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ENGM - NYE INSTRUMENTINNFLYGINGS-PROSEDYRER FOR OSLO LUFTHAVN, GARDERMOEN (RNP AR)

En ny type satelittbaserte innflygingsprosedyrer vil være tilgjengelig ved Oslo Lufthavn, Gardermoen.

Det kreves spesiell godkjenning fra Luftfartstilsynet for å kunne bruke disse prosedyrene.

Required Navigation Performance - Authorization Required (RNP AR)

RNP AR-prosedyrene som er publisert for Oslo Lufthavn, Gardermoen er basert på designkriteriene i ICAO DOC 9905. Vertikalkomponenten i prosedyrene kommer fra flyets barometriske system og er beskyttet av prosedyrenes "Vertical Error Budget" (VEB).

Radius til fix (RF)-funksjonalitet er nødvendig for å kunne benytte alle de vedlagte RNP AR-prosedyrene.

Operatører som ønsker å benytte RNP AR -prosedyrene må være sertifisert av Luftfartstilsynet. EASA har i tillegg publisert Airworthiness Approval and Operational Criteria for RNP AR operations (AMC 20-26) som gir retningslinjer for sertifisering.

Nye SIG-punkt:

Det er publisert tre nye SIG-punkt for RNP AR prosedyrene, disse er:

ENGM - NEW INSTRUMENT APPROACH PROCEDURES AT OSLO AIRPORT, GARDERMOEN (RNP AR)

A new type of satellite based approach procedure will be available at Oslo Airport, Gardermoen.

Special authorisation from the Norwegian Civil Aviation Authority is required prior to operational use of these procedures.

Required Navigation Performance - Authorization Required (RNP AR)

The RNP AR procedures published at Oslo Airport, Gardermoen are based on the design criteria promulgated in ICAO DOC 9905. The vertical component of the RNP AR procedures is provided by the onboard barometric system and is protected through the application of a Vertical Error Budget (VEB) in the procedure design process.

Radius to FIX (RF) functionality is required to fly all of the attached RNP AR procedures.

Operators wishing to utilise the RNP AR procedures must be certified by the Norwegian Civil Aviation Authority. EASA has published an Airworthiness Approval and Operational Criteria for RNP AR operations (AMC 20-26).

New SIG points:

Three new SIG points have been established for the RNP AR procedures, these are:

RIRUT	602758.01N 0110504.0000E
ERULO	595825.01N 0104808.7000E
PIRED	595532.25N 0110650.5810E

Vedlegg:

- ENGM RNAV(RNP) W RWY 01R, inkludert Recommended RNAV coding
- ENGM RNAV(RNP) X RWY 01R, inkludert Recommended RNAV coding
- ENGM RNAV(RNP) X RWY 01L, inkludert Recommended RNAV coding
- ENGM RNAV(RNP) X RWY 19R, inkludert Recommended RNAV coding
- ENGM RNAV(RNP) X RWY 19L, inkludert Recommended RNAV coding

- Vedlegg -

Attachments:

- ENGM RNAV(RNP) W RWY 01R, including Recommended RNAV coding
- ENGM RNAV(RNP) X RWY 01R, including Recommended RNAV coding
- ENGM RNAV(RNP) X RWY 01L, including Recommended RNAV coding
- ENGM RNAV(RNP) X RWY 19R, including Recommended RNAV coding
- ENGM RNAV(RNP) X RWY 19L, including Recommended RNAV coding

- Attachments -

INSTRUMENT APPROACH CHART - ICAO

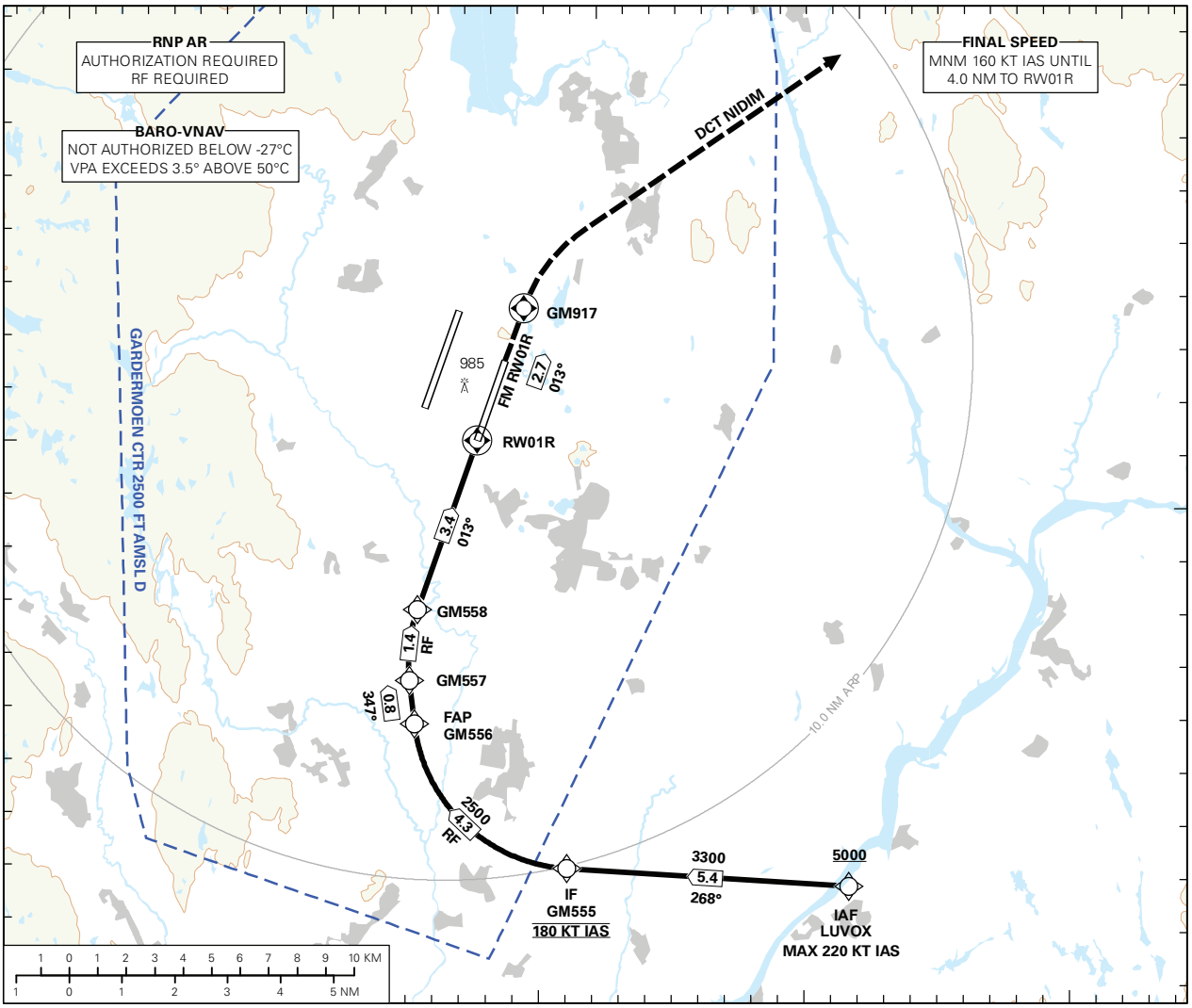
PLAN VIEW SCALE: 1:250 000

OSLO

GARDERMOEN

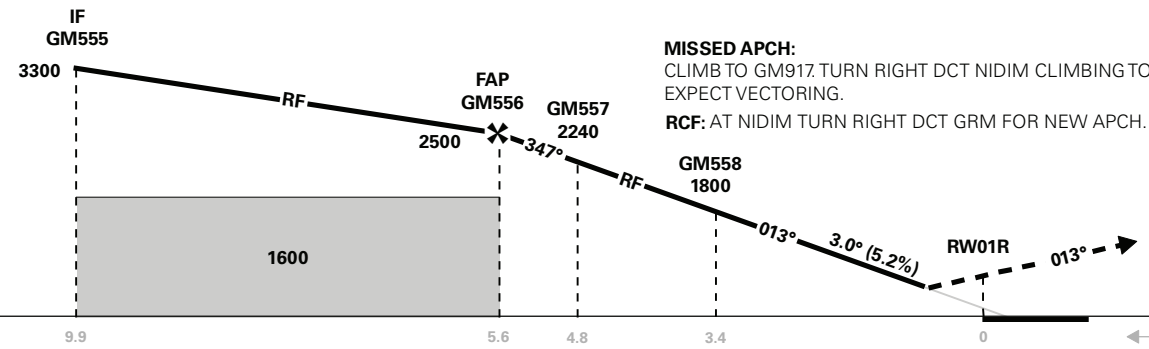
RNAV (RNP) W RWY 01R

3 9 MSA 25 NM ARP	ATIS: 126.125	AD ELEV: 681	
	APP: 118.475 120.450	THR ELEV: 670	DIST IN NM
	DIR: 136.400 (119.975) FIN: 128.900	HGT RELATED TO THR RWY 01R	ELEV, ALT AND HGT IN FT
	TWR: 120.100 (123.325)	CIRCLING HGT RELATED TO AD ELEV	TRANSITION ALTITUDE 7000
	GND: 121.900	BEARINGS ARE MAGNETIC - VAR 2.8 ° E (2015)	



DIST TO RW01R	9	8	7	6	5	4	3	2
ALT (HGT)	-	-	-	-	2320 (1650)	2000 (1330)	1680 (1010)	1360 (690)

RDH 50



MISSED APCH:
CLIMB TO GM917. TURN RIGHT DCT NIDIM CLIMBING TO 4000 . EXPECT VECTORING.

RCF: AT NIDIM TURN RIGHT DCT GRM FOR NEW APCH.

CAT OF ACFT		A	B	C	D	FINAL APCH	DIST FAP - THR: 5.6					
OCA(H) STRAIGHT - IN	RNP 0.3 (2.5%*)	1062 (392)										
	RNP 0.3 (5.0%*)	945 (275)	972 (302)	996 (326)	1019 (349)	SPEED	KT	70	90	120	150	180
		-	-	-	-	TIME	MIN:SEC	04:48	03:44	02:48	02:15	01:52
CIRCLING		1280 (599)		1570 (889)	1630 (949)	ROD	FT/MIN	370	480	635	795	955

NOTE: CIRCLING E OF RWY ONLY. * MNM MISSED APCH CLIMB GRADIENT.

ATS AIRSPACE CLASSIFICATION: REF ENR 1.4

CHANGES: EDITORIALS.

RECOMMENDED RNAV PROCEDURE CODING

ENGM RNAV(RNP) W RWY 01R												
Serial Number	Path Descriptor	Waypoint Identifier	Fly-over	Course °M(°T)	MAG VAR	DIST (NM)	Turn Dir	ALT (FT)	Speed (KT)	VPA / TCH	ARC Centre Radius (NM)	Nav. Spec.
010	IF	LUVOX	-	-	-	-	-	A5000+	K220-	-		RNP 1.0
020	TF	GM555	-	268 (270.5)	-	5.4	-	A3300+	K180	-		RNP 1.0
030	RF	GM556	-	-	-	4.3	R	A2500+	-	-	GM011 3.100	RNP 1.0
040	TF	GM557	-	347 (350.1)	-	0.8	-	A2240+	-	-3.0 50		RNP 0.3
040	RF	GM558	-	-	-	1.4	R	A1800+	-	-3.0 50	GM010 3.000	RNP 0.3
060	TF	RW01R	Y	013 (016.0)	-	3.4	-	-	-	-3.0 50		RNP 0.3
070	TF	GM917	Y	013 (016.0)	-	2.7	-	-	-	-		RNP APCH
080	DF	NIDIM	-	-	-	-	-	A4000	-	-		RNP APCH

Note: Recommended RNAV procedure coding is provided solely to indicate which procedure design protection areas were used in the Instrument Flight Procedure Design process.

Note: Published OCA(H) values are obstacle clearance values. Decision heights (DH) below 250 FT shall not be used due to APV approach operation Type A limitations.

INSTRUMENT APPROACH CHART - ICAO

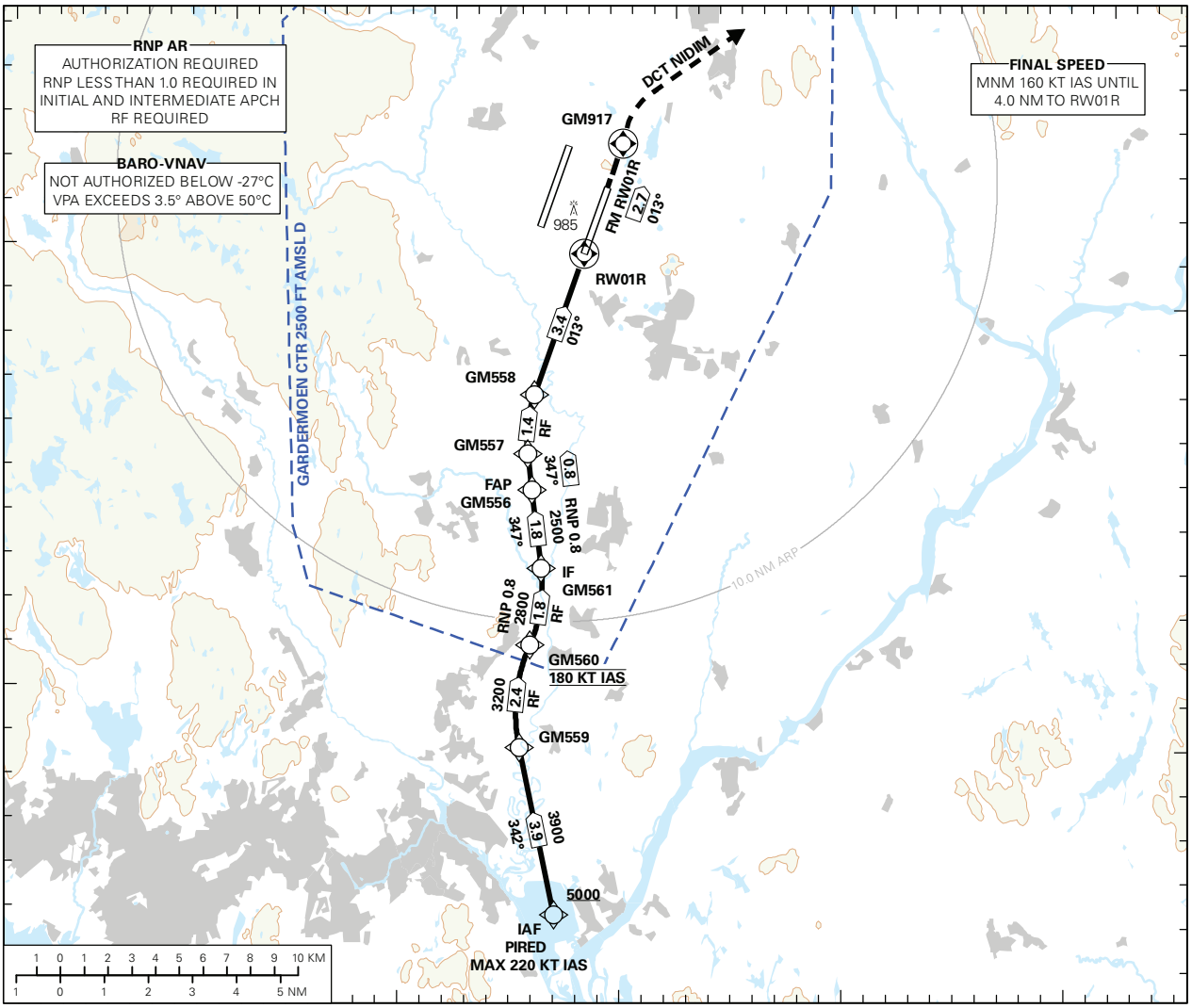
PLAN VIEW SCALE: 1:300 000

OSLO

GARDERMOEN

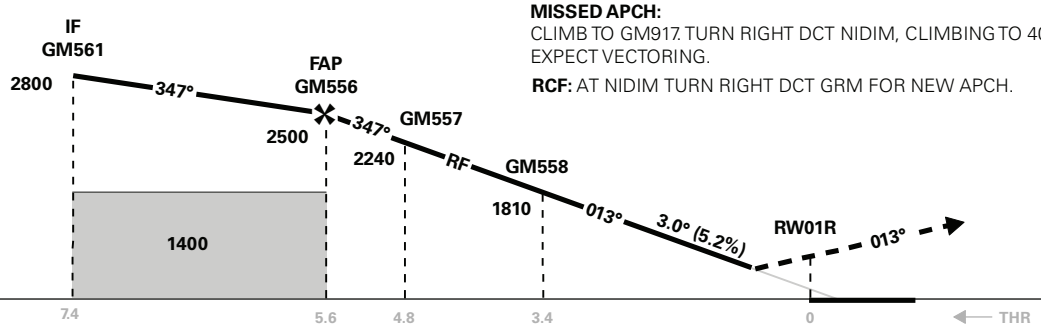
RNAV(RNP) X RWY 01R

3 9	ATIS: 126.125	AD ELEV: 681	
	APP: 118.475 120.450	THR ELEV: 670	DIST IN NM
	DIR: 136.400 (119.975) FIN: 128.900	HGT RELATED TO THR RWY 01R	ELEV, ALT AND HGT IN FT
	TWR: 120.100 (123.325)	CIRCLING HGT RELATED TO AD ELEV	TRANSITION ALTITUDE 7000
MSA 25 NM ARP	GND: 121.900	BEARINGS ARE MAGNETIC - VAR 2.8 ° E (2015)	



DIST TO THR	9	8	7	6	5	4	3	2
ALT (HGT)	-	-	-	-	2320 (1650)	2000 (1330)	1680 (1010)	1360 (690)

RDH 50



MISSED APCH:
CLIMB TO GM917. TURN RIGHT DCT NIDIM, CLIMBING TO 4000 . EXPECT VECTORING.

RCF: AT NIDIM TURN RIGHT DCT GRM FOR NEW APCH.

CAT OF ACFT		A	B	C	D	FINAL APCH	DIST FAP - THR: 5.6					
OCA(H) STRAIGHT - IN	RNP 0.3 (2.5%*)	1062 (392)										
	RNP 0.3 (5.0%*)	945 (275)	972 (302)	996 (326)	1019 (349)	SPEED	KT	70	90	120	150	180
		-	-	-	-	TIME	MIN:SEC	04:48	03:44	02:48	02:15	01:52
CIRCLING		1280 (599)		1570 (889)	1630 (949)	ROD	FT/MIN	370	480	635	795	955

NOTE: CIRCLING E OF RWY ONLY. *MNM MISSED APCH CLIMB GRADIENT.

ATS AIRSPACE CLASSIFICATION: REF ENR 1.4

CHANGES: EDITORIALS.

RECOMMENDED RNAV PROCEDURE CODING

ENGM RNAV(RNP) X RWY 01R												
Serial Number	Path Descriptor	Waypoint Identifier	Fly-over	Course °M(°T)	MAG VAR	DIST (NM)	Turn Dir	ALT (FT)	Speed (KT)	VPA TCH	ARC Centre Radius (NM)	Nav. Spec.
010	IF	PIRED	-	-	-	-	-	A5000+	K220-	-		RNP 1.0
020	TF	GM559	-	342 (345.0)	-	3.9	-	A3900+	-	-		RNP 1.0
030	RF	GM560	-	-	-	2.4	R	A3200+	K180	-	GM008 3.900	RNP 1.0
040	RF	GM561	-	-	-	1.8	L	A2800+	-	-	GM009 3.400	RNP 0.8
050	TF	GM556	-	347 (350.1)	-	1.8	-	A2500+	-	-		RNP 0.8
060	TF	GM557	-	347 (350.1	-	0.8	-	A2240+	-	-3.0 50		RNP 0.3
070	RF	GM558	-	-	-	1.4	R	A1810+	-	-3.0 50	GM010 3.000	RNP 0.3
080	TF	RW01R	Y	013 (016.0)	-	3.4	-	-	-	-3.0 50		RNP 0.3
090	TF	GM917	Y	013 (016.0)	-	2.7	-	-	-	-		RNP APCH
100	DF	NIDIM	-	-	-	-	-	A4000	-	-		RNP APCH

Note: Recommended RNAV procedure coding is provided solely to indicate which procedure design protection areas were used in the Instrument Flight Procedure Design process.

Note: Published OCA(H) values are obstacle clearance values. Decision heights (DH) below 250 FT shall not be used due to APV approach operation Type A limitations.

INSTRUMENT APPROACH CHART - ICAO

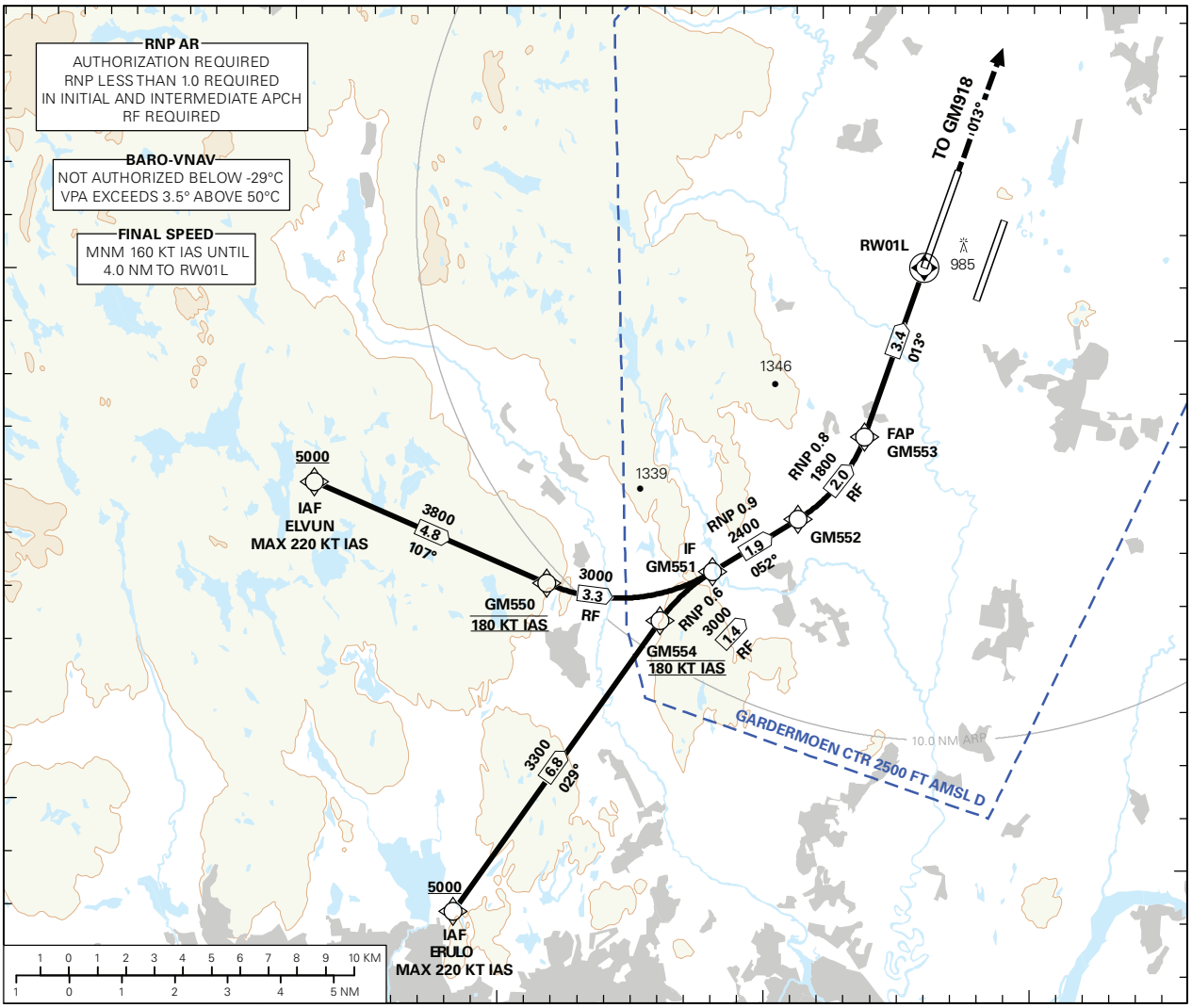
PLAN VIEW SCALE: 1:250 000

OSLO

GARDERMOEN

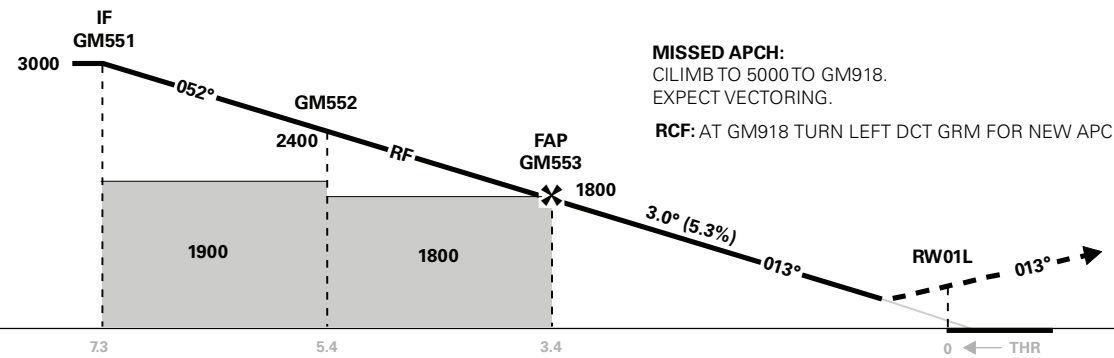
RNAV(RNP) X RWY 01L

3 9 MSA 25 NM ARP	ATIS: 126.125	AD ELEV: 681	
	APP: 118.475 120.450	THR ELEV: 655	DIST IN NM
	DIR: 136.400 (119.975) FIN: 128.900	HGT RELATED TO THR RWY 01L	ELEV, ALT AND HGT IN FT
	TWR: 118.300 (118.700)	CIRCLING HGT RELATED TO AD ELEV	TRANSITION ALTITUDE 7000
	GND: 121.600	BEARINGS ARE MAGNETIC - VAR 2.8 ° E (2015)	



DIST TO RW01L	9	8	7	6	5	4	3	2
ALT (HGT)	-	-	-	-	-	-	1680 (1025)	1350 (695)

RDH 50



MISSED APCH:
CILIMB TO 5000 TO GM918.
EXPECT VECTORING.

RCF: AT GM918 TURN LEFT DCT GRM FOR NEW APCH.

CAT OF ACFT		A	B	C	D	FINAL APCH	DIST FAP - THR: 3.4					
OCA(H) STRAIGHT - IN	RNP 0.3 (2.5%*)	1084 (429)										
	RNP 0.3 (5.0%*)	978 (323)	1006 (351)	1029 (374)	1052 (397)	SPEED	KT	70	90	120	150	180
		-	-	-	-	TIME	MIN:SEC	02:55	02:16	01:42	01:22	01:08
CIRCLING		1280 (599)		1920 (1239)	2230 (1549)	ROD	FT/MIN	375	485	645	805	965

NOTE: CIRCLING W OF RWY ONLY. *MNM MISSED APCH CLIMB GRADIENT.

ATS AIRSPACE CLASSIFICATION: REF ENR 1.4

CHANGES: EDITORIALS.

RECOMMENDED RNAV PROCEDURE CODING

ENGM RNAV(RNP) X RWY 01L												
Serial Number	Path Descriptor	Waypoint Identifier	Fly-over	Course °M(°T)	MAG VAR	DIST (NM)	Turn Dir	ALT (FT)	Speed (KT)	VPA TCH	ARC Centre Radius (NM)	Nav. Spec.
010	IF	ELVUN	-	-	-	-	-	A5000+	K220-	-		RNP 1.0
020	TF	GM550	-	107 (109.9)	-	4.8	-	A3800+	K180	-		RNP 1.0
030	RF	GM551	-	-	-	3.3	L	A3000+	-	-	GM005 3.400	RNP 1.0
010	IF	ERULO	-	-	-	-	-	A5000+	K220-	-		RNP 1.0
020	TF	GM554	-	029 (031.8)	-	6.8	-	A3300+	K180	-		RNP 1.0
030	RF	GM551	-	-	-	1.4	R	A3000+	-	-	GM007 3.400	RNP 0.6
040	TF	GM552	-	052 (055.0)	-	1.9	-	A2400+	-	-		RNP 0.9
050	RF	GM553	-	-	-	2.0	L	A1800+	-	-	GM006 3.000	RNP 0.8
060	TF	RW01L	Y	013 (016.0)	-	3.4	-	-	-	-3.0 50		RNP 0.3
070	TF	GM918	-	013 (016.0)	-	21.1	-	A5000	-	-		RNP 1.0

Note: Recommended RNAV procedure coding is provided solely to indicate which procedure design protection areas were used in the Instrument Flight Procedure Design process.

Note: Published OCA(H) values are obstacle clearance values. Decision heights (DH) below 250 FT shall not be used due to APV approach operation Type A limitations.

INSTRUMENT APPROACH CHART - ICAO

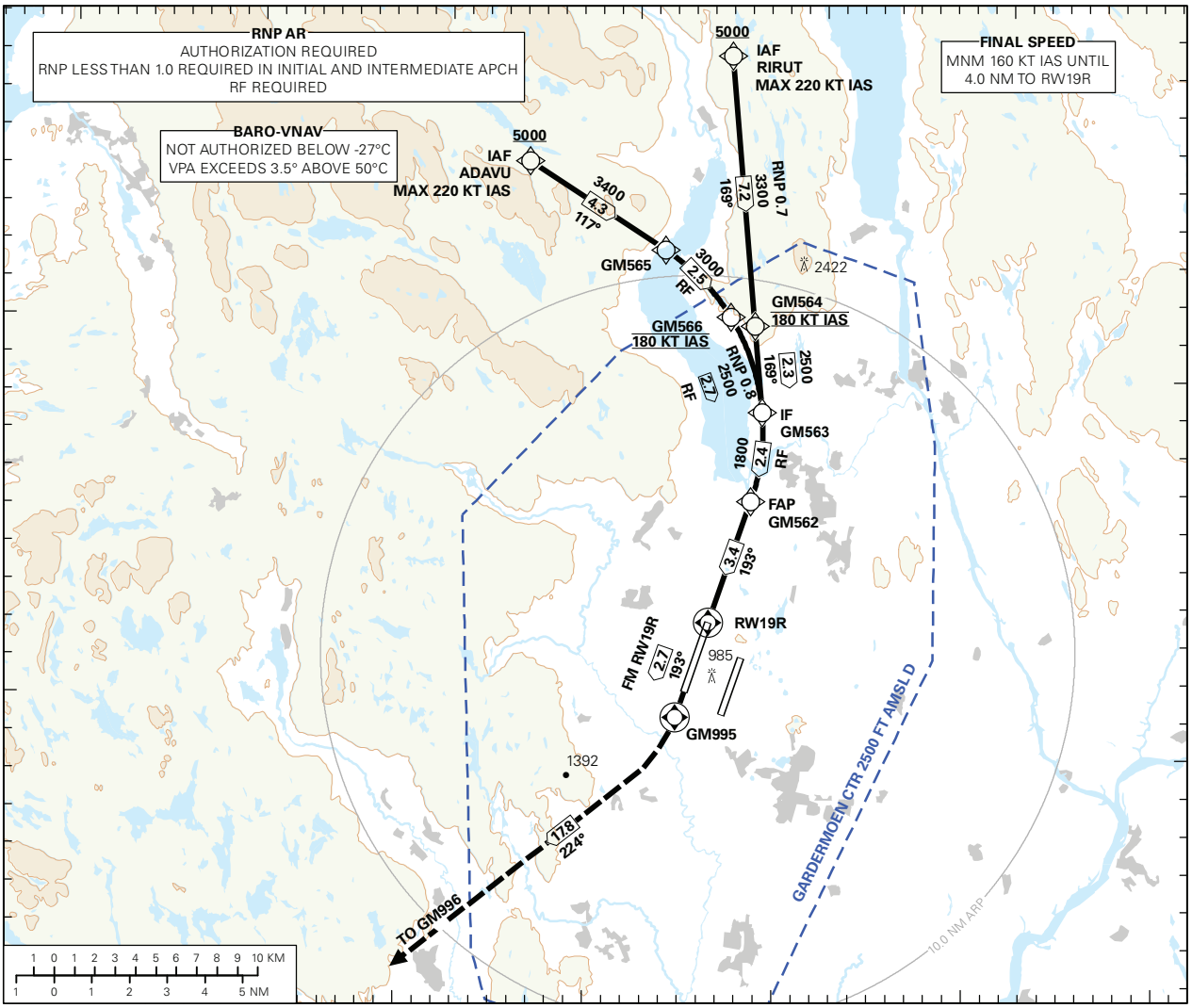
PLAN VIEW SCALE: 1:350 000

OSLO

GARDERMOEN

RNAV(RNP) X RWY 19R

3 9 MSA 25 NM ARP	ATIS: 126.125	AD ELEV: 681	
	APP: 118.475 120.450	THR ELEV: 675	DIST IN NM
	DIR: 136.400 (119.975) FIN: 128.900	HGT RELATED TO THR RWY 19R	ELEV, ALT AND HGT IN FT
	TWR: 118.300 (118.700)	CIRCLING HGT RELATED TO AD ELEV	TRANSITION ALTITUDE 7000
	GND: 121.600	BEARINGS ARE MAGNETIC - VAR 2.8 ° E (2015)	

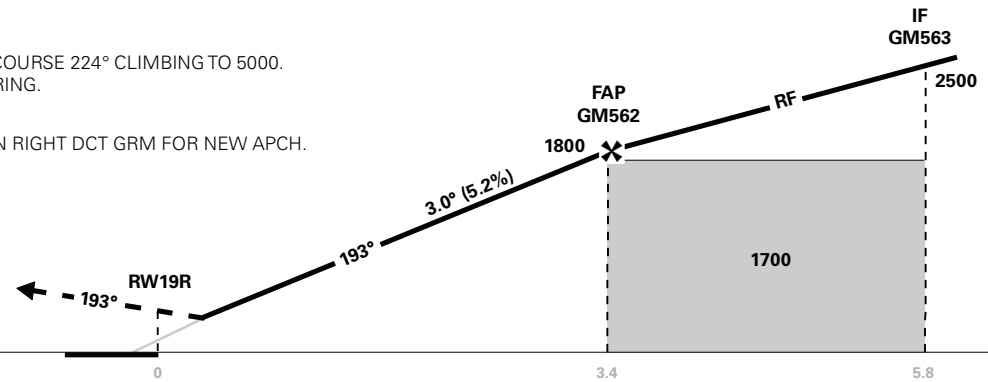


DIST TO RW19R	9	8	7	6	5	4	3	2
ALT (HGT)	-	-	-	-	-	-	1680 (1005)	1360 (685)

RDH 50

MISSED APCH:
TO GM995.
TO GM996 ON COURSE 224° CLIMBING TO 5000.
EXPECT VECTORING.

RCF:
AT GM996 TURN RIGHT DCT GRM FOR NEW APCH.



CAT OF ACFT		A	B	C	D	FINAL APCH	DIST FAP - THR: 3.4				
OCA(H) STRAIGHT - IN	RNP 0.3 (2.5%*)	1060 (385)									
	RNP 0.3 (5.0%*)	970 (295)				SPEED	KT	70	90	120	150	180
		-	-	-	-	TIME	MIN:SEC	02:55	02:16	01:42	01:22	01:08
CIRCLING		1280 (599)		1920 (1239)	2230 (1549)	ROD	FT/MIN	370	475	635	790	950

NOTE: CIRCLING W OF RWY ONLY. * MNM MISSED APCH CLIMB GRADIENT.

CHANGES: EDITORIALS.

ATS AIRSPACE CLASSIFICATION: REF ENR 1.4

RECOMMENDED RNAV PROCEDURE CODING

ENGM RNAV(RNP) X RWY 19R												
Serial Number	Path Descriptor	Waypoint Identifier	Fly-over	Course °M(°T)	MAG VAR	DIST (NM)	Turn Dir	ALT (FT)	Speed (KT)	VPA TCH	ARC Centre Radius (NM)	Nav. Spec.
010	IF	ADAVU	-	-	-	-	-	A5000+	K220-	-		RNP 1.0
020	TF	GM565	-	117 (119.9)	-	4.3	-	A3400+	-	-		RNP 1.0
030	RF	GM566	-	-	-	2.5	R	A3000+	K180	-	GM004 5.719	RNP 1.0
040	RF	GM563	-	-	-	2.7	R	A2500+	-	-	GM004 5.719	RNP 0.8
010	IF	RIRUT	-	-	-	7.2	-	A5000+	K220-	-		RNP 0.7
020	TF	GM564	-	169 (172.0)	-	-	-	A3300+	K180	-		RNP 0.7
030	TF	GM563	-	169 (172.0)	-	2.3	R	A2500+	-	-		RNP 1.0
040	RF	GM562	-	-	-	2.4	-	A1800+	-	-	GM004 5.719	RNP 1.0
050	TF	RW19R	Y	193 (196.1)	-	3.4	-	-	-	-3.0 50		RNP 0.3
060	TF	GM995	Y	193 (196.0)	-	2.7	-	-	-	-		RNP APCH
070	CF	GM996	-	224 (227.0)	-	-	-	A5000	-	-		RNP APCH

Note: Recommended RNAV procedure coding is provided solely to indicate which procedure design protection areas were used in the Instrument Flight Procedure Design process.

Note: Published OCA(H) values are obstacle clearance values. Decision heights (DH) below 250 FT shall not be used due to APV approach operation Type A limitations.

INSTRUMENT APPROACH CHART - ICAO

PLAN VIEW SCALE: 1:350 000

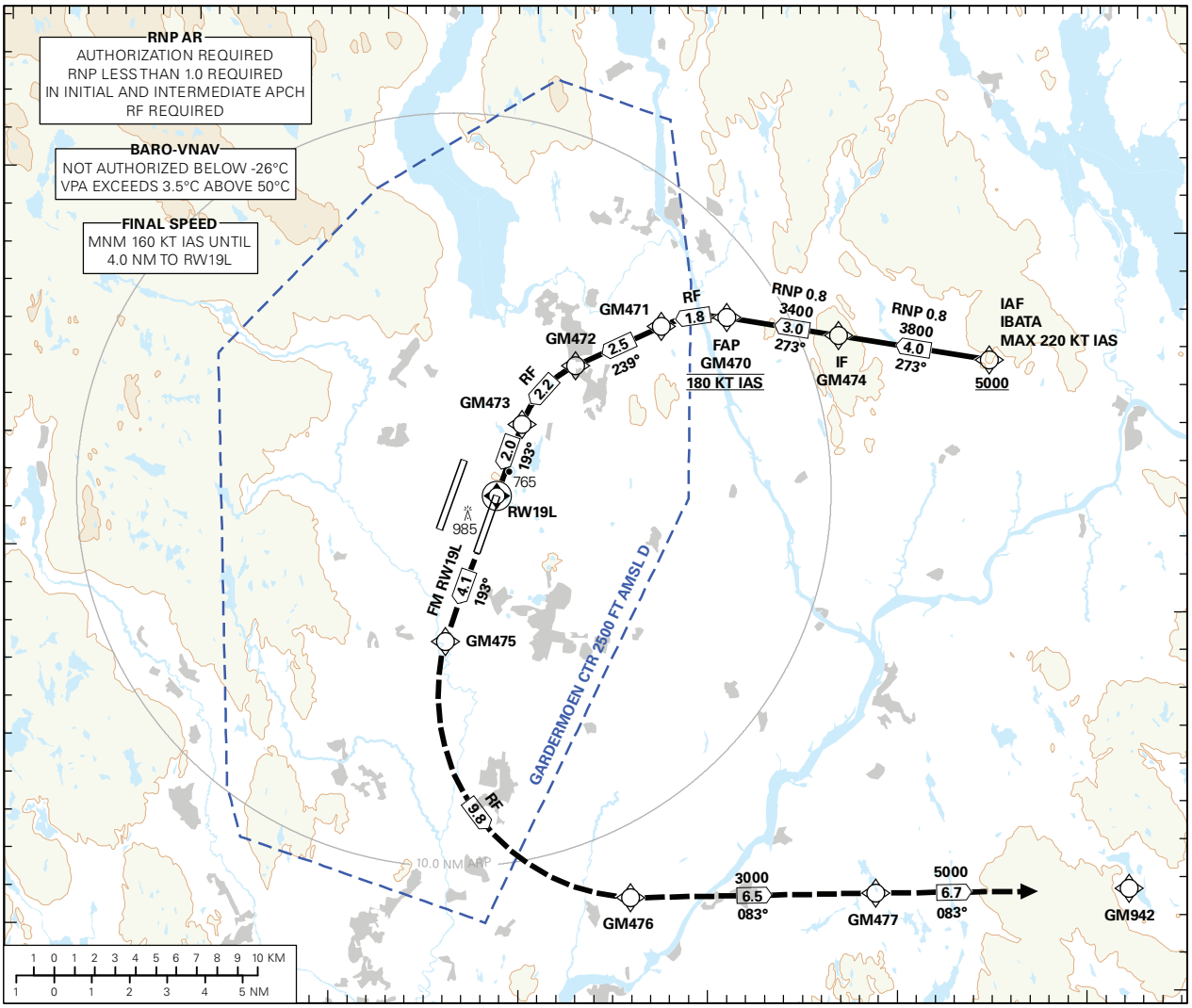
OSLO

GARDERMOEN

RNAV(RNP) X RWY 19L

3 9 MSA 25 NM ARP	ATIS: 126.125	AD ELEV: 681	
	APP: 118.475 120.450	THR ELEV: 681	DIST IN NM
	DIR: 136.400 (119.975) FIN: 128.900	HGT RELATED TO THR RWY 19L	ELEV, ALT AND HGT IN FT
	TWR: 120.100 (123.325)	CIRCLING HGT RELATED TO AD ELEV	TRANSITION ALTITUDE 7000
	GND: 121.900	BEARINGS ARE MAGNETIC - VAR 2.8 ° E (2015)	

ATS AIRSPACE CLASSIFICATION: REF ENR 1.4

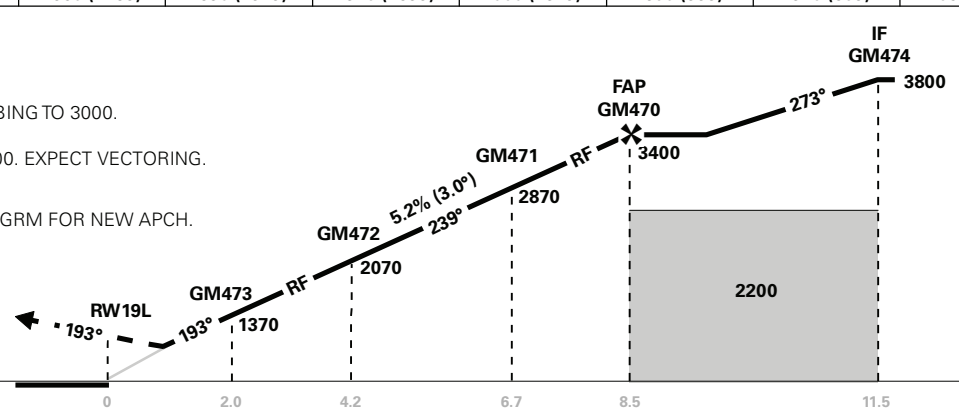


DIST TO RW19L	8	7	6	5	4	3	2	1
ALT (HGT)	3260 (2579)	2950 (2269)	2630 (1949)	2320 (1639)	2000 (1319)	1680 (999)	1370 (689)	1050 (369)

RDH 50

MISSED APCH:
CLIMB TO GM475.
TURN LEFT TO GM476 CLIMBING TO 3000.
TO GM477.
TO GM942 CLIMBING TO 5000. EXPECT VECTORING.

RCF:
AT GM942, TURN LEFT DCT GRM FOR NEW APCH.



CAT OF ACFT		A	B	C	D	FINAL APCH	DIST FAP - THR: 8.5					
OCA(H) STRAIGHT - IN	RNP 0.3 (2.5%*)	1030 (349)	1050 (369)	1070 (389)	1090 (409)							
	RNP 0.3 (5.0%*)	990 (309)	1020 (339)	1040 (359)	1060 (379)	SPEED	KT	70	90	120	150	180
		-	-	-	-	TIME	MIN:SEC	07:15	05:39	04:14	03:23	02:50
CIRCLING		1280 (599)		1530 (849)	1630 (949)	ROD	FT/MIN	370	475	630	790	950

NOTE: CIRCLING E OF RWY ONLY * MNM MISSED APCH CLIMB GRADIENT.

CHANGES: EDITORIALS.

RECOMMENDED RNAV PROCEDURE CODING

ENGM RNAV(RNP) X RWY 19L												
Serial Number	Path Descriptor	Waypoint Identifier	Fly-over	Course °M(°T)	MAG VAR	DIST (NM)	Turn Dir	ALT (FT)	Speed (KT)	VPA/ TCH	ARC Centre/ Radius(NM)	Nav. Spec.
010	IF	IBATA	-	-	-	-	-	A5000+	K220-	-	-	RNP 0.8
020	TF	GM474	-	273(276.2)	-	4.0	-	A3800+	-	-	-	RNP 0.8
030	TF	GM470	-	273(276.1)	-	3.0	-	A3400+	K180	-3.0/50	-	RNP 0.8
040	RF	GM471	-	-	-	1.8	L	A2870+	-	-3.0/50	GM001 r=3.000 NM	RNP 0.3
050	TF	GM472	-	239(242.1)	-	2.5	-	A2070+	-	-3.0/50	-	RNP 0.3
060	RF	GM473	-	-	-	2.2	L	A1370+	-	-3.0/50	GM002 r=2.700 NM	RNP 0.3
070	TF	RW19L	Y	193(196.1)	-	2.0	-	-	-	-3.0/50	-	RNP 0.3
080	TF	GM475	-	193(196.1)	-	4.1	-	-	-	-	-	RNP 1.0
090	RF	GM476	-	-	-	9.8	L	-	-	-	GM003 r=5.100 NM	RNP 1.0
100	TF	GM477	-	083(085.7)	-	6.5	-	A3000	-	-	-	RNP 1.0
110	TF	GM942	-	083(085.9)	-	6.7	-	A5000	-	-	-	RNP 1.0

Note: Recommended RNAV procedure coding is based on ARINC 424-17 and is provided solely to indicate which procedure design protection areas were used in the Instrument Flight Procedure Design process.

Note: Published OCA(H) values are obstacle clearance values. Decision heights (DH) below 250 FT shall not be used due to APV approach operation Type A limitations.