

**Acceptable Means of Compliance and Guidance Material
to Part-FCL (PBN) and Part-ARA (PBN, ARA.MED)**

A. Amendments to AMC/GM to Part-FCL

1. A new GM2 FCL.010 is inserted as follows:

'GM2 FCL.010 Definitions — lateral and vertical navigation

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

- (a) a ground-based radio navigation aid; or
- (b) computer-generated navigation data from ground-based, space-based, self-contained navigation aids or a combination of these.'

2. Point AMC7 FCL.615(b) is amended as follows:

AMC7 FCL.615(b) IR — Theoretical knowledge and flight instruction

Delete '062 05 01', '062 05 02', '062 05 03', and insert '062 07 00 00' below when applicable:

		Aeroplane		Helicopter		IR
		ATPL	CPL	ATPL/IR	ATPL/CPL	
'062 07 00 00	PBN					
062 07 01 00	PBN concept (as described in ICAO Doc 9613)					
062 07 01 01	PBN principles					
LO	List the factors used to define RNAV or RNP system performance requirements (accuracy, integrity, continuity and functionality).	x		x		x
LO	Explain the concept of continuity.	x		x		x
LO	Explain the concept of integrity.	x		x		x
LO	State that, unlike conventional navigation, performance-based navigation is not sensor-specific.	x		x		x
LO	Explain the difference between raw data and computed data.					
062 07 01 02	PBN components					
LO	List the components of PBN as NAVAID infrastructure, navigation specification and navigation application.	x		x		x
LO	Identify the components from an example.	x		x		x
062 07 01 03	PBN scope					
LO	State that in oceanic/remote, en route and terminal phases of flight PBN is limited to operations with linear lateral performance requirements and time constraints.	x		x		x

LO	State that in the approach phases of flight PBN accommodates both linear and angular laterally guided operations.	x		x			x
062 07 02 00	Navigation specifications						
062 07 02 01	RNAV and RNP						
LO	State the difference between RNAV and RNP in terms of the requirement for on-board performance monitoring and alerting.	x		x			x
062 07 02 02	Navigation functional requirements						
LO	List the basic functional requirements of RNAV and RNP specifications (continuous indication of lateral deviation, distance/bearing to active waypoint, g/s or time to active waypoint, navigation data storage and failure indication).	x		x			x
062 07 02 03	Designation of RNP and RNAV specifications						
LO	Interpret "X" in RNAV X or RNP X as the lateral navigation accuracy (total system error) in nautical miles, which is expected to be achieved at least 95 per cent of the flight time by the population of aircraft operating within the airspace, route or procedure.	x		x			x
LO	State that aircraft approved to the more stringent accuracy requirements may not necessarily meet some of the functional requirements of the navigation specification having a less stringent accuracy requirement.	x		x			x
LO	State that RNAV10 and RNP4 are used in the oceanic/remote phase of flight.	x		x			x
LO	State that RNAV5 is used in the en route and arrival phase of flight.	x		x			x
LO	State that RNAV2 and RNP2 are also used as navigation specifications.	x		x			x
LO	State that RNP2 is used in the en route and oceanic/remote phases of flight.	x		x			x
LO	State that RNAV1 and RNP1 are used in the arrival and departure phases of flight.	x		x			x
LO	State that RNP APCH is used in the approach phase of flight.	x		x			x
LO	State that RNP AR APCH is used in the approach phase of flight.	x		x			x
LO	State that RNP 0.3 navigation specification is used in all phases of flight, except for oceanic/remote and final approach, primarily for helicopters.	x		x			x
062 07 03 00	Use of PBN						
062 07 03 01	Airspace planning						

LO	State that navigation performance is one factor used to determine minimum route spacing.	x		x			x
062 07 03 02	Approval						
LO	State that the airworthiness approval process assures that each item of the area navigation equipment installed is of a type and design appropriate to its intended function and that the installation functions properly under foreseeable operating conditions.	x		x			x
LO	State that some PBN specifications require operational approval.	x		x			x
062 07 03 03	Specific RNAV and RNP system functions						
LO	Recognise the definition of an RF leg.	x		x			x
LO	Recognise the definition of a fixed radius transition.	x		x			x
LO	Recognise the definition of a fly-by-turn and a fly-over.	x		x			x
LO	Recognise the definition of a holding pattern.	x		x			x
LO	Recognise the definition of an "ARINC 424 path terminator".	x		x			x
LO	Recognise the definition of the following path terminators: IF, TF, CF, DF, FA, CA.	x		x			x
LO	Recognise the definition of an offset flight path.	x		x			x
062 07 03 04	Data processes						
LO	State that the safety of the application is contingent upon the accuracy, resolution and integrity of the data.	x		x			x
LO	State that the accuracy of the data depends upon the processes applied during data origination.	x		x			x
062 07 04 00	PBN operations						
062 07 04 01	PBN principles						
LO	Recognise the definition of path definition error.	x		x			x
LO	Recognise the definition of flight technical error.	x		x			x
LO	Recognise the definition of navigation system error.	x		x			x
LO	Recognise the definition of total system error.	x		x			x
062 07 04 02	On-board performance monitoring and alerting						
LO	State that on-board performance monitoring and alerting of flight technical error is managed by on-board systems or crew procedures.	x		x			x
LO	State that on-board performance monitoring and alerting of navigation system error is a requirement of on-board equipment for RNP.	x		x			x
LO	State that on-board performance monitoring and alerting of path definition error are managed by gross reasonableness checks of navigation data.	x		x			x
062 07 04 03	Abnormal situations						

LO	State that abnormal and contingency procedures are to be used in case of loss of the PBN capability.	x		x			x
062 07 04 04	Database management						
LO	State that, unless otherwise specified in operations documentation or AMC, the navigational database must be valid for the current AIRAC cycle.	x		x			x
062 07 05 00	Requirements of specific RNAV and RNP specifications						
062 07 05 01	RNAV10						
LO	State that RNAV10 requires that aircraft operating in oceanic and remote areas be equipped with at least two independent and serviceable LRNSs comprising an INS, an IRS FMS or a GNSS.	x		x			x
LO	State that aircraft incorporating dual inertial navigation systems (INS) or inertial reference units (IRU) have a standard time limitation.	x		x			x
LO	State that operators may extend their RNAV10 navigation capability time by updating.	x		x			x
062 07 05 02	RNAV5						
LO	State that manual data entry is acceptable for RNAV5.	x		x			x
062 07 05 03	RNAV/RNP1/2						
LO	State that pilots must not fly an RNAV/RNP1/2 SID or STAR unless it is retrievable by route name from the on-board navigation database and conforms to the charted route.	x		x			x
LO	State that the route may subsequently be modified through the insertion (from the database) or deletion of specific waypoints in response to ATC clearances.	x		x			x
LO	State that the manual entry, or creation of new waypoints by manual entry, of latitude and longitude or place/bearing/ distance values is not permitted.	x		x			x
062 07 05 04	RNP4						
LO	State that at least two LRNSs, capable of navigating to RNP4 and listed in the flight manual, must be operational at the entry point of the RNP airspace.	x		x			x
062 07 05 05	RNP APCH						
LO	State that pilots must not fly an RNP APCH unless it is retrievable by procedure name from the on-board navigation database and conforms to the charted procedure.	x		x			x
LO	State that an RNP APCH to LNAV minima is a non-precision instrument approach procedure designed for 2D approach operations.	x		x			x
LO	State that an RNP APCH to LNAV/VNAV minima has lateral guidance based on GNSS and vertical guidance based on either SBAS or BaroVNAV.	x		x			x

LO	State that an RNP APCH to LNAV/VNAV minima may only be conducted with vertical guidance certified for the purpose.	x		x			x
LO	Explain why an RNP APCH to LNAV/VNAV minima based on BaroVNAV may only be conducted when the aerodrome temperature is within a promulgated range.	x		x			x
LO	State that the correct altimeter setting is critical for the safe conduct of an RNP APCH using BaroVNAV.	x		x			x
LO	State that an RNP APCH to LNAV/VNAV minima is a 3D operation.	x		x			x
LO	State that an RNP APCH to LPV minima is a 3D operation.	x		x			x
LO	State that RNP APCH to LPV minima requires an FAS data-block.	x		x			x
062 07 05 06	RNP AR APCH						
LO	State that RNP AR APCH requires authorisation.	x		x			x
062 07 05 07	A-RNP						
LO	State that Advanced RNP incorporates the navigation specifications RNAV5, RNAV2, RNAV1, RNP2, RNP1 and RNP APCH.	x		x			x
LO	State that Advanced RNP may be associated with other functional elements.	x		x			x
062 07 05 08	PBN Point in Space (PinS) departure						
LO	State that a PinS departure is a departure procedure designed for helicopters only.			x			x
LO	State that a PinS departure procedure includes either a “proceed VFR” or a “proceed visually” instruction from landing location to IDF.			x			x
LO	Recognise the differences between “proceed VFR” and “proceed visually” instruction.			x			x
062 07 05 09	PBN Point in Space (PinS) approach						
LO	State that a PinS approach is an instrument RNP APCH procedure designed for helicopters only, and that may be published with LNAV minima or LPV minima.			x			x
LO	State that a PinS approach procedure includes either a “proceed VFR” or a “proceed visually” instruction from the MAPt to a landing location.			x			x
LO	Recognise the differences between “proceed VFR” and “proceed visually” instruction.			x			x

3. Point AMC2 ARA.FCL.300(b) is amended as follows:

AMC2 ARA.FCL.300(b) Examination procedures

Replace the table for ‘Subject 062 — RADIO NAVIGATION’ with the table below when applicable:

'Subject: 062 — RADIO NAVIGATION						
Theoretical knowledge examination Exam length, total questions and distribution of questions						
	ATPL(A)	CPL(A)	ATPL(H)/IR	ATPL(H)	CPL(H)	IR(A) & (H)
Time allowed (hours)	1:30	0:30	1:30	1:00	0:30	1:00
Distribution of questions with regard to the topics of the syllabus						
062 01	07	04	07	05	04	02
062 02	21	12	21	15	12	23
062 03	12	02	12	08	02	05
062 04	XX	XX	XX	XX	XX	XX
062 05	10	XX	10	XX	XX	05
062 06	11	04	11	06	04	04
062 07	05	XX	05	XX	XX	05
Total questions	66	22	66	34	22	44'

B. Amendments to Part-ARA

1. Point AMC5 ARA.FSTD.100(a)(1) is amended as follows:

AMC5 ARA.FSTD.100(a)(1) Initial evaluation procedure

On the form **FSTD EVALUATION REPORT FOR INITIAL AND RECURRENT EVALUATION** delete the line 'GPS' and insert instead between the lines 'ETOPS capability' and 'Other' the following lines:

'RNP APCH LNAV	
RNP APCH LNAV/VNAV	
RNP APCH LPV	
RNP AR APCH'	

2. A new AMC1 ARA.MED.330 is inserted as follows:

'AMC1 ARA.MED.330 Special medical circumstances**GENERAL**

The protocol should:

- (a) assess the incapacitation risk;
- (b) assess the risk of subtle impairment of performance;
- (c) undertake a risk–benefit analysis;
- (d) include a review of the regulations in use in other major aviation States and ICAO;
- (e) determine which class of medical certificate is included in the scope;
- (f) estimate the number of pilots likely to be included;
- (g) list all anticipated risks to the protocol and provide a risk management strategy including appropriate limitations for every anticipated risk; where the risk of subtle impairment of performance is identified, the protocol should include requirements for minimum simulator testing or minimum line-flying under supervision or both;
- (h) nominate medical research experts, if necessary, to provide advice on research methods.'

3. A new AMC1 ARA.MED.330(b)(c) is inserted as follows:

'AMC1 ARA.MED.330(b)(c) Special medical circumstances**GENERAL**

Initial medical certificates issued on the basis of a protocol should only be issued by the competent authority. Thereafter, the competent authority should decide whether the AeMC or AME may issue the medical certificate.'

4. A new GM1 ARA.MED.330 is inserted as follows:

'GM1 ARA.MED.330 Special medical circumstances

GENERAL

- (a) When the terms 'medical assessment protocol', 'research protocol' and 'protocol' (as mentioned in ARA.MED.330 and its associated AMC) are used, they all refer to a 'medical assessment protocol'.
- (b) The protocol is to enable experience to be gained in special medical circumstances in a controlled manner. This is to facilitate a better understanding of the treatment or condition, so that an evidence-based decision concerning its implementation may be considered.
- (c) The protocol and its implementation should comply with the principles described in the following publication of the World Medical Association (WMA): "WMA Declaration of Helsinki - Ethical Principles for Medical Research Involving Human Subjects", as last amended.'