Chapter 5 ROUTE DESIGN

1. Protected Area

PBN flight paths are protected by an area surrounding the intended flight path based upon the navigation system performance, and other factors.

The protected area is used to assess clearance from terrain and obstacles, and may also be used to establish lateral separation between routes. Details on the computation of protected areas are contained in ICAO Doc 8168 PANS OPS Volume II and ICAO Doc 9905 RNP AR Procedure Design Manual.

2. RNP AR APCH

RNP AR APCH route segments are protected by rectangular volume defined by a minimum obstacle clearance (MOC) applied to distance 2 x RNP either side of track.

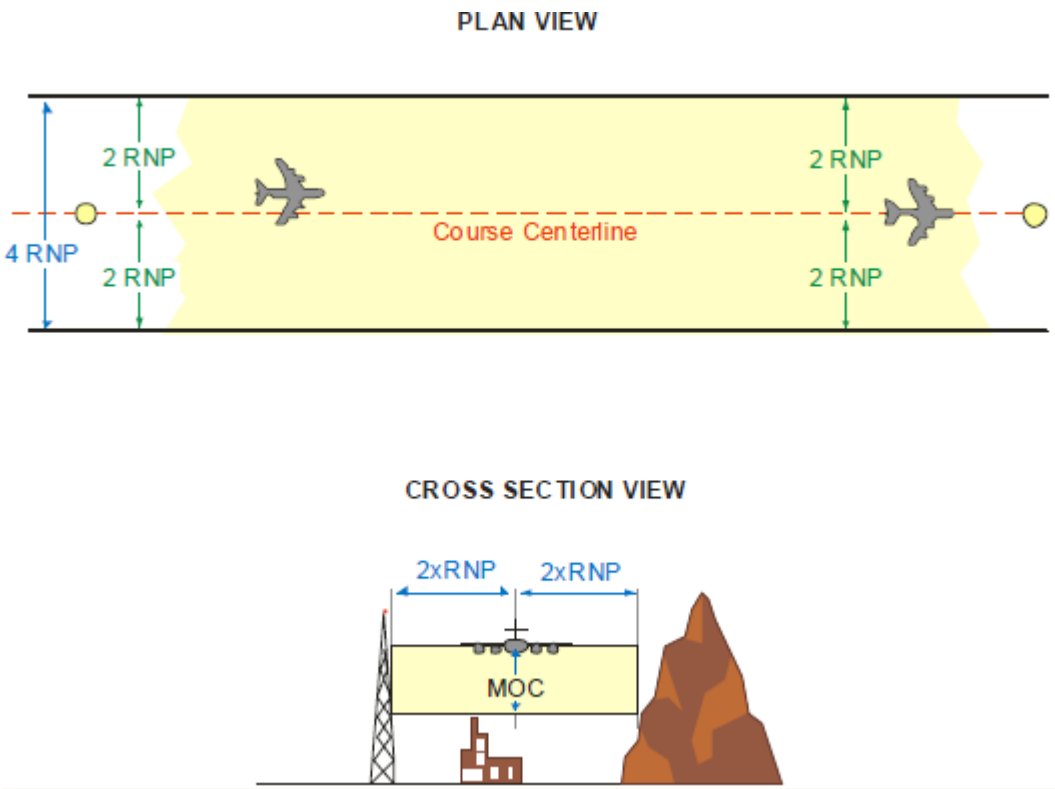

Figure 5.1 RNP AR APCH Obstacle Clearance

3. RNP APCH

RNP APCH route segments are protected by variable lateral areas and a minimum obstacle clearance (MOC) applied to primary and secondary areas. The lateral dimensions of the protected area are based on 1.5 x the navigation tolerance associated with the segment plus a buffer value.

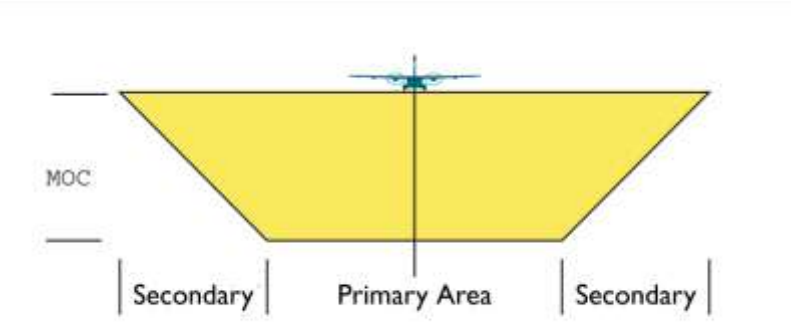

Figure 5.2: Primary and Secondary Areas

Segment	Navigation Tolerance	Buffer Value	Lateral Protection (either side of track)
Initial/intermediate	1.0	1.0	2.5
FAF	0.3	1.0	1.45
Final (MAPt)	0.3	0.5	0.95
Missed approach	1.0	0.5	2.0

Figure 5.3: Typical lateral protection values for RNP APCH (NM)

4. En-route and Terminal

RNAV and RNP terminal and en-route segments are protected in a similar manner to RNPAPCH. Lateral protection areas are defined by 1.5x the navigation accuracy plus a buffer value. Obstacle clearance protection is not included in PANS-OPS for RNAV 10.

Navspec	Navigation Tolerance	Buffer Value	Lateral Protection (either side of track)
RNAV 5[1] >30NM ARP	2.51	2	5.77
RNP 4	4	2	8
RNAV 1 (<15NM ARP)	1.0	0.5	2
RNP 1 (<15NM ARP)	1.0	0.5	2

[1] Based on GNSS. Different values apply to DME/DME routes.

Figure 5.4: Typical lateral protection values for En-route & Terminal Navspecs (NM)