
**RNP APCH procedures for
OMAD Airport
RWY 31**

	NAME	POSITION	DATE	SIGNATURE
Designer		Flight Procedure Designer/Airspace Design		

Change Log

Version	Date	Description	Ref. Paragraphs	Notes

Summary

Contents

1 Acronyms and Definitions	5
2 Input Data	7
3 Design Criteria and Assumptions	8
4 Aeronautical Data	9
5 WAYPOINTS.....	9
6 P/R/D Zones	10
7 NOTAM.....	10
8 Procedure Overview	10
9 Design Report.....	11
9.1 Initial Transition TYRIO	11
9.1.1 Initial approach segment TYRIO to THEON	11
9.1.2 Intermediate approach segment THEON to KHALL	12
9.2 Initial Transition MIPIP.....	13
9.2.1 Initial approach segment MIPIP to THEON.....	13
9.2.2 Intermediate approach segment THEON to KHALL	13
9.3 Initial Transition ALB	14
9.3.1 Initial approach segment ALB to AD301	14
9.3.2 Initial approach segment AD301 to TYRIO	14
9.3.3 Initial approach segment TYRIO to THEON	15
9.3.4 Intermediate approach segment THEON to KHALL	15
9.4 LNAV_Minima.....	16
9.4.1 LNAV Final Segment	16
9.4.2 LNAV Missed Approach Segment	17
9.5 APV Baro Minima.....	18
9.5.1 APV Segment	18
9.5.2 VNAV Missed Approach Segment.....	19
9.6 SBAS Minima.....	19
9.6.1 Precision Segment.....	20
9.6.2 SBAS Missed Approach Segment	20
9.7 Missed Approach Holding	20
9.7.1 Holding on BORIM	20
9.8 Missed Approach Description.....	20
9.9 VSS.....	21
9.10 CIRCLING	22
10 Minima Table	23
11 Coding Table	24

12 Version Amendments	25
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1 Acronyms and Definitions

Acronym	Definition
AIP	A eronautical I nformation P ublication
ARP	A erodrome R eference P oint
ATS	A ir T raffic S ervices
ATT	A long T rack T olerance
Baro-VNAV	B arometric v ertical n avigation
CTA	C on t rol A rea
DA	D ecision A ltitude
DB	D ata B ase
DH	D ecision H eight
ENR	E nroute
FAF/P	F inal A pproach F ix/ P oint
FPDAM	F light P rocedure D esign and A irspace M anager
FTA	F ix T olerance A rea
HG	H eight G ain
Heq	E quivalent H eight
IAF	I nitial A pproach F ix
IAS	I ndicated A ir S peed
ICAO	I nternational C ivil A viation O rganization
IF	I ntermediate F ix
ILS	I nstrument L anding S ystem
KK'	Earliest TP tolerance. It is a main reference to evaluate a missed approach obstacle in the turn area, when a turn at a given fix is defined.
Kt	K no t s
LDA	L ocalizer type D irectional A id
LNAV	L ateral N avigation: The minima line on the chart for RNP Approaches without vertical guidance
LNAV/VNAV	The minima line based on Baro-VNAV system performances that can be used by aircraft approved according to AMC 20-27 or equivalent. LNAV/VNAV minima can also be used by SBAS capable aircraft
LPV	L ocalizer P erformance with V ertical G uidance: the minima-line based on SBAS performances that can be used by aircraft approved according to AMC 20-28 or equivalent
MA	M issed A pproach
MAPt	M issed A pproach P oin t
MAF	M issed A pproach F ix
MAHF	M issed A pproach H olding F ix
MEA	M inimum E n-Route A ltitude
MHA	M inimum H olding A ltitude
MOC	M inimum O bstacle C learance
MSD	M inimum S tabilization D istance
NA	N ominal A ltitude
NM	N autical M iles
OAS	O bstacle A ssessment S urface
OCA/H	O bstacle C learance A ltitude/ H eight

PBN	Performance- Based Navigation. The PBN concept specifies Navigation Specifications in terms of navigation system performance accuracy, integrity and continuity along with the functionality required onboard an aircraft for the proposed operations
PT	Path & Terminator
RA	Required Altitude
RDH	Reference Datum Height (for APV or Precision Approaches)
RNAV	Area Navigation
RNP	Required Navigation Performance
RWY	Run way
SBAS	Space Based Augmentation System
SDF	Step Down Fix
SOC	Start Of Climb
THR	Threshold
TMA	Terminal Control Area
WPT	Way point
XML	Extensible Markup Language

2 Input Data

Software used for the design (Name and version)	
References for design criteria applied (ICAO Documentation)	
References for data criteria applied (ICAO Documentation)	
Data sources (Aeronautical Information Publications)	
Reference coordinate system (Datum)	
Unit of measure (Distance/High/Angle)	
Terrain data sources	
Obstacle data sources	

3 Design Criteria and Assumptions

This chapter reports assumptions and criteria followed in the design of the instrument flight procedures described in this document.

- 1) The flight procedures segments were designed in true degrees and converted in magnetic values by applying X.XX° magnetic variation.
- 2) The study described in this report includes the construction of all the procedures elements involved in the STAR design and their respective protection areas.
- 3) Determination of Minimum Stabilization Distances and Minimum segment length have been assessed according to the provisions of ICAO Doc 8168, Part III, sec. 2, ch. 1, par. 1.4 (Minimum Stabilization Distance) and 1.5 (Determination of the minimum length of a RNAV segment limited by at least one waypoint which is not a turning point).
- 4) Vegetation applied: XXXFT
- 5)

4 Aeronautical Data

Aeronautical data reported in this section, considered as significant input to the procedures design activity, were provided by the XXX Authorities.

Airport Information	
Airport Name	ABU DHABI / AL BATEEN EXECUTIVE AIRPORT
ICAO Identifier	OMAD
A/D Elevation	16.00 FT
ARP Latitude	242542.0000N
ARP Longitude	0542729.0002E
Magnetic Variation (year)	2.0° E (2017)
Aircraft Categories	A/B/D/C

Threshold Information		
Threshold	Coordinates	Elevation (FT)
13	N 24 26 03.40 E054 26 59.60	13.00
31	N 24 25 18.90 E054 28 01.80	13.00

Approach and Runway Lighting Information (PAPI)	
MEHT	ANGLE

5 WAYPOINTS

In the table below, the waypoints used in the procedure design, both existing and new, are listed with their role, identification and coordinates.

ROLE	IDENT	Coordinates
LTP/FTP	AD005	N 24 25 18.90 E 054 28 01.80
OTHER	AD301	N 24 23 57.21 E 054 38 09.30
IAF	ALB	N 24 26 19.30 E 054 26 46.70
OTHER	BORIM	N 24 36 34.00 E 054 11 53.00
FAF	KHALL	N 24 19 58.29 E 054 35 29.29
IAF	MIPIP	N 24 14 15.00 E 054 43 28.00
MAPT	RWY31	N 24 25 18.90 E 054 28 01.80
IF	THEON	N 24 16 53.53 E 054 39 48.53
IAF	TYRIO	N 24 20 33.36 E 054 42 55.25
OTHER	TYRIO	N 24 20 33.36 E 054 42 55.25

6 P/R/D Zones

In the table below the P/R/D Zones (if present) taken into account in the project.

P/R/D Zone		
ID	VERTICAL LIMITS	REMARKS

7 NOTAM

NOTAMs		
NOTAM ID	INTEGRATED	REMARKS
		<i><report "N NOTAM" if there isn't any NOTAM to take into account></i>

8 Procedure Overview

H31

9 Design Report

9.1 Initial Transition TYRIO

9.1.1 Initial approach segment TYRIO to THEON

Segment Data					
START POINT	END POINT	Initial Altitude (FT)	Length (NM)	Descent Gradient (%)	Course T (°)
TYRIO	THEON	A4000+	4.6	0.00	217.91
Turn Parameters					
Fly Over	Turn Direction	Turn Angle (°)	IAS (KT)	Bank Angle (°)	
NO	-	90.00	185.00	25.00	
CONTROLLING OBSTACLE					
OBST.	Coordinates	Elev. (FT)	MOC (FT)	Calculated Altitude (FT)	WP Altitude (FT)
TOP OF ETC TOWER	N 24 21 15.58 E054 42 44.32	469	984	1,453	A4000+
Remarks					
Picture					

9.1.2 Intermediate approach segment THEON to KHALL

Segment Data					
START POINT	END POINT	Initial Altitude (FT)	Length (NM)	Descent Gradient (%)	Course T (°)
THEON	KHALL	A4000+	5	3.29	307.89
Turn Parameters					
Fly Over	Turn Direction	Turn Angle (°)	IAS (KT)	Bank Angle (°)	
NO	RIGHT	0.20	185.00	25.00	
CONTROLLING OBSTACLE					
OBST.	Coordinates	Elev. (FT)	MOC (FT)	Calculated Altitude (FT)	WP Altitude (FT)
#DTM	N 24 16 35.64 E054 41 12.73	184	492	676	@A3000
Remarks					
Picture					

9.2 Initial Transition MIPIP

9.2.1 Initial approach segment MIPIP to THEON

Segment Data					
START POINT	END POINT	Initial Altitude (FT)	Length (NM)	Descent Gradient (%)	Course T (°)
MIPIP	THEON	A3000+	4.3	0.00	308.25
Turn Parameters					
Fly Over	Turn Direction	Turn Angle (°)	IAS (KT)	Bank Angle (°)	
NO	-	0.33	250.00	25.00	
CONTROLLING OBSTACLE					
OBST.	Coordinates	Elev. (FT)	MOC (FT)	Calculated Altitude (FT)	WP Altitude (FT)
#DTM	N 24 13 46.75 E054 43 21.00	322	984	1,306	A3000+
Remarks					
Picture					

9.2.2 Intermediate approach segment THEON to KHALL

Segment Data					
START POINT	END POINT	Initial Altitude (FT)	Length (NM)	Descent Gradient (%)	Course T (°)
THEON	KHALL	A3000+	5	0.00	307.89
Turn Parameters					
Fly Over	Turn Direction	Turn Angle (°)	IAS (KT)	Bank Angle (°)	
NO	-	0.20	185.00	25.00	
CONTROLLING OBSTACLE					
OBST.	Coordinates	Elev. (FT)	MOC (FT)	Calculated Altitude (FT)	WP Altitude (FT)
#DTM	N 24 16 11.27 E054 39 04.87	171	492	663	@A3000
Remarks					
Picture					

9.3 Initial Transition ALB

9.3.1 Initial approach segment ALB to AD301

Segment Data					
START POINT	END POINT	Initial Altitude (FT)	Length (NM)	Descent Gradient (%)	Course T (°)
ALB	AD301	A4000+	10.6	0.00	102.77
Turn Parameters					
Fly Over	Turn Direction	Turn Angle (°)	IAS (KT)	Bank Angle (°)	
NO	-	25.03	250.00	25.00	
CONTROLLING OBSTACLE					
OBST.	Coordinates	Elev. (FT)	MOC (FT)	Calculated Altitude (FT)	WP Altitude (FT)
BUILDING	N 24 25 18.20 E054 26 05.50	545	984	1,529	A4000+
Remarks					
Picture					

9.3.2 Initial approach segment AD301 to TYRIO

Segment Data					
START POINT	END POINT	Initial Altitude (FT)	Length (NM)	Descent Gradient (%)	Course T (°)
AD301	TYRIO	A4000+	5.5	0.00	127.87
Turn Parameters					
Fly Over	Turn Direction	Turn Angle (°)	IAS (KT)	Bank Angle (°)	
NO	-	90.00	185.00	25.00	
CONTROLLING OBSTACLE					
OBST.	Coordinates	Elev. (FT)	MOC (FT)	Calculated Altitude (FT)	WP Altitude (FT)
TOP OF ETC TOWER	N 24 21 15.58 E054 42 44.32	469	984	1,453	A4000+
Remarks					
Picture					

9.3.3 Initial approach segment TYRIO to THEON

Segment Data					
START POINT	END POINT	Initial Altitude (FT)	Length (NM)	Descent Gradient (%)	Course T (°)
TYRIO	THEON	A4000+	4.6	0.00	217.91
Turn Parameters					
Fly Over	Turn Direction	Turn Angle (°)	IAS (KT)	Bank Angle (°)	
NO	RIGHT	90.00	185.00	25.00	
CONTROLLING OBSTACLE					
OBST.	Coordinates	Elev. (FT)	MOC (FT)	Calculated Altitude (FT)	WP Altitude (FT)
TOP OF ETC TOWER	N 24 21 15.58 E054 42 44.32	469	984	1,453	A4000+
Remarks					
Picture					

9.3.4 Intermediate approach segment THEON to KHALL

Segment Data					
START POINT	END POINT	Initial Altitude (FT)	Length (NM)	Descent Gradient (%)	Course T (°)
THEON	KHALL	A4000+	5	3.29	307.89
Turn Parameters					
Fly Over	Turn Direction	Turn Angle (°)	IAS (KT)	Bank Angle (°)	
NO	RIGHT	0.20	185.00	25.00	
CONTROLLING OBSTACLE					
OBST.	Coordinates	Elev. (FT)	MOC (FT)	Calculated Altitude (FT)	WP Altitude (FT)
#DTM	N 24 16 35.64 E054 41 12.73	184	492	676	@A3000
Remarks					
Picture					

9.4 LNAV_Minima

9.4.1 LNAV Final Segment

9.4.1.1 KHALL to AD005

Segment Data						
START POINT	END POINT	Initial Altitude (FT)	Length (NM)	Descent Gradient (%)	TCH (FT)	Course T (°)
KHALL	AD005	@ A3000	8.6	5.59	50.00	308.06
CONTROLLING OBSTACLE						
OBST.	Coordinates	Elev. (FT)	MOC (FT)	Required Altitude (FT)	OCA (FT)	
BUILDING	N 24 24 51.90 E054 27 48.00	438	242	680	690.00	
Remarks						
Picture						

9.4.2 LNAV Missed Approach Segment

9.4.2.1 AD005 to BORIM

Segment Data						
START POINT	Initial Alt. (FT)	END POINT	END POINT Alt. (FT)	Length (NM)	Climb Gradient (%)	Course T (°)
AD005	A690+	BORIM	A3310+	-	2.50	-
SOC Definition						
Coordinates		Distance From MAPt (NM)	Time (s)	IAS (KT)	Altitude (FT)	
N 24 26 05.68 E054 26 56.41		1.26		185.00	690	
CONTROLLING OBSTACLE						
OBST.	Coordinates	Elev. (FT)	MOC (FT)	Required Altitude (FT)	OCA M.A. (FT)	
TOP OF BUILDING CORNER	N 24 24 52.12 E054 27 45.85	439.00	245	684	690.00	
Remarks						
Picture						

9.5 APV Baro Minima

9.5.1 APV Segment

Final Segment APV						
START POINT	END POINT	Initial Altitude (FT)	Length (NM)	Descent Gradient (%)	Course (°)	
KHALL	AD005	@A3000	8.6	5.59	308.06	
TCH	Promulgated VPA (°)	Tmin	T correction (FT)	Min VPA (°)		
50	3.2	0	156.86	3.03		
FAS angle (°)	X FAS (m)	Tmax	Xz CAT A/B	Xz CAT C/D		
3.02	1513.45	-	-900m	-1100m/-1400m		
Missed Approach APV						
END POINT	END POINT ALT. (FT)	Climb Gradient (%)		Course (°)		
BORIM	A3352+	2.5		-		
Min TNA (Only if turn is defined at Altitude or On MAPt)						
OBST.	Coordinates	Elev. (FT)	MOC (FT)	Required TNA (FT)	Nominal TNA (FT)	
-	-	-	-	-	-	
CONTROLLING OBSTACLE (FAS+GROUND PLANE)						
CAT	OBST.	Coordinates	Elev. (FT)	HL (FT)	OCA VNAV (FT)	
A	TOP OF BUILDING CORNER	N 24 24 52.12 E054 27 45.85	439	132	572	
B	TOP OF BUILDING CORNER	N 24 24 52.12 E054 27 45.85	439	145	585	
C	TOP OF BUILDING CORNER	N 24 24 52.12 E054 27 45.85	439	153	593	
D	TOP OF BUILDING CORNER	N 24 24 52.12 E054 27 45.85	439	163	603	
CONTROLLING OBSTACLE (Z Surface)						
CAT	OBST.	Coordinates	Elev. (FT)	Z.eq (FT)	HL (FT)	OCA VNAV (FT)
A	BUILDING	N 24 24 55.20 E054 26 54.60	446	251	133	397
B	BUILDING	N 24 24 55.20 E054 26 54.60	446	251	145	410
C	BUILDING	N 24 25 07.90 E054 26 04.10	556	247	154	414

CONTROLLING OBSTACLE (Z Surface)						
CAT	OBST.	Coordinates	Elev. (FT)	Z.eq (FT)	HL (FT)	OCA VNAV (FT)
D	BUILDING	N 24 25 07.90 E054 26 04.10	556	264	164	441
Remarks						
Picture						

9.5.2 VNAV Missed Approach Segment

9.5.2.1 AD005 to BORIM

Segment Data					
START POINT	END POINT	Initial Altitude (FT)	Length (NM)	Descent Gradient (%)	Course T (°)
AD005	BORIM	A63+	-	2.50	-
Turn Parameters					
Fly Over	Turn Direction	Turn Angle (°)	IAS (KT)	Bank Angle (°)	
NO	-	0.00	265.00	15.00	
CONTROLLING OBSTACLE					
OBST.	Coordinates	Elev. (FT)	MOC (FT)	Calculated Altitude (FT)	WP Altitude (FT)
BUILDING	N 24 25 07.90 E054 26 04.10	556	32	441	A3352+
Remarks					
Picture					

9.6 SBAS Minima

9.6.1 Precision Segment

9.6.2 SBAS Missed Approach Segment

9.7 Missed Approach Holding

9.7.1 Holding on BORIM

Segment Data					
Holding Point	MHA (FT)	Inbound/Outbound Track (°)	IAS (KT)	Time (sec)/Limiting Distance (NM)	
BORIM	A3000+	127/307	210.00	60	
Turn Direction	Entry Sector	RNAV Specification		Type	
RIGHT	ALL	RNAV 1		WITHOUT_HOLDING_FUNCTIONALITY	
CONTROLLING OBSTACLE					
OBST.	Coordinates	Elev. (FT)	MOC (FT)	Required Minima (FT)	Minimum Holding Altitude (FT)
TOP OF BUILDING	N 24 28 50.64 E054 19 18.64	617	197	814	3,000
Remarks					
Picture					

9.8 Missed Approach Description

-

9.9 VSS

Segment Data			
RWY CODE	OCH LNAV (FT)	VSS Slope (°)	VSS Length (m)
31	607	2.08	5094.1
CONTROLLING OBSTACLE			
OBST.	Coordinates	Elev. (FT)	Penetration (FT)
MOSQUE MINARET	N 24 24 46.80 E054 28 28.50	384	235
Remarks			
Pictures			

9.10 CIRCLING

Segment Data						
CAT		Radius (NM)			Limitation	
A		1.7			-	
B		2.69			-	
C		4.27			-	
D		5.36			-	
CONTROLLING OBSTACLE						
CAT	OBST.	Coordinates	Elev. (FT)	MOC (FT)	Required Minimum (FT)	Nominal Altitude (FT)
A	MOSQUE MINARET	N 24 24 43.10 E054 28 33.70	384	295	679	700
B	MOSQUE MINARET	N 24 24 43.10 E054 28 33.70	384	295	679	700
C	TOP OF BUILDING ATC TOWER	N 24 29 36.55 E054 24 30.38	812	394	1206	1300
D	TOP OF BUILDING	N 24 29 46.07 E054 24 30.37	992	394	1386	1400
Remarks						
Pictures						

10 Minima Table

OCA(H)	A	B	C	D
LNAV	690 (674)			
LNAV/VNAV	590 (577)	600 (587)	610 (597)	620 (607)

11 Coding Table

Serial Number	Path Terminator	Waypoint Identifier	Fly Over	Course °M (°T)	Distance (NM)	Turn Direction	Altitude (ft)	Speed Limit (kt)	Recommended Navaid	VPA/TCH	Navigation Specification
010	IF	TYRIO	N	-	-	-	A4000+	185-	-	-	RNP APCH
020	TF	THEON	N	216 (217.9)	4.6	-	A4000+	185-	-	-	RNP APCH
030	TF	KHALL	N	306 (307.9)	5	R	@A3000	185-	-	-	RNP APCH
010	IF	MIPIP	N	-	-	-	A3000+	-	-	-	RNP APCH
020	TF	THEON	N	306 (308.2)	4.3	-	A3000+	-	-	-	RNP APCH
030	TF	KHALL	N	306 (307.9)	5	-	@A3000	-	-	-	RNP APCH
010	IF	ALB	N	-	-	-	A4000+	-	-	-	RNP APCH
020	TF	AD301	N	101 (102.8)	10.6	-	A4000+	-	-	-	RNP APCH
030	TF	TYRIO	N	126 (127.9)	5.5	-	A4000+	185-	-	-	RNP APCH
040	TF	THEON	N	216 (217.9)	4.6	R	A4000+	185-	-	-	RNP APCH
050	TF	KHALL	N	306 (307.9)	5	R	@A3000	185-	-	-	RNP APCH
010	IF	KHALL	N	-	-	-	@A3000	-	-	-	RNP APCH
020	TF	AD005	Y	306 (308.1)	8.6	-	-	-	-	-3.2/ 50	RNP APCH
010	IF	RWY31	Y	-	-	-	A690+	-	-	-	RNP APCH
020	DF	BORIM	Y	-	-	-	A3310+	-	-	-	RNP APCH
030	HM	BORIM	Y	125 (127.0)	-	R	A3000+	210-	-	-	RNAV 1

12 Version Amendments

In this section all the changes, relative to the IFP design due to validation results, are reported