Eco activity – ANA
Feed Back on the advantages of DARP Operation ANA

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Oceanic Flight Route

- **NOPAC Route (NOPAC: North Pacific)** • • • Defined as Airway
- **PACOTS Route (PACOTS: Pacific Organized Track System)**
  • • • PACOTS consists of flexible track established based on a daily weather forecast by JCAB and FAA.
- **UPR Route (UPR: User Preferred Route)**
  • • • UPR is a method of flight planning that allows oceanic airspace operators to choose random route based on individual airframes, flight time, weather forecast etc.
Flight plan creation procedure

Weather forecast data updated every 6 hours

Flight plan creation

Briefing

Departure Airport

Flying over 8 hours

Weather forecast data update: 00z, 06z, 12z, 18z

(Example)

Flight plan creation (UTC) 08:00

Briefing 10:30

Departure 12:00

Weather forecast data updated at 06:00

12:00 Weather forecast data update
New operating method at oceanic area (DARP)

Blue line: Initial route
Yellow line: Optimum path with new predictive wind

① Get latest weather forecast data
② Optimum route calculation
③ Share new route with Pilot (*)
④ Request change to new route (*)
⑤ Change clearance (*)

(*) All communication by data link
New operating method at oceanic area (DARP)

DARP Route
Fuel Saving: 5,300LBS
Time Saving: 18分

Initial route
Overview of DARP operation

- Tokyo (HND/NRT) ⇔ Honolulu (HNL) - From OCT 2012
- Tokyo (HND/NRT) ⇔ Los Angeles (LAX) - From MAR 2014
- Tokyo (NRT) ⇔ San Francisco (SFO) - From NOV 2014
- Tokyo (NRT) ⇔ San Jose (SJC) - From JUN 2015
Actual result

The results of the target flight of DARP from October 1, 2012 to August 31, 2017 are as follows.

- Target number of flights with DARP available route: **12,422 flights**
- The number of flights applied DARP: **384 flights (3.1%)**
- Total Fuel Saving: **376,500LBS**
- Total CO$_2$ emission reducing: **420 t-CO$_2$**
- Total Time Saving: **26:50**

Transitive graph of target flights, execution flights and cumulative fuel saving

(Data: A total of 12,422 flights between 2012.10.1 and 2017.8.31)
### Result (Data by Route)

**HNL \(\Rightarrow\) HND/NRT**
- TTL: 219,300lbs / 16:10
- Savings: 251 DARP / 4348 Flights (5.8%)
- (2012.10.1-2017.8.31)

**HND/NRT \(\Rightarrow\) HNL**
- TTL: 27,800lbs / 2:41
- Savings: 47 DARP / 3589 Flights (1.3%)
- (2012.10.1-2017.8.31)

**HND/NRT \(\Rightarrow\) LAX**
- TTL: 63,900lbs / 3:27
- Savings: 49 DARP / 2559 Flights (1.9%)
- (2014.3.1-2017.8.31)

**NRT \(\Rightarrow\) SJC**
- TTL: 5,800lbs / 0:33
- Savings: 11 DARP / 797 Flights (1.4%)
- (2015.6.25-2017.8.31)

**NRT \(\Rightarrow\) SFO**
- TTL: 58,900lbs / 3:52
- Savings: 24 DARP / 1058 Flights (2.3%)
- (2014.11.1-2017.8.31)

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**Departure Airport** | **Arrival Airport** | **Target FLT** | **Applied DARP FLT** | **Executing Rate (%)** | **TTL Fuel Saving (LBS)** | **TTL Time Saving** | **TTL Fuel Saving per flight (LBS)** | **Time Saving per flight**
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HNL | HND/NRT | 4348 | 251 | 5.8% | 219,300 | 16:10 | 874 | 0:03
HND/NRT | HNL | 3589 | 47 | 1.3% | 27,800 | 2:41 | 591 | 0:03
HND/NRT | LAX | 2559 | 49 | 1.9% | 63,900 | 3:27 | 1,304 | 0:04
NRT | SFO | 1058 | 24 | 2.3% | 58,900 | 3:52 | 2,454 | 0:09
NRT | SJC | 797 | 11 | 1.4% | 5,800 | 0:33 | 527 | 0:03

(Data: A total of 12,351 flight between 2012.10.1 and 2017.8.31)
Future prospects

Future

[HND/NRT](#) [HNL](#) [SFO/SJC](#) [MEX](#)
To raise DARP implementation rate

Complicated Operation

**Dispatcher**
1. Get latest weather forecast data
2. Optimum route calculation
3. Share new route with Pilot (*)

**Request change to new route (**)**
**Change clearance (**)**
**Share new route with Pilot (**)**

Blue line : Initial route
Yellow line : Optimum path with new predictive wind

(*) All communication by data link
Questions?
Thank you for your kind attention