RNP AR RWY 16 in Vienna Schwechat (LOWW)

PBN based Noise Abatement

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ICANA, Frankfurt, November 2016

SAFETY IS IN THE AIR

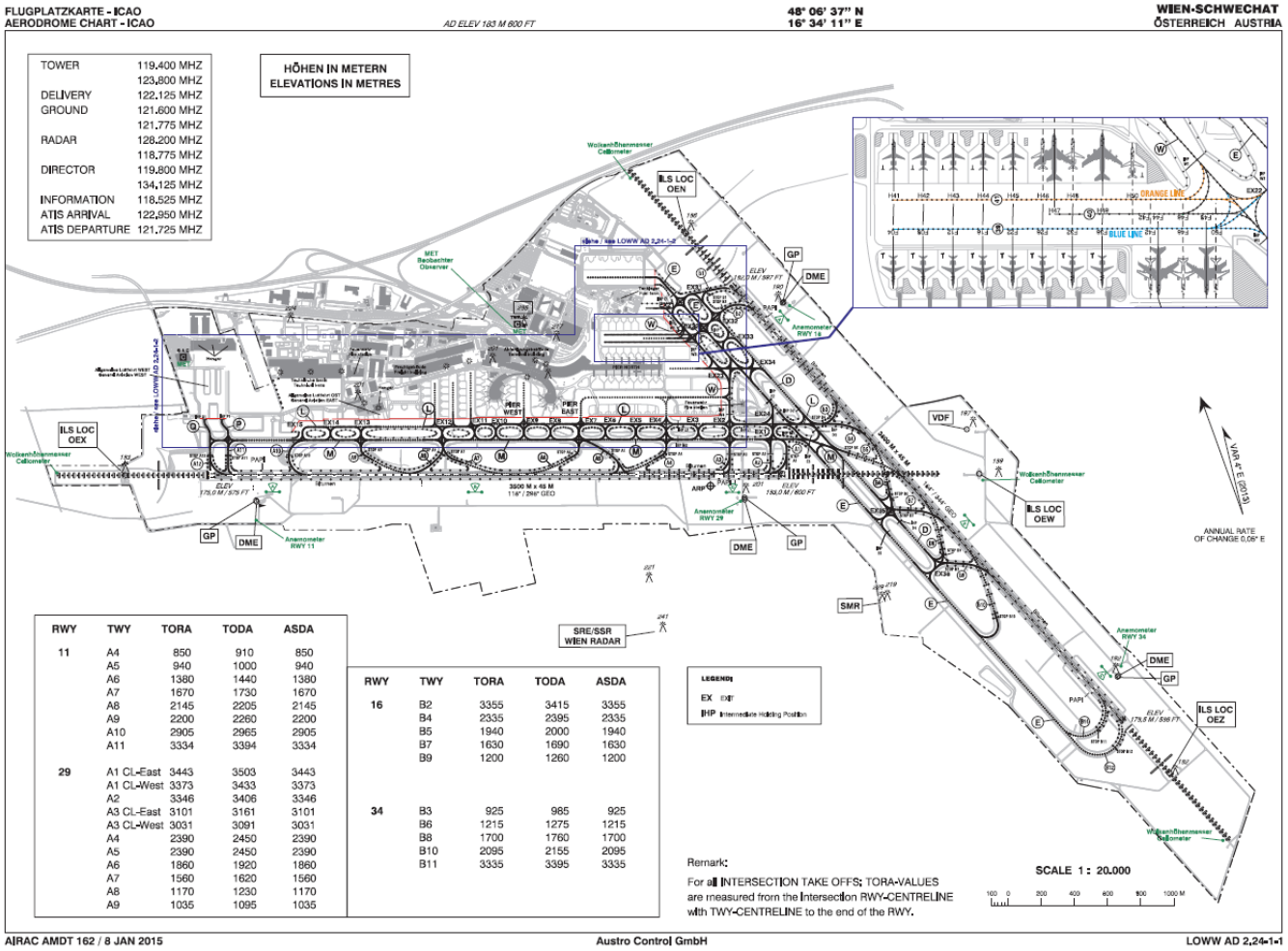
Our history of RNP

- Austria has extensive experience with RNP AR Procedures
- First RNP AR in Innsbruck published in 2005 (before ICAO had provided full guidelines, therefore still based on FAA TERPS)
- Since then, several other RNP AR procedures designed and published (Salzburg and Innsbruck), including a pioneering hybrid approach (RNP merge) in Innsbruck
- Common element to all of them: **terrain avoidance!**
- **Hence the application of RNP AR for noise reduction and environmental considerations was a new chapter in our PBN story**

RNP-AR in Austria: from avoiding “solid rock” to noise abatement

Noise Sensitivity at Vienna International Airport (LOWW)

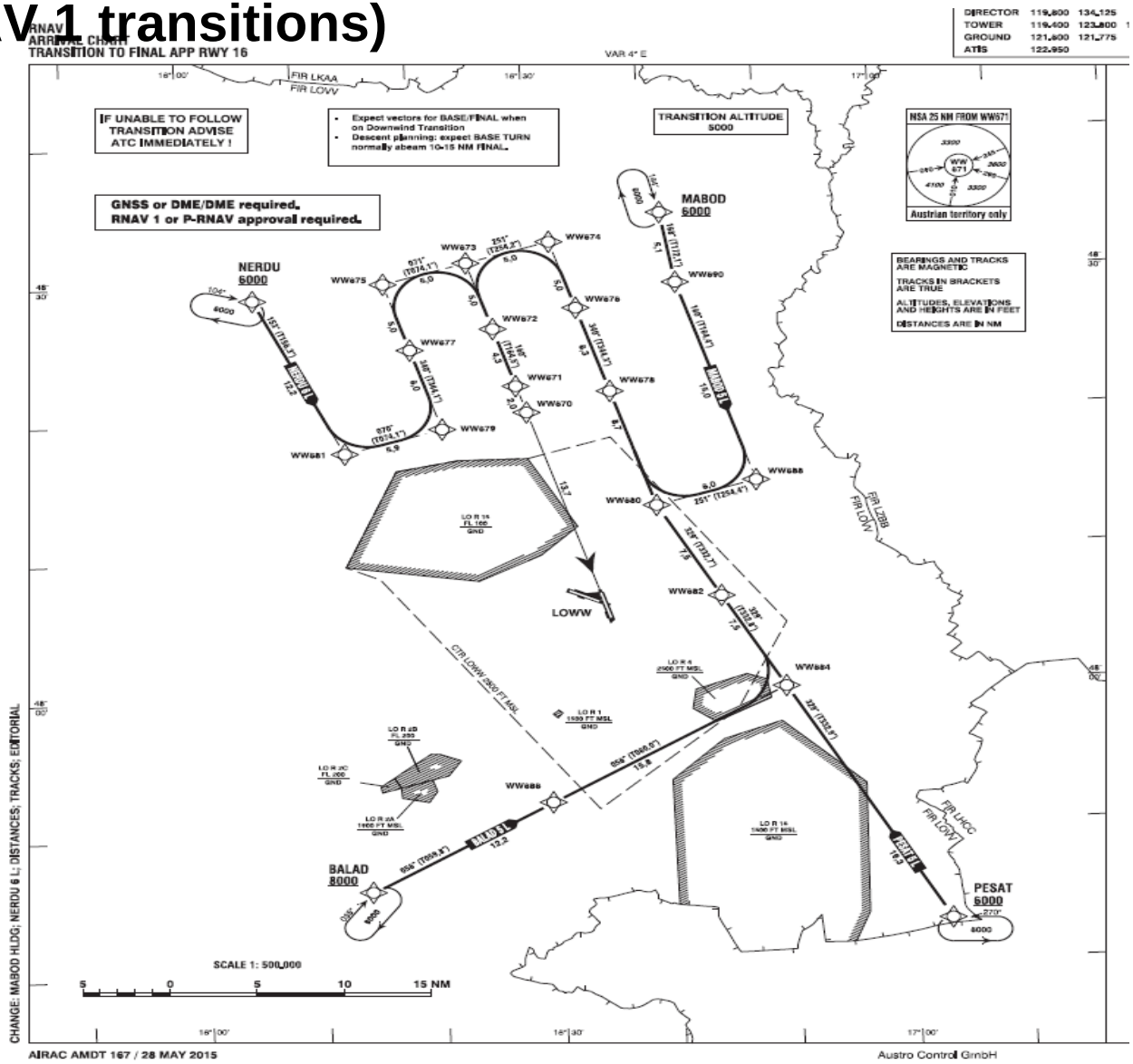
LOWW conventional mode of operation



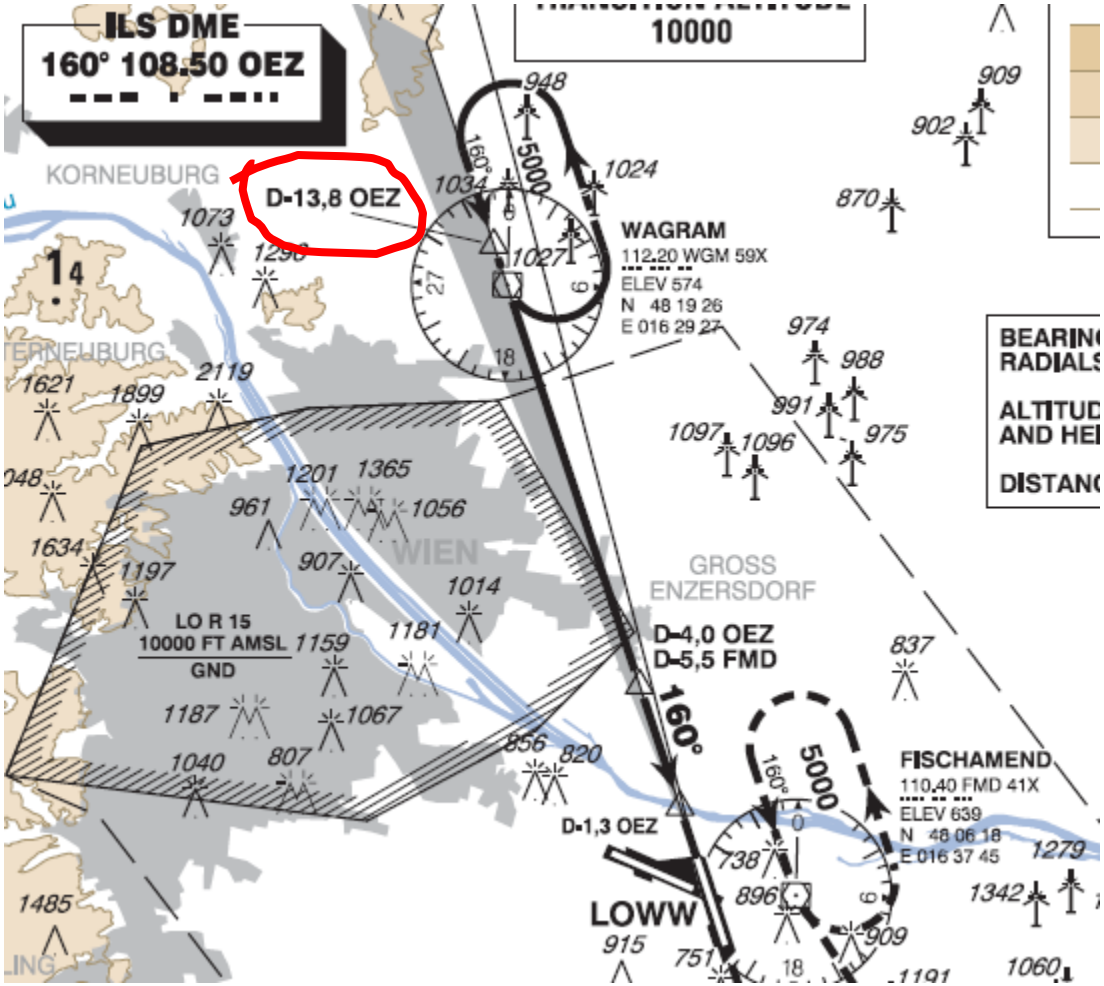
RWY	TWY	TORA	TODA	ASDA
11	A4	850	910	850
	A5	940	1000	940
	A6	1380	1440	1380
	A7	1670	1730	1670
	A8	2145	2205	2145
	A9	2200	2260	2200
	A10	2905	2965	2905
	A11	3334	3394	3334
29	A1 CL-East	3443	3503	3443
	A1 CL-West	3373	3433	3373
	A2	3346	3406	3346
	A3 CL-East	3101	3161	3101
	A3 CL-West	3031	3091	3031
	A4	2390	2450	2390
	A5	2390	2450	2390
	A6	1860	1920	1860
	A7	1560	1620	1560
	A8	1170	1230	1170
	A9	1035	1095	1035

RWY	TWY	TORA	TODA	ASDA
16	B2	3355	3415	3355
	B4	2335	2395	2335
	B5	1940	2000	1940
	B7	1630	1690	1630
	B9	1200	1260	1200
34	B3	925	985	925
	B6	1215	1275	1215
	B8	1700	1760	1700
	B10	2095	2155	2095
	B11	3335	3395	3335

LOWW RWY16 conventional mode of operation (RNAV 1 transitions)



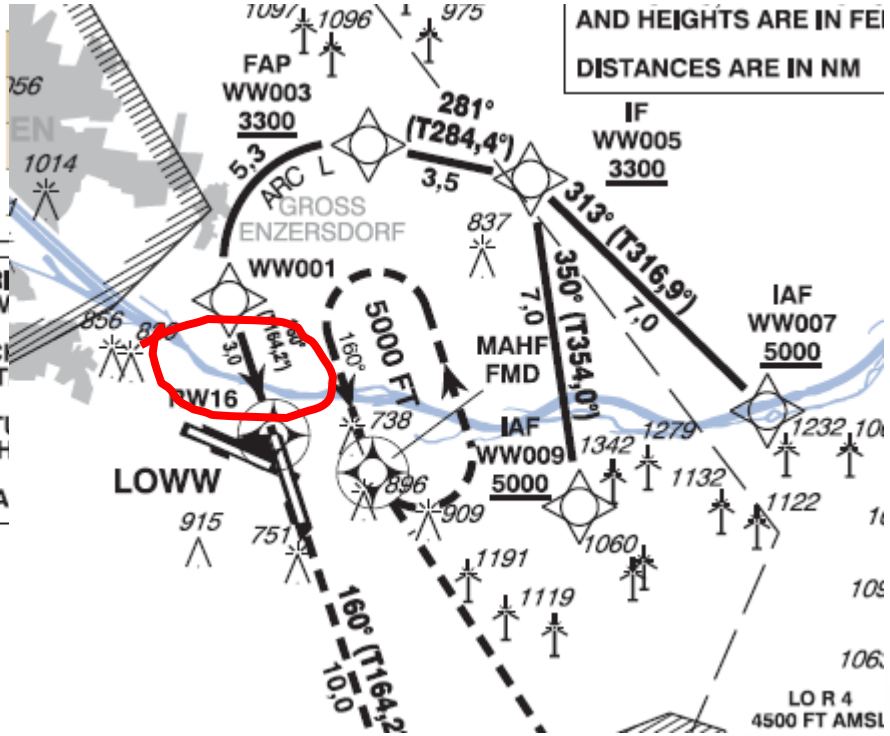
LOWW RWY16 conventional mode of operation (ILS)



FAF to THLD Distance is 13.8nm

Straight Final (of course!)

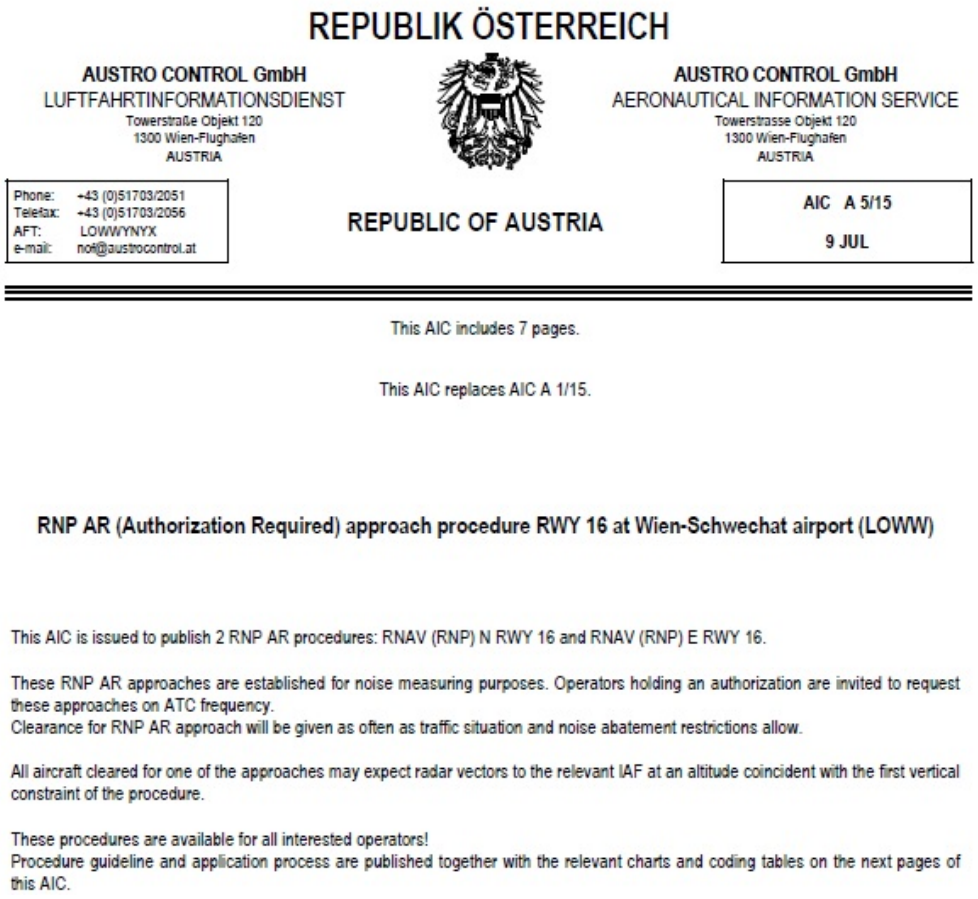
LOWW RWY16 RNP AR – the new approach



- curved and adapted to minimize community impact
- straight final segment of **3nm**

RNP AR RWY 16 - the Publication

- published as AIC to underline trial status



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REPUBLIC OF AUSTRIA

AIC A 5/15

9 JUL

This AIC includes 7 pages.

This AIC replaces AIC A 1/15.

RNP AR (Authorization Required) approach procedure RWY 16 at Wien-Schwechat airport (LOWW)

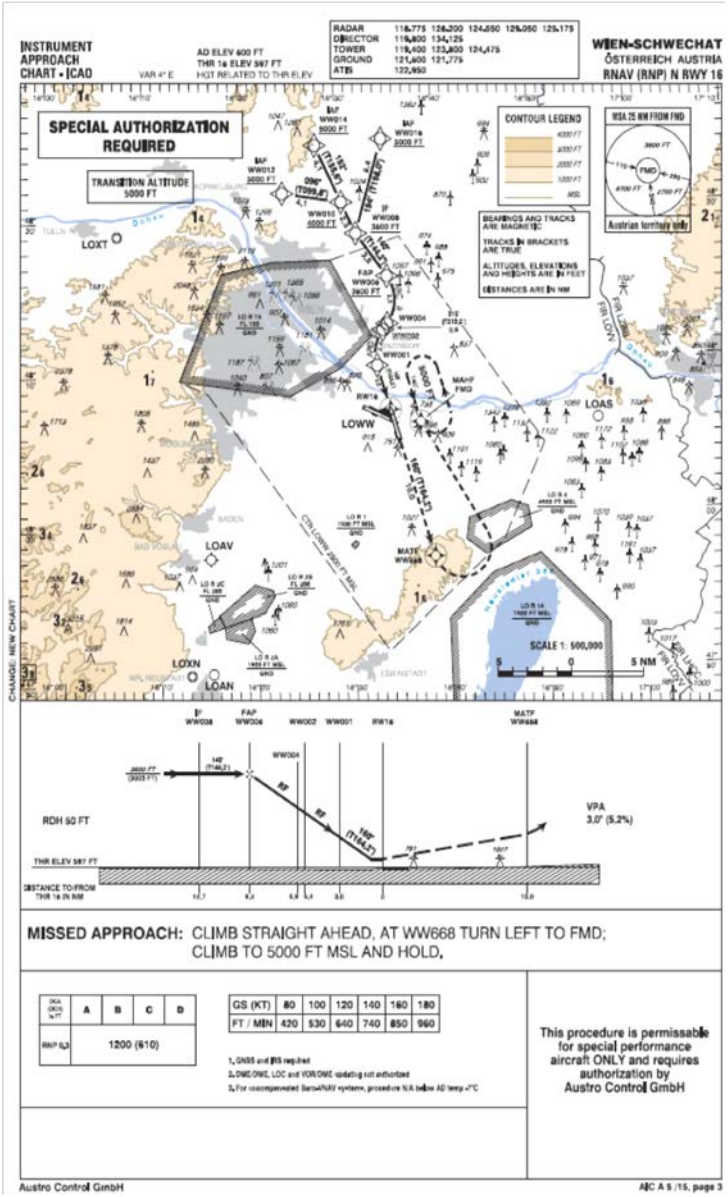
This AIC is issued to publish 2 RNP AR procedures: RNAV (RNP) N RWY 16 and RNAV (RNP) E RWY 16.

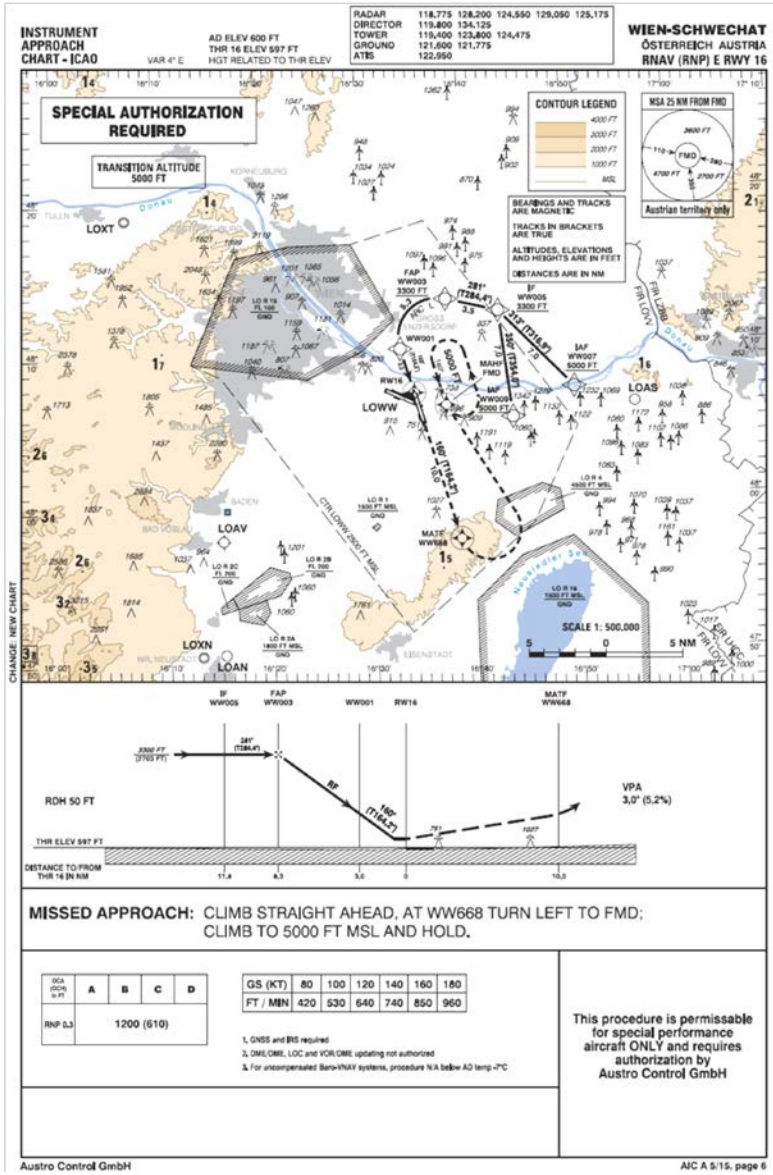
These RNP AR approaches are established for noise measuring purposes. Operators holding an authorization are invited to request these approaches on ATC frequency.
Clearance for RNP AR approach will be given as often as traffic situation and noise abatement restrictions allow.

All aircraft cleared for one of the approaches may expect radar vectors to the relevant IAF at an altitude coincident with the first vertical constraint of the procedure.

These procedures are available for all interested operators!
Procedure guideline and application process are published together with the relevant charts and coding tables on the next pages of this AIC.

Charting


INSTRUMENT APPROACH CHART - ICAO
WIEN-SCHWECHAT
ÖSTERREICH AUSTRIA
RNAV (RNP) N RWY 16
SPECIAL AUTHORIZATION REQUIRED
TRANSITION ALTITUDE 5000 FT
CONTOUR LEGEND
MISSED APPROACH: CLIMB STRAIGHT AHEAD, AT WW668 TURN LEFT TO FMD; CLIMB TO 5000 FT MSL AND HOLD.
1200 (610)
This procedure is permissable for special performance aircraft ONLY and requires authorization by Austro Control GmbH
Austro Control GmbH
AIC A 5 /15, page 3


INSTRUMENT APPROACH CHART - ICAO
WIEN-SCHWECHAT
ÖSTERREICH AUSTRIA
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1200 (610)
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Austro Control GmbH
AIC A 5/15, page 6

Coding Table

Proposed Instrument Approach Procedure Coding Table
Wien-Schwechat RNAV (RNP) E RWY 16

Path Terminator	Waypoint				Course/ Track ° MAG (° True)	DIST NM	Turn Direction	ARC Centre Waypoint		ARC Radius NM
	Identifier	Type	Flyover	Coordinates				Identifier	Coordinates	
IF	WW009	IAF	no	N480523.87 E0164413.08						
IF	WW007	IAF	no	N480714.77 E0165016.06						
TF	WW005	IF	no	N481221.09 E0164307.62	350° (354.0°) 313° (316.9°)	7.0				
TF	WW003	FAP	no	N481313.20 E0163803.37	281° (284.4°)	3.5				
RF	WW001		no	N481004.33 E0163328.07		5.3	left	WW011	N481045.54 E0163707.34	2.54
TF	RW16		yes	N480711.22 E0163441.40	160° (164.2°)	3.0				
TF	WW668	MATF	yes	N475734.06 E0163844.80	160° (164.2°)	10.0				
DF	FMD	MAHF	yes	N480618.41 E0163745.35			left			

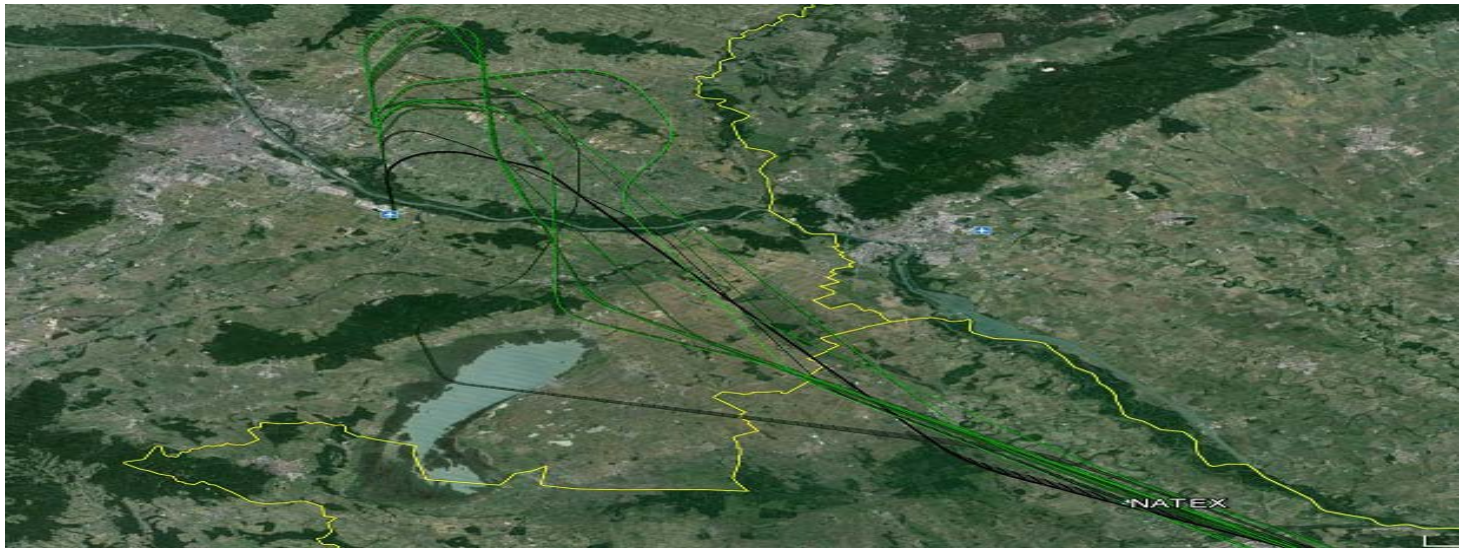
Waypoint	Constraints		RNP Value NM	Navigation Specification	Remarks
Identifier	Level	Speed			
WW009	A5000+		1.0	RNP AR APCH	
WW007	A5000+		1.0	RNP AR APCH	
WW005	A3300+	K210-	1.0	RNP AR APCH	
WW003	A3300+	K185-	0.3	RNP AR APCH	
WW001			0.3	RNP AR APCH	
RW16			0.3	RNP AR APCH	
WW668			-	RNP APCH	Missed Approach based on RNP APCH Criteria
FMD	A5000+		-	RNP APCH	Missed Approach based on RNP APCH Criteria

RNAV Holding

Holding Point	Inbound Track ° True	Inbound Track ° MAG	Turn Direction	MAX IAS	Minimum Holding Altitude FT MSL / FL	Time	DIST NM	Remarks
FMD	163.6°	160°	left		A5000	1 MIN		

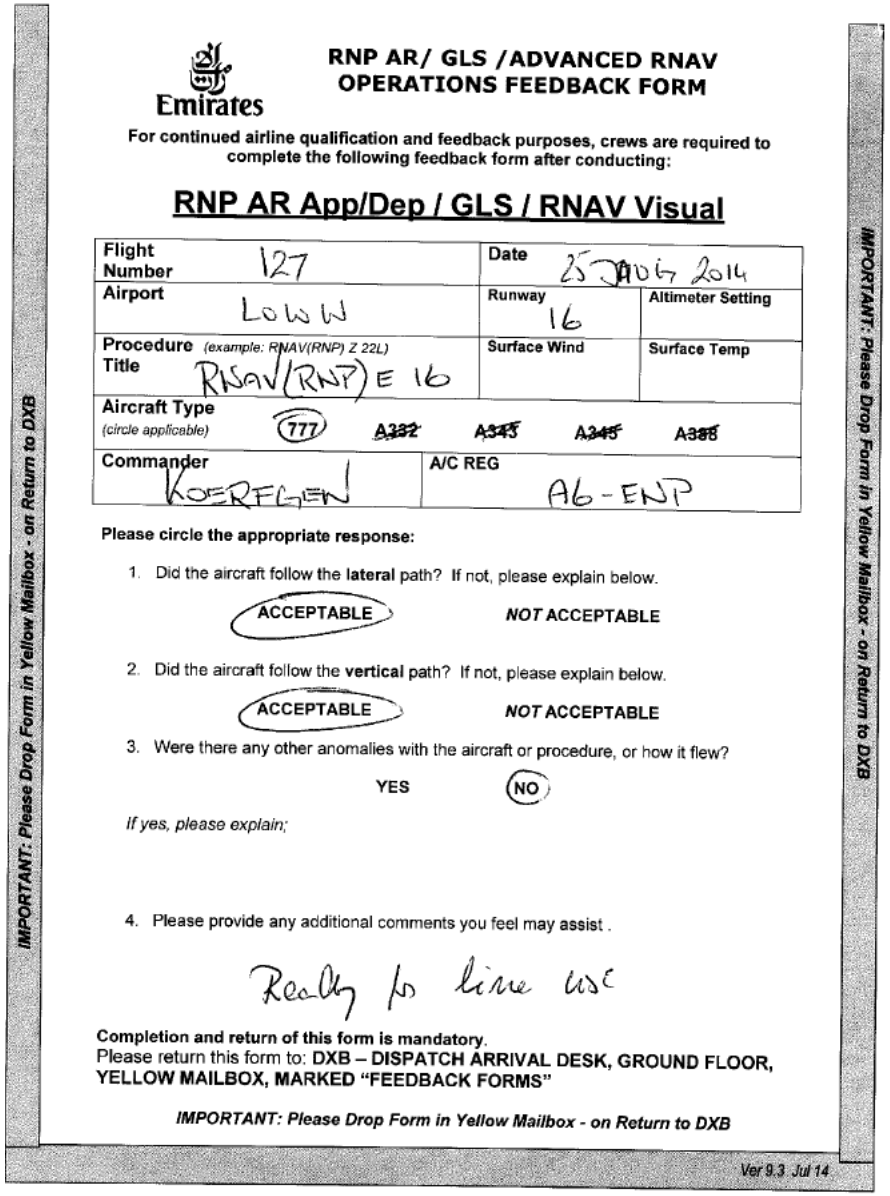
Feedback Emirates (I/II)

Thank you for your kindly support for Capt XXXX's flight and our line crew VMC evaluations.
We found out the significant numbers of benefit from your new procedures.
Capt Kurt flight track is shown as follows.
His flight followed RNP AR approach course nicely (Black line)



We found the Fuel benefit around ***100kg-300kg*** per flight, 200kg-600kg /Day.
Emission saving will be around ***300kg-900kg*** per flight, 600kg-1800kg/Day
This number is big benefit for us to save the fuel and emission.
We appreciate your effort for the introduction of these efficient RNP AR approaches.
Not only from us, All industry members would recognize your effort and achievement.
We are happy to have good work relationship with Austrocontrol, please keep us in the development process of all airspace projects in Enroute and at Vienna.
As Capt XXXX already requested, please develop RNP AR for RWY 11 with us for further Vienna operational efficiency enhancement..
Congratulations of this achievements!
Best regards.
Emirates Flight OPS Team

Feedback Emirates (II/II)



Emirates

RNP AR/ GLS /ADVANCED RNAV OPERATIONS FEEDBACK FORM

For continued airline qualification and feedback purposes, crews are required to complete the following feedback form after conducting:

RNP AR App/Dep / GLS / RNAV Visual

Flight Number 127		**Date** 25 AUG 2014	
Airport LOWW		**Runway** 16	**Altimeter Setting**
Procedure Title *(example: RNAV(RNP) Z 22L)* RNAV(RNP) E 16		**Surface Wind**	**Surface Temp**
Aircraft Type *(circle applicable)* (777) ~~A332~~ ~~A343~~ ~~A345~~ ~~A388~~			
Commander KOERFGEN		**A/C REG** A6-ENP	

Please circle the appropriate response:

1. Did the aircraft follow the **lateral** path? If not, please explain below.

   (ACCEPTABLE) ***NOT*** **ACCEPTABLE**

2. Did the aircraft follow the **vertical** path? If not, please explain below.

   (ACCEPTABLE) ***NOT*** **ACCEPTABLE**

3. Were there any other anomalies with the aircraft or procedure, or how it flew?

   YES (NO)

   If yes, please explain;

4. Please provide any additional comments you feel may assist .

   Ready for line use

Completion and return of this form is mandatory.
Please return this form to: **DXB – DISPATCH ARRIVAL DESK, GROUND FLOOR, YELLOW MAILBOX, MARKED "FEEDBACK FORMS"**

IMPORTANT: Please Drop Form in Yellow Mailbox - on Return to DXB

Ver 9.3 Jul 14

IMPORTANT: Please Drop Form in Yellow Mailbox - on Return to DXB

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Handling of the Procedure
Statements from LOWW APP

- with speed instructions, multiple RNP AR entries can be accomodated for aircraft flying the approach in sequence, however only in low-demand situations

- a full “zip-lock” system seems not feasible at the moment, as questions such as “along track” vs. “lateral spacing” would have to be clarified first (work ongoing in ICAO SASP

- Reduction to 2.5nm when “established on the same final approach track” can theoretically be applied when established on the RNP track (hardly ever occurs)

- Procedure has also been flown by home carrier as “track mile saver” in VMC (without AR Approval, so officially as visual approach)
- **Noise exposure footprint is reduced by short straight final distance of 3nm rather than 13.8nm (FAF to THLD on ILS)**

More Findings

- Airlines had requested relaxed speed limitations at WW005 and WW003 (currently at 210 kts and 185 kts, respectively) – they requested 230 kts and 190 kts, but procedure design criteria did not allow for that

- Air Traffic Controllers are happy with the approach but see the need for intervention by means of radar vectoring if the approach is used in a mixed-mode (ILS/RNP) – this is contrary to the RNP AR concept

- Airlines argue against the relatively high burden of AR approval cost for non terrain/obstacle critical AR procedures – this discussion is also pursued on an ICAO Level (i.e. the possibility of exempting non-critical AR procedures from the approval requirement – not likely to happen!

Outlook

- In a revised version, the RNP AR Approach to Runway 16 will have an improved track layout to avoid overflight of even more communities
- The revised version will have an even shorter straight final segment of 2.3nm rather than 3nm (roll-out to THLD)
- A future RNP AR to Runway 29 is planned which is the main runway for night operations in Vienna
- Austro Control is also rolling out RF legs on SIDs in Vienna, to even further reduce and funnel noise footprints


Thank you very much
Any question?
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