OM A

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OM A Revision 3

Introduction

OM A is updated to Revision 3. The purpose of this revision is to align more closely with current BA procedures, and to provide updated guidance regarding PBN operations. Significant changes are summarised below.

Contents

Minimum Operating Altitude (MOA)

The MOA for any flight or part of a flight is the minimum altitude at which the flight may be planned or operated, taking account of the minimum standards and operating procedures defined ~~in this manual~~below.

The MOA for any part of a BAV flight, including a test flight, must never be less than the following:

- FOR NIGHT OR IMC FLYING – the relevant MSA (see Relevant MSA), or, when under the control of an approved radar unit, the Radar Cleared Altitude;

Note: The minimum clearance provided by Radar Cleared Altitudes when under the control of approved radar unit is 1000 ft with a minimum band width of ±5 nm. Conflict may, therefore, occur between clearances based on these criteria and MSAs based on the wider margins used in BAV documentation. Such clearances may be accepted in accordance with the conditions in OM A **Error! Reference source not found.**. However, if there is any doubt about t he aircraft's position, the operation must be conducted with reference to the relevant MSA.

- For VMC FLYING BY DAY – 500 ft above all obstacles.

In addition, in adverse meteorological conditions, corrections must be applied to the MOA, as described in the paragraphs below.

Corrections to Minimum Operating Altitude

The minimum standards specified above, for calculating MSAs are not necessarily the safe minima in all meteorological conditions. For example very low air temperatures cause an altimeter to overread and mountainous terrain can generate abnormal turbulence and lee waves, particularly in strong winds.

Strong Wind Adjustment

The MOA must be increased to ensure that the relevant MSA or SSA is not infringed when strong winds, moderate or severe turbulence or mountain wave conditions are forecast, reported or experienced.

When the wind speed at the relevant MSA or SSA exceeds 50 kts, the MOA must be increased by at least 2,000 ft. When flying over mountainous terrain in mountain wave conditions a vertical clearance over the highest ridge at least equal to the height of the ridge above the surrounding terrain should be selected.

Deviation from Flight Planned Route

The Captain must ensure that the flight planned altitude for each segment of the route complies with the relevant MSA. If any deviation from the flight planned track becomes necessary, all terrain and obstructions near the intended track must be carefully considered and adequate allowance made to avoid them, taking account of the following factors:

a. The relative merits of a direct route over high ground and of an indirect route avoiding it.

b. The possibility of maintaining visual contact with the ground or water as against flying IFR.

c. The accuracy and reliability of navigational aids.

d. The forecast met conditions, including the type and height of cloud over high ground, wind velocity, down draughts, icing layers, and any sudden and unpredictable changes in barometric pressure and temperature.

e. The accuracy of maps and charts in certain parts of the world.

Instrument Approach Procedure Approval

All aircraft in the BAVirtual fleet are authorised to fly the following types of approach:

ILS (Uncategorised, Cat I, II and III), ILS Lower than Standard Cat I (LTS Cat I), ILS Other Than Standard Cat II (OTS Cat II), Localiser (LOC), Localiser Back-Course, LDA, PRM, SOIA, PAR, SRA*, VOR (with or without DME), NDB (with or without DME), Locator (with or without DME), Circling.

*SRAs are only authorised at specific destinations. These are:

- Gibraltar (LXGB/GIB)

In addition, all aircraft in the British Airways fleet are authorised to fly the following types of approach in the USA:

a. Circling approaches with visibility minima less than 3 sm. Such approaches are specifically authorised by the BAV USA Operations Specification.

b. Cat II ILS approaches with a published RVR of 1000 ft. Such approaches are specifically authorised by the BAV USA Operations Specification.

c. Cat II ILS approaches which contain a Note saying 'Special aircrew and aircraft authorisation/certification required'

d. Cat III ILS approaches which contain a Note saying 'Special aircrew and aircraft authorisation/certification required' and/or 'Special Autoland evaluation required'; where Cat III minima are also published

e. Authorised final approaches for specific aircraft type are listed in the table below:

Approach Type	Chart Title	Chart Minima Heading	Airbus Single Aisle	A350	A380	B777	B787	E190
~~GLS~~	~~GLS~~		~~No~~	~~No~~	~~No~~	~~No~~		~~Yes*~~
MLS			Yes	No	No	No	No	No

~~*GLS is permitted in the B787 only to Cat 1 minima for manual landing~~

Note: See Performance Based Navigation (PBN Procedures) below for information about permitted PBN procedures.

~~All BA aircraft are explicitly prohibited from flying the following types of final approach:~~

~~Approach Type~~	~~Chart Title~~	~~Chart Minima Heading~~	~~Notes~~
~~RNP APCH (PBN designator)~~	~~RNAV (GPS)~~	~~LPV~~	
	~~RNAV (GNSS)~~	~~LPV~~	
~~RNP AR APCH (PBN designator)~~	~~RNAV (RNP)~~	~~RNP 0.3~~ ~~RNP0.16~~ ~~RNP 0.11~~	
~~GLS~~	~~GLS~~	~~Cat II~~ ~~Cat III~~	
~~ILS~~		~~LTS Cat I~~	~~Lower than Standard (LTS) Cat I~~

~~ILS~~		~~ILS~~	~~'Cat I ILS Special Authorisation Procedure' (USA only)~~
~~ILS~~		~~OTS Cat II~~	~~Other than Standard (OTS) Cat II~~

Authorisation of Non-precision Approaches Flown Without Using the CDFA Technique

UK Air Ops requires authorisation from the CAA to fly any Non-Precision Approach other than by using the CDFA technique. The following approaches are authorised in this category:

- KJFK VOR or GPS Rwy 13 L/R (The 'Canarsie Approach')

AR (Authorisation Required), or SAAAR (Special Aircraft and Aircrew Authorisation Required) Approaches

Some instrument approach charts state Special Aircrew and Aircraft Authorisation, or simply Special Authorisation required. The charts may refer to ILS approaches or to RNAV approaches. AR/SAAAR **ILS** approaches **are** authorised for use by all aircraft in the BAV fleet (but see Prohibited Instrument Approach Procedures below about Cat I ILS Special Authorisation Procedure in the USA). See Performance Based Navigation (PBN) Procedures for information concerning RNP AR (PBN) approaches.

~~However, until further notice, AR/SAAAR **RNAV** approaches are **not** authorised for use by any aircraft in the BAV fleet.~~

Prohibited Instrument Approach Procedures

All BAVirtual aircraft are explicitly prohibited from flying the following types of final approach:

Approach Type	Chart Title	Chart Minima Heading	Notes
ILS (USA only)	ILS	ILS	'Cat I ILS Special Authorisation Procedure' (USA Only)

Note: See Performance Based Navigation (PBN) Procedures below for information about prohibited PBN procedures.

Application of Forecast Conditions

Forecast conditions should be applied based on the following table:

APPLICATION OF AERODROME FORECASTS (TAF & TREND) TO PRE-FLIGHT PLANNING (ICAO Annex 3 refers)

i. APPLICATION OF INITIAL PART OF TAF

a. **Application time period:** From the start of the TAF validity period up to the time of applicability of the first subsequent 'FM…*' or 'BECMG'; or if no 'FM' or 'BECMG' is given, up to the end of the validity period of the TAF.

b. **Application of forecast:** The prevailing weather conditions forecast in the initial part of the TAF should be fully applied with the exception of the mean wind and gusts (and crosswind) which should be applied in accordance with the policy 'in the column 'BECMG AT and FM' in the table below. This may however be overdue temporarily by a 'TEMPO' or 'PROB**' if applicable according to the table below.

ii. APPLICATION OF FORECAST FOLLOWING CHANGE INDICATION IN TAF AND TREND

	FM (alone) and **BECM AT:**	**BECMG** (alone), **BECMG FM**, **BECMG TL**, **BECMG FM…*TL** in case of:		**TEMPO** (alone), **TEMPO FM**, **TEMPO FM…TL**, **PROB30/40** (alone)			**PROB TEMPO**
	Deterioration and Improvement	**Deterioration**	**Improvement**	**Deterioration**		**Improvement**	**Deterioration and Improvement**
TAF or TREND for AERODROME PLANNED AS:				**Transient/ Shower Conditions** in connection with short-lived weather phenomena, e.g. thunderstorms, showers	**Persistent Conditions** in connection with e.g. haze, mist, fog, dust/sandstorm continuous precipitations	In any case	

APPLICATION OF AERODROME FORECASTS (TAF & TREND) TO PRE-FLIGHT PLANNING (ICAO Annex 3 refers)

DESTINATION at ETA ± 1 HR **TAKE-OFF ALTERNATE** at ETA ± 1 HR **DEST. ALTERNATE** at ETA ± 1 HR **EN-ROUTE** Alternate ETA ± 1 HR	Applicable from the **start of the change;** **Mean wind:** Should be within required limits; **Gusts:** May be disregarded.	Applicable from the time of **start of** the change; **Mean wind:** Should be within required limits; **Gusts:** May be disregarded.	Applicable from the time of **the end of** the change; **Mean wind:** Should be within required limits; **Gusts:** May be disregarded.	Not applicable **Mean wind and gusts:** exceeding required limits may be disregarded.	Applicable **Mean wind:** Should be within required limits; **Gusts:** May be disregarded;	Should be disregarded.	Deterioration may be disregarded; Improvement should be dis regarded including mean wind and gusts.
ETOPS ENRT ALTN at earliest/latest ETA ± 1 HR	Applicable from the **time of start** of the change; **Mean wind:** Should be within required limits; **Gusts** exceeding crosswind limits should be fully applied.	Applicable from the **time of start** of the change; **Mean wind:** Should be within required limits; **Gusts** exceeding crosswind limits should be fully applied.	Applicable from the **time of end** of the change; **Mean wind:** Should be within required limits; **Gusts** exceeding crosswind limits should be fully applied.	**Applicable if below applicable landing minima;** **Mean wind:** Should be within required limits; **Gusts** exceeding crosswind limits should be fully applied.	**Applicable if below applicable landing minima;** **Mean wind:** Should be within required limits; **Gusts** exceeding crosswind limits should be fully applied.		

Note 1: 'Required limits' are those contained in the Operations Manual.
Note 2: If promulgated aerodrome forecasts do not comply with the requirements of ICAO Annex 3, operators should ensure that guidance in the application of these reports is provided.
* The space following 'FM' should always include a time group e.g. 'FM1030'.

~~When considering selection of a destination alternate or en-route alternate PROB 40% or greater forecast conditions are taken into account (PROB 30% and PROB 40% TEMPO are disregarded). Neither PROB 30% nor PROB 40% forecast conditions are considered at the take-off alternative or the destination.~~

~~Change indicators "TEMPO" and "BCMG" are qualified by a time band and must be considered in determining the suitability of an aerodrome with respect to planning. If a TEMPO condition is forecast, each occurrence of the condition is expected to last less than an hour and the aggregate of all the occurrences less than half of the period indicated. The time band following BCMG refers to the time during which the change is expected to take place.~~

~~Deteriorating conditions should be considered to apply from the start of any notified time period, improving conditions from the end.~~

~~Mean wind should be used to assess crosswind and tailwind conditions, gusts need not be taken into account except at ETOPS en-route alternates.~~

~~Simbrief provides up to four destination alternates. If Simbrief's first choice of alternate is not acceptable, Captains should check the remaining ones for suitability before generating a new flight plan with the selected (suitable) alternate entered as the first option on the flight planning page.~~

Approach Minima

All BAV landing minima are expressed in terms of (M)DA/H and RVR or Visibility. Minima published on the Instrument Approach Chart must be used.

Decision Altitudes/Heights may be quoted as:

- Altitudes based on QNH
- Radio heights using radio altimeters

For non-precision and category 1 ILS approaches, the barometric decision altitude must be used. The radio altimeter is only used for Category 2 and 3 ILS approaches where specifically stated on the approach chart.

Commerically-produced (i.e. Lido/Jeppesen) format charts from Navigraph/Aerosoft have pre-calculated minima which should be used directly from the chart with no adjustment.

There is no requirement to adjust charted minima for non-precision approaches where a continuous descent final approach is to be conducted.

Most state-produced (e.g. UK AIP) charts show raw Obstacle Clearance Altitude/Height (OCA/H) data only and it will be necessary to manually calculate the appropriate (M)DA as follows:

1. Take the Obstacle Clearance Height from the chart and compare to the System Minima for the procedure (see table below)
2. Take the higher of the OCH or System Minima
3. Add the aerodrome elevation to this figure to give the Decision Altitude based on QNH

Type of Approach Aid	Lowest DH/MDH
Cat 1 ILS	200 ft
Localizer only	250 ft
RNAV (LNAV only or LNAV/VNAV)_	250 ft

VOR/DME	250 ft
VOR only	300 ft
NDB/DME	300 ft
NDB only	350 ft
SRA (terminating at 2NM)	350 ft

BAV AOM are not usually quoted as barometric heights based on QFE (B777/B787 fleet DH/MDH to be calculated in accordance with B777/B787 FCOM). In those states still using the QFE datum (mostly ex 'Eastern Bloc'), tables are provided on the Instrument Approach Chart to convert Decision Heights to Decision Altitudes at destinations and planned alternates. When operating to off-line aerodromes in those States, the Commander must ensure that Decision Altitudes are used, based on a derived QNH.

Approach Minima – Use of MDA(H) as a DA(H)

It is BAvirtual policy that, when flying an instrument approach operation to an MDA(H), the Commander is authorised to treat that minimum as a DA(H). Specifically, there is no requirement to add any height increment to the value of MDA(H) extracted from the relevant Instrument Approach Chart.

Approach Minima – Use of MDA(H) as a DA(H) Background

BA has a specific safety case authorising use of MDA(H) as a DA(H) as with no height add-on which has been accepted by the UK CAA. The safety case relies on three important surrounding elements:

- The instrument approach shall be flown using the Continuous Descent Final Approach technique
- Except for those approaches specifically authorised in Authorisation of Non-precision Approaches Flown Without Using the CDFA Technique, and Circling Approaches, there shall be no level-flight segment at MDA(H); and
- If the required visual references are not visible to the PF at MDA(H), the go-around must be executed promptly to minimise height-loss during the manoeuvre.

Presentation of Minima

CAT III

The decision height decode for LIDO charts where 'Company' is shown in the minima box is as follows:

ACFT	CAT 3B NO DH	CAT 3B WITH DH	CAT 3A
A32N	**No DH**	**25 RA**	**50 RA**
~~B747~~	~~**No DH**~~	~~**20 RA**~~	~~**50 RA**~~
~~B767~~	~~**No DH**~~	~~**14 RA**~~	~~**50 RA**~~
B777	**No DH**	**15 RA**	**50 RA**

B787	**No DH**	**15 RA**	**50 RA**
A380	**No DH**	**15 RA**	**50 RA**
E190	**Not Authorised**	**Not Authorised**	**50 RA**

Altitude and Terrain Information on Flight Documents

The information in this section should be read in conjunction with the Lido/Jeppesen chart legends which have more detailed information about the depiction of terrain and minimum altitudes used in the respective chart products. Within the broad scope of the Operations Manual, the term Minimum Safe Altitude is used (for example, in the provision of drift-down information) to indicate the altitude below which the flight crew will need to pay particular attention to the mitigation of the threat of Controlled Flight Into Terrain (CFIT). Sustained flight above Minimum Safe Altitude is therefore, by definition, not (as) susceptible to CFIT risk.

Operational Flight Plan

MSAs are shown on Simbrief-generated flight plans and represent the MSA on the direct track between two points. Care must be taken when transferring from the Operational Flight Plan to aerodrome documentation to ensure that any relevant MSAs are not infringed; the MSA/SSA shown on aerodrome charts should be considered to override MSAs shown on the OFP during departure and arrival.

MSAs shown on the Operational Flight Plan are subject to a minimum of 2000ft.

```
POSITION    ID/FREQ
  MSA    AWY   /ITT/    -TRM-

HEATHROW BPK7F
  2.3  BPK7F   /276/    -VAR-

D268D
  2.3  BPK7F   /297/    -296-

D278F
  2.3  BPK7F   /349/    -349-
```

MSA Critical Points

MSA Critical Points and escape procedures may be published in Performance Manuals.

On sectors where driftdown escape routes are published the route options should be entered in to RTE 2 or the SEC F-PLN of the FMS prior to reaching the start of the escape route.

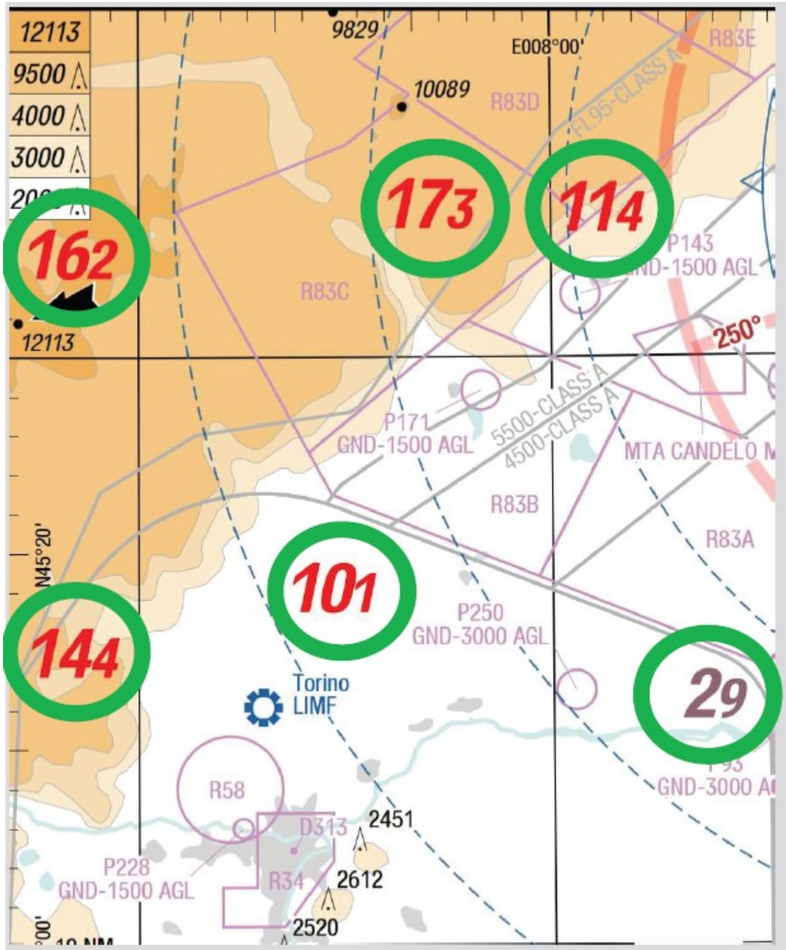
Regulated Altitudes on Charts

The following regulated altitudes appear on LIDO and Jeppesen (Navigraph) charts, and are relevant to the policies for climb, cruise and descent.

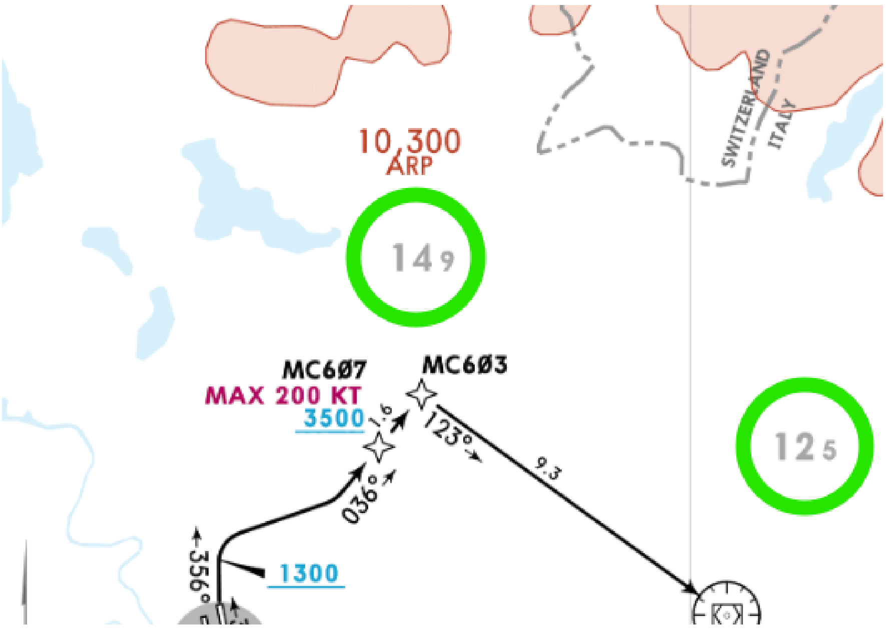
Minimum Grid Altitude (MGA): MGA shows the lowest safe altitude which may be flown off-track. MGA is calculated by rounding up the elevation of the highest obstruction within the respective grid area and adding an increment of:

- 1000 ft for terrain or obstructions up to 6000 ft
- 2000 ft for terrain or obstructions above 6000 ft.

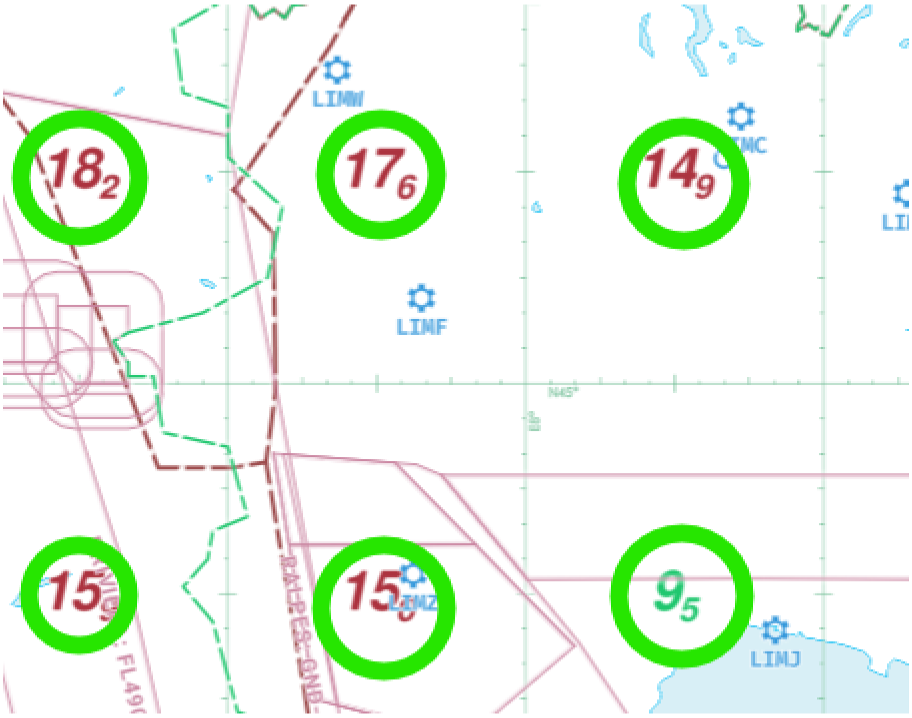
MGAs below 10,000 ft are shown in purple on LIDO charts; at and above 10,000 ft in red. MGAs may be found on Enroute, SID, STAR, MRC and AFC charts.



MGAs to the south and west of Milan Malpensa, on LIDO SID chart



MGAs shown on Navigraph/Jeppesen SID chart



MGAs shown on Navigraph/Jeppesen enroute chart

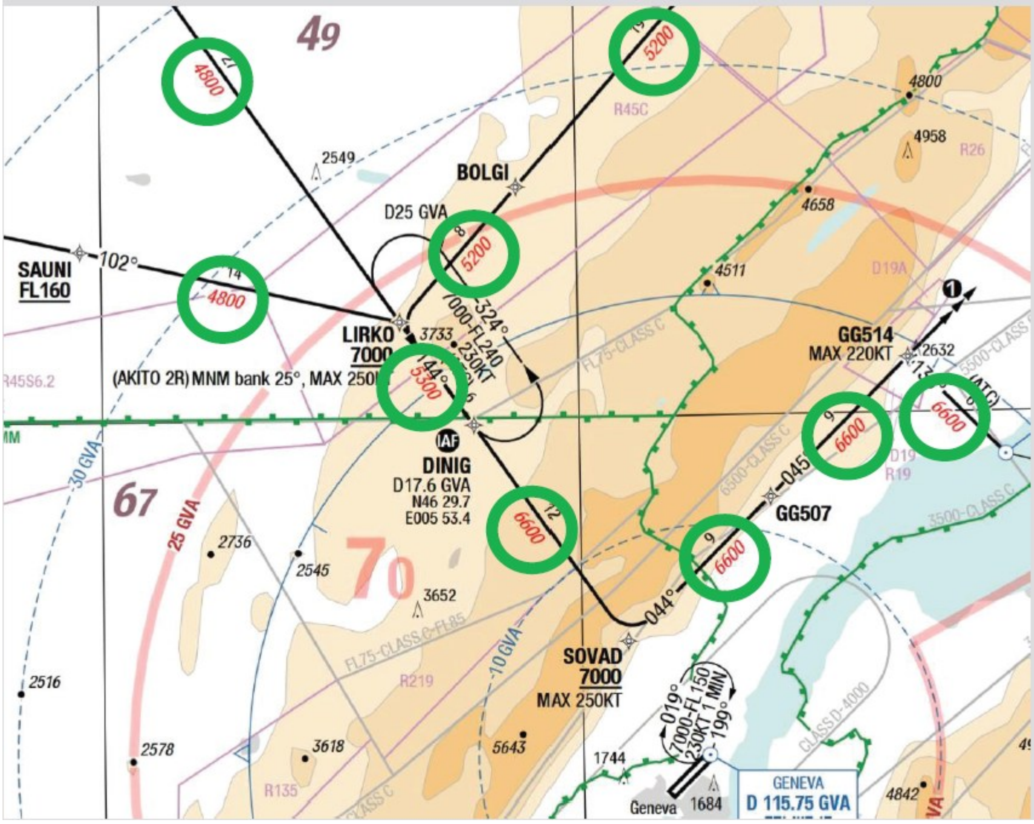
Minimum Terrain Clearance Altitude (MTCA): MTCA covers, exclusively, terrain and obstacles relevant for air navigation. For SIDs and STARs, the MTCA is calculated for an area either 5 NM either side of the procedure centreline, and around a Navaid or waypoint. For airways the buffering extends to up 10 NM either side of the centreline. MTCA is calculated by rounding up the elevation of the highest obstruction within the respective area and adding an increment of:

- 1000 ft for terrain or obstructions up to 6000 ft; or
- 2000 ft for terrain or obstructions above 6000 ft

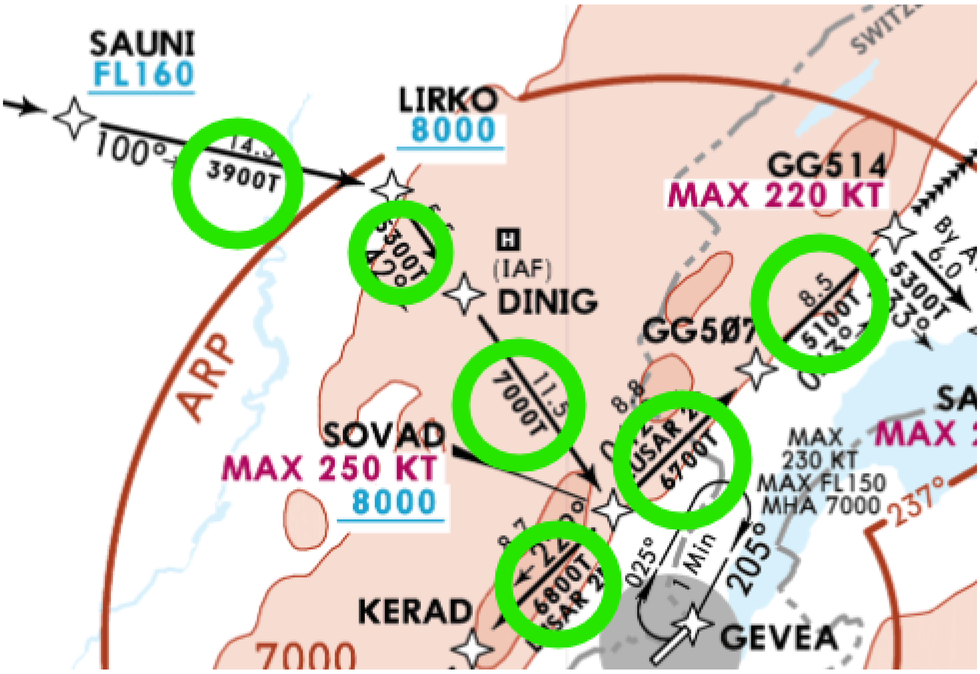
The lowest MTCA which will be shown on a chart is 3100 ft, which means that if no MTCA value is shown 3000 ft can be considered a safe flight altitude. Occasionally the MTCA for a specific segment can be higher than the official MEA, as a consequence of different asusmptions used in calculating the two parameters; if that is the case, flight crew should consider the MTCA value to be the minimum usable altitude.

MTCAs on LIDO charts are shown in red, italicised font. On Jeppsen charts the level is appended with a "T".

MTCA is provided by LIDO for all airway segments, for all STARs up to IAF or equivalent end point, and, exceptionally, for SIDs at selected airport.



MTCAs on STAR chart for Geneva (LIDO)

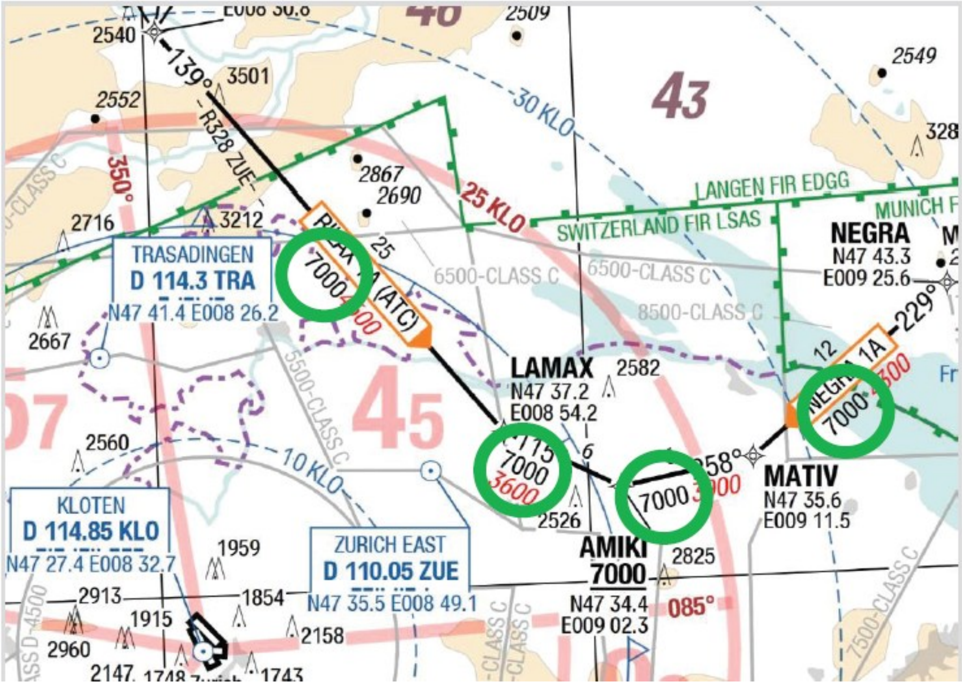


MTCAs on STAR chart for Geneva (Navigraph/Jeppesen)

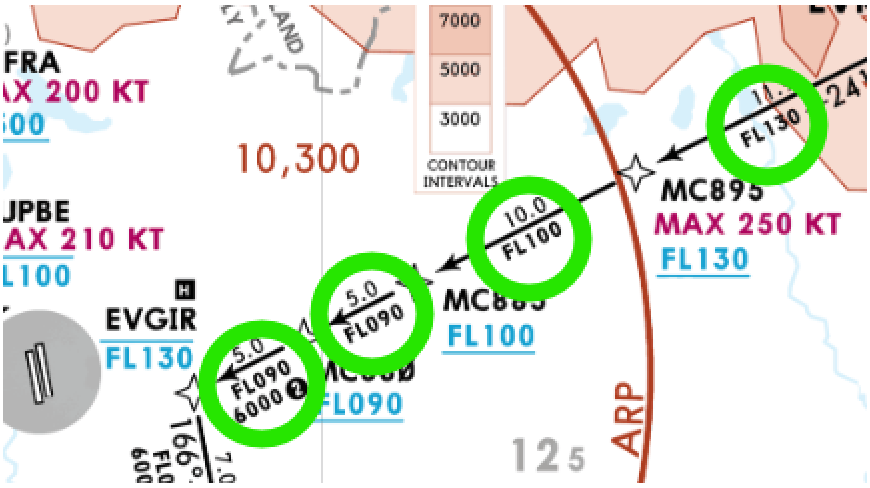
Minimum Enroute Altitude (MEA): MEA is shown only if published by the relevant state. It represents the lowest altitude, or lowest usable IFR flight level, for a given route segment. As noted above, MEA may, occasionally, be lower than MTCA for the same segment because of the different assumptions used in calculating the two parameters. If that is the case, flight crew should consider the MTCA value to be the minimum usable altitude.

MEA, if published, is shown in black text below the relevant route segment, to the left of (or above) the MTCA value.

MEAs may be found on LIDO Enroute, SID, STAR and IAC charts.



MEAs on STAR chart for Zurich (LIDO)



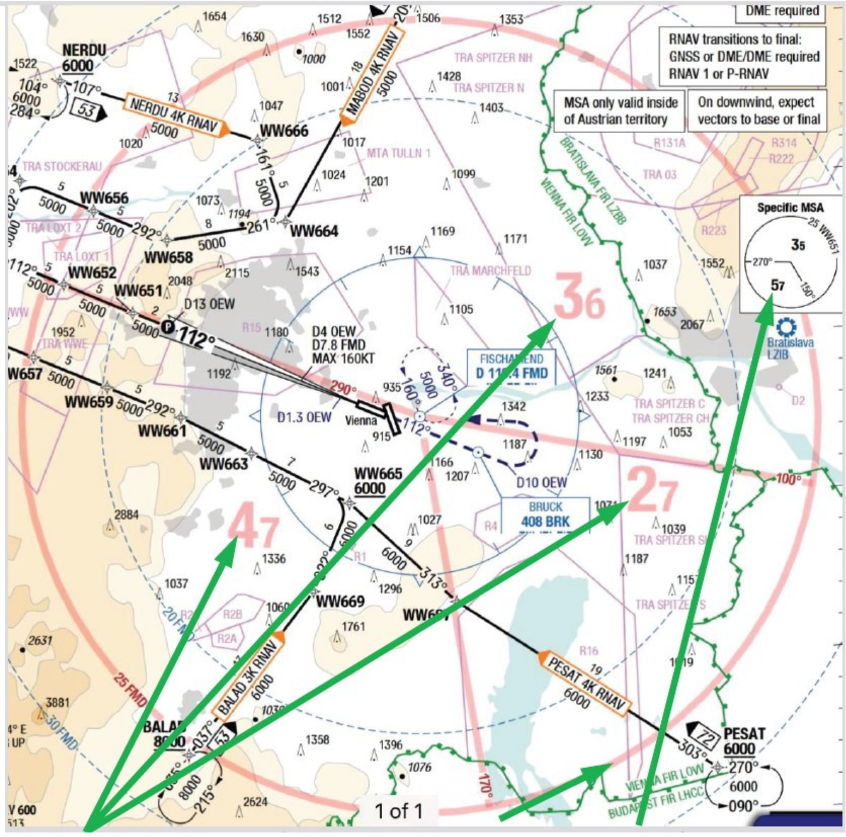
MEAs on STAR chart for Milan Malpensa (Jeppesen/Navigraph)

Minimum Sector Altitude. Minimum Sector Altitude (still referenced in a number of Operations Manual publications as Sector Safe Altitude (SSA)) is shown for sectors formed by radials, QDRs or tracks (depending on the reference facility) and a limiting circle. The Minimum Sector Altitude provides obstacle clearance of at least 300 m/1000 ft. The sectors and altitudes are published by states.

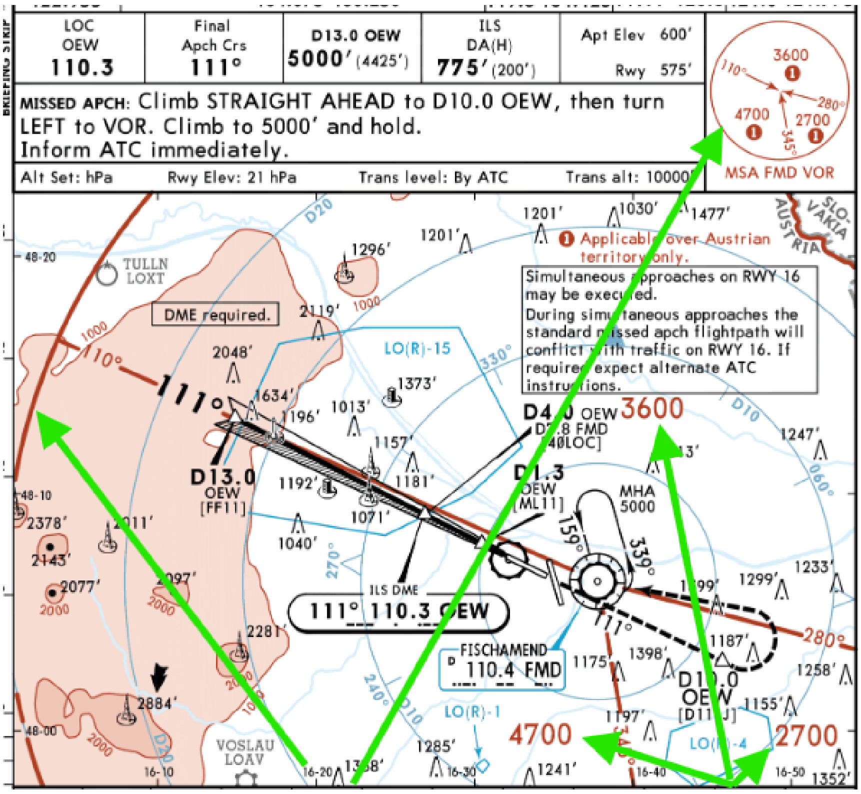
The Minimum Sector Altitude Limiting Circle is shown centred on a reference NAVAID or the Aerodrome Reference Point; if no other information is shown, the radius is 25 NM. A Minimum Sector Altitude Pictogram is used when the chart plan view is only able to show partial Minimum Sector Altitude sector information.

Minimum Sector Altitudes may be found on SID,

STAR, IAC, MRC and AFC charts.

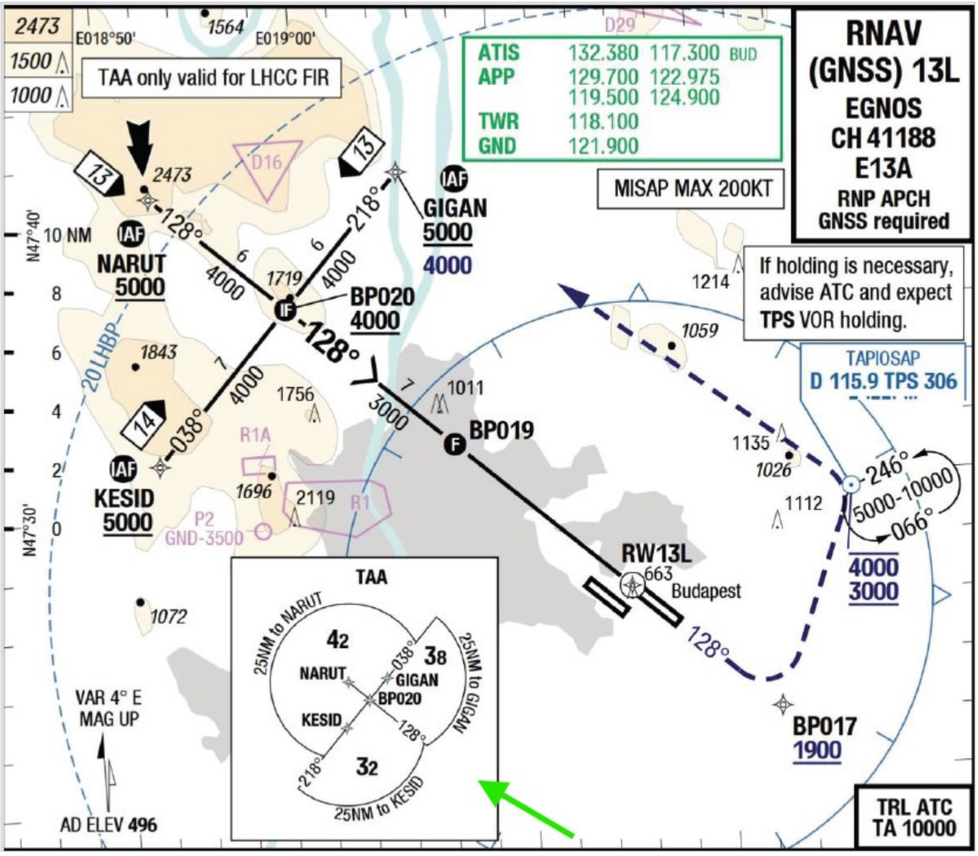


Minimum Sector Altitude information, Limiting Circle and Pictogram (in this case based on waypoint WW651, not the aerodrome reference point) on IAC for Vienna (LIDO).

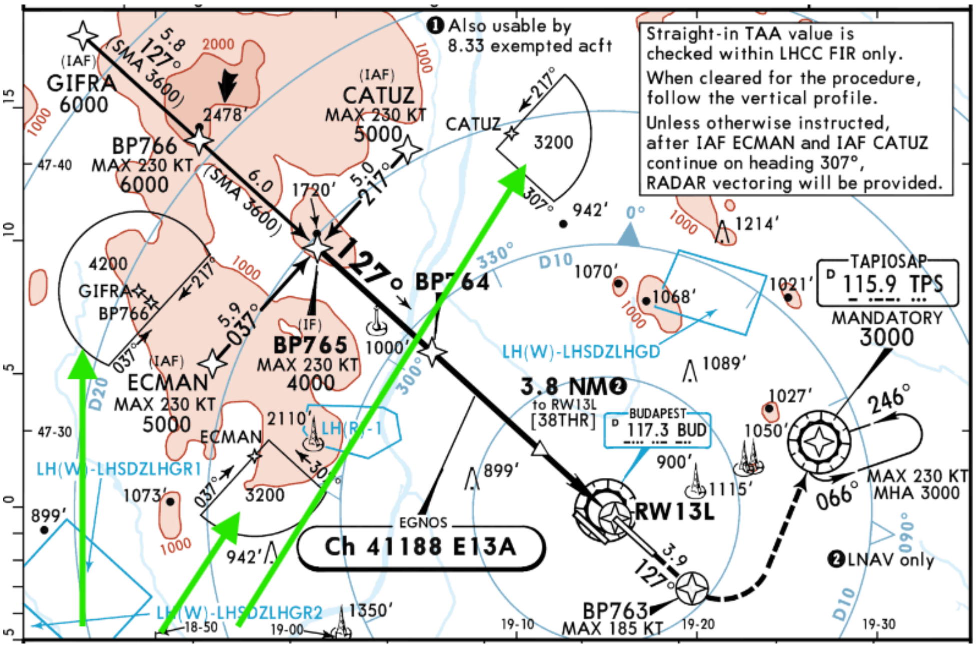


Minimum Sector Altitude information, Limiting Circle and Pictogram (in this case based on FMD VOR, not the aerodrome reference point) on IAC for Vienna (Navigraph/Jeppesen).

Terminal Arrival Altitude (TAA): TAA sectors and altitudes are only depicted for RNAV/RNP approaches, replacing Minimum Sector Altitude on some charts (but not all: TAA information is only depicted if officially published by states). Similarly to Minimum Sector Altitude information, a TAA pictogram is shown if the full sector information is not clearly visible on the chart plan view; and the TAA provides obstacle clearance of at least 300 m/1000 ft.



TAA Pictogram on RNAV Approach chart for Budapest.



TAA Pictogram on RNAV Approach chart for Budapest (Jeppesen/Navigraph)

Altitude Depictions on Charts

Minimum or Maximum Altitudes are rounded up to the nearest 100 ft and either:

- For MGA, Minimum Sector Altitude and TAA: quoted in hundreds of feet, excluding the last two zeros (e.g. 76 indicates 7600 ft); or:

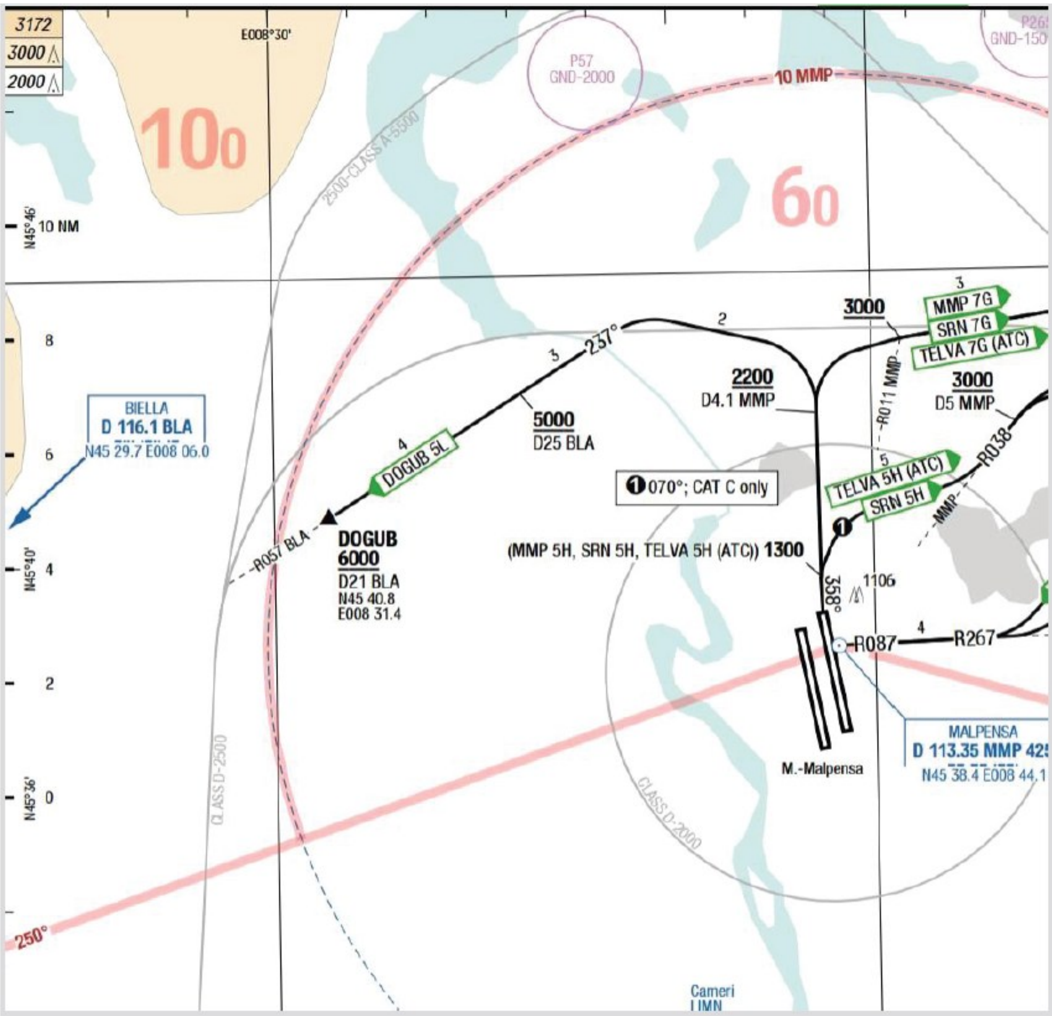
- For MEA, MTCA and MRC: shown as whole figures (e.g. 6600).

Aerodrome elevation, terrain and obstacles are depicted to the nearest foot.

Background Information

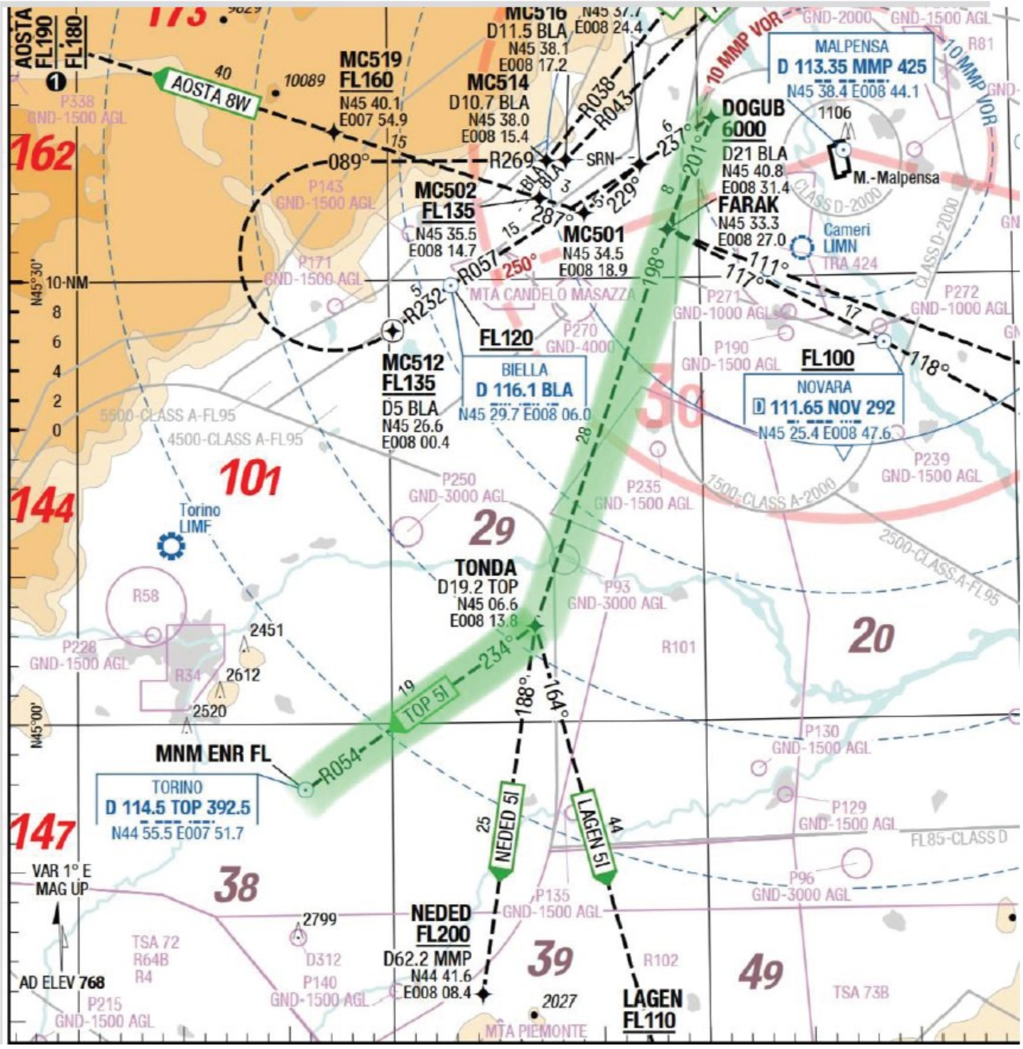
The information below shows how the various minimum altitude depictions could be relevant to operations, using an example flight from Milan Malpensa to Grenoble. It is empahsised that this example is simply intended to be an illustration of how the various chart types can be sued to build situational awareness about proximity to terrain.

Our fictitious flight takes off from Runway 35R at Malpensa. The MSA from the Operational Flight Plan plan is 15.4. The aircraft is cleared via a DOGUB 5L SID:



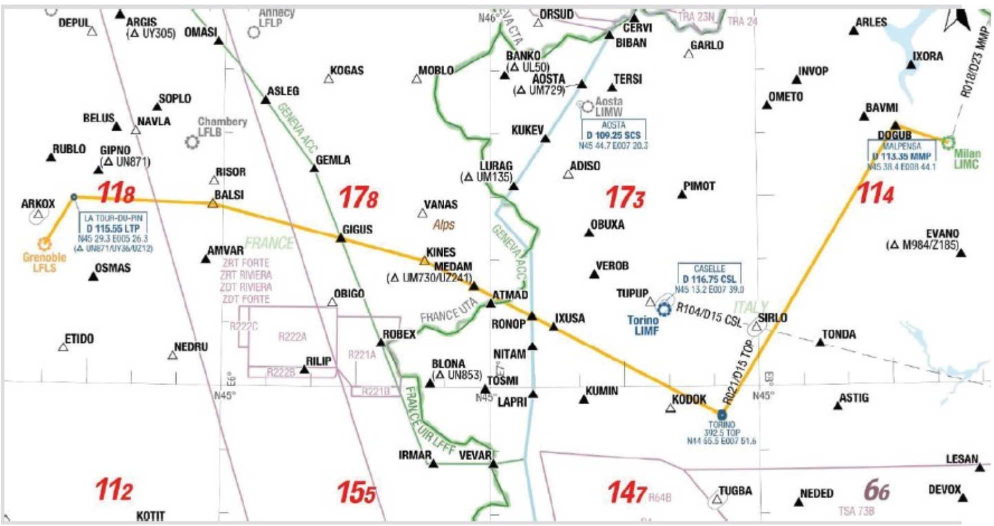
Based on the Minimum Sector Altitude depiction, the relevant MSA until DOGUB is 6000 ft.

The onward clearance is a TOP 5I transition:

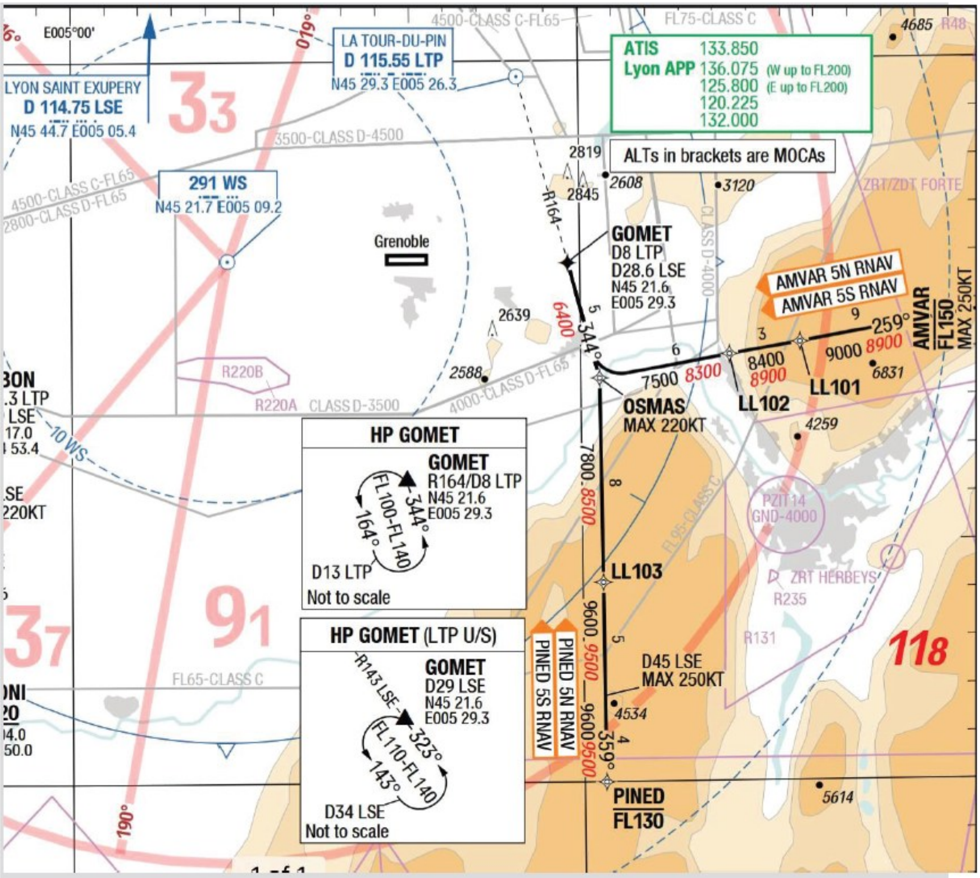


After passing FARAK, with the aircraft flying over the Po Valley, the Minimum Sector Altitude, and MGAs, show that the highest relevant MSA until reaching TOP is 3800 ft.

Half way between FARAK and TONDA, ATC issues a clearance direct to MEDAM; because the clearance is off the planned track, the crew refer to the Route charting in the Lido enroute charts and note the MGA values, which give a relevant MSA of 17,300 ft until passing 7° East then 17,800 ft – higher than the value from OFP:



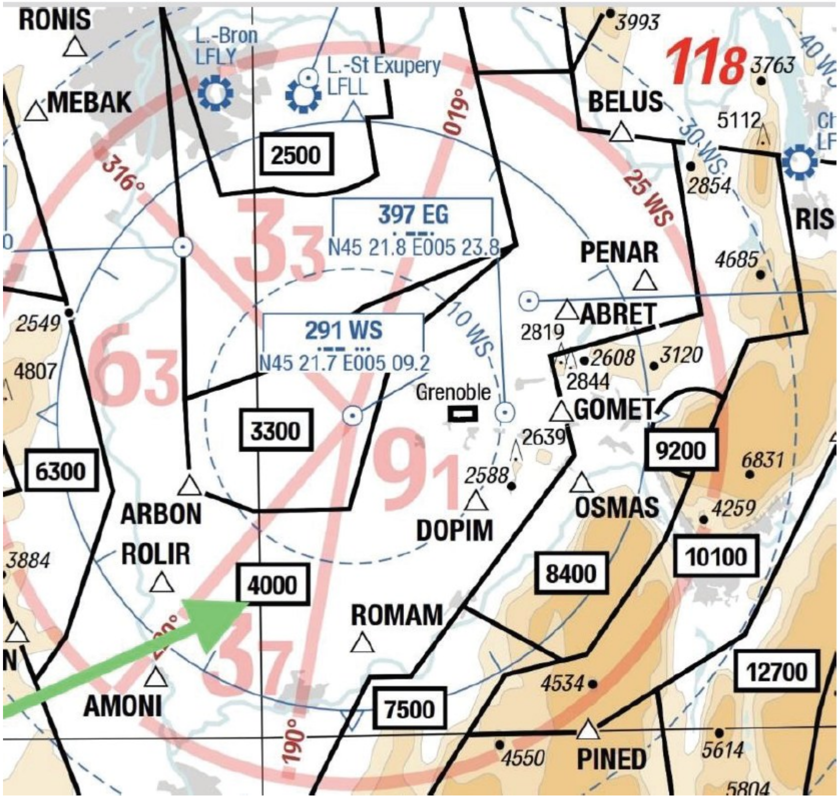
After being handed-over to French ATC, the flight is cleared to AMVAR for an AMVAR 5S arrival, to hold at GOMET. The crew note the MGAs of 17,800 ft and 11,800 ft from the chart above.



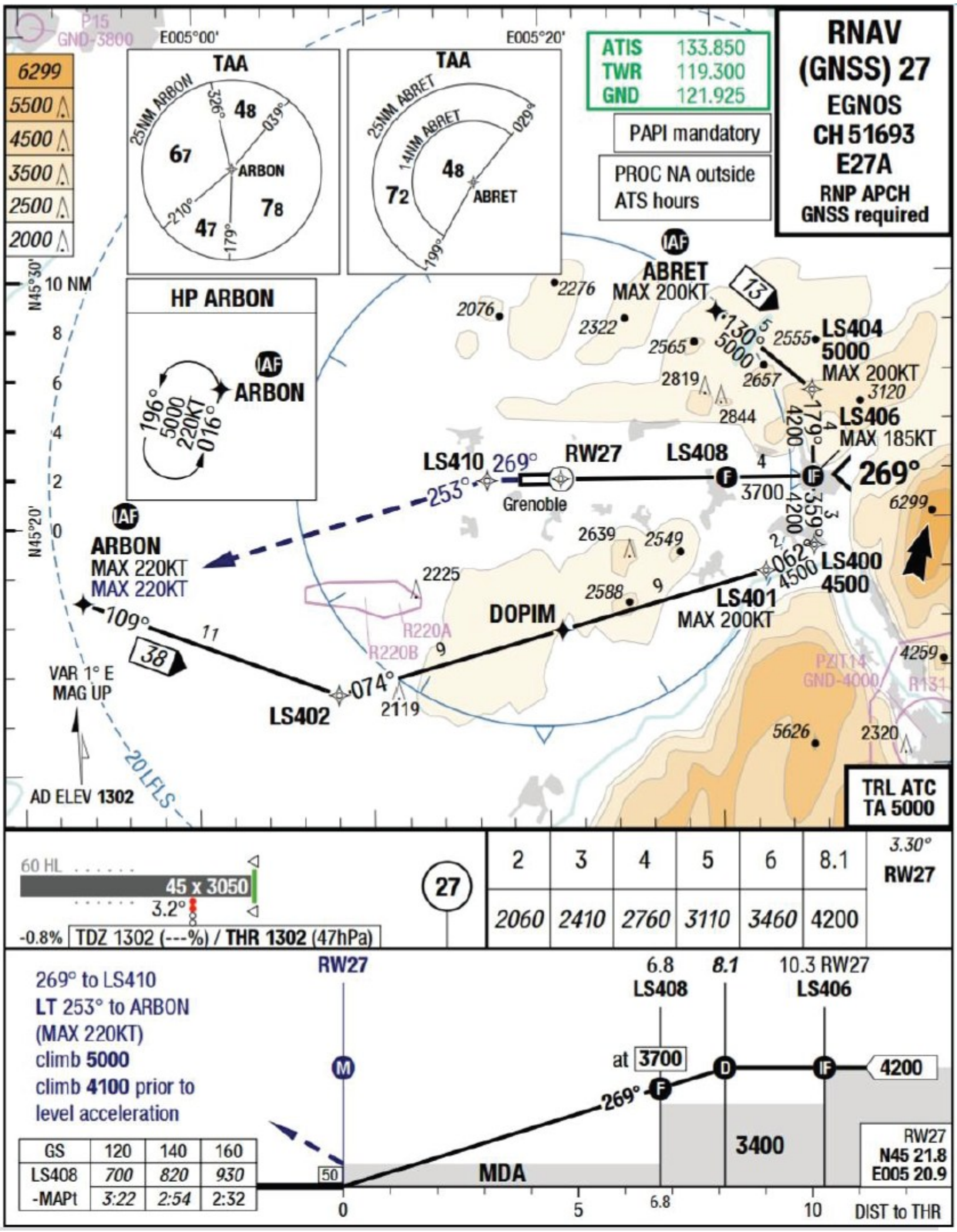
After AMVAR the highest MTCA before GOMET is 8900 ft – higher than the state-published MEA between LL101 and LL102! Once within 25 NM of NDB WS, the Minimum Sector Altitude information gives a relevant MSA of 9100 ft. The aircraft is cleared to hold at GOMET at FL100.

GNB is using Runway 27. ATC clears the aircraft to leave GOMET heading 250 degrees and to descend to altitude 5000 ft. The crew determines that the relevant MSA is 9100 ft, from the Minimum Sector Altitude depiction on the STAR chart above.

A glance at the MRC for GNB shows 4000 ft to be the minimum radar-vectoring altitude in that area:



The aircraft is then cleared direct to ABRET, at 5000 feet, to fly the RNAV (GNSS) approach to Runway 27, and to descend in accordance with the procedure:



Referring to the TAA pictogram, the crew notes that 4800 ft is the relevant MSA to the north-west of ABRET, and they will expect to descend below that altitude when past LS404. They make sure they are aware of the QNH, review the vertical profile (noting that the Intermediate Approach Fix altitude is 4200 ft, the FAF altitude is 3700 ft and the approach has a vertical slope of 3.3 degrees) and discuss that the radio altimeter activation may well happen on the leg from ABRET to LS404. At the call of "Radio Altimeter", about 2.5 miles past ABRET, the crew confirm they have the correct QNH set and that they are where they were expecting to be – thus justifying continuation of the approach.

Air Traffic Services Flight Plan

An ~~ATC~~ IFR flight plan must be filed for all BAVirtual online flights and the flight plan must not be cancelled in flight. The conditions under which VMC clearances may be requested or accepted in flight are described in OM A **Error! Reference source not found.**.

For flights planned using the BAVMS Simbrief dispatch system, a link to the VATSIM flight plan pre-filing system is provided on the Briefing page for convenience. To pre-file a flight plan with VATSIM, click the link provided. This will open the VATSIM flight plan form, pre-filled with all relevant data.

Check all the data is correct before submitting the flight plan.

For all flights, whether conducted online or offline, the ATC flight plan must be entered in to Merlin. This will be auto-populated with the planned route if the flight has been planned using the BAVMS Simbrief dispatch system. For flights planned using external software, the route must be entered manually.

The ATC Flight Plan, in ICAO format, is reproduced on the last page of the OFP.

The ICAO designator for British Airways is "BAW, or "SHT" for UK domestic flights and these should be used in online flying clients. All commercial applications (e.g. ACARS, communication with Operations, flight booking etc) use "BA" and the commercial flight number.

BA Euroflyer use the ICAO designator "EFW". BA CityFlyer use the designator "CFE".

Operational Flight Plan ~~(Cirrus)~~

The BAV Simbrief dispatch centre provides an operational flight plan in British Airways ~~CIRRUS~~ format. There is no requirement for a paper OFP on each flight, provided an electronic copy has been obtained.

The Captain is responsible for ensuring that the flight plan generated takes account of the available meteorological and operational information and at the flight planning stage the ~~Cirrus~~Operational Flight Plan should be checked for:

- Aircraft type and registration.
- Departure, destination and alternate aerodromes.
- Flight Levels.
- Cost Index/Mach No.
- Performance penalties.
- Gross Error Check on:
    - Fuel Distance or Flight Time.
    - Aircraft Weights.
    - Fuel quantities
- Remarks

When the loadsheet is obtained, the actual ZFW/TOW should be used to cross-check the assumed ZFW/TOW on the Operational Flight Plan.

It is essential that crew and ATC have the same flight plan details, with particular attention being given to the initial departure/exit routing. In the event of a discrepancy instigate remedial action as early as possible.

It is BAV policy to provide an Operational Flight Plan based on providing the correct amount of fuel necessary to complete the flight in normal operational conditions. It is the Commander's responsibility to ensure that sufficient fuel is carried to operate the aircraft in accordance with BAV procedures; however, it is policy that Minimum Block Fuel should be uplifted unless the Commander can identify good reasons for carrying discretionary fuel.

Altimeter Setting Procedures

Changes to altimeter settings should be initiated by PF and communicated to PM. Should the PF not initiate the relevant altimeter setting change as soon as is practicable the PM will prompt with the call “ALTIMETERS”.

Altimeter setting procedures and altitude alerting system procedures are covered within the relevant aircraft-specific manuals.

Altimeters should be set according to the following principles:

Flight Phase	Captain	First Officer	Standby
Prior to departure	Departure airfield QNH	Departure airfield QNH	Departure airfield QNH
When cleared to a flight level	STD	STD	QNH until above MSA and TA
Cruise (if above TA)	STD	STD	STD
Prior to descent	STD	STD	Destination airfield QNH
When cleared to an altitude	Destination airfield QNH	Destination airfield QNH	Destination airfield QNH

Where the initial climb is to a Flight Level, both primary altimeters should be set to STD at acceleration altitude. The standby altimeter should still remain on QNH until above MSA and TA.

Verification of Transition Altitude/Level

Prior to take-off or approach, flight crew should verify that the Transition Altitude and/or Transition Level (when published or available) are correctly programmed in the Flight Management System.

Altimeter Setting Procedures for "Climb Via" and "Descend Via" Clearances

When given a "climb via" or "descend via" clearance along a SID/STAR, the vertical profile published on the applicable chart must be followed. To allow the FMS to provide correct vertical guidance, the relevant altimeter setting for each constraint must be set (i.e. QNH for an Altitude constraint and STD for a FL constraint).

Consequently, when a "climb via" or "descent via" clearance is expected or received, it will be necessary to delay the change in altimeter setting from STD to QNH (or vice-versa). In such cases, flight crew must establish and agree:

- The relevant Altitude/FL target to set in the MCP/FCU
- When the altimeter setting will be changed to the next setting

Any ambiguity concerning an ATC clearance must be resolved without delay.

A number of States publish SIDs and STARs which contain both altitude and Flight Level restrictions at sequential waypoints. If instructed by ATC to either "climb via" SID or "descend via" a STAR, the published vertical profile must be followed in accordance with ATC Clearances on SIDs and STARs.

Such clearances require the change in altimeter setting to be delayed until past any applicable constraints. In turn, this increases the risk of the Flight Crew omitting to change the altimeter setting entirely. Such an omission would raise the threat of mid-air collision and/or CFIT and must therefore be mitigated against through careful briefing and monitoring.

Communication

General

The PM~~F~~ will operate the R/T ~~up to and including taxi clearance. Both pilots must monitor the ATC clearance. At all other times the PM will operate the R/T~~ and be responsible for correct frequency selections, as specified within OM B specific fleet manuals. Both pilots must monitor the ATC clearance. Additionally, UK Regulations stipulate that on the ground, when receiving the ATC departure clearance via voice communication, the headset shall be used as the primary device for voice communications with ATS. In cases where the First Officer would have to refer to the Captain for a decision, it is recommended that the Captain responds directly.

The PF must normally monitor R/T at all times. If the PF wishes to leave the primary ATC control frequency for any reason, temporary control of the aircraft must be passed to the other pilot. If, for any reason, a pilot has to leave the ATC frequency the remaining pilot must check that his/her own audio panel is set correctly to maintain communications with ATC. When the pilot has completed his/her other activities they must re-check that the audio panel is set correctly to re-establish communication with ATC. The returning pilot will be briefed on any changes to communications by other crew members.

Standard R/T phraseology must be used for communications with ATC. All communication must be carried out in accordance with ~~FCSI 02~~UK CAA CAP 413 and the aircraft callsign used in all transmissions.

Contact must be maintained with the Air Traffic Control Centre (ATCC) or Flight Information Centre (FIC) prescribed by the Air Traffic Services controlling the area in which the aircraft is flying, and clearance must be obtained from one station before changing to another. Frequency transfer by means of datalink (CPDLC) is acceptable for that purpose.

R/T frequencies must only be used for the purposes for which they are promulgated; in particular, ground movement frequencies should not be used while airborne. In exceptional circumstances however, or where communication is difficult, any suitable means of contact may be used.

A continuous R/T listening watch must be maintained with the appropriate ATS Authority throughout flight unless:

- Permission has been given by the appropriate ATS Authority to discontinue radio watch; or
- SELCAL watch has been established; or
- Use of defective radio equipment might endanger the safety of the aircraft

The ICAO Phonetic Alphabet and phraseology must be used for all R/T communications. The use of idiomatic or colloquial expressions should be avoided where foreign controllers have a limited knowledge of English and may well only understand standard phraseology and procedures.

International VHF Emergency Frequency (121.5 MHz)

The frequency 121.5 is provided at area control centres, flight information centres, aerodrome control towers and approach control offices.

Crews operating long over-water flights or over designated areas where the carriage of an Emergency Locator Transmitter (ELT) is required, should continuously monitor ('guard') the emergency frequency 121.5 except:

- When carrying out communications on other channels;
- When flight deck duties do not permit the simultaneous guarding of two channels;
- When airborne equipment limitations exist.

In addition, the guarding of 121.5 shall be made in areas or over routes where the possibility of interception or other situations may exist as notified.

Crews operating in areas other than the above, e.g. Europe, should guard 121.5 when practical and when communication difficulties using the normal channels exist.

~~UNICOM~~ VATSIM Advisory Frequencies~~(122.8 MHz)~~

~~The UNICOM frequency 121.8 MHz is used on the VATSIM network to facilitate short-range conflict resolution and co-ordination w~~When no ATS is available on the VATSIM network, particularly on the ground and between aircraft taking off and landing, the relevant Advisory Frequency must be used to facilitate coordination between aircraft.

En-route, 122.800 MHz is used as the global common advisory frequency and must be monitored at all times when no ATS is available. The maximum range of voice transmissions on 122.800 MHz is approximately 30 nm.

On the ground and in the vicinity of an aerodrome, the relevant CTAF frequency must be monitored and 'blind' transmissions made to advise other traffic in the vicinity of your intentions.

In the USA, Canada, Mexico and the Caribbean, discrete CTAF frequencies are used for each airfield. The relevant CTAF frequency may be found by typing .ctaf <ICAO> in to your VATSIM pilot client, e.g. .ctaf KJFK will return the CTAF frequency for JFK. It is strongly recommended to monitor 122.800 MHz on a second VHF radio whilst operating on discrete CTAF frequencies due to the lack of compliance by other pilots.

In all other areas, 122.800 MHz is used as the common advisory frequency for use in the vicinity of aerdromes as well as enroute.

Voice transmission ~~on UNICOM~~ is encouraged but pilots are reminded of the requirement to monitor the text frequency as well and to be mindful that there may be pilots who are unable to receive voice communications in the area.

~~The maximum range of UNICOM voice transmissions is approximately 30 nm.~~

Transmissions on the ~~UNICOM~~ advisory frequency must be limited to those which are operationally necessary. 'Blind' transmissions should be kept short, and contain:

- The name of the airfield the aircraft is operating from or to
- The aircraft callsign
- The pilot's intentions
- End with the name of the airfield the aircraft is operating from to to

For example: "Heathrow traffic, Speedbird 123, taking off runway 27L, Heathrow".

Where the Captain is certain there is no other traffic to affect operations 'blind' ~~UNICOM~~ transmissions may be omitted.

Where co-ordination with other aircraft is necessary this should be kept as brief and unambiguous as possible.

Pilots are reminded that not all other aircraft will be monitoring or transmitting ~~on UNICOM~~on the advisory frequency. A sharp visual and TCAS lookout is therefore essential and, in conjunction with the right-of-way rules, remains the foremost means of collision avoidance.

Likewise, pilots are reminded that the blind transmission of intentions ~~on UNICOM~~ does not confer any particular priority or right of way or obligate other aircraft to give way.

Pilots must not engage in non-operational conversations or arguments on the ~~UNICOM~~ advisory frequency.

Met Information – Air to Ground – AIREP

Position reports to ATC should be followed by an AIREP message according to the following rules:

Europe – not required.

Outside Europe on established airways – report at points marked "M" on Radio Navigation Charts and "AIREP" on the Operational Flight Plan.

On the North Atlantic Track System – report, **only if requested**, for the reporting point and the midpoint. The midpoint observation should retained for transmission with the report at the next reporting point.

On Atlantic routes which are not on the NAT system – report at each Oceanic Reporting Point (only if requested).

In order to minimise workload on short sectors AIREPS need not be made if flight duration is less than 2 hours or if the aircraft is within 1 hour of landing.

AIREPs should contain – Position, Flight Level, Temperature, Wind Velocity and, if applicable, Significant Weather as required in an AIREP Special.

AIREP Special

An AIREP Special should be made to ATC during, or as soon after the occurrence as possible if any of the Sigmet conditions listed in Section 5 are encountered. If the condition persists then routine AIREPs should contain a reference to the condition.

R/T Callsigns

In communications with ATC, R/T callsigns must always be given in full, including the designator "SPEEDBIRD" except in the case where the aircraft registration is used where this may be abbreviated after initial contact. e.g. Callsign "G-BNLL" can be abbreviated to "G-LL"; Callsign "SPEEDBIRD G-BNLL" can be abbreviated to "SPEEDBIRD LL". The three letter designator BAW is used in ATC flight plans, e.g. "BAW11M" is spoken as "Speedbird 1 1 Mike".

Aircraft operating British Airways Shuttle will use the three letter designator SHT, spoken as "Shuttle" ~~followed by the callsign~~ e.g. "SHT-6J" becomes "Shuttle 6 Juliet".

Aircraft operating BA Euroflyer will use the three letter designator EFW spoken as "Griffin", e.g. "EFW8SM" is spoken as "Griffin 8 Sierra Mike".

Aircraft operating BA CityFlyer will use the three letter designator CFE, spoken as "Flyer", e.g. "CFE35E" is spoken as "Flyer 3 5 Echo".

The Simbrief ~~CIRRUS~~Operational Flight Plan ~~flight plan document~~ should contain the callsign to be used.

Avoidance of Confusion

In order to reduce the potential confusion associated with similar flight numbers, it is BAV policy to use ATC callsigns which may differ from the published flight number. Alpha-numeric callsigns are used extensively on Shuttle, Domestic and selected European flights.

In some cases on long-haul flights, a callsign using the 9000 series or alpha-numeric may be allocated, providing overflight clearances are not compromised.

Prior coordination with ATC authorities and relevant stations ensures acceptance of a callsign not directly related to flight numbers.

Care must be taken that ATC instructions intended for another aircraft are not accepted due to nearly similar flight numbers or omission of the airline designator by the ground station.

If the Captain becomes aware that there is a risk of their flight number callsign becoming confused with that of another aircraft, he must request permission from ATC to change to their aircraft registration letters preceded by “SPEEDBIRD”, “GRIFFIN” or “FLYER” as appropriate.

Performance Based Navigation (RNAV) Operations

~~*General*~~

~~Where flight in RNP airspace is to take place the aircraft navigation system must be serviceable and operating to the required level of accuracy and integrity.~~

~~When referring to 'RNP-X', 'X' is the navigation accuracy expressed in NM. The aircraft's true position must remain within this radius of the required position with a probability of at least 95%. An RNP value may be associated with:~~

- ~~A class of airspace~~
- ~~A route~~
- ~~A SID or STAR~~
- ~~An RNAV approach or missed approach procedure~~

~~Depending on the RNP value and airspace environment (e.g. ground-based navaid availability), different navigation equipment or specific authorisation may be necessary.~~

~~*RNP Capability*~~

~~In order to achieve a given RNP value, the FMS estimated position accuracy (ANP) must be equal to or less than the RNP value. The ANP value is dependent upon the equipment or sensors feeding information to the FMS (e.g. GPS, DME/DME, VOR/DME or IRS).~~

~~FMS CDU/MCDUs will normally have a display of both the current ANP and the required RNP. The RNP may be a default value, drawn from the navigation database or manually entered.~~

Aircraft shall only be operated in designated airspace, on routes or in accordance with procedures where performance-based navigation (PBN) specifications are established if the aircraft are technically capable of such operations and the flight crew members each hold a PBN endorsement to the Instrument Rating.

Specific approval is required to conduct RNP AR Approach operations. BAVirtual aircraft are authorised for the following PBN Operations:

PBN Navigation Specification	Airbus Single Aisle	A380	A350	B777	B787	E190
RNAV/RNP-10	Yes	Yes	Yes	Yes	Yes	Yes
RNAV-5	Yes					
RNP 4	No					No
RNP 2	Yes					
RNAV 1 (P-RNAV)						Yes
RNP 1						
RF LEGS *(Note 2)*						
RNP APCH (LNAV/VNAV)						
RNP APCH LPV/LP	Not approved		Yes	Not approved		Not approved

RNP AR APCH	Yes *(Note 1)*	Not approved	Yes	Not approved	Yes
GLS *(Note 3)*	Not approved				Yes

Note 1: Only A320neo and A321neo aircraft with RNP AR certification as detailed in FCOM-PRO-LIM Auto Flight System-Flight Management Function can execute an RNP AR Approach.

Note 2: Except when a fleet is authorised to conduct RNP AR operations, RF legs may only be flown on SIDs and STARs, the initial and intermediate segments of an instrument approach, RNAV Visual, Visual with Prescribed Track and Circling with Prescribed Track operations (when coded in the FMS) and the final segment of a missed approach (that segment when 50 m [164 ft] obstacle clearance can be achieved and maintained).

Note 3: GLS approaches are only permitted to CAT I minima, followed by manual landing.

Identification of Approved PBN Approach Procedures

In 2015 ICAO published Circular 336, which is a new protocol for the naming of RNAV final approach procedures. In accordance with the general move away from the older term 'RNAV' to the newer concept of Performance Based Navigation, a final approach designed to be flown using RNAV techniques will be referred to as an RNP approach. However, there remains doubt about global implementation of the Circular and therefore it is likely that pilots will encounter a variety of terms for RNP approaches.

Common terms which may be used to label an approved RNP approach are:

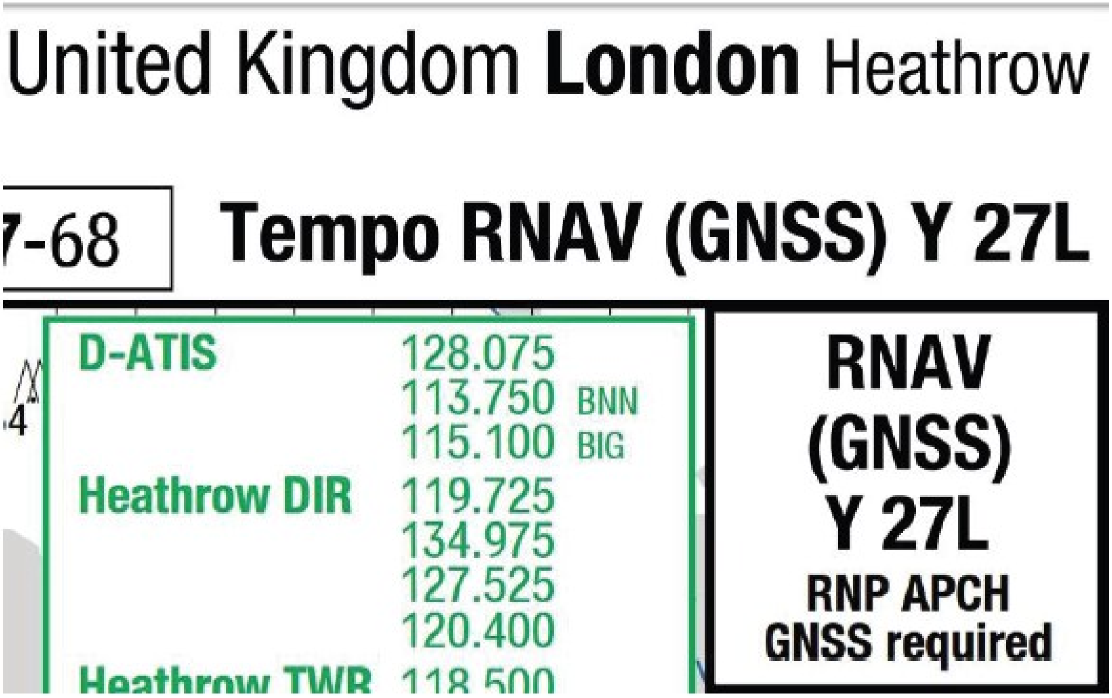
- RNAV (GNSS)
- RNAV (GPS)
- RNP
- GLS (approved fleets only)

Approved minima for RNP approaches may be titled RNAV GNSS, RNAV GPS or RNP followed by:

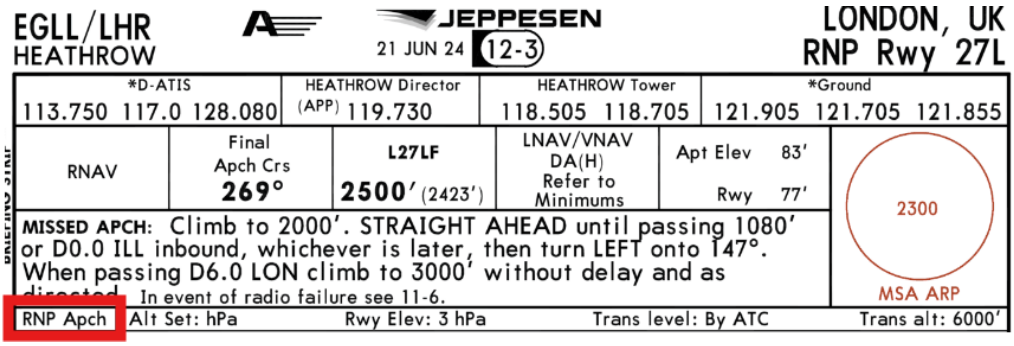
- LNAV, or
- LNAV/VNAV, or
- VNAV, or
- LPV*, or
- LP*

(*Approved fleets only)

In each case, the title of the navigation specification box in the top-right corner of LIDO IACs should contain the designation RNP APCH, for example:



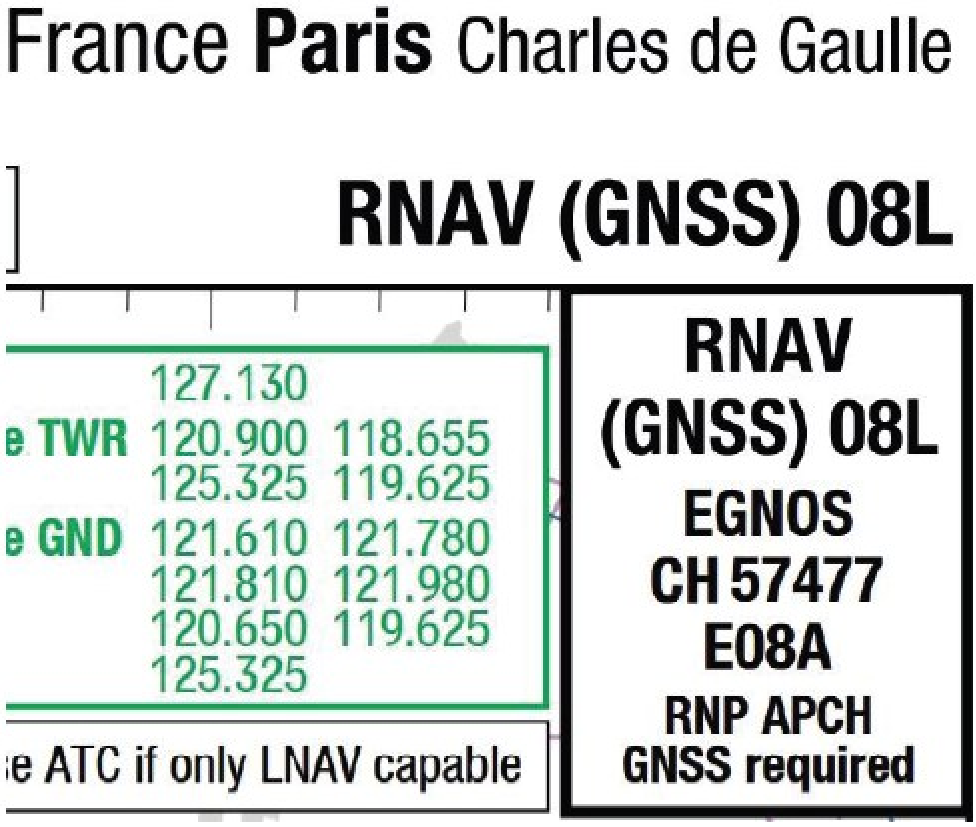
Jeppesen (Navigraph) charts have this information in the Briefing Strip:



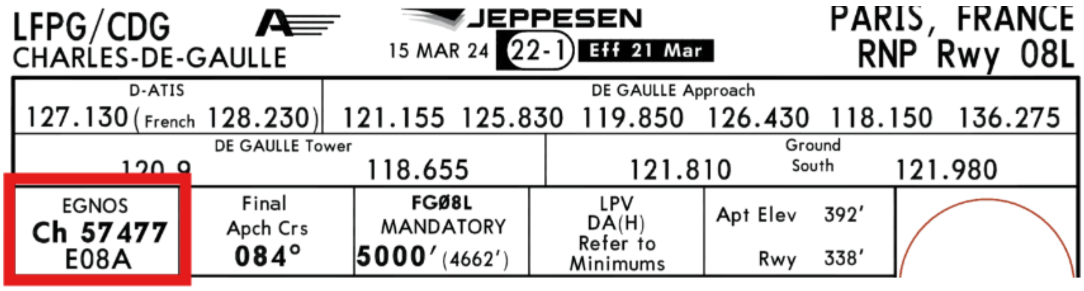
Identification of PBN Approach procedures using SBAS

Some RNP approaches (especially in the USA and France) have both conventional minima and minima predicated on the use of Satellite-Based Augmentation of the accuracy of the GPS.

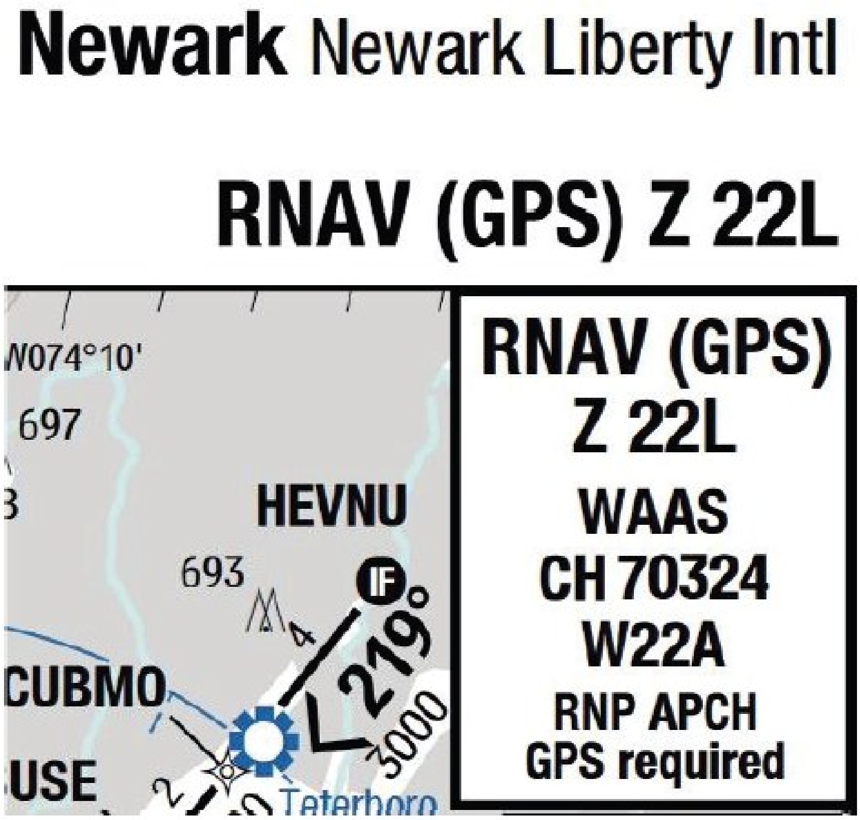
The Navigation Specification box on the relevant LIDO IAC will contain information about the SBAS constellation which is used to support LPV or LP minima. For example:



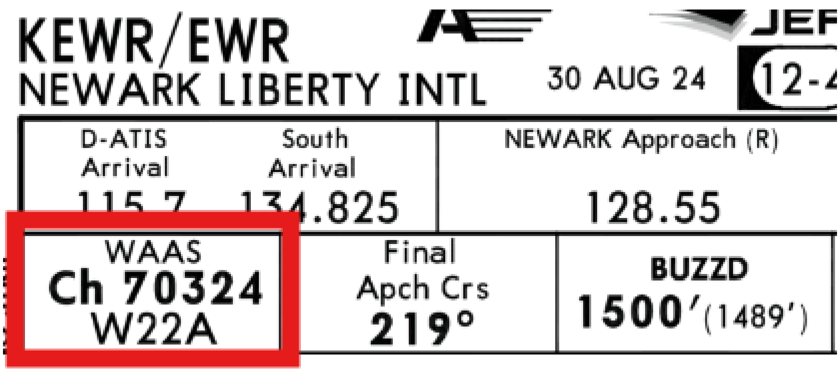
Again, the equivalent information on Navigraph charts is found in the Briefing Strip:



The above examples relate to the European Geostationary Navigation Overlay Service; the USA's Wide Area Augmentation System is shown similarly:



(LIDO)



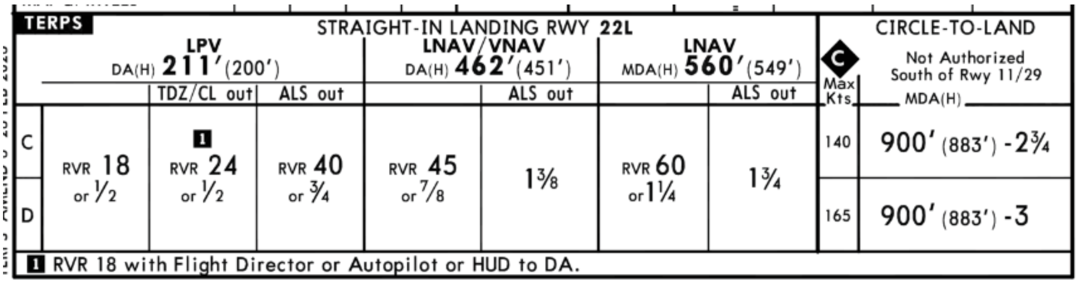
(Navigraph/Jeppsen)

Approaches with LPV (or LP) minima will generally also have LNAV and/or VNAV minima. The SBAS information applies only to LPV/LP minima and does not affect the ability to fly to LNAV or VNAV minima. Considering the approach to EWR 22L, the minima box shows:

22L TERPS		RNAV GPS LPV	RNAV GPS VNAV 1)	RNAV GPS VNAV APL U/S 1)	RNAV GPS LNAV		Circling 2) New TERPS
C	ft - ft/SM ft	200 - 2400R/0.5V 220	420 - 5000R/1.0V 430	420 - 1.38V 430	530 - 5500R/1.0V 540		890 - 2.75V 900
D	ft - ft/SM ft	200 - 2400R/0.5V 220	420 - 5000R/1.0V 430	420 - 1.38V 430	530 - 5500R/1.0V 540		890 - 3.0V 900

1) Uncompensated BARO VNAV NA below -13°C (9°F) or above 54°C (130°F)
2) To RWY 29 HJ only

(LIDO)

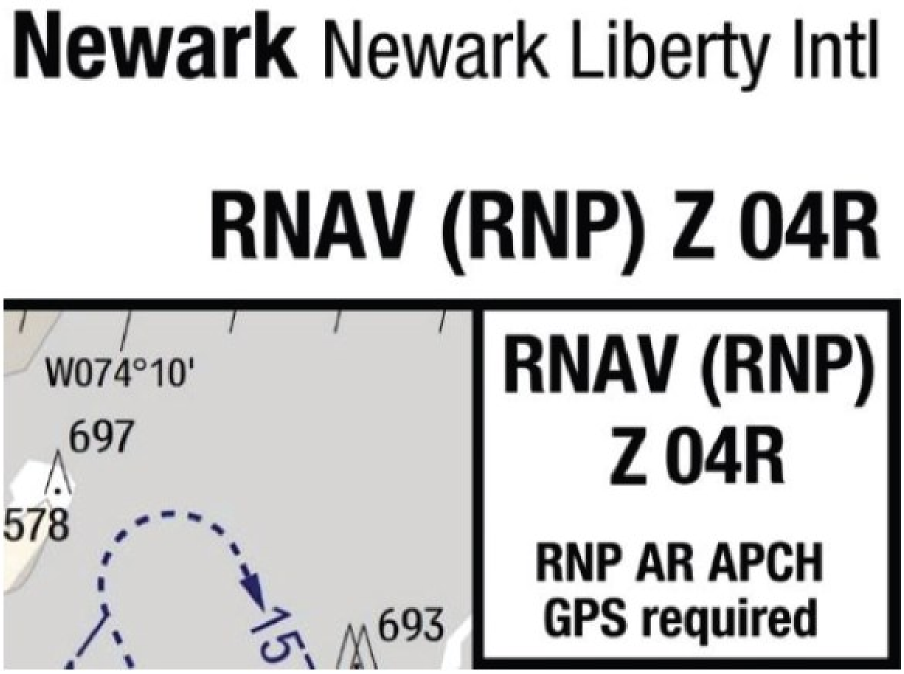


(Navigraph/Jeppsen)

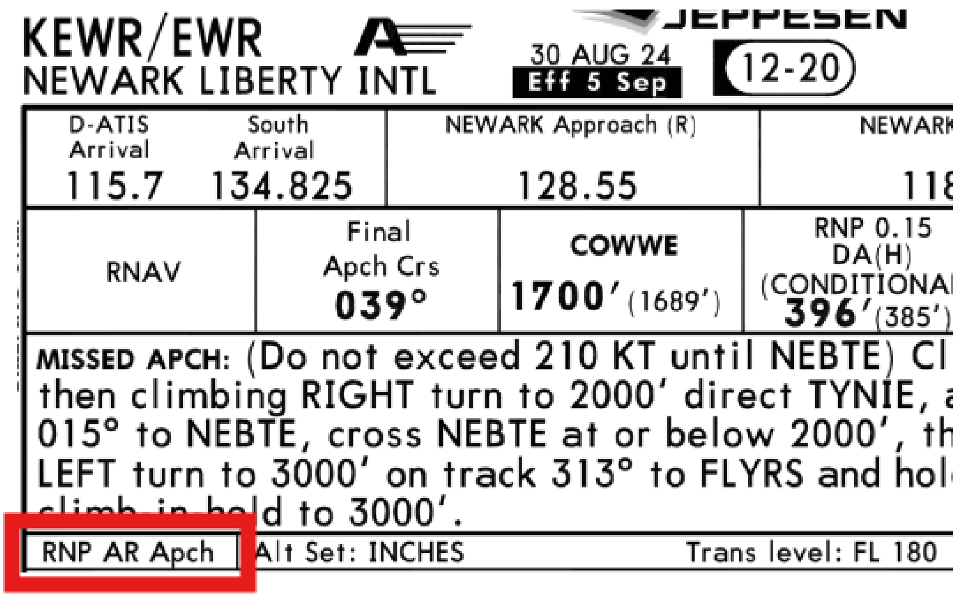
Of those, the LPV minima may only be used by specifically-authorised fleets; VNAV and LNAV minima may be used as normal.

Identification of RNP (AR) Approaches

RNP (AR) approaches may be identified in two ways. Firstly, an approach chart for an RNP (AR) approach may have the letters AR or RNP in brackets at the end of the relevant chart name, in IAC section of the charts list. Seocndly, the chart itself will either contain a note saying 'authorisation required' or will be labelled 'RNP AR APCH' in the navigation specification box at the top right of LIDO IACs, or in the Briefing Strip for Jeppsen/Navigraph IACs. For example:



(LIDO)



(Jeppesen/Navigraph)

RNP (AR) Approaches are only authorised for use in accordance with the table above.

Identification of Approved Procedures using RF Legs

The authorisation to fly procedures using RF legs is mainly designed to be of benefit when flying SIDs and STARs, as well as RNAV Visual, Visual with Prescribed Track and Circling with Prescribed Track operations. See below for related operating procedures. Examples of approved procedures which use RF legs are (as of January 2025) certain SIDs from 25L/R at Hong Kong and the VEBIT 2K SID from Runway 34 at Zurich. In each case the relevant chart will contain a note which states 'RF Required'. Crew should be aware than an RNP Approach procedure which requires the use of RF legs is very likely to be an RNP (AR) approach; such approaches are only authorised for use in accordance with the table above.

Performance Based Navigation – General

There are two types of navigation specification: Area Navigation (RNAV) and Required Navigation Performance (RNP). The specifications are similar, but the key difference is that a specification which includes a requirement to have an on-board performance monitoring and alerting system is referred to as an RNP specification, whereas RNAV specifications do not have such requirements. The performance monitoring and alerting system monitors system performance and alerts the flight crew when the RNP parameters are not met, or cannot be guaranteed with a sufficient level of integrity.

RNAV and RNP functioning is expressed by the Total System Error (TSE). This is the deviation of the aircraft's true position from the nominal or desired position, measured in nautical miles. The TSE should remain equal or less than the required accuracy expected to be achieved at least 95% of the flight time by the population of aircraft operating within the airspace, route or procedure.

RNP Capability

In order to achieve a given RNP value, the FMS-estimated position accuracy (also called Estimated Position Error) must be smaller, i.e. more accurate, than the RNP value. Obviously this is dependent on the navigation sensor or sensors feeding positional information to the FMS (GPS, DME/DME, VOR/DME or IRS).

On the FMS CDU/MCDU, the required and estimated position accuracy are displayed. The required accuracy can be a default value, which is either a function of the flight phase or a value taken from the navigation database associated with a loaded procedure, or a value entered manually by the flight crew.

Definitions

Accuracy
In the context of PBN operations, the degree of conformance between the estimated, measured or desired position and/or the velocity of a platform at a given time, and its true position or velocity. Navigation performance accuracy is usually presented as a statistical measure of system error and is specified as predictable, repeatable and relative.

Aircraft-Based Augmentation System (ABAS)
A system that augments and/or integrates the information obtained from the other GNSS elements with information available on board the aircraft. The most common form of ABAS is Receiver Autonomous Integrity Monitoring (RAIM).

ANP
Actual Navigational Performance

Area Navigation (RNAV)
~~Short for "Area Navigation".~~ A method of navigating which allows operation on any desired flight path using self-contained or ground based aids, or a combination thereof. Also refers to terminology used to define minima for final approaches flown without reference to ground-based navaids.

Availability
In the context of PBN operations, an indication of the ability of the system to provide usable service within the specified coverage area and is defined as the portion of time during which the system is to be used for navigation during which reliable navigation information is presented to the crew, autopilot or other system managing the flight of the aircraft.

Coding
The information contained within the FMS which determines flight path and trajectory control in the Final Approach.

Instrument Approach Operation
An approach and landing using instruments for navigation guidance based on an instrument approach procedure. There are two methods for executing instrument approach operations:

- A two-dimensional (2D) instrument approach operation, using lateral navigation guidance only
- A three-dimensional (3D) instrument approach operation, using both lateral and vertical navigation guidance

Note: Lateral and vertical navigation guidance refers to the guidance provided either by:

- A ground-based radio navigation aid; or
- Computer-generated navigation data from ground-based, space-based, self-contained navigation aids or a combination of these.

Localiser Performance (LP) and Localiser Performance with Vertical Guidance (LPV)
Minima available when an RNP APCH procedure is flown using guidance augmented by SBAS.

PBN

Performance Based Navigation. The general concept of ensuring with >95% certainty that a navigation system is capable of accuracy within a specified value.

Overlay
An approach which is defined conventionally using ground-based navaids but flown using LNAV. BA aircraft may fly overlay approaches as detailed in fleet-specific manuals.

Performance-Based Navigation (PBN)
Performance Based Navigation. The general concept of ensuring with >95% certainty that a navigation system is capable of accuracy within a specified value.

RNAV
Short for "Area Navigation". A method of navigating which allows operation on any desired flight path using self-contained or ground based aids, or a combination thereof. Also refers to terminology used to define minima for final approaches flown without reference to ground-based navaids.

Receiver Autonomous Integrity Monitoring (RAIM)
A technique whereby a GNSS receiver/processor determines the integrity of the GNSS navigation signals. RAIM detects faults with the redundant GNSS-range measurements. That is, when more satellites are available than needed to produce a position fix, the exta range measurements should all be consistent with the computed position. A range measurement which differs significantly from the expected value (an outlier) may indicate a fault with the associated satellite or another signal integrity problem (e.g. ionospheric dispersion). Traditional RAIM uses fault detection only, but newer GNSS receivers incorporate fault detection and exclusion which enables them to continue to operate in the event of a GNSS failure.

BAVirtual approval for RNP AR APCH operations requires specific assessment of RAIM availability at every airfield where such approaches are authorised. For other PBN operations (e.g. RNP APCH, RNP 1, RNP 2 etc) flight crew may assume that RAIM prediction is satisfactory unless information is received to the contrary. RAIM prediction will be provided via the Brief or technical handout.

In the event that a RAIM outage of 5 minutes or more is predicted, crew may not fly any part of an approach procedure (RNP APCH or RNP AR APCH) – from the Initial Approach Fix to the end of the Missed Approach - during that outage time.

RNP
Required Navigational Performance

ANP
Actual Navigational Performance

RNP AR APCH
RNP Authorisation Required Approach. Such approaches require individual approval before crews may fly them. Each operator and each individual approach is specifically authorised. Such approaches may include low RNP flight segments (<0.3), use of curved (RF) legs, and managed track keeping accuracy during the go-around phase (e.g. TOGA to LNAV). Where BA have specific approval to fly a procedure this will be noted in the OM C or on the Planning Portal.

Coding
The information contained within the FMS which determines flight path and trajectory control in the Final Approach.

~~**Database Validation**~~
~~A procedure for ensuring the accuracy of FMS data against a published procedure. The vertical and horizontal profile from the FMS is checked against the relevant chart. If the database profile does not match the chart (excepting small rounding errors) the approach may not be flown. No manual modification of the data is permitted.~~

B-RNAV (RNAV 5)
A navigation specification used in the UK, Europe and Middle East. Applicable in the UK on all ATS routes and in certain European states above FL95. Requires ~~a track-keeping~~aircraft navigational accuracy ~~of at least~~to within 5 NM. The minimum equipment required is an FMS capable of RNAV 5 specification. The ICAO Navigation Specification RNAV 5 is identical to B-RNAV.

P-RNAV (RNAV 1)
A European navigation specification for SIDs, STARs and runway transitions requiring a track keeping accuracy of at least 1 NM. GPS updating is not required, but DME/DME and IRS are. P-RNAV terminates at the FAF. The ICAO Navigation Specification RNAV 1 is identical to P-RNAV for aircraft with radio (DME) updating and an underlying IRS.

Radius to Fix Legs
A Radius to Fix (RF) procedure provides a means of coding a fixed-radius curved path in a PBN procedure. The RF leg is defined by radius, arc length and fix. RNP systems supporting this leg type provide the same ability to confirm to track-keeping accuracy during the turn as in straight-line segments. Bank angle limits for different aircraft types and winds aloft are taken into account in procedure design. An RF leg provides a predictable and repeatable ground track during a turn and prevents to dispersion of tracks experienced in other types of turn construction (owing to varying aircraft speeds, turn anticipation, bank, roll rate etc). Therefore, RF legs can be employed where a specified path must be flown during a turn.

BAVirtual aircraft authorised to fly RF legs may fly procedures which use them in the initial and intermediate segments of an instrument approach, RNAV Visual, Visual with Prescribed Track and Circling with Prescribed Track operations (when coded in the FMS), the final phase of the missed approach, SIDs and STARs. However, if an RF leg is used in the final approach segment of an instrument approach, or the initial or intermediate phases of a missed approach, the relevant procedure would be designated as RNP AR; only aircraft which are authorised to fly RNP AR approaches may use those procedures.

RNP 10
An Oceanic or remote area en-route RNAV specification which requires an accuracy of at least 10 NM without regular updates from ground-based navaids and which can support 50 NM track-spacing. Although RNAV 10 airspace is, for historical reasons, also called RNP 10 airspace, there is no requirement for on-board monitoring and alerting systems. RNP 10 approval is based upon IS performance. ~~At least two long range navigation systems are required and a limit of 5.9 hours between ground based navaid updates for IRS-based systems. If GPS is available there is no time limit between navaid updates.~~

RNP 10 navigation is unlimited in time provided GPS updating is available to the FMS. Should GPS updating be unavailable, RNP 10 navigation is limited to 6.2 hours from the time the FMS is placed in the 'Navigation' Mode unless the aircraft enters an area where radio updating is available. Should radio updating be discontinued, the aircraft can continue RNP 10 operations for a maximum of 5.9 hours following loss of DME/DME radio updating, or a maximum of 5.7 hours following the loss of VOR/DME updating.

For aircraft to operate in RNP 10 airspace a minimum of two independent long-range navigation systems based on GPS and/or IRS sensor information are required to be fitted.

RNP 4
~~An en-route RNAV specification requiring an accuracy of at least 4 NM without reference to ground based navaids. At least two separate long range navigation systems are required and there must be an alerting function to let the flight crew know if the accuracy falls out of limits. ADS or CPDLC surveillance from Air Traffic Control is also required.~~RNP4 is an en-route airspace specification which does not require any ground-based navaid infrastructure. For RNP 4 operations in oceanic or remote airspace, at least two fully-serviceable independent long-range navigation systems (LRNSs) must be

fitted to the aircraft, with integrity such that the navigation system does not provide misleading information. GNSS must be used, and can be used either as a standalone navigation system or as one of the sensors in a multi-sensor system. During operations in airspace or on routes designated as RNP 4, the lateral total system error must be within ±4 NM for at least 95% of the total flight time. Unlike the case of RNP 10 (where no ATS surveillance service is required), in the case of RNP 4, ADS contract (ADS-C or CPDLC) is used.

For RNP 4, at least two LRNSs capable of navigating to RNP 4 and listed in the FCOM or QRH Operational Information section, should be operational at the point of entry of the RNP 4 airspace. If an item of equipment required for RNP 4 operations is unserviceable, the flight crew may consider an alternative route or diversion. For multi-sensor systems, the FCOM may permit entry if one GNSS sensor is lost after departure, provided one GNSS and one inertial sensor remain available.

RNP 1

~~Similar to P-RNAV but requires GPS/GNSS as the primary navigation sensor.~~RNP 1 is a terminal airspace specification which may also be applied in the en-route phase. RNP 1 generally requires GNSS as the primary navigation sensor unless DME/DME is authorised by the state. It is designed to connect en-route airspace structure to instrument approaches (STARs and runway transitions) and for departures (SIDs). As in the cast of P-RNAV, RNP 1 terminates at the FAF. During operations in airspace or on routes designated as RNP 1, the lateral total system error must be within ±1 NM for at least 95% of the total flight time.

RNP 2

RNP 2 is primarily intended for a diverse set of en-route applications, particularly in geographic areas with little or no ground navaid infrastructure, limited or no ATS surveillance and low to medium density traffic. Use of RNP 2 in continental applications requires a lower continuity requirement than used in oceanic/remote applications. Duuring operations in airspace or on routes designated as RNP 2, the lateral total system error must be within ±2 NM for at least 95% of the total flight time.

RNP APCH

The ICAO term to describe RNAV (GNSS) approaches. The charting and avionics will retain the existing labels as a legacy to existing operations. However, the approach operations conform to RNP principles. Refers to any approach which relies solely on RNAV guidance. Such approaches require approval of the operator and crew training. The default RNP value for an RNP APCH is 0.3 NM.

RNP AR APCH

RNP Authorisation Required Approach. Such approaches require individual approval before crews may fly them. Each operator and each individual approach is specifically authorised. Such approach procedures may include low RNP flight segments (<0.3 NM), use of curved path transitions (RF) and managed track keeping accuracy during the go-around phase, e.g. TOGA to LNAV/NAV. Specific approval will be promulgated for each approach.

Vertical Navigation

A method of navigation which permits aircraft operation on a vertical flight path using altimetry sources, external flight path references or a combination of these.

Vertical Navigation (VNAV) Guidance System

A VNAV guidance system uses the aircraft's FMS to compute and display a vertically-guided path. That vertical path is neither computed by nor broadcast from ground-based navigation aids (as is the case with ILS). The altitude input to the system comes from either the aircraft's barometric altimeter (in which case it the system is referred to as Baro-VNAV) or GPS Geometric Altitude, for those aircraft fitted with SBAS receivers or GLS. The type of approach being flown will determine which altimetery source is used: plain RNAV/RNP approaches always use barometric altimetry, whereas approaches flown to LPV or LP minima (when authorised), and GLS approaches, use GPS Geometric Altitude. The altimetry source is automatically selected by the aeroplane depending on the type of approach being flown.

Some Baro-VNAV systems are able to make automatic compensation for temperature differences from ISA (e.g. Airbus FLS) and therefore any temperature limitations published on instrument approach charts for RNAV/RNP approaches do not apply. Other Baro-VNAV systems are unable to compensate for temperature variation (e.g. VNAV, FINAL APP, APP-DES) and therefore any published temperature limitations shown on instrument approach charts must be adhered to.

Within the text of OM A, the generic term “VNAV” is used to refer to the angular vertical guidance generated by an aircraft’s FMS and used to fly the vertical path of an RNAV or RNP approach (including approaches flown to LPV/LP minima, and GLS). The various modes and terminology are described in type-specific FCOMs.

Note: Use of AFDS vertical speed or flight path angle modes do not constitute VNAV guidance.

Flight Crew Procedures

- ***Integrity of the Database***

For RNAV 1, RNAV 2, RNP 1, RNP 2 and RNP APCH, the flight crew should neither insert nor modify waypoints by manual entry into a procedure (departure, arrival or approach) which has been retrieved from the database except as defined in **Error! Reference source not found.**. User-defined data for altitude/speed constraints may be inserted where those constraints are not included in the navigation database coding.

For RNP 4 operations, the flight crew should not modify waypoints which have been retrieved from the database. User-defined data (e.g. for un-named waypoints) may be entered and used.

The lateral and vertical definition of the flight path between the FAF and the Missed Approach Point (MAPt) retrieved from the database should not be modified by the crew.

- ***Modification of Flight Plan – RNP AR Approaches***

Flight crew are not authorised to fly a published RNP AR APCH procedure unless it is retrievable by the procedure name from the aircraft navigation database and it conforms to the charted procedure. The lateral path should not be modified; with the exception of accepting a clearance to go direct to a fix in the approach procedure which is before the FAF and does not immediately precede an RF leg. The only other acceptable modification to the loaded procedure is to change altitude and/or airspeed waypoint constraints on the initial, intermediate or missed approach segments flight plan fixes (e.g. to apply temperature corrections or comply with an ATC clearance/instruction).

- ***Modification of Waypoint Constraints***

Vertical and speed constraints may be modified either for the purposes of profile and energy management (e.g. to 'harden up' an 'at or above' constraint in a STAR to become an 'at' constraint) or in accordance with ATC instructions. Lateral path changes (e.g. a DIR TO) must be in accordance with ATC instructions. The insertion of new waypoints into a procedure, or the creation of a procedure using manual waypoint entry, is not permitted.

Consequently, if there is an 'at or above' altitude restriction before the FAF, it may be changed to an 'at' restriction using the same altitude. Speed modifications are permitted provided the maximum published speed is not exceeded. However, NO changes are permitted between the Final Approach Fix of any kind of RNP approach and the Missed Approach Point (inclusive).

Integrity of Database - RNAV and RNP SIDs

During pre-flight preparation:

- Confirm the waypoint sequence
- Ascertain which waypoints are FLY BY or OVERFLY and verify the ND track passes through any OVERFLY waypoints

When using an RNAV procedure in the TMA, the creation of new waypoints by manual entry in to the RNAV system by the flight crew is **not permitted.**

Use of DIR TO **is** permitted. However, when using DIR TO an OVERFLY waypoint the waypoint may change to a FLY BY waypoint. On certain procedures this may reduce terrain clearance or cause infringement of noise-sensitive areas.

Integrity of Database – RNAV and RNP STARs and Transitions

- Review the STAR and Transition loaded in to the FMS and crosscheck against the approach plate and ND

The coding of the vertical profile is designed, wherever possible, to achieve a continuous descent on a 3 degree gradient. However, the FMS descent profile must conform to the vertical constraints of the procedure.

Displays and Automation

For RNAV 1, RNP 1 and RNP APCH operations, the flight crew should use a lateral deviation indicator, where available, and flight director and/or autopilot in lateral navigation mode.

The appropriate display should be selected so that the following information can be monitored:

- The computed desired path
- Aircraft position relative to the lateral path (cross-track deviation) for FTE monitoring
- Aircraft position relative to the vertical path (for a 3D operation)

The flight crew of an aircraft with a lateral deviation indicator (e.g. CDI) should ensure that the lateral deviation indicator scaling is suitable for the navigation accuracy associated with the various segments of the procedure.

The flight crew should maintain procedure centrelines unless authorised to deviate by Air Traffic Control (ATC) or unless emergency conditions dictate.

Cross-track error/deviation should normally be limited to ±½ the RNAV/RNP value associated with the procedure. Brief deviations from this standard (e.g. overshoots or undershoots during and immediately after turns) up to a maximum of 1 x the RNAV/RNP value are allowable.

In the event of sustained cross-track error greater than ±½ the RNAV/RNP value associated with a procedure, and at any time if the cross-track error is greater than the procedure's RNAV/RNP value, the flight crew should discontinue the procedure; if flying an RNP APCH/RNP AR APCH, flight crew should execute a missed approach if the lateral deviation exceeds these criteria, unless the visual references required to continue the approach are in sight.

For a 3D approach operation, the flight crew should use a vertical deviation indicator and, where required by AFM limitations, a flight director or autopilot in vertical navigation mode.

Deviations below the vertical path should not exceed 75 ft at any time, or half-scale deflection where angular deviation is indicated, and not more than 75 ft above the vertical profile, or half-scale deflection where angular deviation is indicated, at or below 1,000 ft above aerodrome level. The flight crew should execute a missed approach if the vertical deviation exceeds this criterion unless the visual references required to continue the approach are in sight.

- ### *Operating Procedure for using RF Legs*

i. Crew should refer to the type-specific information in the relevant fleet's FCOM/FCTM
ii. Procedures with RF legs will be identified on the relevant charts
iii. The aircraft must be established on the procedure prior to beginning the RF leg – it is not permissible to perform a DIRECT TO the beginning of the RF leg
iv. The crew are expected to maintain the centreline of the desired path on RF legs. For normal operations, the cross-track error/deviation should be limited to half the navigation accuracy associated with the procedure (e.g. 0.5 NM for RNP 1)

v. If an aircraft system failure results in the loss of capability to follow an RF turn, the PF should maintain the current bank angle and roll out on the charted RF exit course. The crew should advise ATC of the system failure as soon as possible

vi. When initiating a missed approach operation during or shortly after the RF leg, the crew should be aware of the importance of maintaining the published path as closely as possible

vii. The crew must not exceed the maximum airspeed values shown in the table below throughout the RF leg. A missed approach operation prior to DA/H may require compliance with speed limitation for that segment.

Indicated Airspeed (Knots)					
Segment	Indicated Airspeed by Aircraft Category				
	Cat A	Cat B	Cat C	Cat D	Cat E
Initial and Intermediate (IAF to FAF)	150	180	240	250	250
Final (FAF to DA)	100	130	160	185	As specified
Missed approach (DA/H to Missed Approach Holding Procedure)	110	150	240	265	As specified
Airspeed restriction*	As specified				

*Airspeed restrictions may be used to reduce turn radius regardless of aircraft category

○ *Operating Procedure for RNP AR Approaches*

Prior to conducting an RNP AR approach, the Commander must satisfy themselves that the following requirements have been met:

i. Both pilots are qualified to conduct RNP AR operations

ii. The RNP AR approach has been authorised for BAV operations. Refer to the RNP AR authorisation table published in the BAV Forum. Crew should check the desired runway is specifically approved in the RNP AR table. If an RNP AR approval is not present in the BAV Forum, RNP AR approaches are not approved for that airfield.

iii. Any procedure-specific training requirements for an individual RNP AR approach have been completed by both pilots.

In addition to the general requirements for RNP APC – Alerting and Abort (see below), the following operating requirements and procedures must be adhered to prior to and during an RNP AR Approach:

iv. EGPWS/TAWS must be serviceable prior to commencing the approach

v. The Navigation Database must be current

vi. If GPS RFI effects are present, an RNP AR approach should not be conducted. Crews should refer to fleet-specific guidance for further information.

○ *RNAV (Visual) Procedures*

This policy applies to procedures which are titled:

- RNAV (Visual)

- Visual with Prescribed Tracks
- XXX *(Procedure Name)* with Prescribed Tracks (e.g. JFK VOR 13L Good Weather)

In order to aid flight crew to conduct approach operations to airfields which may have challenging terrain or other operational constraints, Flight Operations has started to commission a number of purpose-designed procedures which code visual approaches, or the visual segment of circling approaches, as 'RNAV' (strictly PBN) procedures. Some examples of these include the RNAV Visual to Runway 09 at Gibraltar, or the RNAV Visual to Runway 29 at Dubrovnik, both of which are based upon the corresponding RNP (AR) procedures. Since these are custom procedures not all are available in the Navigraph database which is comprised only of publicly available procedures. Where such a procedure is based upon an existing public RNP approach the corresponding public procedure from the Navigraph database can be used.

Regardless of whether an official RNAV Visual approach which is publicly available is being flown, or whether a public RNP AR approach from Navigraph is being used in lieu of a corresponding visual procedure used by BA, important points to note are:

- On true RNAV Visual charts the visual part of the procedure should be depicted with a series of arrows instead of solid lines
- The visual segment will be coded from a specific point, which may or may not be the missed approach point of the preceding instrument approach, to the runway; therefore a guided missed approach may not be available
- Although the procedure will be <u>coded</u> (and, given the constraints of Navigraph, possibly <u>titled)</u> as an RNP approach within the FMS (and flight crew will be expected to use fleet-specific PBN procedures to fly such approaches), it is a <u>visual approach</u>; therefore terrain-clearance is assured by flying the procedure in VMC
- The visual part of the procedure may contain RF legs: this does not breach policy concerning RNP AR approaches because the procedure is a <u>visual approach</u> (as opposed to an instrument approach) and will be <u>flown in VMC</u>.
- Any specific training or recency requirements will be included in the relevant aerodrome briefing in OM C
- Weather minima for conducting such approaches are as detailed in <u>Visual Flight Manoeuvres</u>

LNAV or VNAV Minima

If both LNAV and VNAV minima are available for an RNP APCH, flight crew should use fleet-specific procedures and fly to the lower minima.

Note: If flying to VNAV minima, VNAV must be used – it is not permissible to use VNAV minima whilst controlling the vertical path using V/S or Flight Path Angle.

In adopting this philosophy, flight crew should be aware that an approach with VNAV minima is designed as an Approach with Vertical Guidance, with a DA; whereas an approach with LNAV minima is designed as a Non-Precision Approach with an MDA. However, both can be flown as 3D approach operations. Moreover, BAVirtual's policy is to treat an MDA as a DA (see 0 above); therefore providing normal procedures are used – specifically that a go around is executed promptly at DA so as to minimise height-loss during the manoeuvre – there is no degradation of safety.

Temperature Corrections on PBN Procedures

All (RNAV/RNP) procedures: Vertical revisions to the active FMS route in order to correct for temperature MUST NOT be made. Where a temperature limitation (i.e. a minimum and/or maximum temperature) is published, this refers to the surface temperature at the airfield.

Note: P-RNAV SIDs are not subject to temperature limitations.

Where temperature limitations are published on RNAV (RNP) Approach charts they must be observed; if no minimum temperature is published crew should assume a minimum of ISA -25°C. Overlay Approaches, or RNAV approaches designed only with LNAV minima, do not have a minimum temperature published on the approach chart; however a generic minimum of ISA -25°C should be applied if VNAV is to be used. Below this temperature, revert to lateral-only guidance and use of FPA or V/S.

Note: There is no prohibition on the use of LNAV/NAV to fly the lateral portion of an RNAV approach whatever the temperature.

Some aircraft types have the ability to compensate for temperature-differences from ISA automatically when flying RNAV/RNP approaches (e.g. the FLS function on the A320neo, A350 and A380). When an RNAV/RNP approach is flown using the equipment and procedures which compensate for temperatures below ISA, the minimum temperature published on the relevant instrument approach chart is not applicable, and VNAV minima can be used. Likewise, LPV and LP minima can be used at any temperature. See fleet-specific FCOMs for fleet-specific procedures.

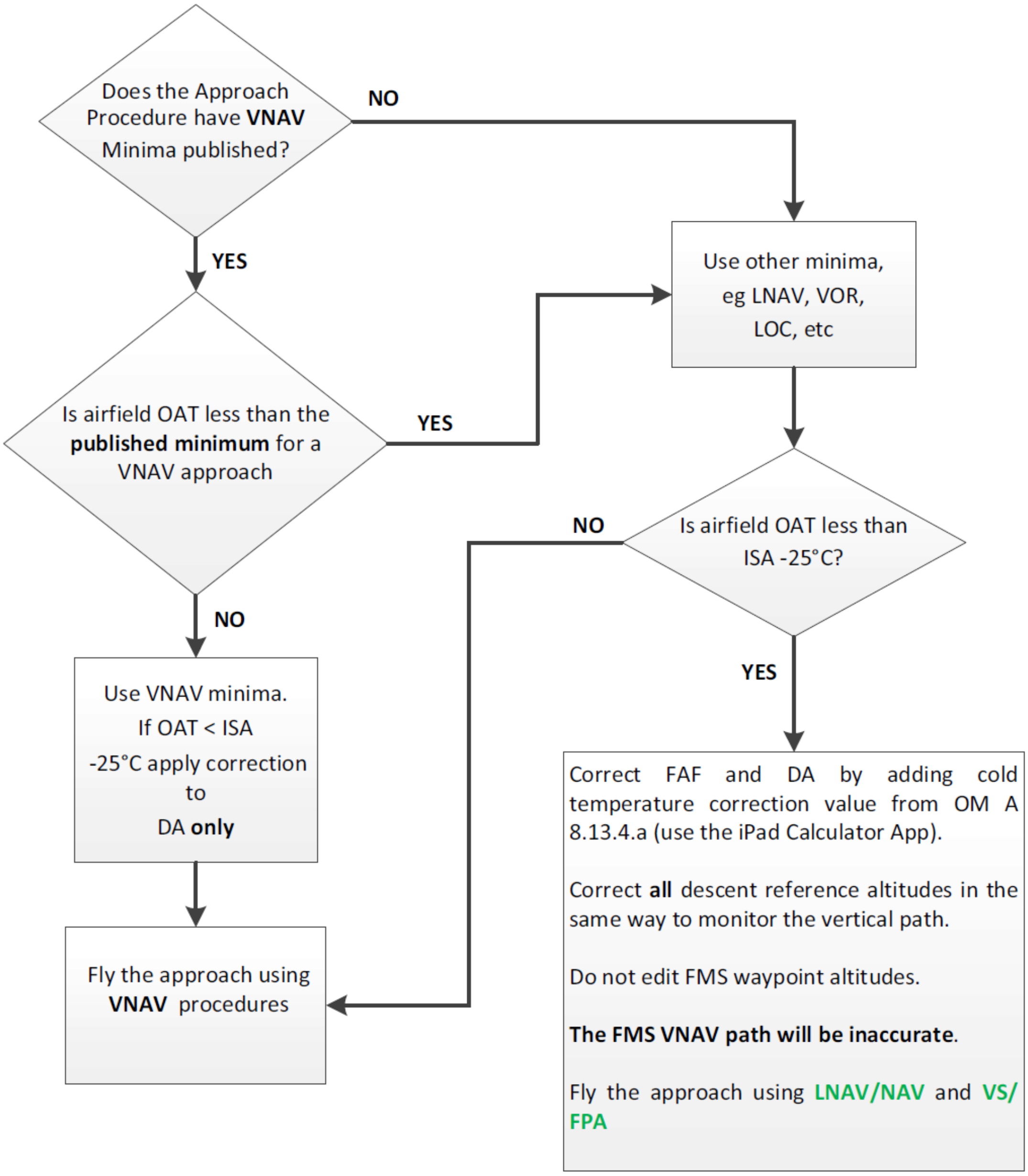
The automatic temperature-compensation systems fitted to BAVirtual aircraft only correct for temperature devisations below ISA, so as to minimise the risk of CFIT. They do not correct for temperatures above ISA. Therefore, any maximum temperature limitations published on PBN approach charts must be observed.

Some airfields publish a minimum temperature associated with VNAV minima which is above ISA -25°C; for example, the RNP APCH procedures at DXB all assume a minimum temperature for VNAV of 5 degrees Celsius (ISA -10°C). If that is the case, and the temperature at the airfield is less than the minimum on the chart, flight crew should revert to using LNAV minima for the approach.

However, given that LNAV minima are produced using conventional non-precision approach design criteria – with no minimum temperature assumed – flight crew may fly to the LNAV minima using fleet-specific VNAV procedures, until the temperature falls below ISA -25°C.

The rationale behind this policy is that use of a vertical-navigation mode to fly the final segment of an RNP APCH, or a conventional non-precision approach flown as a database/overlay approach (when no minimum temperature is stipulated) is acceptable without correction down to ISA -25°C.

The following flow chart explains the policy, if intending to use VNAV minima in cold conditions.



Contingency Procedures

Flight crew should make the necessary preparation to revert to a conventional arrival procedure where appropriate. The following conditions should be considered:

- Failure of the navigation system components including navigation sensors, and a failure affecting flight technical error (e.g. failures of the flight director or autopilot)
- Multiple system failures affecting aircraft performance
- Coasting on inertial sensors beyond a specified time limit, and
- RAIM (or equivalent) alert or loss of integrity function

In the event of loss of PBN capability, flight crew should invoke contingency procedures and navigate using an alternative means of navigation. Flight crew should notify ATC of any problem with PBN capability. In the event of communication failure, flight crew should continue with the operation in accordance with published lost communication procedures.

~~o~~ *Take-off Position Update*

If runway position update fails to take place and the aircraft position is significantly in error it may not be possible to fly a SID accurately.

- Manual intervention may be required
- Inform ATC when airborne
- Follow ATC instructions or continue on the SID using conventional navigation aids where possible

The RNAV procedure may be rejoined once radio updating or GPS coverage is re-established.

An RNP SID may not be commenced if there are any ECAM/EICAS warnings that navigation accuracy is downgraded (e.g. Unable RNP, GPS Primary Lost, NAV ACCY downgrade etc).

~~o~~ *Altimeter Setting*

For RNP APCH operations, the vertical path of the approach is calculated with reference to the aerodrome QNH. It is, therefore, imperative that the QNH is set before the final approach is commenced.

ATC may provide QNH when giving clearance below transition level, but not in all circumstances. For example, the prompt to change from STD pressure setting to QNH may occur when the aircraft passes a geographical position or other constraint represented on the approach plate, and not by ATC instruction. The QNH setting requirement should be included in the approach brief and crew must be aware of the risks of distraction. At the appropriate time, the PF will then initiate the change to QNH.

Refer to 0 above for further guidance on the altimeter setting procedures applicable in such circumstances.

The flight crew should complete an altimetry cross-check ensuring both pilots' altimeters agree within ±100 ft prior to the FAF but no earlier than when the altimeters are set for the aerodrome of intended landing. If the alimetry cross-check fails, the approach operation should not be continued.

Especially when conducting RNP APCH operations, the cross-check of altitude at the Final Approach Fix is particularly important to ensure that the correct vertical profile is being flown.

When flying the final approach using VNAV, there is no regulatory requirement to cross-check distance from the runway with altitude. The pre-approach check of the database coding, check of altitude at the Final Approach Fix, and adherence to the calculated vertical path will assure the approach profile is correct.

~~The published minimum temperature for an RNAV/RNP procedure refers to the surface temperature at the airfield.~~

~~P-RNAV SIDs are not subject to a minimum temperature.~~

~~Where minimum temperatures are published on RNAV Approach charts they must be observed.~~

~~Overlay approaches do not have a minimum temperature but a generic minimum of -10°C should be applied for the use of VNAV/FINAL APP. Below this temperature revert to lateral-only guidance and use of FPA or V/S.~~

PBN Operations With Specified Minimum Navigation Performance

Before entering Scheduled Navigation Areas or before conducting P-RNAV or RNP operations, the crew must verify that the RNAV system equipment is serviceable. For non-GPS aircraft operating outside ground-based navaid coverage (e.g. MNPS Operations over the North Atlantic), the system is operational if there are no warnings apart from an anticipated 'IRS NAV ONLY' warning (fleet specific).

The RNAV STAR and RNAV transition provide a vertical and lateral flight profile terminating at a defined Final Approach Fix. At the FAF the aircraft may continue on an RNP APCH (if approved) or establish on a conventional approach procedure (e.g. ILS). Where an approach plate states that Dual RNAV systems are required, two independent FMS, an A/P or F/D and two sensors (either two GPS and/or two DME and/or two VOR) must be serviceable.

RNAV Substitution

RNAV Substitution is a navigation technique that allows procedures based on conventional navaids to be flown using a coded procedure from the FMS without reference to, or in the absence of, those navaids.

Provided that:

i. The aircraft is capable of at least RNAV 1 performance;
ii. The flight crew are qualified for PBN operations;
iii. The coded overlay procedure is selected from the FMS navigation database and flown in a managed lateral mode (e.g. LNAV or NAV modes);
iv. Normal procedures associated with PBN Operations are used (refer to 0 above)

Then the following operations are permitted by way of RNAV Substitution:

i. Navigation to/from a VOR or NDB;
ii. Holding over a VOR, NDB or DME fix;
iii. Flying a DME arc;
iv. Using a coded procedure selected from the FMS to fly a conventionally defined route or procedure (e.g. flying a SID/STAR, or the Initial, Intermediate or Missed Approach segments of an instrument approach procedure defined by a conventional navaid(s))

RNAV Substitution must not be used if shown as 'Not Authorised' on an instrument approach chart or prohibited by NOTAM.

It is not permitted to use RNAV Substitution for lateral navigation in the Final Approach Segment of an instrument approach procedure. For guidance on navigation within the Final Approach Segment, refer to fleet-specific FCOMs.

~~o Airspace Class~~

~~Verify that there are no RNAV system warnings prior to entering any Scheduled Navigation Area or conducting P-RNAV or RNP operations. An anticipated "IRS NAV ONLY" warning (fleet specific) is acceptable for non-GPS aircraft operating outside ground-based navaid coverage.~~

~~o~~ *ATC Procedures*

P-RNAV/RNP STARs and RNAV approaches may utilise specific phrases which identify the method of intercept, navigation, climb or descent to be used. Details will be published on relevant approach charts.

ATC must be advised of any deterioration or failure of navigation equipment below that required for entry in-to a scheduled navigation area or continued operation in such airspace.

Vectoring and Positioning

ATC tactical interventions in the terminal area may include radar headings, 'direct to' clearances which bypass the initial legs of an approach, interceptions of initial or intermediate segments of an approach or the insertion of additional waypoints loaded from the database. In complying with ATC instructions, flight crew should be aware of the implications for the navigation system.

‘Direct to’ clearances may be accepted to the Intermediate Fix (IF) provided that it is clear to the crew that the aircraft will be established on the final approach track at least 2 miles from the FAF.

‘Direct to’ clearance to FAF is not acceptable. Modifying the procedure to intercept the final approach course prior to the FAF is acceptable for radar vectored arrivals or at other times with ATC approval.

The final approach trajectory should be intercepted no later than the FAF in order for the aircraft to be correctly established on the final approach course before starting the descent (to ensure terrain and obstacle clearance).

‘Direct to’ clearances to a fix that immediately precede an RF leg are not permitted.

For parallel offset operations enroute (in RNP 4), transitions to and from the offset track should maintain and intercept angle of between 30 and 45° unless specified otherwise by ATC.

~~Where an approach plate states that Dual RNAV systems are required the following must be servicable:~~

- ~~Two independent FMS~~
- ~~An A/P or F/D~~
- ~~Two sensors (either two GPS and/or two DME and/or two VOR)~~

~~*RNP Go-around*~~

~~Where the approach specifies RNP values to be met during the go-around this will be on the approach chart. Such approaches normally require special authorisation.~~

~~When G/A RNP is a requirement, LNAV/NAV must be engaged at the earliest opportunity.~~

Errors

Whenever a significant RNAV/RNP navigational error occurs or would occur without crew intervention, other BAV members should be informed through a post on the Flight Operations forum detailing:

- The addon used
- The navigation database provider, cycle and version
- The erroneous procedure

Examples of errors include:

- Significant navigation errors attributed to incorrect data or a navigation coding error
- Unexpected deviations in lateral or vertical flight path not caused by pilot input

RNP APCH – Alerting and Abort

There is no requirement to cross-check the navigation system’s performance with conventional Navaids as the absence of an integrity alert is considered sufficient to meet the integrity requirements. However, the flight crew should monitor the reasonableness of the navigation solution and report any loss of RNP capability to ATC.

An RNP APCH procedure should be discontinued:

i. If navigation system failure is annunciated (e.g. warning flag);
ii. If lateral or vertical (if provided) FTE exceeds the tolerances of the approach RNP; if, where applicable, VNAV trajectory is not consistent with aircraft altimetry system information or vertical speed information;
iii. If integrity failure is annunciated (e.g. RAIM alert);

iv. If integrity monitoring is lost (e.g. RAIM loss);

Unless the pilot has sufficient visual reference to continue the approach to a safe landing.

Where vertical guidance is lost while the aircraft is still above 1000 ft AGL, the flight crew may decide to continue the approach to LNAV minima, when supported by the navigation system.

The missed approach should be flown in accordance with the published procedure. Use of PBN navigation during the missed approach procedure is acceptable, provided:

i. The navigation system enabling PBN is operations (e.g. no loss of function, no RAIM alert, no failure indication etc.). Where the missed approach is triggered by the failure or failure of integrity of one sensor system, it does not preclude the use of a different sensor for the missed approach procedure.
ii. The whole procedure (including the missed approach) is loaded from the navigation database.

Where the approach requires specific RNP values to be met during the go-around a statement to this effect will be included on the approach plate. Such approaches usually require special authorisation. When G/A RNP is a requirement, LNAV/VNAV must be engaged at the earliest opportunity.

Navigational Errors

Whenever a significant RNAV/RNP navigational error occurs or would occur without crew intervention, other BAV members should be informed through a post on the Flight Operations forum detailing:

- The addon used
- The navigation database provider, cycle and version
- The erroneous procedure

Examples of errors include:

- Significant navigation errors attributed to incorrect data or a navigation coding error
- Unexpected deviations in lateral or vertical flight path not caused by pilot input or erroneous operation of equipment
- Significant misleading information without a failure warning
- Total loss or multiple navigation equipment failure
- Loss of integrity, e.g. RAIM function, when integrity was predicted to be available during pre-flight planning
- Problems with ground navigation facilities leading to significant navigation errors not associated with transitions from an inertial navigation mode to radio navigation mode.

Performance Based Operations – Background Information

Introduction

ICAO has published a PBN manual (Doc 9613) which defines the concept of PBN operations.

The PBN concept specifies that aircraft RNAV or RNP system performance requirements be defined in terms of accuracy, integrity, continuity and functionality required for the proposed operations in the context of a particular airspace concept, when supported by the appropriate Navaid infrastructure. The PBN concept represents a shift from sensor-based navigation to PBN. Performance requirements are identified in navigation specifications, which also identify the choice of navigation sensors and equipment that may be used to meet the performance requirements.

Benefits

PBN offers a number of advantages over the sensor-specific method of developing airspace and obstacle clearance criteria. For instance, PBN:

i. Reduces the need to maintain sensor-specific routes and procedures and their associated costs. For instance, moving a single VOR ground facility an impact dozens of procedures as VOR can be used on routes, VOR approaches, missed approaches etc. Adding new sensor-specific procedures will compound this cost and the rapid growth in available navigation systems would soon make sensor-specific routes and procedures unaffordable;

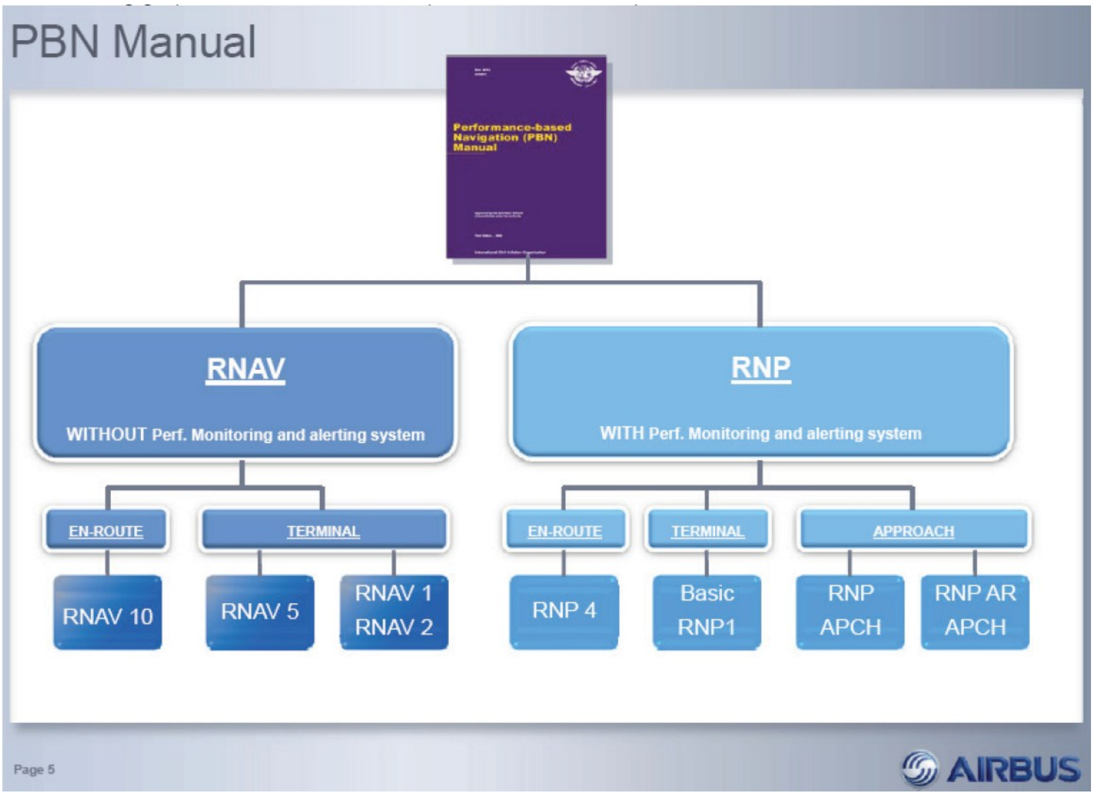
ii. Avoids the need for development of sensor-specific operations with each new evolution of navigation systems, which would be cost-prohibitive. The expansion of satellite navigation systems is expected to contribute to the continued diversity of RNAV and RNP systems in different aircraft.

iii. Allows for more efficient use of airspace (route placement, fuel efficiency, noise abatement etc)

iv. Clarifies the way in which RNAV and RNP systems are used, and

v. Facilitates the operational approval process for operators by providing a limited set of navigation standards intended for global use

The following graphic illustrates the development of PBN concepts:



World Geodetic System 1984 (WGS-84)

There are many different geodetic reference systems in use throughout the world for charting particular areas. This is because the true shape of the Earth (the 'geoid') is not perfectly spherical. As a result, each coordinate system attempts to fit a particular mathematical model of the Earth (the 'ellipsoid') to the geoid in such a way as to minimise the differences between the ellipsoid and the geoid in the particular area being charted. These different systems result in different latitude and longitude grids and hence different sets of geographical coordinates.

These differences do not have a significant effect if the primary means of navigation is based on the use of VOR or NDB to define tracks to or from a beacon, with turning points either at the beacon or at a distance from it defined by DME. However, with RNAV or RNP systems which navigate based entirely on geographic coordinates, it becomes apparent that if the standard used by the navigation system is different to that used by the procedure designer, the situation is changed dramatically.

This led to the introduction of a common global geodetic reference system, which has been defined and developed by the United States Department of Defence (World Geodetic System Committee) and is known as WGS-84. To use GPS to fly RNAV final approach procedures, the coordinates of the procedure waypoints must be referenced to WGS-84. Almost all state AIPs specify that coordinates are to be in WGS-84.

Global Navigation Satellite Systems (GNSS)

GNSS is a generic term for a constellation of satellites used for navigation. The United States Global Positioning System (GPS) is one such group. The Russians have a similar system called GLONASS, a third system, Galileo is operated by the Europeans and the Chinese operate a system known as BeiDou.

Global Navigation Satellite Systems (GNSS) Interference

GNSS jamming, spoofing and system outages are becoming more prevalent in the commercial aviation environment and reports confirm increases in frequency, severity and locations of occurrences. Onboard navigation system architecture provides multiple layers of redundancy and resilience, but it is important for flight crew to be aware of the possible flight deck effects of these events, associated procedures and mitigations.

GPS ***jamming*** blocks the GPS signal, presenting crew with a system failure and corresponding alert. GPS ***spoofing*** provides an erroneous signal, "tricking" a GNSS receiver in to thinking it is at a different location and/or altitude. Spoofing technology is an emerging threat and is becoming increasingly prevalent. All of BAV's aircraft types will generate an alert when there is a significant difference between the IRS and GNSS calculated positions, but depending on the nature of the interference and the aircraft type there may be other alerts or failures. In all cases, crews should follow type-specific procedures associated with the alerts.

Verification of action position using ground navigation aids (e.g. VOR/DME) is a useful tool to support situational awareness.

> **Note:** GNSS position updating should not be disabled unless required by a published procedure or location-specific NOTAM.

The emergence of GNSS spoofing has resulted in reports of 'map shift', which is rare on current-generation aircraft, but does elevate the risk of unusual AFDS behaviour, particularly during departure and arrival. Various flight deck effects include:

- Significant map shifts
- GNSS faults and other navigational system failures, with some persisting well outside the area of interference
- Activation of the EGPWS system at any altitude, including on approach

When the loss of GNSS signal (jamming) and/or false GNSS data is being accepted by the aircraft, or persistent GNSS interference is affecting aircraft performance, fleet specific guidance may necessitate the requirement to switch off the GNSS and/or (E)GPWS systems for approach and landing. In such circumstances, follow fleet specific guidance which may also affect the aircraft's approach capability.

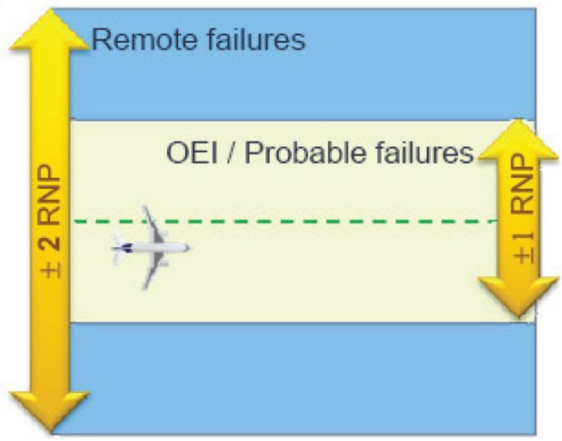
Should (E)GPWS look-ahead functionality be turned off or inoperative refer to Operations Without EGPWS Look-Ahead/Terrain Function for further guidance.

Receiver Autonomous Integrity Monitoring (RAIM)

Receiver Autonomous Integrity Monitoring (RAIM) involves the onboard GPS receiver/processor determining the integrity of the GPS navigation. This determination is achieved by a consistency check among redundant measurements, called pseudo- ranges. When more satellites are available than needed to produce a position fix, the extra pseudo-ranges should all be consistent with the computed position. A pseudo-range which differs significantly from the expected value (i.e., an outlier) may indicate a fault of the associated satellite or another signal integrity problem (e.g., ionospheric dispersion). Traditional RAIM uses fault detection (FD) only, however newer GPS receivers incorporate fault detection and exclusion (FDE) which enables them to continue to operate in the presence of a GPS failure. At least one satellite in addition to those required for navigation must be in view for the receiver to perform RAIM. Four satellites will give a navigation solution but five are needed for the equipment to conduct RAIM and six or more will allow the equipment to lock out a rogue satellite The aircraft turning, or terrain masking during approach, can block the signals from the satellites and cause short duration RAIM outages.

RNP Containment

An RNP value, expressed in nautical miles, defines the maximum lateral distance from the required track, within which the aircraft must remain. Procedures are designed which assume, for normal operation and in the case of remote failures of equipment, that the aircraft will remain laterally within 2 x RNP of the centre of the defined track. So, for example, an approach procedure designed for RNP 0.3 (the default value) will take account of obstacles within +/- 0.6 nm of the defined centreline of the approach. This concept is called containment, illustrated below:



ANP/EPE Definition

RNP operation is Sensor-Independent. Operational criteria specify the need for the crew to be able to monitor the RNP capability during flight; however, because mixed sensors can be used, monitoring would be a cumbersome task for the pilot. So the industry solution to the problem was to provide the pilot with an indication of the accuracy of the FMS position (it is actually a measure of the position uncertainty based on navigation sensor error models contained in the FMS). This measure of FMS position uncertainty is called:

- Actual Navigation Performance (ANP-Boeing); or

- Estimated Position Error (EPE-Airbus)

If this estimated error approaches the RNP value, an 'UNABLE RNP' or 'NAV ACCUR DOWNGRADE', warning is generated. ANP/EPE consists of a calculated Navigation System Error and an assumed model of the Flight Technical Error, it is not a direct measure of the actual FMS position error.

Localiser Performance (LP) and Localiser Performance with Vertical Guidance (LPV)

LPV approaches take advantage of improvement in the accuracy of the lateral and vertical guidance, achieved by SBAS, to provide an approach procedure very similar to a Category I ILS. Like an ILS, an LPV has vertical guidance and is flown to a Decision Altitude. The design of an LPV approach incorporates lateral guidance with increasing sensitivity the closer an aircraft flies to the runway threshold. Sensitivities, and therefore corrections to regain the inbound course, are nearly identical to those of an ILS at similar distances. Depending on the SBAS coverage and procedure design, an LPV approach can support CAT I minima: 200 feet DH/550 m RVR. An LPV approach is therefore deemed to be a precision approach, by definition.

LPV approach guidance must be displayed on a lateral and vertical deviation display including a failure indicator. The deviation display must have a suitable full-scale deflection based on the required track-keeping accuracy. The lateral and vertical full scale deflections are angular and associated with the lateral and vertical definitions of the Final Approach contained in the navigation database.

LP approach procedures: at some airports, it may not be possible to meet the requirements to publish an approach procedure with LPV vertical guidance. This may be a consequence of obstacles and terrain along the desired final approach path, airport infrastructure, or the inability of SBAS to provide the desired availability of vertical guidance (i.e. an airport located on the fringe of the SBAS service area). When this occurs, a state may provide an LP approach procedure based on the lateral performance of SBAS. An LP approach procedure is a non-precision approach procedure with angular lateral guidance, equivalent to a localizer-only approach. As a non-precision approach, an LP approach procedure provides lateral navigation guidance to an MDA; however, the SBAS integration provides no vertical guidance.

LPV and LP approaches are only available in areas where SBAS coverage is provided – e.g. in the USA using WAAS or in Europe using EGNOS. An approach designed with LPV or LP minima includes extra information, coded in the aircraft's FMS navigation database, to instruct the multi-mode receivers which SBAS constellation provides the augmentation information. Unlike PBN approaches flown using Baro VNAV, the vertical path of an LPV approach is produced with reference to GPS geometric altitude, augmented by SBAS. Therefore, it is not susceptible to temperature variation (hot or cold) and does not require correction. However, the DA(H) is still determined by reference to barometric altimetry; therefore, the policy for cold-temperature correction of a procedure minimum (OM A) still applies – just as it would with a Cat I ILS.

LNAV or LNAV/VNAV Minima

A problem with the development of PBN terminology is that aerodrome operating minima are listed under headings which refer to aeroplane autopilot modes specific to Boeing aeroplanes. In fact minima titled LNAV or VNAV refer to the way in which an approach was designed, not the autopilot modes required to fly it. Unfortunately, pilots sometimes see a minimum specification labelled 'LNAV' and assume they have to use that MCP mode.

An approach designed with only LNAV minima is a conventional NPA, but using RNAV as the lateral-guidance medium. VNAV minima imply an approach is designed as an RNP APCH. But one approach can have both LNAV minima, for the simple case, and VNAV minima for the RNP APCH case. The difference in the minima arises from the use of different obstacle-assessment criteria. In some cases VNAV minima can be higher than LNAV.

Confusion arises because all fleets fly FMS database approaches using VNAV. It is perfectly acceptable to fly an approach which only has LNAV minima (e.g. BDA 12, BOD 05 & 23) using VNAV, providing the appropriate (fleet-specific) procedures are used.

Aircraft RNAV Systems

The RNAV system consists of an FMS with associated Navigation sensors along with the Auto flight and Display systems. Commercial aircraft navigation systems are certificated as Multi-sensor systems. The FMS position is usually based on a combination of the outputs from one, two or three Inertial Reference Systems (IRS) refined by inputs from other navigation sensors. Preference is vested in the navigation sensor resulting in the most accurate position. Before using a navigation sensor, the FMS performs a reasonableness check on the data. Typical position accuracy figures (FMS position) in order of sensor accuracy:

- GPS – 100 meters.
- DME/DME – 0.3 nm Dependent on geometry.
- VOR/DME – 1.0 nm Depends on distance from facility.
- IRS (multiple Fit) – 2.0 nm/hr (approx.) drift from alignment.

(E)GPWS Policy and Procedures

This policy covers both Enhanced and basic GPWS systems.

(E)GPWS Warnings

Below FL250, or MSA if higher, (E)GPWS warnings ~~shall~~ must never be ignored.

In the event of an (E)GPWS Warning below FL250, or MSA if higher, the Pilot Flying shall immediately execute the fleet-specific procedure.

The aircraft will be climbed until known to be clear of terrain or MSA as appropriate.

Inform ATC as soon as practical.

All BAV aircraft use GPS as the position reference for the (E)GPWS.

With valid GPS data (E)GPWS is an extremely accurate, reliable and effective system. Over the last 30 years there has never been a CFIT accident to a western-built aeroplane equipped with (E)GPWS, where the pilots have followed a pull-up command. There have been CFIT accidents, but only when pull-up warnings have been ignored.

Rarely, GPS interference can lead to an (E)GPWS registering an incorrect altitude. This can result in (E)GPWS Cautions/Alerts being triggered at high altitudes, including during the cruise phase.

To mitigate the effect of GPS interference, an (E)GPWS Warning received above FL250, or the MSA if higher, can be considered spurious in nature.

~~o ***Below MSA***~~

~~In the event of a GPWS warning the pilot shall immediately execute the fleet-specific GPWS pull-up manoeuvre and the aircraft climbed until known to be clear of terrain or above MSA as appropriate. Inform ATC as soon as practical.~~

~~A GPWS warning can be treated as a caution (see 4.3.9.2 below) if **ALL** of the following conditions are satisfied:~~

- ~~Daylight~~
- ~~VMC~~
- ~~It is immediately obvious that the aircraft is in no danger in respect of its configuration, proximity to terrain or current flight path~~

- ~~***Positively Confirmed as being above MSA***~~

~~Treat the warning as a caution (see 4.3.9.2 below).~~

(E)GPWS Cautions

In the event of an EGPWS Caution the Flight Crew must take appropriate corrective action. This may include fleet specific procedures, or where not specifically detailed an adjustment to, or confirmation of the correct flight path, a configuration change, a check of the altimeter sub-scale setting or a navigation accuracy check.

To mitigate the effects of GPS interference, an (E)GPWS Caution received above FL250, or MSA if higher, can be considered spurious in nature.

GPWS Procedures

(E)GPWS circuit breakers must never be pulled unless called for by a type-specific Non-normal procedure.

To enhance situational awareness during the departure, arrival or over high terrain the crew should consider the use of the Terrain display. Where terrain is a significant feature one pilot should normally display Terrain until passing MSA on departure and from top-of-descent on arrival. The decision to display the Terrain function should take into account display clutter or systems restrictions, e.g. the need to use Weather Radar.

The Glideslope Inhibit function of the (E)GPWS system may be used to avoid nuisance cautions, where appropriate, (e.g. ILS side-step manoeuvre, LOC only or circling approach).

Operations Without EGPWS Look-Ahead/Terrain Function

If operating without EGPWS Look-Ahead/Terrain function (referred to from here on as Look-Ahead), the following policies must be briefed and followed. Refer to fleet-specific manuals for exact Look-Ahead functionality according to type.

Even without the Look-Ahead functionality, GPWS immediate alerting capability may still be available and any ground proximity alerts that are received are valid and must be followed in accordance with fleet standard operating procedures.

Departure Procedures

If departing without Look-Ahead capability, ensure the departure briefing considers the following:

- Terrain and departure routing to build and maintain terrain situational awareness
- Consider the routing of any emergency turn and have a good awareness of terrain relative to the emergency turn routing
- Use the available terrain depictions on charts to enhance the briefing
- Crews should ensure the departure adheres to OM A MSA and the briefing of relevant MSA and Clearance Through MSA with the required justifications for the departure routing
- Particular care and focus on the relevant MSA must be taken if any direct routings are given by ATC.

In-flight Procedures

Crews should ensure other procedure barriers, such as descent below MSA SOPs and position checks are effectively utilised to maximise position and terrain situational awareness throughout the approach.

Current standard operating procedure mitigations against CFIT should be followed and comprehensively briefed. These include:

- QNH monitoring – OM A Altimeter Setting Procedures
- FL100/FL200 altimeter checks – Standard Calls, FCOM
- Transition to QNH check – Standard Calls, FCOM
- Clearance through MSA – OM A
- (E)GPWS Cautions
- Rate of Descent Limit – OM A **Error! Reference source not found.**
- Position Check at Radio Altimeter activation – OM A

- Radio Altimeter Monitoring
- Glide Path check – OM A **Error! Reference source not found.**
- Altimeter/DME checks during non-precision approaches – OM A **Error! Reference s ource not found.**
- Altimeter callouts – Standard Calls, FCOM
- Approach Briefing – OM A Approach Briefing

Additional Position Checks at FL200 and FL100 in the Descent

As well as the procedures listed above, additional CFIT barriers are required if a flight operates without the Look-Ahead function, to compensate for reduced terrain situational awareness. Crews are required to add a position check and justification for continued descent below relevant MSA at both the FL200 and FL100 checks. The intent behind these additional position checks is to bolster Terrain Situational Awareness.

Final Approach Without Look-Ahead Function

Crews should ensure full autopilot capability is utilised to preserve capacity and compensate for the loss of terrain awareness due to lack of Look-Ahead functionality. This includes the preferential use of ILS for all approaches where possible. Crews should ensure standard operating procedure mitigations against CFIT are followed, and if there is any doubt about the position of the aircraft the approach should be discontinued.

Standard Callouts on Takeoff – V Speeds

During takeoff, the PM should call “V1” if the V1 speed is less than VR. If V1 and VR are the same speed, the PM should only call “Rotate”. For those fleets with automatic callout of V1, the PM will only call “Rotate”.

MSA

Relevant MSA

During the departure and arrival phases of a flight, the Commander must ensure that the flight crew maintains situational awareness about the aircraft’s proximity to terrain so as to mitigate effectively the threat of CFIT. The ultimate ‘back-stop’ to that mitigation is the requirement that a GPWS warning must never be ignored (see OM A (E)GPWS Policy and Procedures).

This policy requires the crew to identify the ‘relevant’ MSA during climb and descent. In general, the Operational Flight Plan (OFP) will show the highest MSA which is likely to be encountered during the departure and arrival phases of the flight, assuming that the routing followed is the one in the OFP. That MSA value may well be sufficient as a once-for-all figure when flying from or to airports where terrain is not a factor.

However, it may be the case that, in addition to the information from the OFP, the crew will need to identify pertinent values of:

- During departure: Minimum Sector Altitude, MTCA and MGA; and
- During arrival: MGA, MTCA, Minimum Sector Altitude and/or TAA as well as the MRC if the aircraft is being vectored by ATC.

Any of those values could be ‘relevant’ for the purposes of determining MSA, depending upon the stage of flight, especially if higher than the value published on the OFP.

Clearance through MSA

When a clearance is received which results in flight through the relevant MSA, the Pilot Flying will call “Clearance above/ below MSA”. The Pilot Monitoring will respond with the relevant MSA figure and justification to continue flight below MSA if required. During the departure process, a SID/ATC cleared altitude above/below MSA must be acknowledged and briefed as part of the Take-off briefing as per OM A . During the climb or descent, if a clearance is received that changes the expected lateral or vertical profile below MSA, crews should ensure that their situational awareness with regard to terrain clearance is maintained and that flight below MSA continues to be justified. In the case of subsequent lateral and vertical clearances below MSA, the need to make further verbal justifications may be removed if the relevant MSA has not changed.

On the rare occasion that a crew is unable to justify flight below the relevant MSA, they should immediately ascertain their position and clearance in relation to terrain. If doubt still exists, the clearance to remain below the relevant MSA must be challenged and if necessary the crew must take appropriate action to discontinue flight below the relevant MSA if required.

The obligation for avoidance of terrain always resides in the flight-deck. Air traffic control never assumes that responsibility (see OM A **Error! Reference source not found.**). Therefore, when being g iven radar vectors or 'direct-to' clearances, the crew must continue, in the words of OM A MSA (above), to 'justify flight below the relevant MSA'. Phrases like "under radar" or "under ATC control" are not sufficient justification to meet the intent of the policy.

Descent and Approach Procedures

Approach Briefing

Before starting an approach to land the Commander must satisfy themselves that according to the information available to them, the weather at the aerodrome and the condition of the runway intended to be used should not prevent a safe approach, landing or missed approach. They will brief their flight crew on their intentions, the type of approach, method to be used to identify the aerodrome and landing runway, and the go-around checklist. Before an instrument approach, the briefing must include reference to all radio aids to be used and the relevant go around procedure. During the approach each flight crew member must monitor that all headings and altitudes are consistent with the appropriate facilities and runway.

The Commander must ensure that a comprehensive brief is completed which facilitates situational awareness of terrain throughout the descent and approach to touchdown. The terrain brief should include all relevant MSA figures that may be encountered during a re-route as well as other relevant terrain factors. Examples of such factors include: barometric altitude vs radio altitude, approach and runway in use, expected altimeter pressure setting and the expected position of the radio altimeter activation. The brief should also include the expected factors of the 'Position Check' call and the criteria to justify continued descent. If at any time continued descent cannot be justified, or there is doubt over terrain separation, the conflict must be resolved or the approach discontinued.

For approaches with a Variation to the Stable Approach Criteria (See OM A Approaches with Variations to Stable Approach Criteria) the Manual 1000 ft AAL Callout Altitude must be stated in the brief.

Flight Below Minimum Safe Altitude (MSA)

An ATC clearance does not guarantee terrain or obstruction clearance, and does not constitute authority to descend below the relevant MSA.

When a clearance is received which results in flight through the relevant MSA, the Pilot Flying will call "Clearance above/below MSA". The Pilot Monitoring will respond with "MSA of XXXX". If cleared to descend through MSA, the PM will state the justification to continue the descent below MSA.

The crew must continue to maintain awareness of the controlling MSA when operating below it and if required re-confirm their justification to continue.

On the rare occasion that a crew is unable to justify continued flight below MSA, they should immediately ascertain their position and clearance in relation to terrain. If doubt still exists, flight below the controlling MSA must be discontinued.

Minimum Operating Altitude

Refer to Minimum Operating Altitude (MOA) above.

IMC Flight Below Minimum Safe Altitude (MSA)

Reliance on any one radio navigation aid or navigation system when establishing position for the purpose of descent below MSA must be avoided if practicable.

The aircraft's navigation is effectively reduced to reliance on a single navigation aid when:

- The FMS/FMGS is radio updating from a single VOR/DME; and
- The same VOR is being used for the approach; and
- No radar surveillance is available.

If conducting a single aid approach with no other independent navigation cross-check available, (e.g. GPS displayed position or GPS PRIMARY on MCDU PROGRESS page), the only independent back-up available is the expected heading, track, and radio altimeter information. Any discrepancy between expected and displayed values must be resolved to continue the approach.

- Descent to the relevant ~~SSA (or 25 mile MSA published on the approach plate) is permitted when the aircraft is within 25 nm of the relevant aerodrome and within the appropriate quadrant (or relevant area); consideration must be given to the SSAs in adjacent quadrants (or adjacent MSA).~~MSA is permitted in accordance with the information provided on charts

- Descent to radar cleared altitude is permitted when under positive radar control OM A **Error! Reference source not found.**.

Further descent is permitted using a published instrument approach procedure or in accordance with VMC Descent Below MSA below.

VMC Flight Below Minimum Safe Altitude (MSA)

Visual descent below MSA ~~to the relevant circling minimum~~ is permitted:

By Day (except RNAV Visual): If the descent can be continued so as to ensure clearance from all obstacles on the intended track (see note)

- **By Night:** ~~Additionally, o~~Only if the line of sight is also the line of flight (i.e. flight is directly towards an identifiable lit area, in general the runway) and distance is checked against height by means of radio or radar aids. If this is not possible the relevant MSA or SSA must be maintained until over the aerodrome.
- **RNAV Visual procedures (day or night unless promulgated as DAYLIGHT ONLY):** Wen flying an RNAV (Visual) procedure, visual reference is the main source of obstacle identification and clearance at all times. The guidance provided by an RNAV (Visual) procedure is utilised to reduce workload during a visual approach manoeuvre. A descent may continue towards the published procedure waypoints without maintaining 'line of sight, line of flight' towards an identifiable lit area, as long as VMC is maintained and the lateral and vertical profile is followed. Fleet specific PBN procedures must be used if

conducting an RNAV (Visual) procedure. Should a navigation accuracy downgrade occur, e.g. UNABLE RNP or NAV ACCUR DOWNGRAD, the descent may be continued if the aircraft trajectory is towards an identifiable lit area and position is checked using all available aids. If a visual reference toward a lit and identifiable area at night cannot be maintained on receipt of a navigation accuracy downgrade, the approach must be discontinued and the aircraft climbed to MSA as appropriate. Further information on RNAV (Visual) procedures can be found at OM A RNAV (Visual) Procedures.

~~On reaching circling minimum, sufficient visual reference must be maintained to fix position continuously and accurately within the specified radius and any specified sector. If this condition cannot be satisfied, the aircraft must be climbed to MSA or SSA as appropriate.~~

Note: It is not essential for obstacles to be individually identified; descent over terrain obscured by low cloud or fog is permitted if the flight path remains clear of any such obscuration.

Minimum Altitude in MCP/FCU

Unless allowable under an FCOM-approved procedure (e.g. RNAV Final Approach) the minimum selectable altitude in the MCP/FCU Altitude window will be 1000 ft above airfield elevation.

Safe Landing ***Policy***

The Safe Landing Policy comprises four main elements:

i. Inflight Landing Performance Assessment
ii. Stable Approach Criteria
iii. Safe Touchdown Criteria
iv. Safe Rollout Criteria

Suitable gates shall be identified to assure a stable approach. In accordance with the Safe Touchdown and Rollout Criteria, the Commander shall establish a Latest Touchdown Point (by default this is the end of the Touchdown Zone), a safe braking strategy and a provisional runway exit point.

Awareness of conditions which degrade the stop margin must be maintained throughout the approach and touchdown. Degrading conditions may eliminate the stop margin and/or affect the Latest Touchdown Point. The Commander must be prepared to cease the approach or landing should there be any doubt that a safe stop is assured.

Inflight Landing Performance Assessment

In accordance with fleet specific guidance, a calculation of the Landing Distance at Time of Arrival (LDTA) must be completed, taking in to account:

- The prevailing approach, runway(s) of intended use and runway conditions
- Aircraft weight
- Approach configuration
- Any planned aeroplane ground deceleration devices and/or retardation device deficiencies
- Missed Approach climb gradient (if published)

The calculated landing distance will be compared to the LDA to establish the stop margin available. The Inflight Landing Performance must remain valid throughout all stages of the approach and landing. If the PIC is not satisfied that the Landing Performance calculation remains valid at any stage of the approach or landing, then a go-around must be flown.

Stable Approach Criteria

~~Unstablised approaches are frequent factors in approach and landing accidents (ALAs), including those involving runway excursions and Controlled Flight in to Terrain (CFIT). Unstablised approaches are often the result of a flight crew who conducted the approach without sufficient time to plan, prepare and conduct a stabilised approach.~~

On all approaches, the aircraft must be flown to be stable by the 1,000 ft~~ radio altimeter~~ auto-callout (see Note 3).

If the stable approach criteria have not been achieved by the 1,000 ft auto-callout (see Note 3) then a go-around must be flown.

An approach is considered stable when **all** of the following criteria are met:

In the planned landing configuration (gear down, landing flap ~~set~~achieved)

Stabilised on the correct vertical and lateral profile (~~ILS glideslope, non-precision final approach path or visual profile~~see Note 1)

Stabilised at the target approach speed~~ taking in to account the prevailing conditions – see note~~ (see Note 2)

In all cases, the landing checklist must be completed by the 500 ft auto-callout.

Note 1: For the purposes of these criteria, the vertical and lateral profile is defined as either:

- A 3D Instrument approach, or;
- A 2D final approach path/track, or;
- A visual profile, which may include FMS guidance

In the complete absence of electronic or instrument approach guidance, the method of defining the correct visual profile should be agreed at the briefing stage. The correct visual vertical profile is that defined by either:

- A Visual Approach Slope Indicator System if available. Once established on the extended centreline, unless otherwise specified, an indication of 'All Whites' or 'All Reds' would not satisfy the stabilised approach criteria, or:
- Where no VASIS guidance is provided the required profile will default to that commensurate with a 3° approach slope

Note 2: **Only** in circumstances of rapid wind changes, turbulence or adherence to appropriate ATC speed requirements where speed stability has not been achieved by the 1000 ft auto-callout (see Note 3) **and** speed is no more than 20 kts above the target approach speed, and reducing, can the approach be continued.

If the aircraft is not stable at the target approach speed before the 500 ft auto-callout then a go-around must be flown.

In response to the 1000 auto-callout (see Note 3) the P1 will respond with one of the following calls:

- "Unstable, Go-around"
- "Stable", or
- "Speed" – the subsequent call of "Stable" must occur before the 500 ft auto-callout (see Note 2).

Note 3: On specified approaches, the 1000 auto-callout is substituted by P2 manually announcing the 1000 ft AAL Altitude stipulated in the OM C airfield briefing (See Approaches with Variations to Stable Approach Criteria).

In the absence of the 1000 auto-callout of P2 manual 1000 ft AAL callout, P1 must still assesss stability at the required point, and make the applicable call.

On all approaches, the P2 should fly the approach and the P1 should not take control before the stable approach criteria have been achieved. By implication, this handover will not normally occur until after the 1000 ft auto-callout.

There may be occasions where it might be appropriate to raise the Stable Approach assessment higher than 1000 ft AAL (e.g. high MDA). In such cases the assessment point should be clearly defined and briefed.

There is no requirement for P1 to take control immediately after the assessment of stability. There are occasions where continued lateral manoeuvring is required after 1000 ft AAL (e.g. an offset approach). In such circumstances it may be beneficial for P1 to delay taking control until all manoeuvring has been completed.

Both pilots (and P3 IAW Augmented Crew Procedures) must monitor that the stable approach criteria are maintained with the aim to deliver the aircraft to the point in space above the runway from which a flare manoeuvre will result in touchdown at the right speed and attitude and within the touchdown zone. If the criteria cannot be maintained then a go-around must be flown.

Additional guidance and clarification on the application of these criteria for visual/circling approaches is published at OM B 2.8.4 Allocation of Duties for Circling or Visual Approaches.

Approaches with Variations to Stable Approach Criteria

On approaches where the 1000 ft auto-callout occurs at a height significantly different to 1000 ft AAL, there are multiple auto-callouts or location-specific factors that impact the Safe Landing Policy, alternative station-specific procedures for achieving Stable Approach Criteria will be published in OM C. Any variation to OM C SAC entries will be ratified via the Flight Operations governance process.

Safe Touchdown Criteria

On all approaches the aircraft must be flown to achieve a safe touchdown.

If the safe touchdown criteria have not been achieved, then a rejected landing manouevre must be flown.

A rejected landing can be conducted at any time until reverse thrust is selected.

A touchdown is considered safe when all of the following criteria are met:

- Main Gear Touchdown within the Touchdown Zone (see Note 1, 2)
- Main Gear Touchdown and trajectory within runway edge is guaranteed
- Normal Runway contact within the aircraft geometric landing limits.

Note 1: If the aircraft is still airborne at the end of the TDZ, or it is obvious that the landing will not be within the TDZ, a rejected landing shall be initiated. The crew need not wait until the aircraft physically touches down to perform the rejected landing.

Note 2: If no Touchdown Zone is painted on the runway, the aircraft must touch down as close to the aiming point as possible. Pilots should use all available sources to define an appropriate Latest Touchdown Point. OM C airfield satellite imagery (where provided) may help with identification.

If the Safe Touchdown Criteria are not achieved, PM will use the following call:

- “Go-Around”

PF can initiate a Rejected Landing at any time if they consider the touchdown to be, or likely to be, unsafe. To facilitate this, PF shall not remove their hand from the thrust levers until all elements of the Safe Touchdown Criteria have been satisfied.

Safe Rollout Criteria

On all rollouts the aircraft must be decelerated in such a manner to assure a safe stop prior to the runway end and to routinely achieve taxi speed by at least 300m from the runway end.

If at any stage following initial selection of reverse thrust stopping is not assured, maximum braking and the maximum reverse as permitted by fleet-specific guidance shall be used.

A safe rollout is achieved by:

- Timely use of all deceleration devices that were included in the Inflight Landing Performance Assessment

- Maintaining deceleration (see Note) until stop is assured and an appropriate runway exist speed is reached.

Note: Cancelling Autobrake systems early in the rollout and coasting at high speed can increase the threat of runway overrun and lateral excursion, even after a safe touchdown. Braking action at the stop-end of the runway is not guaranteed to be consistent with that achieved during the initial rollout.

~~**Note:** Exceptionally, if the crew have failed to achieve speed stability by the 1,000 ft auto-callout, the approach may be continued if the speed is close to the target approach speed and reducing. If the aircraft is not stable at the target approach speed by the 500 ft auto-callout then a go-around must be flown. Prevailing conditions include rapid wind changes, turbulence and adherence to appropriate ATC speed requirements.~~

~~***Shared Cockpit Operations***~~

~~In response to the 1,000 auto-callout the P1 will respond with one of the following calls:~~

~~"**Unstable, Go-around**"~~

~~"**Stable**", or~~

~~"**Speed**" – the subsequent call of "Stable" must occur before the 500 ft auto-callout (see Note).~~

~~On all approaches the P2 should fly the approach and the P1 should not take control before the stable approach criteria have been achieved. By inference of this policy, this handover will not normally occur until after the 1,000 ft auto-callout.~~

~~Both pilots must monitor that the stable approach criteria are maintained to touchdown. If they cannot be maintained then a go-around must be flown.~~

Radio Altimeter Monitoring

At the first indication of radio altitude (typically 2500 RA) both pilots must confirm correct altimeter setting and include a positive statement to justify continued descent. Pilots must ensure that their ~~cross-check aircraft~~ position in relation to terrain and the approach in use are as expected.

Cold Temperature Altimeter Correction

Pressure altimeters are calibrated to indicate true altitude under ISA conditions. Any deviation from ISA will result in an erroneous reading on the altimeter. In the case of the temperature being lower than ISA, the true aircraft altitude will be lower than indicated. The altimeter error may be significant, and becomes important when considering obstacle clearances in very cold temperatures.

In conditions where the surface temperature at an airport is less than ISA -25 degrees, pilots should add the values derived from OM C – Cold Temperature Corrections to the published procedure altitudes at the Final Approach Fix and the MDA/DA to ensure adequate obstacle clearance.

With respect to altitude corrections, the following procedures apply:

i. IFR assigned altitudes may be either accepted or refused. Refusal in this case is based upon the pilot's assessment of temperature effect on obstruction clearance.
ii. IFR assigned altitudes accepted by a pilot shall not be adjusted to compensate for cold temperatures, i.e. if a pilot accepts "maintain 3000", an altitude correction shall not be applied to 3000 feet.
iii. When corrections are applied to a published FAF altitude, pilots should advice ATC how much of a correction is to be applied.

Note: Should the crew have doubt about the terrain clearance afforded by an ATC clearance it must be challenged immediately.

Low Visibility Operations

Approach

It is BAVirtual policy that following any LVO approach to minima below Cat I, an Autoland followed by auto rollout (if capable) should be completed. LTS Cat I, Cat II, OTS Cat II and Cat III approach procedures are approved for use if the associated minima are published on the relevant approach chart, unless a contrary restriction is published on the airfield OM C brief.

LTS Cat I, Cat II, OTS Cat II and Cat III approach procedures may only be utilised operationally if Low Visibility Procedures (or equivalent in non-EU countries) are in force, including RVR reporting – it is not permissible to conduct LVO approaches using reported meteorological visibility. Terminology is not standardised, but references in ATIS broadcasts or ATC transmissions to 'Low Visibility procedures in force' or 'Cat II approaches in operation', etc, are sufficient.

Note: A minima column which contains 'ACFT MAX 65/7' indicates that the minima values are only usable by aircraft with a maximum wing span of 65 m and, when in the landing configuration, a vertical distance between the flight path of the landing gear and glide path antenna of a maximum of 7 m. In BAVirtual, these minima may be used by all aircraft except the A380.

A Commander intending to make an approach for which Cat II or Cat III minima apply must request this, on first contact with Approach Control at the aerodrome of intended landing, and in addition, in the case of LHR, on first contact with London Control.

Landing clearance must be obtained before descending below 200 ft Radio Height without visual reference, otherwise a go-around must be flown.

In order to make an approach to Cat IIIB minima (with or without Decision Height), an aeroplane is required to be equipped with a fail-operational autopilot, which must be functioning. If the aircraft capability downgrades to fail-passive, the lowest minima which may be used are Cat IIIA. The functional capabilities of the aircraft are indicated to the crew as follows:

Aircraft Capability	Airbus Fleets	Boeing Fleets	E190	Lowest Usable Minima
Fail Passive	CAT 3 SINGLE/ LAND 3 SINGLE	LAND 2	AUTOLAND 1	Cat IIIA
Fail Operational	CAT 3 DUAL/ LAND 3 DUAL	LAND 3	Not Authorised	Cat IIIB

Extended Range Twin Operations (ETOPS)

Interpretation of Forecasts

The Flight Planning system interpretation of TEMPO, PROB and BCMG in forecasts, when determining airfield suitability, complies with normal guidance in accordance with Application of Forecast Conditions. Cloud amounts of FEW and SCT do not define the ceiling; thus, a forecast of FEW003 SCT005 BKN008 is interpreted as a ceiling of 800 ft.

Augmented Flight Crew Procedures

General Policy

These guidelines detail the operational proceduers for augmented flight crew operations.

All BAV aircraft are certified for a two-crew operation; therefore the help of the RP(s) or P3 should not interfere with the normal crew operation. For example, the RPs should not operate systems (e.g. ACARS) unless asked to do so by the operating crew.

Previous incidents have highlighted that there is a risk of reduced vigilance by the operating crew when relief crew are carried. It is essential that the operating crew continue to apply the highest standards of threat and error management – the intervention or assistance of the P3 should not be relied upon.

In-flight Rest Periods

All crew members must be rested and fit for duty at report. On the day, allocation of crew rest periods is the responsibility of the operating Commander. Operating crew who are taking in-flight rest in bunks or passenger seats must be woken not less than one hour before landing. They should be seated at the controls at least 30 minutes before top of descent.

These are minimum times and should be extended as required when operating to an unfamiliar destination, in non-normal circumstances or in difficult weather conditions.

Acting Pilot in Command and Operating Roles

The aircraft Commander, when taking rest, will explicitly designate the acting pilot-in-command (APIC) before leaving the flight deck. This will normally be in order of rank, but the Commander will determine the most appropriate APIC taking into account suitability, experience and seniority. First officers who are currently designated as Category C are ineligible for APIC, and must notify the Commander of their status.

When occupying an operating seat, the RP(s) will assume the role of either PF or PM. Following a crew change, the Commander (or APIC) will explicitly agree and designate which pilot is undertaking which role. The new operating crew must be absolutely clear on the allocation of PF/PM tasks.

Flight Planning

All flight crew members should be involved in and contribute to the planning and briefing process. Maximum use should be made of the knowledge and experience of all crew members. It is accepted that in certain circumstances it may be advisable for the RP(s) to proceed to the aircraft to start the departure procedures whilst the operating crew carry out the pre-flight briefing process. In these cases, a comprehensive briefing should be given to the RP(s) before departure.

Monitoring

Any RP(s) present in the flight crew compartment should be prepared to alert the operating crew to any unsafe condition or situation at any time. When taxiing, RP(s) should be aware of the risk of ground collision and contribute to maintaining an effective lookout and high situational awareness.

When carried, at least one RP shall be designated as P3 to remain in the flight crew compartment for taxi, take-off, climb to and descent below FL200 (or MSA, if higher) and landing. The P3 must occupy the first observer's seat (behind and between the operating seats), with a clear view of the EICAS/ECAM and flight instruments.

Briefing

The Commander will ensure that the P3 is briefed before departure and again before approach. Where possible, the P3 should be present for and contribute fully to the operating crew's briefing. Where it has not been possible for the P3 to be present for the operating crew's briefing, a specific brief will be given to the P3. This will include salient threats, avoidance/mitigation strategies, appropriate intervention by the P3 and any special considerations. The P3 must have a clear understanding of the plan, and in particular any potential threats, in order to be able to effectively and proactively monitor.

Intervention

The primary role of the P3 is to act as a second monitoring pilot during critical phases of flight.

The P3 is authorised and encouraged to intervene where necessary, as briefed by the operating crew. The timing and necessity of any such intervention should be carefully considered so as to avoid unnecessary distraction to the operating crew. During take-off and final approach, the P3 must be ready to intervene verbally, and should have their Discord settings in voice activation mode if possible.

During take-off, the P3 will alert the Commander to any malfunction or unsafe condition that has not already been called out by the operating crew.

During approach, the P3 will intervene to alert the operating crew to any unsafe condition or a potentially high-energy or unstable approach. At or below the 1000 ft auto-callout, this may include calling "Go-Around", though consideration should be given to alerting the operating crew with enough time to prepare for a go-around without having to initiate it immediately.

Once the flare manoeuvre has been commenced, the P3 may not have sufficient visual reference to accurately judge the touchdown point. Whilst in the flare, the P3 should only call "Go-Around" if it is immediately obvious that the aircraft is at risk.

Other Duties

The Commander may ask the RP(s) to perform certain other duties to assist the operating crew. Duties that may be completed by RP(s) preflight include the external check, cabin inspection and delegated duties in the flight crew compartment. Post-flight, the RP(s) may assist with administrative duties, as requested by the Commander.

Crew Change Handover

A full handover briefing must be given to the crew taking over the flying duties, as defined in OM B Crew Change Handover Briefing.

Relief pilots are required to review the location of safety critical equipment and switches, and relevant emergency procedures when operating in an unfamiliar seat. This need not be achieved on every sector but sufficiently frequently to maintain individual competency.

Non-normal Operations

During any non-normal situation, full use may be made of any RP at the discretion of the Commander. The Commander must ensure that this does not disrupt the completion of non-normal procedures and SOPs, which are written in the assumption of a two-crew operation. The primary role of the RP(s) will be to monitor and assist where requested, they should not be used to action non-normal checklists.

Line Checks and Safety Pilots

In circumstances where a line check is being conducted, the training captain will only be considered as part of the flight crew complement when they are seated in an operating seat. The flight will otherwise be conducted as a two-crew operation, with the training captain normally taking no active part other than to observe. In emergency situations or where safety is impacted, maximum use may be made of the training captain and they must intervene in accordance with OM A Monitoring above. The training captain will brief the operating crew in accordance with OM D Line Check with the LCC having Additional In-flight Relief Duties. Where a safety pilot is carried, they will be designated as P3 and act in accordance with OM A Monitoring above.

Notification to ATC

The Commander should notify Air Traffic Control as soon as practicable in the event of an in-flight incident in any of the following categories:

- ACAS (TCAS) Resolution Advisory
- Dangerous goods

Any of the following SIGMET conditions must be reported to ATC immediately by R/T if the Commander considers that they are likely to affect the safety of other aircraft.

- All heavy, severe or widespread cases of hail
- Icing
- Line squalls
- Mountain waves
- Sandstorms or dust storms
- Thunderstorms
- Tropical revolving storms
- Volcanic ash
- Turbulence
- Runway braking action below reported RWY condition code

Such messages must be prefixed “AIREP SPECIAL”.

In the event of a lightning strike an ASR should be filed, and the effect of the strike on the aircraft’s instrumentation or systems should be noted. If flight instrumentation was not affected this should be stated.

Turbulence

Levels of turbulence are defined as:

- Light: Light Turbulence: Slight changes in attitude or altitude or changes in IAS of 5-15 kt
- Light Chop: Slight bumpiness without changes in attitude, altitude or IAS. Occupants may feel a slight strain against seat belts though no difficulty is encountered in walking.
- Moderate: Moderate Turbulence: Turbulence that is similar to light turbulence but of greater intensity, changes in attitude and or altitude occur, IAS fluctuates 16–25 kts but the aircraft remains in positive control at all times.
- Moderate Chop: Turbulence that is similar to light chop but of greater intensity causing rapid bumps or jolts without appreciable changes in attitude or altitude. Occupants feel definite strain against seat belts or shoulder harness. Unsecured objects are dislodged. Food service and walking are difficult.
- Severe: Severe Turbulence: Turbulence that causes large, abrupt changes in attitude or altitude. Aircraft may be momentarily out of control. IAS fluctuates by more than 25 kts. Occupants are forced against seat belts or shoulder harness. Unsecured objects are tossed about. Food service and walking are impossible.

The continuity of turbulence should be described as:

- Occasional: Less than 1/3 of the time
- Intermittent: 1/3 to 2/3 of the time
- Continuous: More than 2/3 of the time

Severe turbulence must be reported to ATC giving position, time (GMT), FL/Altitude, A/C type, intensity, in or near cloud and duration.

If severe turbulence is encountered an ASR must be raised.

If the Commander considers the turbulence experienced is severe enough to warrant an engineering check of structural integrity on the aircraft, they must inform Engineering so that a turbulence check may be made.

Windshear

Windshear encountered on take-off or approach must be reported to ATC immediately by R/T if considered a hazard giving details of height and severity.

Severe windshear is considered to be uncontrollable changes from normal steady flight conditions below 1000 AGL, in excess of the following:

- 15 kts indicated airspeed
- 500 fpm vertical speed
- 5° pitch attitude
- 1 dot displacement from the glideslope/glidepath
- Unusual thrust levels for a significant period of time

Bird Strikes and Hazards

The Commander shall immediately inform the appropriate ground station whenever a potential bird hazard is observed.

Runway Braking Action

If the Commander considers the braking action encountered during the landing roll to be worse than reported, ATC must be notified as soon as practicable by means of AIREP Special.