



ICAO

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Agenda Item 5: ATS Route Development

UPDATE ON SOUTH-EAST ASIA-OCEANIC IMPLEMENTATION OF FREE ROUTE OPERATIONS (SEA-O FRTO) TRIAL

(Presented by IATA on behalf of AAC Workstream 4)

SUMMARY

This paper presents a report on the operational trial of a South-East Asia-Oceanic Implementation of Free Route Operations (SEA-O FRTO) in several adjacent FIRs in the Asia and Pacific Regions (APAC) under the APAC ANSP Committee (AAC) Workstream 4.

1. INTRODUCTION

1.1 The APAC ANSP Committee Workstream 4 (AAC WS4) was tasked with promoting operational efficiency, enhancing coordination and addressing issues of common interest amongst oceanic ANSPs.

1.2 A Free Route Operations (FRTO) trial was identified to capitalize on existing and emerging User Preferred Route (UPR) programs in the region.

1.3 Four ANSPs (CAAS, AirNav Indonesia, Airservices Australia, and Airways NZ) agreed to collaborate with IATA and selected member airlines to create a suite of city-pairs for four airlines (Singapore Airlines (SIA), Garuda Indonesia (GIA), Qantas (QFA) and Air New Zealand (ANZ)) to flight plan trial UPRs with minimal constraints or operational restrictions.

2. DISCUSSION

2.1 In August 2024, the South-East Asia-Oceanic Implementation of Free Route Operations (SEA-O FRTO) project team commenced a trial involving four ANSPs (CAAS, AirNav Indonesia, Airservices Australia, and Airways NZ) and four airlines (SIA, GIA, QFA and ANZ). The trial combined several existing and emerging UPR programs and enhanced their potential efficiencies primarily through cooperation of neighbouring ANSPs to create a larger volume of access and remove constraints of tracking points at FIR boundaries.

2.2 Effectively ‘connecting’ the FIRs of the ANSPs provided opportunity for UPR flights to be planned for maximum distance with minimal restriction between thirty-seven (37) agreed city-pairs.

2.3 The initiative set out to demonstrate several benefits and goals:

2.3.1 Progressing cross-border collaboration on FRTO initiatives:

- Demonstrate how benefits can be generated and sustained when multiple States cooperate for common goals

2.3.2 Optimize flight planning efficiency for operators

- Enhanced efficiency by optimizing flight paths available to operators
- Increased options for operators during flight planning to find the most optimal route

2.3.3 Reduce operational cost for aircraft operators and airlines

- Fewer track miles and/or more wind assisted routes flown equates to lower fuel burn which helps to reduce fuel uplift and operational costs, or
- Airlines utilize potential fuel savings in other ways to generate benefits suiting business objectives

2.4 A review of the trial and identification of benefits and expansion opportunities took place in Q1/2025. Data collated represented total savings achieved for UPR vs fixed routes for the restricted set of city-pairs used in the trial. The data represented what can be achieved in total when multiple States work in cooperation, not just the incremental saving from the trial itself, as much of the UPR efficiencies already existed in other individual programs.

2.5 Feedback from participating airlines indicated that it took some a period to familiarize with and get started using the trial procedures. Some faced system setup challenges and change management issues, but once commenced, participation and tracking became more consistent.

2.6 Airlines also explained that flight planning does not normally track fuel savings on a flight-by-flight basis, instead at times uses modelling capability built into the flight planning system to measure potential savings.

2.7 Tracking fuel savings also requires a separate flight plan to be created for comparison; this flight plan would never be used. This increases planner workload.

2.8 After considering the airline data on fuel and CO₂ efficiencies, the AAC agreed to extend the trial until 31 October 2025 and expand it by adding two ANSPs (NiuSky Pacific and Fiji Airports), as well as four additional airlines (Cathay Pacific (CPA), Eva Air (EVA), Fiji Airways (FJA), and JetStar Airways - Australia (JST)) operating in an expanded suite of city-pairs.

2.9 The project team agreed that this would be the final extension, and the trial would cease at end of October 2025 with further data collation and reporting. Airline data reported post-completion of the trial is described in Appendix A.

2.10 At cessation of the trial, airlines provided feedback on pros and cons of FRTO as follows:

2.10.1 Pros:

- Efficient routes
- Benefits realisation
- Weather and volcano avoidance

2.10.2 Cons:

- Limited city-pairs

- Requirement to email route prior to FPL
- Additional Field 18 annotations
- Ongoing restrictions in some FIRs
- Winds not always conducive to UPR planning
- High terrain constrains some route options
- Requirement to reach minimum FLs before UPR reduces gains
- Requirements at some locations (eg: starting point of STARS) reduces gains
- Some city-pairs didn't yield expected benefits

2.11 ANSPs provided feedback on pros and cons of FRTTO as follows:

2.11.1 Pros:

- Expansion of Free-Route Airspace
- Seamless FIR boundaries

2.11.2 Cons:

- Slow take-up by some airlines on some city-pairs
- Lack of ATM system automation to support broader expansion
- Change management challenges
- Some airlines still planning incorrectly (eg: FPL using low-level waypoints on STARS which the ATM system detects as an arrival)

2.12 The data results and lessons learnt from the trial are being utilized by the project team to develop future guidance material to encourage and support other ANSPs to transition to FRTTO environment in the future so as to support regional expansion of the capability. That guidance material will be developed for targeted endorsement by the AAC in Q2/2026.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

- a) note the information contained in this paper;
- b) encourage States/Administrations to collaborate on FTRO initiatives to optimize flight efficiency; and
- c) discuss any relevant matters as appropriate.

APPENDIX A: SEA-O FRTO Trial – Airline Data

Airline 1:

Fuel savings measured based on seasonal periods as some times of year yield little to no benefit.

2nd Dry Season (2nd Jul 25 to 31st Aug 25) - 61 days of data					
Aircraft	City Pair	Fuel saving (kgs)	Days this flight participated in trial	Average fuel savings (kgs)	Percentage of participation
A380	SYD-SIN	52,154	50	1043	82
A330	MEL-HKG	2,479	28	89	46
A330	HKG-MEL	25,392	47	540	77
A330	MEL-SIN	7,538	42	179	69
A330	SIN-MEL	3,281	30	109	49
A330	MEL-CGK	1,738	12	145	20
A330	CGK-MEL	665	15	44	25
A330	SYD-CGK	9,536	31	308	51
A330	CGK-SYD	1,034	23	45	38
A330	BNE-SIN	59,117	57	1037	93
A330	SIN-BNE	3,562	31	115	51
A330	PER-SIN	19,437	57	341	93
A330	SYD-HKG	7,799	36	217	59
A330	HKG-SYD	7,818	29	270	48
A330	SYD-MNL	3,045	4	761	7
A330	MNL-SYD	27,791	50	556	82
A330	BNE-MNL	0	0	Nil	0
A330	MNL-BNE	7,636	27	283	44
B738	DPS-MEL	0	0	Nil	0
Total Fuel Saved (kgs)			240,022		
Total CO2 emmissions (kgs)			758,470		
Total average participation (%)			49		

Airline 2:

SIN-AKL-SIN – analytics modules were used to compare annual flights over 3 years for fixed routes against annual flights over 3 years for UPRs (both B777 and B787). For fixed routes, 3 routes were chosen to give a reasonable spread of routes for the system to choose. For the analysis the most efficient fixed route was compared with the UPR results. The period April 2024 – April 2025 was selected to analyse averages and flight counts.



Total annual fuel savings April 2024 – April 2025

- 1872 tonnes fuel
- 7208 tonnes CO2
- Substantial savings on both routes resulting from planning UPRs. The 2% fuel burn reduction is slightly higher than anticipated but aligns closely with the airline’s experience of UPRs in other regions

SIN-AKL:

- B787 ave fuel saving 1200 kg/trip count 169 / 199 t fuel saved
- B777 ave fuel saving 1700 kg/trip count 410 / 726 t fuel saved

AKL-SIN

- B787 ave fuel saving 1500 kg/trip count 174 / 252 t fuel saved
- B777 ave fuel saving 1700 kg/trip count 415 / 695 t fuel saved

Airline 3:

BNE-TPE return flight showed marginal benefit – almost the same effect as using the traditional route. A/C Type: Boeing 787.

Savings	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Time (ave)	00:13	00:14	00:12	00:08	00:04	00:01	00:00	00:01	00:01	00:04	00:07	00:10
CO ₂ (kg)	4857	5334	4219	3024	1454	560	123	572	547	1346	2560	4155

Savings reported from Jan – Oct 2025. Overall, within the 15-month trial period, an average of 170 flights were planned on UPR each month. This equates to approximately 37% of the flights published in LOI.

Average fuel saving per UPR flight was 180 KG. Although they do not track the flight time and distance differences, they are estimated to be below 5 minutes (average flight time saving) and 25 NM (average track mile saving).

Airline 4:

Totals tracked monthly.

Month	Total No. of Flights on UPR	Total UPR Fuel Savings
Jan 2025	214	41 T
Feb 2025	200	41 T
Mar 2025	159	30 T
Apr 2025	182	32 T
May 2025	174	33 T
Jun 2025	170	33 T
Jul 2025	157	28 T
Aug 2025	189	40 T
Sep 2025	165	39 T
Oct 2025	172	31 T
10-Month Total	1,782	348 T