International Civil Aviation Organization
South American Regional Office
Twenty Fifth Workshop/Meeting of the SAM Implementation Group SAM (SAM/IG/25) – Regional Project RLA/06/901
(Lima, Perú, 2 to 4 November 2020)

SAM/IG/25-IP/2.3
29/10/2020

Agenda
Item 2: **Report of activities of the GESEA and Subgroups**

a) Review of air navigation priorities in the ATM field
b) Deliverables and progress of SG1/SG2 working groups

PBN flight procedures implementation in Ecuador

(Presented by Ecuador)

SUMMARY
The purpose of this note is to present the implementations of PBN procedures carried out in 2020 at airports in Catamayo, Coca and Quito, Ecuador.

References:

- SG2 GESEA PANS OPS meeting summary
- Doc. 9613 Manual on PBN
- Doc. 9905 Manual on RNP – AR procedures
- Doc. 8168 Vol. II PANS OPS

1. Introduction

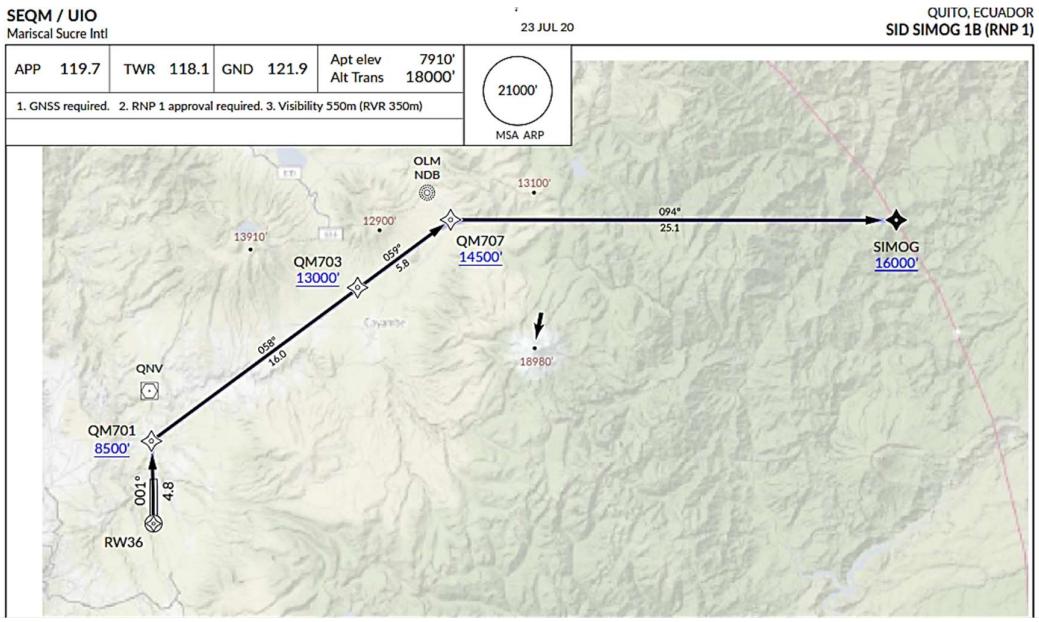
1.1 This note aims to present to SAM states an update on the progress made by Ecuador with respect to the implementation of PBN within its airspace at hard-to-reach airports and optimizing routes that allow fuel economy, lower CO2 emissions.

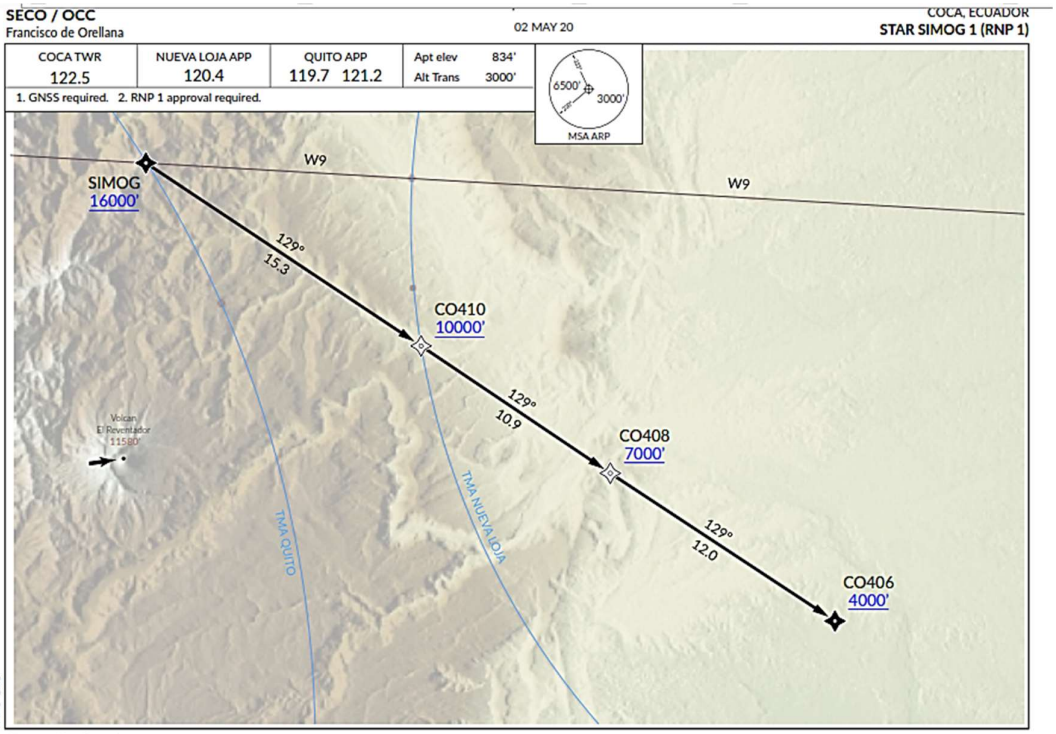
1.2 **In collaboration with LATAM airlines,** PBN procedures for Catamayo, Coca and Quito have been developed and implemented.

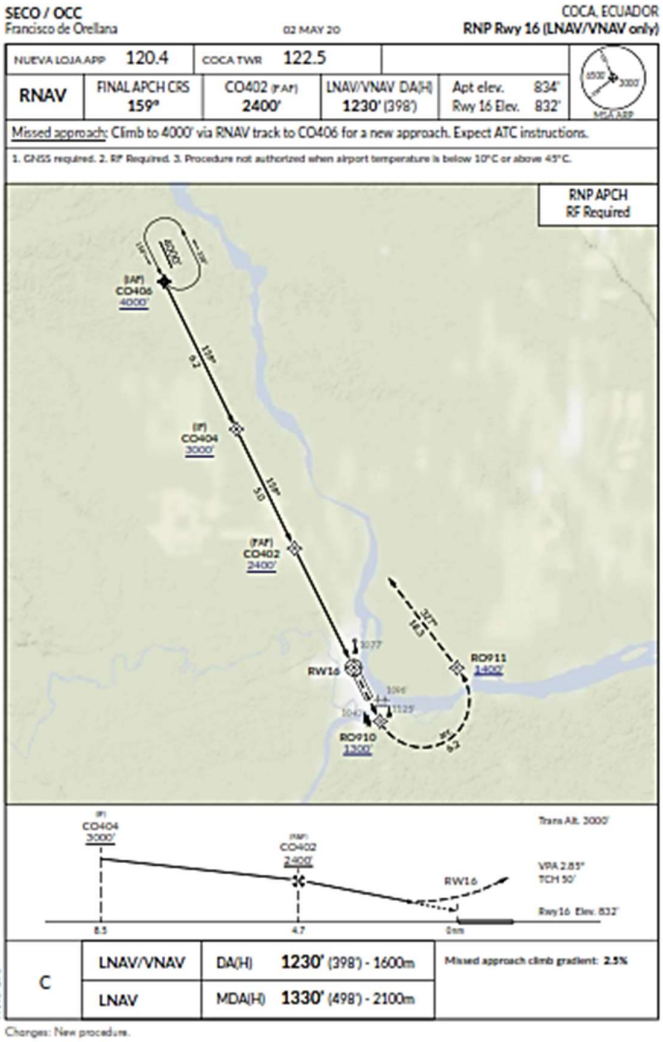
2. Analysis

2.1 On route optimization, a procedure has been designed and implemented under criteria of Doc. 8168 ICAO, a SID procedure from Quito Airport (RNP 1), which has allowed a direct path to the SIMOG exit point, followed by STAR (RNP1) that takes the aircraft until a direct approach procedure (RNP APCH) to Coca Airport.

2.2 The operational savings of route optimization, mean a distance reduction from 130.3 NM to 103.3 NM, with corresponding fuel savings and CO2 emissions. View graphs:

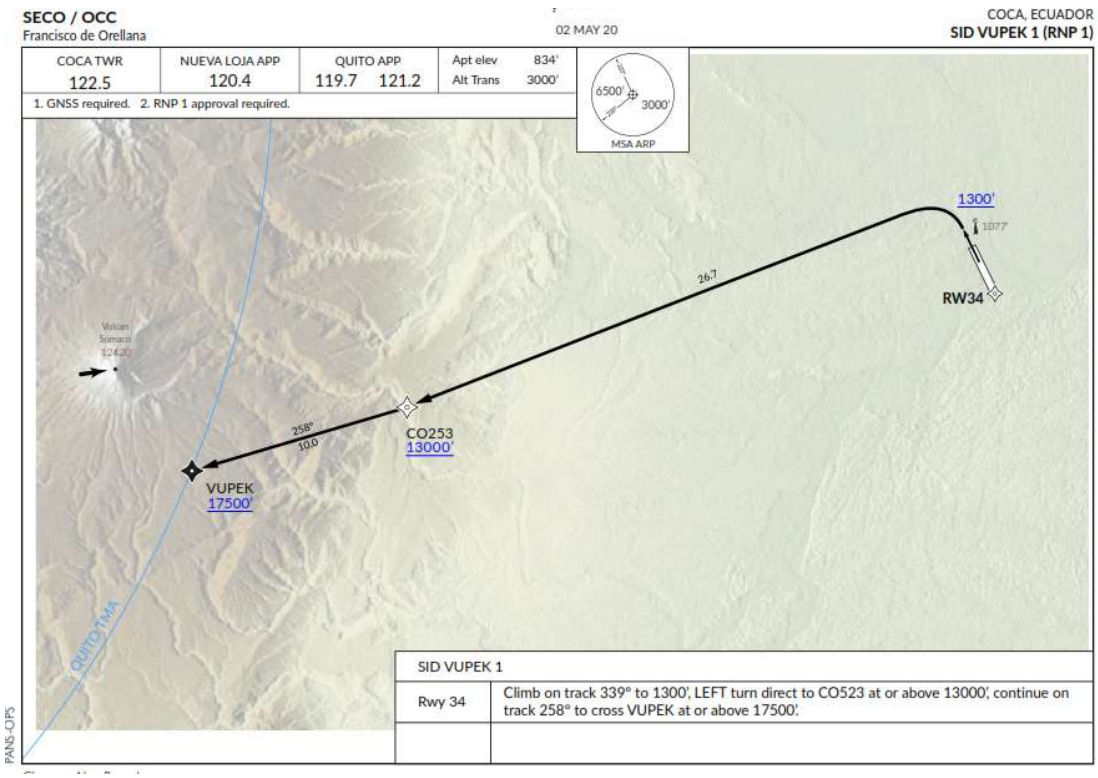

SEQM / UIO
Mariscal Sucre Intl
23 JUL 20
QUITO, ECUADOR
SID SIMOG 1B (RNP 1)
APP 119.7
TWR 118.1
GND 121.9
Apt elev 7910'
Alt Trans 18000'
1. GNSS required. 2. RNP 1 approval required. 3. Visibility 550m (RVR 350m)
21000'
MSA ARP
OLM
NDB
13100'
12900'
13910'
094°
25.1
QM707
14500'
SIMOG
16000'
069°
5.8
QM703
13000'
058°
16.0
QNV
18980'
QM701
8500'
001°
4.8
RW36

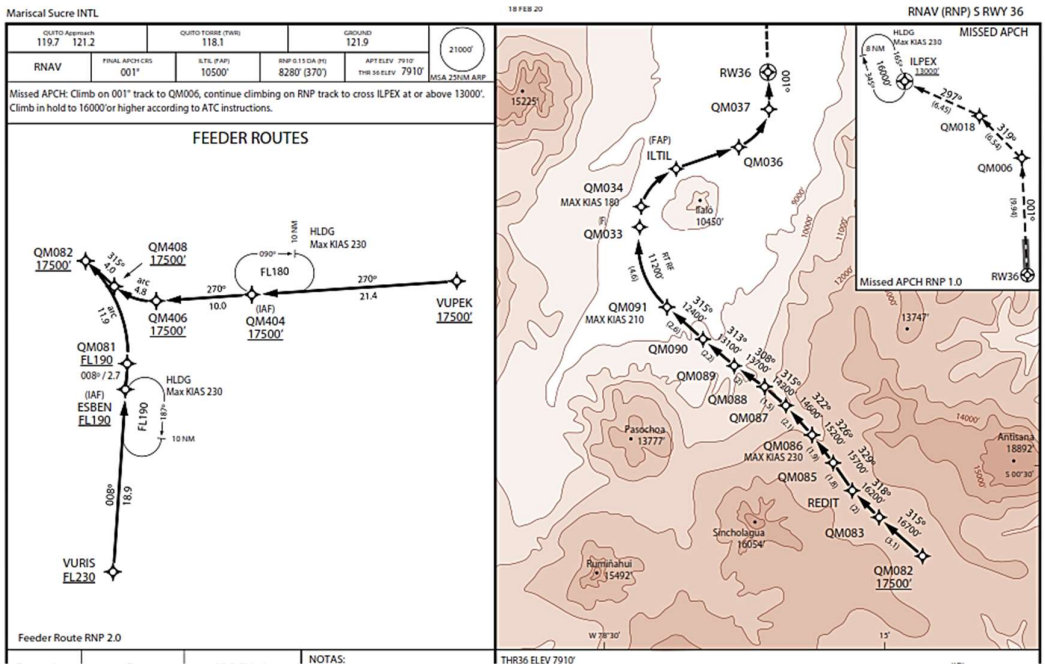

SECO / OCC
Francisco de Orellana
02 MAY 20
COCA, ECUADOR
STAR SIMOG 1 (RNP 1)
COCA TWR
122.5
NUEVA LOJA APP
120.4
QUITO APP
119.7 121.2
Apt elev 834'
Alt Trans 3000'
1. GNSS required. 2. RNP 1 approval required.
6500'
3000'
MSA ARP
W9
W9
SIMOG
16000'
129°
15.3
CO410
10000'
129°
10.9
CO408
7000'
129°
12.0
CO406
4000'
Volcan
El Reventador
11580'
TMA QUITO
TMA NUEVA LOJA
PANS OPS
Changes: New Procedure.



2.3 Back from Coca Airport to Quito Airport, a traffic flow system has been created to prevent congestion in the arrival route, implementing a SID (RNP1) to VUPEK (TMA UIO) following a STAR (RNP 1) that links to the RNAV RNP (AR) S RWY 36, towards Quito Airport.

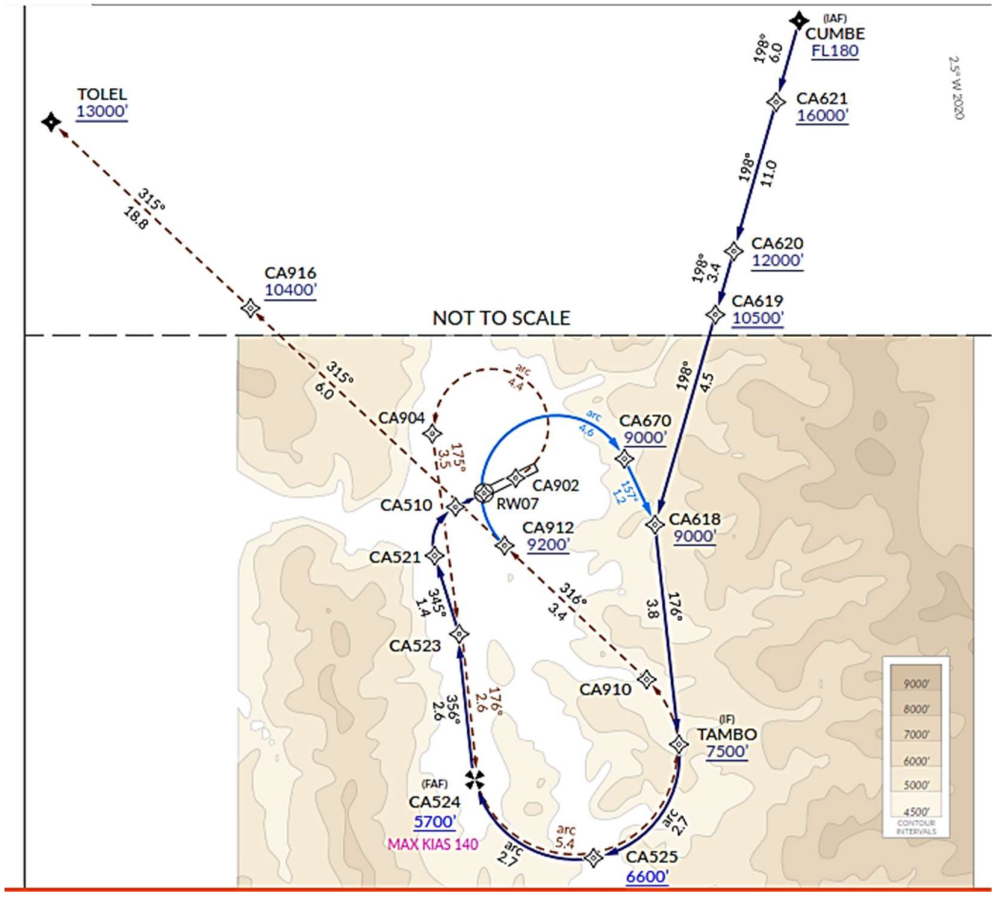
2.4 The operational savings of this optimization mean a reduction from 138.7 NM to 92.71 NM flight distance. See graphs.

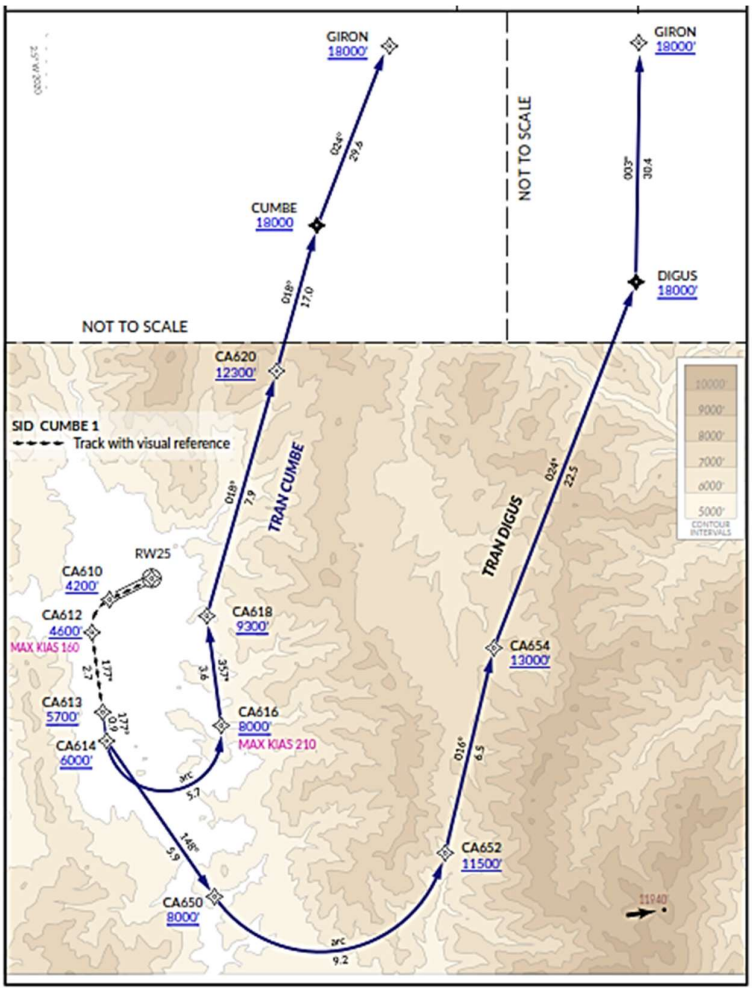

SECO / OCC
Francisco de Orellana
02 MAY 20
COCA, ECUADOR
SID VUPEK 1 (RNP 1)
COCA TWR 122.5
NUEVA LOJA APP 120.4
QUITO APP 119.7 121.2
Apt elev 834'
Alt Trans 3000'
1. GNSS required. 2. RNP 1 approval required.
6500'
3000'
MSA ARP
1300'
1077'
RW34
26.7
Volcan Sumaco 12430'
258°
10.0
CO253
13000'
VUPEK
17500'
QUITO TMA
SID VUPEK 1
Rwy 34
Climb on track 339° to 1300', LEFT turn direct to CO523 at or above 13000', continue on track 258° to cross VUPEK at or above 17500'.
PANS-OPS


Mariscal Sucre INTL
18 FEB 20
RNAV (RNP) S RWY 36
QUITO Approach 119.7 121.2
QUITO TORRE (TWR) 118.1
GROUND 121.9
21000'
MSA 25NM ARP
RNAV
FINAL APCH CRS 001°
ILTL (FAP) 10500'
RNP 0.15 DA (H) 8280' (370')
APT ELEV 7910'
THR 36 ELEV 7910'
Missed APCH: Climb on 001° track to QM006, continue climbing on RNP track to cross ILPEX at or above 13000'. Climb in hold to 16000'or higher according to ATC instructions.
FEEDER ROUTES
QM082 17500'
QM408 17500'
QM406 17500'
QM404 17500'
FL180
HLDG Max KIAS 230
VUPEK 17500'
QM081 FL190
ESBEN FL190
VURIS FL230
Feeder Route RNP 2.0
NOTAS:
RW36
QM037
QM036
ILTIL
QM034 MAX KIAS 180
QM033
Exio 10450'
QM091 MAX KIAS 210
QM090
QM089
QM088
QM087
QM086 MAX KIAS 230
QM085
REDIT
QM083
QM082 17500'
Pasochoa 13777'
Antisana 18892'
Sincholagua 16054'
Ruminahui 15492'
MISSED APCH
ILPEX 13000'
QM018
QM006
Missed APCH RNP 1.0
THR36 ELEV 7910'

2.5 Catamayo Airport is considered a difficult–access airport, as it is located in a valley that must be overflown to enter into a corridor and perform a maneuver a few miles from the runway in order to land.

2.6 Because a number of mountains surrounding it has not been possible to build conventional procedures since the protection areas are affected, thus RNAV RNP AR (RNP 0.1) procedures were implemented, which protection areas ensure that the nominal trajectory is protected and allow safe operation on both landing and take-off. See designs below;





3. Conclusions

3.1 The implementation of PBN procedures at Airports in Ecuador has enabled optimizations in SID, STAR and IAC procedures, as well as on direct routes providing operational advantages for airspace users with the corresponding benefits.

3.2 It is suggested to continue studies and development for the implementation of new PBN procedures at airports with mixed geography, to improve accessibility

— END —