International Civil Aviation Organization
South American Regional Office
First Workshop on Interface between TMAs and Version 03 of the SAM ATS Route network - Regional Project - RLA/06/901
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Optimization of NE-SW flow to the Andes region

(Presented by KLM Royal Dutch Airlines)

EXECUTIVE SUMMARY	
KLM Royal Dutch Airlines is seeking ways to improve the Northeast-Southwest traffic flow from Europe to/from various aerodromes in the Andes region (i.e. Cali, Quito, Guayaquil, Lima). KLM experiences improved possibilities for inflight DCTs in the region. KLM is seeking possibilities to use these options in the planning phase. The optimized routing possibilities as presented below will lead to optimized flight operations and reductions in fuel burn and CO_2 emissions.	
ICAO Strategic Objectives:	B - Air navigation capacity and efficiency D - Economic development of air transport E - Environmental protection

1. **Route proposals:**

1.1 **Country:** **Colombia**
Area: **Cali North/Northeast departure**
Serves: **Cali-Amsterdam**

Optimized routing through/around Colombia restricted area R10 Palanquero.
Proposed upper routes:

a) Conditional route through R10 (evening/night/weekend opening).
Route: PEI-EJA. Fuel savings +/- 850 per flight, plus increased payload.

b) New route North of R10. Route: PEI-DIPRA-EJA v.v. Fuel savings +/- 800 kgs per flight, plus increased payload.

c) New upper airway over lower airway W26 between RNG and EJA. Route: RNG-MRN-EJA v.v. No mileage reduction, but 193NM at optimized FL instead of low level. Fuel savings +/- 675 kgs. per flight, plus increased payload.

d) New upper airways v.v. over lower airway W1 between ULQ-ABL, and W17 between ABL-BOG. No mileage reduction, but 77NM at optimized FL instead of low level. Fuel savings +/- 275 kgs per flight, plus increased payload.

1.2 **Country:** **Colombia**
Area: **Cali North departure**
Serves: **Cali-Amsterdam, Guayaquil-Amsterdam, Amsterdam-Quito**

Direct route from RNG to BAQ v.v. Current route is: RNG-UG438-CTG-UG445-BAQ.
Proposed upper route: RNG-BAQ v.v. Mileage reduction 15NM. Fuel savings +/- 250 kgs. per flight.

1.3 **Country:** **Colombia**
Area: **North of Barranquilla**
Serves: **Cali-Amsterdam, Guayaquil-Amsterdam, Amsterdam-Quito**

Establishment of a new reporting point at the intersection of airways UW5 and UM525, to allow a transfer between these airways. Depending on the prevailing wind, average fuel savings 150 kgs per flight.

1.4 **Country:** **Colombia**
Area: **West and North Colombia**
Serves: **Guayaquil-Amsterdam, Amsterdam-Quito**

KLM crews report long directs from TCO to ANRON (boundary Bogota/Barranquilla FIR), OROSA (boundary Barranquilla/Curacao FIR), or VOR/DME BAQ.
Proposed upper route: From TCO to OROSA v.v., with a waypoint at the intersection with UM525, to allow a transfer to UM525. Depending on the prevailing wind, average fuel savings 1200 kgs. per flight.

1.5 **Country:** **Colombia and Curaçao**
Area: **North and West Colombia (via Guajira peninsula), Curaçao**
Serves: **Cali-Amsterdam, Guayaquil-Amsterdam, Amsterdam-Quito**

In addition to point 4), KLM is seeking NE-SW routes v.v. via the Guajira peninsula. Free flight route calculations with statistical data show this route option favourable for 40%. Proposed routing via VOR/DME Riohacha RHC, or else NDB El Cabo ECB.
Proposed upper routes: TCO-RNG-RHC-SCAPA v.v. and TCO-RNG-RHC-VESKA v.v. Depending on the prevailing wind, average fuel savings between 700-1200 kgs. per flight.

1.6 **Country:** **Colombia**
Area: **Central and East Colombia**
Serves: **Lima-Amsterdam, Amsterdam-Lima**

Establishment of new reporting points at the intersection of airways UQ110-UM662, and UM414-UM662, to allow a transfer between these airways. Depending on the prevailing wind, average fuel savings 1100 kgs. per flight.

1.7 **Country:** **Colombia**
Area: **East Colombia**
Serves: **Lima-Amsterdam, Amsterdam-Lima**

Direct route from ILMUX-AMAYA v.v. No current routing. If intersection between airways UM414-UM662 is established, this route would still save an additional 23NM. Proposed upper route: ILMUX-AMAYA. Compared to no current route, and depending on the prevailing wind, average fuel savings 1200 kgs. per flight.

1.8 **Country:** **Ecuador**
Area: **Northeast Ecuador**
Serves: **Amsterdam-Quito**

Establishment of a new reporting point at the intersection of airways UM662 and UW21, to allow a transfer between these airways. Depending on the prevailing wind, average fuel savings up to 700 kgs. per flight.

1.9 **Country:** **Venezuela**
Area: **North Venezuela over the Caribbean Sea**
Serves: **Lima-Amsterdam, Amsterdam-Lima**

Direct route from VOR/DME Puerto Cabello PBL to SILVA.
Current route is: PBL-UG427-IMBAT-UL793-SINDA-UA516-SILVA. Proposed upper route: PBL-SILVA v.v. Mileage reduction 36NM. Fuel savings +/- 700 kgs per flight.

2. **Suggested action:**

2.1 KLM invites the Meeting to review the new proposed routes for implementation.

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