



PBN Operational Approval The Process



What is a PBN
Operations Approval?

Does it include
approval of routes?



How do I *approve*
PBN Ops?



Why Operational Approval?

Early Area Navigation operations based on
airworthiness requirements

PBN is a suite of ***OPERATIONS***

All aspects of the operation needs to be considered



What does Operational Approval Do?

Authorizes PBN operations:

- In designated airspace
- On a PBN specified route
- On a PBN approach (or departure)

Operational Approval does not involve evaluation of routes, airspace or approach/departure procedures

- Responsibility of the ANSP



State Responsibilities

Up to three different States/regulatory bodies can be involved:

- State of Design / Manufacture
- State of Registry
- State of the Operator



State of Design

- Issues the Type Certificate (TC) to the design organisation.
- Approves the Master Minimum Equipment List (MMEL), the mandatory maintenance tasks and intervals, and the Aircraft Flight Manual (AFM) and its amendments
- May issue a design change approval for an aircraft as a Supplemental Type Certificate (STC).



State of Registry

- The State in which the aircraft is registered
- Responsible for the airworthiness of the aircraft
- Approves the aircraft maintenance programme and issues the Certificate of Airworthiness
- Approves aircraft repairs and modifications
- Approves the Minimum Equipment List (MEL) and the conduct of specified PBN operations for General Aviation



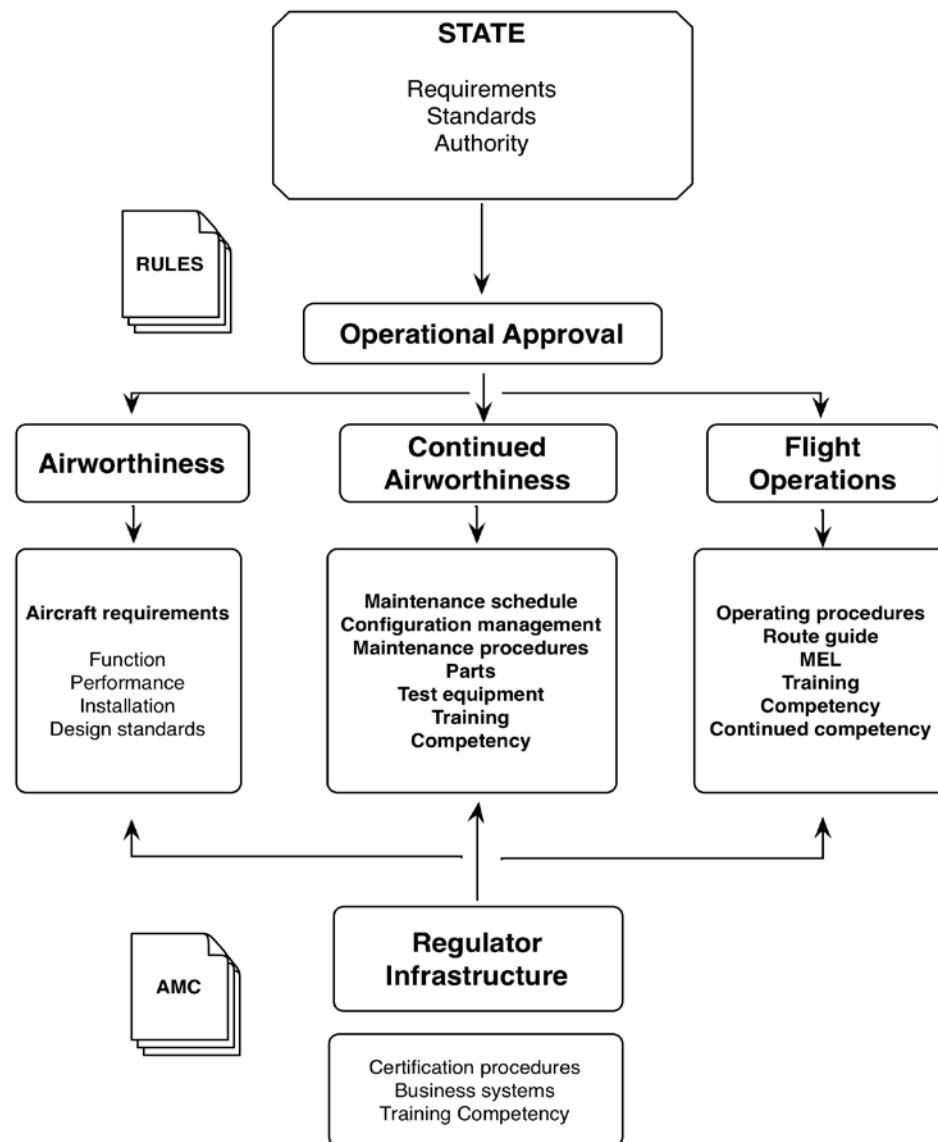
State of the Operator

- For commercial air transport operators
- Accepts the aircraft maintenance programme and approves the MEL, the flight crew training programmes and the conduct of specified PBN operations.
- May be different from the State of Registry



Operational Approval

- *Operations conducted in accordance with National regulations*
- Operational Approval usually the responsibility of the State of the Operator for commercial air transport operations and the State of Registry for general aviation operations
- Approval process may involve input from State of Design/Manufacture, State of Registry and State of the Operator
- Do not re-approve technical data provided by another State





Documentation

State decision to require a formal operational approval

Extent of documentation depends on:

- Existing certification
- Complexity of PBN operation
- Maturity of operational concept
- Risk of improper conduct/implementation
- Availability of training, procedures and checking standards
- Promulgation of information (e.g MMEL and training requirements).



Operations by Flight Phase

Oceanic/Remote	En Route	Terminal	Approach	
Advanced RNP	Advanced RNP	Advanced RNP	Advanced RNP	RNP AR APCH
RNP 2	RNP 2	RNP 1	RNP APCH Part A & B	
RNP 4	RNAV 1 & RNAV 2	RNAV 1 & RNAV 2		
RNAV 10 (Designated RNP 10)	RNAV 5			



General Aviation

- General Aviation approval requirements may differ from those for Commercial Operators
- Formal documentation of approval may not be necessary.
- GA may need formal issuance of an LOA to enable operation in foreign states.

Note: The absence of a formal operational approval for GA is not intended to imply a lesser standard of operations



Operator Compliance

Operator must demonstrate compliance with:

- **Airworthiness** – aircraft is eligible for operation
- **Continued Airworthiness** – aircraft remains eligible
- **Flight Operations** – operating procedures and training



Airworthiness

- Functions and performance levels defined in navigation specification/referenced certification standard
- Installation governed by relevant airworthiness standards (US 14 CFR / EASA CS Part 25)
- Non-navigation equipment may also be relevant (e.g. datalink)



Continued Airworthiness

- Inherent in the aircraft airworthiness approval
- Navigation system must be maintained compliant with the type design.
 - Database and configuration management, systems modifications and software revisions)
- Consistent with other CNS / ATM operational approvals e.g. RVSM.



Flight Operations

Operator's infrastructure for conducting PBN operations:

- Operations Manual
- Flight crew operating procedures, training and competency
- Checklists (Crew Review Cards)
- MEL
- Database management
- Dispatch
- Other









Approval of Technical Data

States should not re-approve technical data
approved by another State

- ***Re-approval*** transfers the responsibility to the State
- States should:
 - Review the data
 - Determine that it is acceptable
 - Formally ***accept*** the data



Levels of Qualification

Equipment Level	TSO & MOPS	
Aircraft Level	LAM AC; FAA AC; EASA AMC etc	 
Operator Level	FAA Order; EASA EU-OPS; etc	  



RNP APCH Example

EASA Criteria



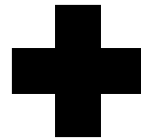
A

Equipment
Approval

CS-ETSO –
C145()

CS-ETSO –
C146()

CS-ETSO-C129a



B

Airworthiness
Approval

CS-25

CS-23 & VLA

CS-22

CS-27 & CS-29

AMC 20-27



C

Operations
Approval

EU-OPS

AMC 20-27



Summary

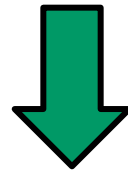
- Eligible/qualified/approved aircraft and navigation equipment



- Procedures for flight crew/pilots, maintenance, and dispatch



- Training for personnel



- Approval/authorization





5 Step Approval Process

- *Step one: Pre-application*
- *Step two: Formal application*
- *Step three: Analysis of the documentation*
- *Step four: Demonstration and inspection*
- *Step five: Approval*

For simple approvals some steps may be condensed or eliminated



Step 1 - Pre-Application

- Operator
 - Reviews requirements of State of Operator
 - Checks aircraft eligibility according to State of Registry
 - Checks operating procedures
 - Checks dispatch procedures
 - Checks training requirements and records
 - Checks maintenance procedures
 - Fills in application
- *Pre-application meeting with regulator usually beneficial.*
- *Assistance from OEMs/design organisations may be necessary for complex applications*



Step 2 - Formal Application

- Operator submits formal written application to CAA
- CAA appoints project manager
 - For a specific approval
 - Or general PBN approvals

Tip: Appointment of trained/experienced PBN Project Manager is a key to success



Step 3 – Document Evaluation

- CAA Project Manager evaluates application
 - Aircraft eligibility and maintenance procedures
 - Operating procedures
 - Training

Note: Complex applications may require assistance from other agencies or experts

Tip: PBN Project Manager should be supported by an expert team



Step 4 – Demonstration and Inspection

- CAA Project Manager visits operator for formal inspection
- Operator demonstrates how requirements are being met
- May require team of inspectors/observers from CAA
- Simple applications may not require this step (e.g. RNAV 5)
- Complex ops always require this step (e.g. RNP AR)

Tip: Project Managers and key inspectors should be qualified to fly the PBN operations under evaluation



Step 5 - Approval

CAA approval given via

- Ops Spec associated with AOC; and
- Ops Manual amendment
- LOA

Some GA operations may not require formal approval

Note: An OPSPEC is the appropriate method of approval for commercial operators.



Complexity Scale

Notional Levels of Difficulty

“Simple”

“Challenging”



RNAV 5 RNAV10 RNAV1and 2 RNP 1 RNP 4 RNP 2 RNP APCH RNP AR APCH



Existing National Standards

ICAO	FAA	EASA
RNP APCH [Including LP and LPV]	AC 90-107	AMC 20-28
RNP APCH [Including Baro-VNAV]	AC 90-105 Note 1: Advanced RNP, RNP 0.3, and RNP 2 pending Note 2: Basic-RNP 1 designated as RNP 1	AMC 20-27
Radius-to-Fix (RF)		TBD
RNP 1		TBD
Advanced-RNP 1		TBD
RNP 0.3	TBD	TBD
RNP 2		TBD
RNP AR APCH	AC 90-101	AMC 20-26
RNAV 1 and RNAV 2	AC 90-100()	TGL 10 (RNAV 1)
RNAV 5	AC 90-96()	AMC 20-4
RNP 4	Order 8400.33	TBD
RNAV 10 [Designated as RNP 10]	Order 8400.1290	AMC 20-12



Existing National Standards

ICAO	ICAO LAM	CASA
RNP APCH [Including LP and LPV]	TBD	CAO 20.91
Baro-VNAV	AC91-010	AC 91U-II-Attachment
Radius-to-Fix (RF)	TBD	TBD
RNP 1	AC 91-006	CAO 20.91
Advanced-RNP 1	TBD	CAO 20.91
RNP 0.3		CAO 20.91
RNP 2		CAO 20.91
RNP AR APCH	AC 91-009	CAO 20.91
RNAV 1 and RNAV 2	AC 91-003	CAO 20.91
RNAV 5	AC 91-002	CAO 20.91
RNP 4	AC 91-006	AC91U-3
RNAV 10 [Designated as RNP 10]	AC 91-001	AC 91U-2()



Questions?