Chapter 8 FLIGHT CREW TRAINING

1. General

The amount and type of training required for flight crews varies significantly depending upon a number of factors including;

- Previous training and experience
- Complexity of operations
- Aircraft equipment

Consequently it is not possible to specify for each of the PBN Manual navigation specifications the particular training that will be required, and some judgement is required in determining the content and structure of flight crew training. The navigation specifications in the PBN Manual cover a wide range of operations, from basic to complex and that training needs to be appropriate to the particular circumstances.

Each navigation specification includes guidance on flight crew training although it should be noted that the training specified for each operation is generally considered independently. It should be recognised that the PBN Manual is a compilation of guidance material, some of which has been in existence in other forms for some number of years, and the training requirements may not be entirely consistent across the range of navigation specifications.
For en-route operations, ground training is commonly sufficient to provide crews with the necessary knowledge. Delivery methods will vary, but classroom training, computer based training or in some cases desk-top simulator training is normally sufficient.

Arrival and departure operations and particularly approach operations normally will also require some flight simulator training, in addition to ground training and briefings.

Consideration should also be placed upon the need for flight crews to demonstrate that competency standards are achieved and the means of documentation of qualification.

2. Knowledge requirements

For all PBN operations the following areas of knowledge will need to be included, with varying content and complexity depending upon the particular operations.

Area navigation principles. Area navigation is the basis for all PBN operations, and the same general knowledge of is applicable to all navigation specifications. Note that pilots with previous experience may not be familiar with some more advanced features such as Radius to Fix legs (RF) and the application of vertical navigation.

Navigation system principles. Flight crews should have a sound knowledge of the navigation system to be used. The relevance of the navigation system to particular PBN Manual navigation specifications should be clearly established. For example knowledge of inertial navigation and updating is relevant to requirements for some oceanic and remote navigation specifications, as is knowledge of GNSS is necessary for RNP AR APCH operations.

Equipment operation and functionality. Considerable variation exists in the operation of navigation equipment, cockpit controls, displays and functionality. Crews with experience on one type of installation or aircraft may require additional training on another type of

equipment. Special attention should be placed on the differences between stand-alone GNSS equipment and Flight Management Systems with GNSS updating.

Flight planning Knowledge of the relevant aspects of each of the navigation specifications that relate to flight planning is required.

Operating procedures. The complexity of operating procedures varies considerably between PBN operations. RNP APCH and RNP AR APCH require a detailed knowledge of standard operating procedures for both normal and non-normal operations.

Monitoring and alerting. Flight crew responsibilities for performance monitoring and alerting provided by the navigation system or other means (crew procedures) must be understood.

Limitations. Operating limitations (e.g. time limits, minimum equipment) vary both between and within the PBN Manual navigation specifications and flight crews need to be able to recognise and plan accordingly.

Contingencies Alternative means of navigation or other contingency procedures must be included.

Air Traffic Control procedures. Flight crews need to be aware of ATC procedures that may be applicable to PBN operations.

3. Flight Training requirements

Approach and departure operations, and in some cases arrivals require flight training and the demonstration of flight crew competency.

The amount of flight training required varies with the PBN operation, previous flight crew training and experience and other factors. In the course of operational approval all relevant circumstances need to be considered and the training evaluated for completeness and effectiveness. Ongoing and recurrent training should also be considered.

Despite the variation in training requirements, some general guidelines may be helpful in evaluating the extent of training that might be required. Some examples of "average" cases are included below. These examples assume that flight crews have previous relevant experience, and have completed knowledge training curriculum.

En-Route: In general flight training is not required.

Arrival & Departure: As departure and arrival operations require strict adherence to track during periods of higher workload, and are associated with reduced clearance from terrain and increased traffic, crews need to be fully conversant with the operation of the navigation system. Consequently, unless crews have significant appropriate operational experience simulator or flight training must be provided. Particular care should be taken in the evaluation of this type of operation conducted with stand-alone GNSS equipment where functional limitations require crew intervention.

RNP APCH: Training for RNP APCH conducted using stand-alone GNSS equipment; particularly in a single-pilot aircraft normally requires multiple in-flight exercises each with

pre-flight and post-flight briefing. Considerable attention needs to be given to programming and management of the navigation system, including in-flight re-programming, holding, multiple approaches, mode selection and recognitions, human factors and the navigation system functionality.

Approaches conducted in FMS equipped aircraft, are generally much easier to manage and aircraft are generally fitted with good map displays assisting situational awareness. Normal operations are generally quite simple and competency can be achieved with one or two approaches. Additional training should be provided to achieve familiarity and competency in operations which involve changes to the planned approach, system alerting and missed approach requirement. Attention also needs to be placed on the method of vertical navigation, using standard non-precision approach procedures (LNAV) or barometric VNAV (LNAV/VNAV). As a guide initial training for crews with previous relevant GNSS & RNAV experience typically can achieve competency during one full flight simulator training session with associated pre-flight and post flight briefing.

RNP AR APCH: RNP AR APCH operations are able to deliver improvements in safety and efficiency which are enabled by the Authorisation Required process which ensures that all areas of the operating are carefully examined and appropriate attention placed on all aspects of the operation including training. Accordingly training for RNP AR APCH operations should be thorough and ensure that crews are able to manage operations safely within the additional demands placed on procedure design, aircraft and crew procedures.

As a guide, crews without previous relevant experience (e.g. RNP APCH with Baro VNAV), may require a course of ground training (1 – 2 days) plus simulator flight training (4hrs or more) in order to achieve competency.

Additional information regarding flight crew knowledge and training is included in PART 2.