuel savings. The FAA and the JCAB will monitor these restrictions and remove them when feasible.
- 2.3 Japan Airlines has expressed interest in expanding UPRs in two areas. The first area is between Hawaii and Japan where PACOTS tracks are currently utilized. At the IPACG/27 meeting in Japan, an agreement with JCAB and the operators was reached to conduct a UPR paper trial. Between 1-15 December, operators submitted to the FAA and JCAB what UPR they would have filed and what the savings would have been as compared to flying the PACOTS tracks.
- 2.3.1 The Hawaii – Japan UPRs did not always provide a daily savings over the PACOTS tracks, however there were savings on many of the days. Based on the results from the paper trial a projected annual fuel savings of 2.27 million kg could be realized. The FAA has modeled the traffic UPRs and determined that they could support UPRs between Hawaii and Japan.
- 2.3.2 The second area that Japan Airlines requested UPRs is between RJAA and YSSY/YBBN. Japan Airlines has completed some initial analysis and determined that they could save up to 1900 kg of fuel for a flight. An agreement was reached with JCAB at IPACG/27 to conduct a paper trial of UPRs between these city pairs in the Oakland and Fukuoka FIRs.
- 2.3.3 At a side bar meeting at ISPACG22, an agreement was reached to conduct a Paper Trial of UPRs between RJAA and YSSY/YBBN/YBCS. The Paper Trial will run for eight weeks starting on April 7, 2008. On Mondays, (4/7, 4/14, 4/21, 4/28, 5/5, 5/12, 5/19, 5/26), JAL and QFA have committed to develop UPRs for their flights that depart on that day for the Paper Trial. They will send the following data on their UPRs for the Monday Trials:
1. Callsign.
 2. Type Aircraft.
 3. Current Constrained ATS Routing that was filed for that day.
 4. Projected Fuel Burn and Enroute Time for Current Constrained ATS Route.
 5. UPR Routing for the Associated Flight.
 6. Projected Fuel Burn and Enroute Time for UPR Routing
- 2.3.4 The data from the Paper Trial will be used to assess the impact on ATC operations and the benefits of the RJAA – YSSY/YBBN/YBCS UPRs. After the Paper Trial is completed the data will be analyzed to determine the next steps.
- 2.4 FAA will continue to work together with the other ANSPs to expand the use of UPRs throughout the Pacific.

3. ACTION BY THE MEETING

- 3.1 The meeting is invited to discuss and support the expansion of UPRs where feasible.