

How to check and validate a RNP-AR procedure.

Before flying a RNP-AR procedure, our French authorities ask us to determine if a RNP-AR procedure is complex or « only » generic with the following flags.

Arinc Decoder permit this as per those parameters:

If one of those appear...

- $dFROP < 2 \text{ NM}$ ($dFROP = \text{distance from LTP to final rollout point}$)
- $VPA > 3,5^\circ$
- $RNP < 0,3$.
- First leg in Missed approach is a RF leg before the DER
- $RNP < 1$ in missed approach segments
- RF leg radius $< 2,5 \text{ NM}$ (in final and missed approach segments)
- Lenth of a leg $< 2 \times RNP$ after the FAF

...The procedure is complex and has to follow a safety study and a validation from our authorities.

If not, we just have to test this approach in full flight simulator and to verify all the coding versus the AIP with Arinc Decoder.

First I make a filter with the airports of my operation, here in my example is:

“Example RNP-AR” (with FSIA KBOI KJFK KPBI MHTG MPPA MROC PHNL SCDA SPHI)

ARINC Decoder V.4.6 Air France version

Main Screen Arinc1904 - Actual Cycle (28 mars 19 → 25 avr 19) Stop All Airport

Map D.O.F Fixes MTCA Manual Coding Co-Routes / Catalog ATC Route Queries Help File

Primary Code S P

Codage Standard Tailored

All World !

Search ICAO Code Airport Waypoints Holding patterns Nav aids (VHF/NDB) PRD Zones FIR/UIR Airspaces Airways MORAs

Arinc Zone Canada USA Latin America South America Europa Africa North Pacific Russia Asia Middle East South Pacific All World !

Configuration About

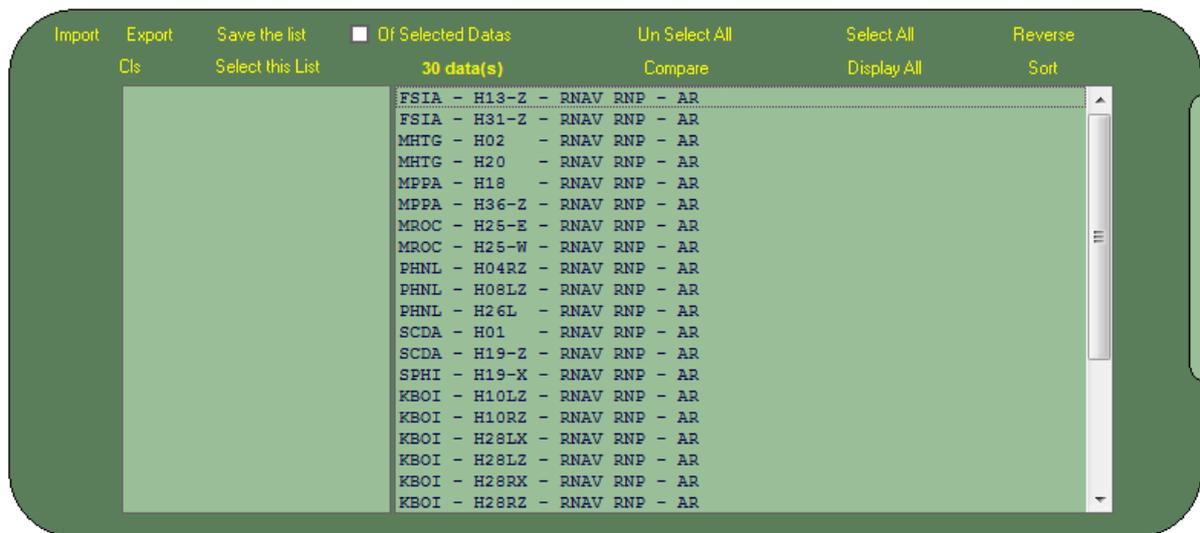
Load

Char # 13 7 8 9 10 14 15 16 Value F H

Filter Suivi RNP-AR 787 Type App All Effectivity 1904

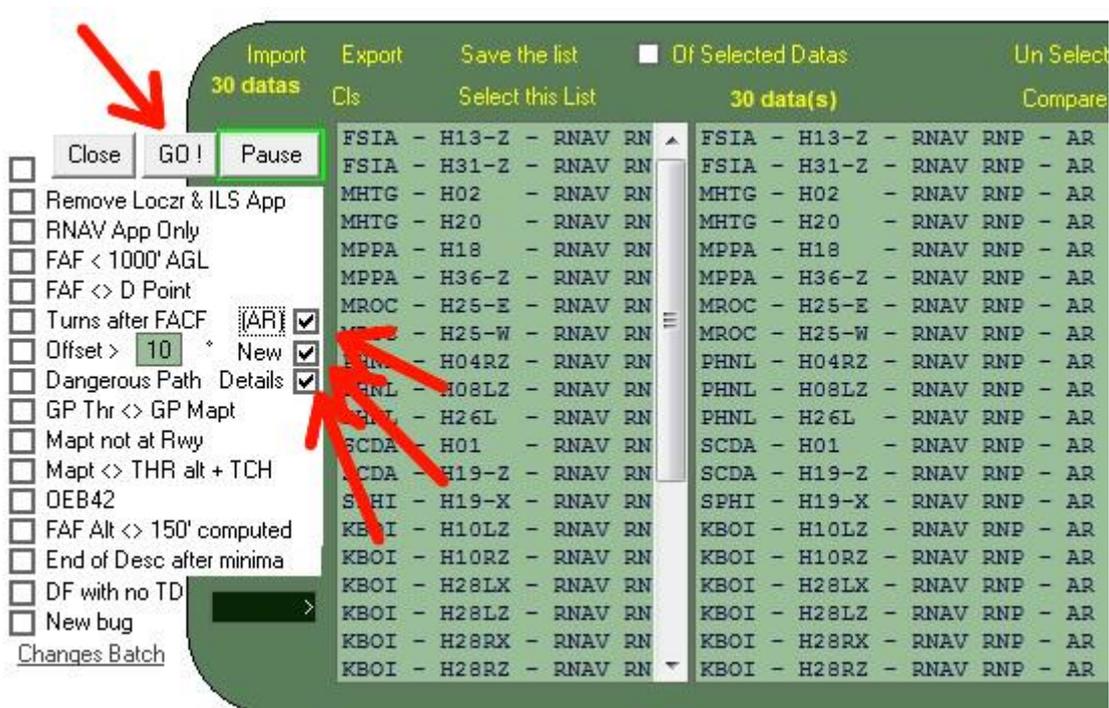
Search

Press "Load" and the list of all RNP AR of those airports will appear:



Press "Save the list" and "Check App"

Check (AR) and "Details" (if you want to know them...)



Then press "GO !"

Few seconds after...

Import 30 datas Export Cls Save the list Of Selected Datas Un Select All Select All Reverse

30 datas Select this List 30 data(s) Compare Display All Sort

GO! Pause

Loczr & ILS App
 op Only
 00' AGL
 Point
 er FACP (AR)
 10 * New
 js Path Details
 > GP Mapt
 at Rwy
 THR alt + TCH

> 150' computed
 esc after minima
 to TD 28 <

it ch

PHNL - H26L - RNAV RN	FSIA - H13-Z - RNAV RNP - AR - ** Specific ** RF Radius.15'' MDA
SCDA - H01 - RNAV RN	FSIA - H31-Z - RNAV RNP - AR - ** Specific ** RNP in Missed App.
SCDA - H19-Z - RNAV RN	MHTG - H20 - RNAV RNP - AR - ** Specific ** RF Radius.DFroP.15''
SPHI - H19-X - RNAV RN	MPPA - H18 - RNAV RNP - AR - ** Specific ** RNP in Missed App.
KBOI - H10LZ - RNAV RN	MPPA - H36-Z - RNAV RNP - AR - ** Specific ** RFatMapt.RNP in Mi
KBOI - H10RZ - RNAV RN	MROC - H25-E - RNAV RNP - AR - ** Specific ** RF Radius.DFroP.15
KBOI - H28LX - RNAV RN	MROC - H25-W - RNAV RNP - AR - ** Specific ** RF Radius.DFroP.15
KBOI - H28LZ - RNAV RN	PHNL - H04RZ - RNAV RNP - AR - Generic
KBOI - H28RX - RNAV RN	PHNL - H08LZ - RNAV RNP - AR - Generic
KBOI - H28RZ - RNAV RN	PHNL - H26L - RNAV RNP - AR - ** Specific ** RNP.RF Radius.DFroP.
KJFK - H04LZ - RNAV RN	SCDA - H01 - RNAV RNP - AR - Generic
KJFK - H04RZ - RNAV RN	SCDA - H19-Z - RNAV RNP - AR - ** Specific ** RNP.RF Radius.RNP
KJFK - H22LZ - RNAV RN	SPHI - H19-X - RNAV RNP - AR - ** Specific ** RF Radius.RNP in M
KJFK - H31LZ - RNAV RN	KBOI - H10LZ - RNAV RNP - AR - Generic
KJFK - H31RZ - RNAV RN	KBOI - H10RZ - RNAV RNP - AR - ** Specific ** RF Radius.
KPBI - H10LZ - RNAV RN	KBOI - H28LX - RNAV RNP - AR - ** Specific ** RNP.RF Radius.
KPBI - H14-Z - RNAV RN	KBOI - H28LZ - RNAV RNP - AR - Generic
KPBI - H28RW - RNAV RN	KBOI - H28RX - RNAV RNP - AR - ** Specific ** RNP.RF Radius.DFro
KPBI - H28RZ - RNAV RN	KBOI - H28RZ - RNAV RNP - AR - Generic
KPBI - H32-Z - RNAV RN	KJFK - H04LZ - RNAV RNP - AR - Generic

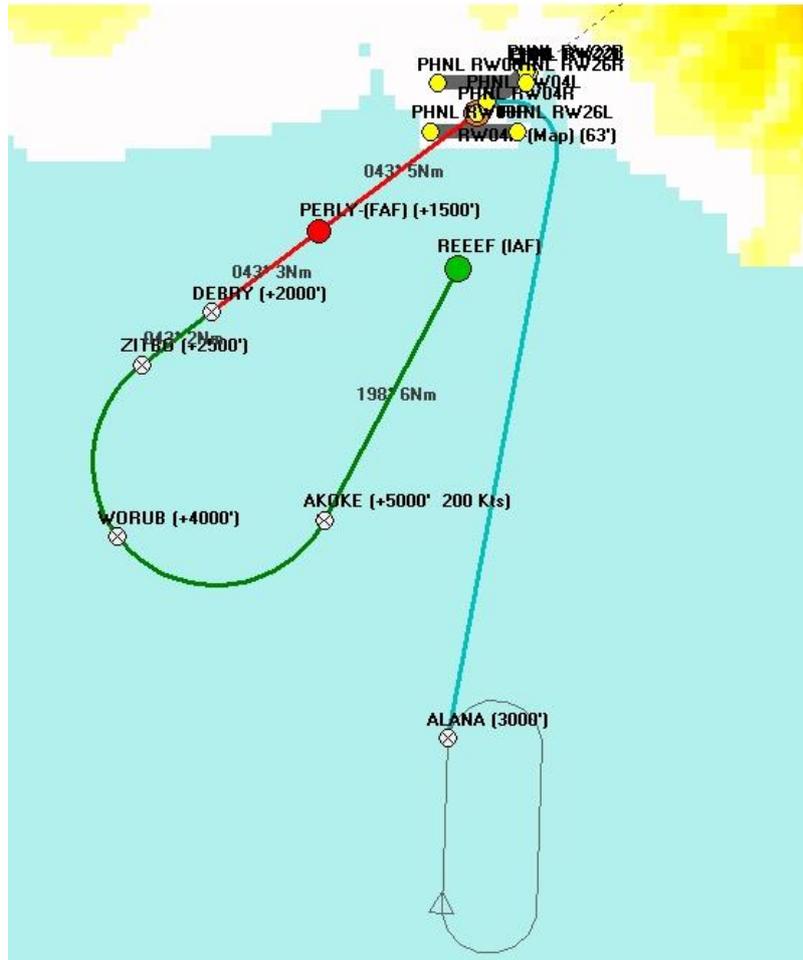
The delta between 28 approaches in the list and the 30 datas in the first one is because some LDAs are below 1500 meters, and that's too few for an airliner.

If you press "Export" you will have a excel spreadsheet with all details ...

	A	B	C	D	E	F	G
1	FSIA - H13-Z - RNAV RNP - AR -	Complex	RF Radius	15'' MDA	RNP in Missed App		
2	FSIA - H31-Z - RNAV RNP - AR -	Complex	RNP in Missed App				
3	MHTG - H20 - RNAV RNP - AR -	Complex	RF Radius	DFroP	15'' MDA	RNP in Missed App	RF Rad in Missed App
4	MPPA - H18 - RNAV RNP - AR -	Complex	RNP in Missed App				
5	MPPA - H36-Z - RNAV RNP - AR -	Complex	RFatMapt	RNP in Missed App			
6	MROC - H25-E - RNAV RNP - AR -	Complex	RF Radius	DFroP	15'' MDA	RNP in Missed App	
7	MROC - H25-W - RNAV RNP - AR -	Complex	RF Radius	DFroP	15'' MDA	RNP in Missed App	
8	PHNL - H04RZ - RNAV RNP - AR -	Generic					
9	PHNL - H08LZ - RNAV RNP - AR -	Generic					
10	PHNL - H26L - RNAV RNP - AR -	Complex	RNP	RF Radius	DFroP		
11	SCDA - H01 - RNAV RNP - AR -	Generic					
12	SCDA - H19-Z - RNAV RNP - AR -	Complex	RNP	RF Radius	RNP in Missed App		
13	SPHI - H19-X - RNAV RNP - AR -	Complex	RF Radius	RNP in Missed App	RF Rad in Missed App		
14	KBOI - H10LZ - RNAV RNP - AR -	Generic					
15	KBOI - H10RZ - RNAV RNP - AR -	Complex	RF Radius				
16	KBOI - H28LX - RNAV RNP - AR -	Complex	RNP	RF Radius			
17	KBOI - H28LZ - RNAV RNP - AR -	Generic					
18	KBOI - H28RX - RNAV RNP - AR -	Complex	RNP	RF Radius	DFroP		
19	KBOI - H28RZ - RNAV RNP - AR -	Generic					
20	KJFK - H04LZ - RNAV RNP - AR -	Generic					
21	KJFK - H04RZ - RNAV RNP - AR -	Generic					
22	KJFK - H22LZ - RNAV RNP - AR -	Generic					
23	KJFK - H31LZ - RNAV RNP - AR -	Generic					
24	KJFK - H31RZ - RNAV RNP - AR -	Generic					
25	KPBI - H10LZ - RNAV RNP - AR -	Generic					
26	KPBI - H14-Z - RNAV RNP - AR -	Complex	RF Radius				
27	KPBI - H28RW - RNAV RNP - AR -	Complex	RF Radius	DFroP	15'' MDA		
28	KPBI - H28RZ - RNAV RNP - AR -	Generic					

The Generic approaches will just have to be validated in full flight simulator and the coding will have to be check once, then, modifications each cycle will have to be verified :

Example... PHNL 04R – Z



Approach - PHNL - H04RZ (AR) Honolulu / Daniel K Inouye Intl **Mag Var : 11.0° E (Apt)**

Via	Seq	Pt	Fix	Typ	F/D	TD	Mag	Crs	Alt 1	Alt 2	Vert Angle	RNP	Speed Limit	Distance	Time	CTR	RF	Radius	Leg (Nm)	Update	
REEEF	10	IF	REEEF	IAF																Transition	1504
REEEF	20	TF	AKOKE				196.9°	+	5000			1	200 Kts	6,5 Nm						Transition	1801
REEEF	30	RF	WORUB			R	312°	+	4000			1		5,6 Nm			CFPPX	2,8	Transition	1212	
REEEF	40	RF	ZITBO			R	42°	+	2500			1		4,4 Nm			CFPPX	2,8	Transition	1212	
REEEF	50	TF	DEBRY	Inter AF			41.9°	+	2000			1		2 Nm					Transition	1801	
	10	IF	DEBRY	FACF					2000											1707	
	20	TF	PERLY	FAF			41.9°	+	1500		-3.00°	1		3 Nm						1707	
	30	TF	RW04R	MaPt	FO		41.9°		63		-3.00°	0,3		4,5 Nm						1707	
	40	CA	RW04R	Go.Arr			42°	+	580			1								1707	
	50	DF	ALANA		FO	R			3000			1								1707	
	60	HM	ALANA			R	351°							4 Nm						1707	

Approach - PHNL - H04RZ (AR) Cycle :1904



--- Authorization Required --- Generic
D-Point 1.6 Nm before FAF

Threshold

7	6	5	4	3	2	1
2290	1970	1660	1340	1020	700	380

D-Point: 6.1 Nm from THR (Intercept at 2000')

[Computed Altitude from MaPt ']

Coded Altitude in FMS '

Apt Z: 13 '

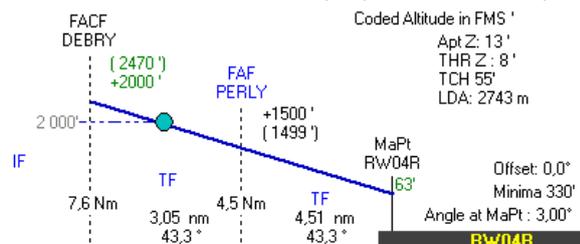
THR Z: 8 '

TCH 55'

LDA: 2743 m

RW04R
N21.18.8
W157.55.6

Arinc Decoder



Means... nothing trigger the complexity criteria.

This one has 3 complicating parameters...

Approach - KBOI - H28RX (AR)

Boise Air Terminal / Gowen Fld

Mag Var : 13.0° E (Apt)

Via	Seq	Pt	Fix	Typ	F/D	TD Mag Crs	Alt 1	Alt 2	Vert Angle	RNP	Speed Limit	Distance Time	CTR RF Leg (Nm)	CTR RF Radius (Nm)	Update
CAMML	10	IF	CAMML	IAF			8000				210 Kts				Transition 1412
CAMML	40	TF	SMYRF	Inter AF		102.4°	6800			1		4.8 Nm			Transition 1713
	10	IF	SMYRF	FACF			6800								1713
	20	TF	CUBAR			101°	5500		-3.00°	0.3	180 Kts	5.5 Nm			1801
	30	RF	SIALS		R	156°	5000		-3.00°	0.15		2.2 Nm	CFFMN	2.3	1713
	40	RF	W0SEP		R	168°	4800		-3.00°	0.15		0.5 Nm	CFFMM	2.2	1713
	50	RF	ZAKVA		R	183°	4600		-3.00°	0.15		0.6 Nm	CFFMK	2.1	1713
	60	RF	DGUVU	FAF	R	199°	4400		-3.00°	0.15		0.6 Nm	CFFMK	2.1	1713
	70	RF	UZZOX		R	282°	3548		-3.00°	0.15		2.7 Nm	CFFMH	1.8	1713
	80	TF	RW28R	MaPt	FO	282.1°	2926		-3.00°	0.15		1.9 Nm			1713
	90	TF	ATTOL	Go.Arr	FO	282.1°	6000					12.8 Nm			1713
	100	HM	ATTOL		R	102°						5 Nm			1713

Threshold

1	2	3	4	5	6	7	8	9
3240	3560	3880	4200	4520	4840	5160	5480	5790

Approach - KBOI - H28RX (AR) Cycle :1904

--- Authorization Required --- SPECIFIC
DFRoP = 1.95 Nm
RF Radius = 1.84 Nm
RNP: 0.15

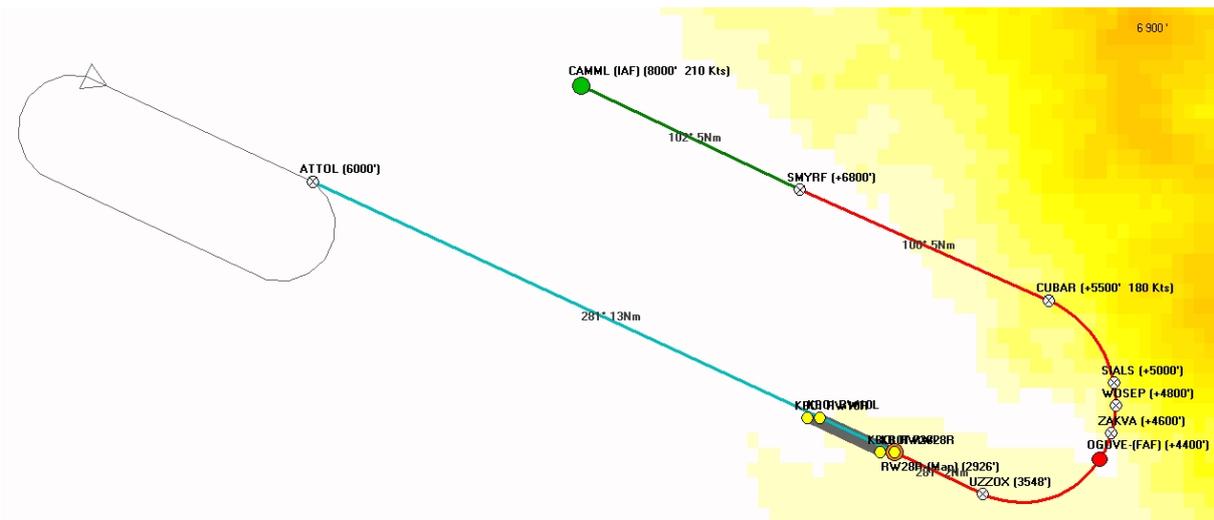
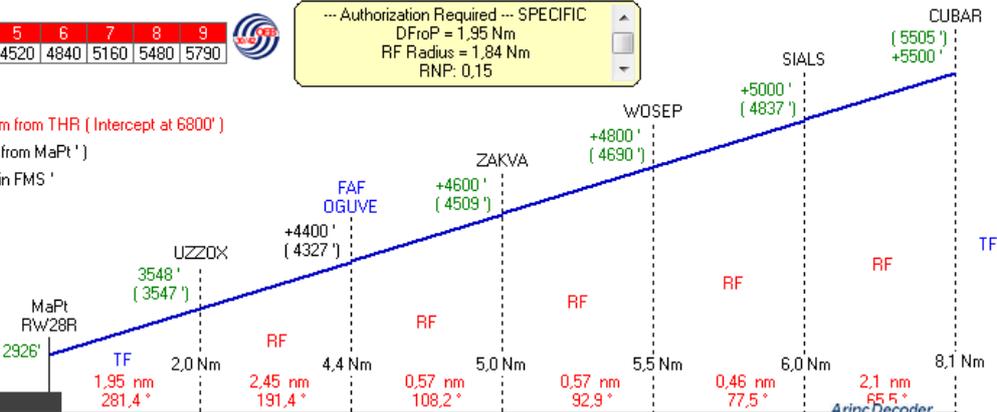
D-Point: 12.2 Nm from THR (Intercept at 6800')

(Computed Altitude from MaPt')

Coded Altitude in FMS'

Apt Z: 2872'
THR Z: 2872'
TCH 54'
LDA: 3048 m
DFRoP: 1.95 Nm
RF Radius: 1.84 Nm
RNP: 0.15
Offset: 0.0°
Minima 3290'
Angle at MaPt: 3.00°

RW28R



- The last RF leg radius is only 1.84 Nm.
- The dFRoP is less than 2Nm.
- The RNP coded is only 0.15, and we have terrain in the trajectory...

This one is also specific for other reasons:

Approach - MPPA - H36-Z (AR) Cycle :1904

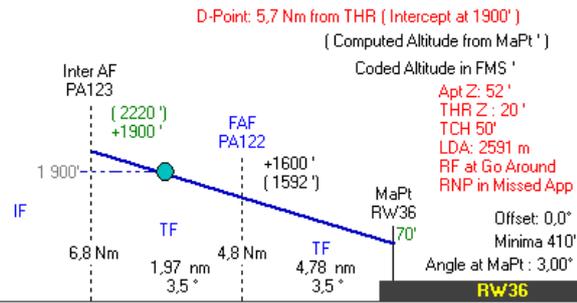


--- Authorization Required --- SPECIFIC
 RF at Go Around
 Low RNP in missed App
 D-Point 0,9 Nm before FAF

Threshold					
6	5	4	3	2	1
1980	1660	1340	1020	710	390

RW36
 N08.54.2
 W079.36.0

Arinc Decoder

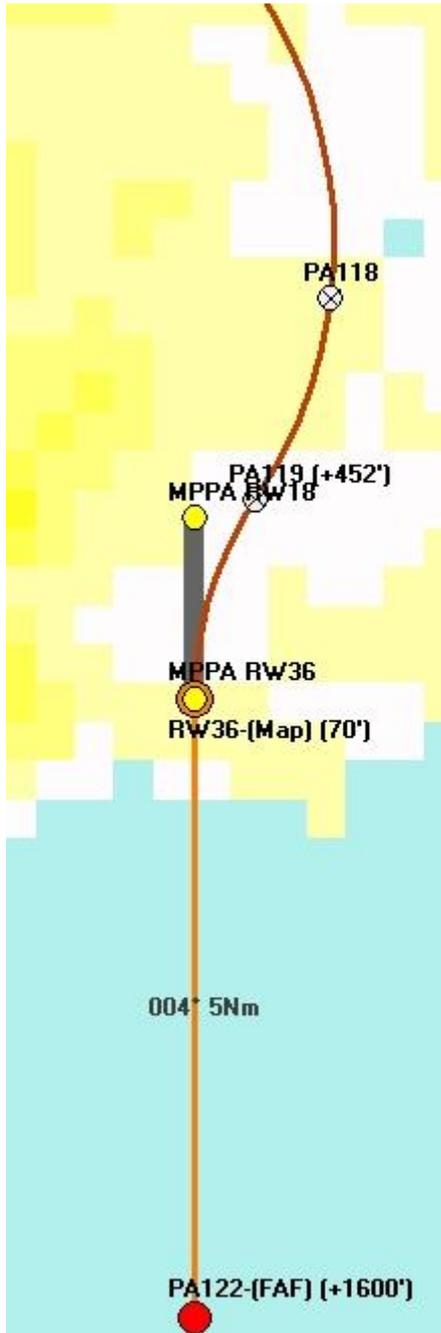


Approach - MPPA - H36-Z (AR)

Balboa / Panama Pacifico Intl

Mag Var : 03.0° W (Apt)

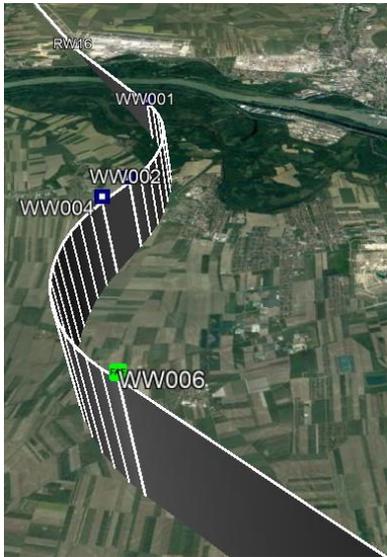
Via	Seq	Pt	Fix	Typ	F/D	Mag	Crs	Alt 1	Alt 2	Vert Angle	RNP	Speed Limit	Distance Time	CTR	RF	Radius (Nm)	Update
PANEP	10	IF	PANEP	IAF			3°	+ 3000									Transition 1809
PANEP	20	TF	PA123	Inter AF				+ 1900			0.3		5 Nm				Transition 1801
SINEM	10	IF	SINEM	IAF Hold				+ 7000									Transition 1809
SINEM	20	TF	PA126				177.1°	+ 4000			0.3	210 Kts	14.6 Nm				Transition 1510
SINEM	25	RF	PA125		L		51°	+ 2600			0.3		8.2 Nm		PA998	3.7	Transition 1510
SINEM	30	RF	PA123	Inter AF	L		4°	+ 1900			0.3		3 Nm		PA998	3.7	Transition 1510
TIRNU	10	IF	TIRNU	IAF Hold				+ 3100									Transition 1809
TIRNU	20	TF	PA124				189.1°	+ 2500			0.3	210 Kts	8.7 Nm				Transition 1510
TIRNU	30	RF	PA123	Inter AF	R		4°	+ 1900			0.3		10 Nm		PA999	3.3	Transition 1510
	10	IF	PA123	Inter AF				+ 1900									1809
	20	TF	PA122	FAF			3°	+ 1600		-3.00°	0.3		2 Nm				1801
	30	TF	RW36	MaPt			3°	70		-3.00°	0.3		4.8 Nm				1801
	40	RF	PA119	Go Arr	R		38°	+ 452			0.3		1.6 Nm		PA996	2.8	1707
	50	RF	PA118		L		11°				0.3		1.7 Nm		PA995	3.6	1707
	60	RF	PA117		L		307°				0.5		4 Nm		PA995	3.6	1707
	70	RF	PA116		L		277°				1	210 Kts	1.9 Nm		PA995	3.6	1707
	80	TF	SINEM				275.7°	4000			1		6.5 Nm				1707
	90	HM	SINEM		R		177°						1 Min				1707



The RNP is coded at 0.3 at the beginning of the missed approach leg, and the first leg is a RF to avoid the terrain.

Last example...

At LOWW, nobody knows why but they coded a leg of 0.5 Nm after the FAF, that's less than 2 RNP's. And no manufacturers of FMS is 100% sure the aircraft will have a good reaction... so a safety study is necessary...



Approach - LOWW - H16-N (AR) Vienna / Schwechat Mag Var : 04.0° E (Apt)

Via	Seq	Pt	Fix	Tjyp	F/O	TD	Mag Cts	Alt 1	Alt 2	Vert Angle	RNP	Speed Limit	Distance Time	CTR	RF Radius (Nm)	Cycle : 1904	Update
Ww012	2	IF	Ww012	IAF				+ 5000								Transition	1409
Ww012	6	TF	Ww010			95.7°	+ 4000				1		4.1 Nm			Transition	1508
Ww012	10	TF	Ww008	Inter AF		151.6°	+ 3600				1	210 Kts	2.3 Nm			Transition	1801
Ww014	2	IF	Ww014	IAF			+ 5000									Transition	1409
Ww014	10	TF	Ww008	Inter AF		151.5°	+ 3600				1	210 Kts	6.4 Nm			Transition	1801
Ww016	2	IF	Ww016	IAF			+ 5000									Transition	1409
Ww016	10	TF	Ww008	Inter AF		194°	+ 3600				1	210 Kts	6.4 Nm			Transition	1801
	10	IF	Ww008	Inter AF			+ 3600					210 Kts					1707
	20	TF	Ww006	FAF		140.2°	+ 3600			-3.00°	0.3	185 Kts	3.5 Nm				1707
	30	RF	Ww004		R	215°	+ 2525			-3.00°	0.3			Ww013	2.5		1707
	40	TF	Ww002			215.1°	+ 2366			-3.00°	0.3						1801
	50	RF	Ww001		L	160°	+ 1602			-3.00°	0.3			Ww011	2.5		1707

