

# Established on RNP (AR) approach concept

General principles overview

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# AGENDA

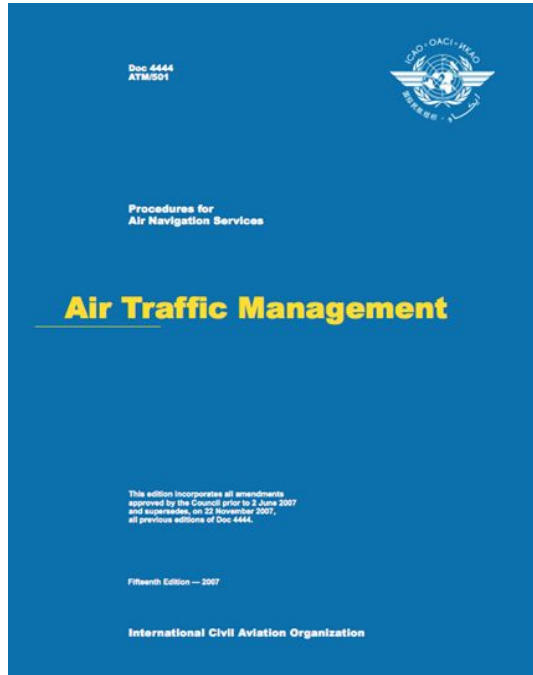
- 1 Introduction
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# Introduction

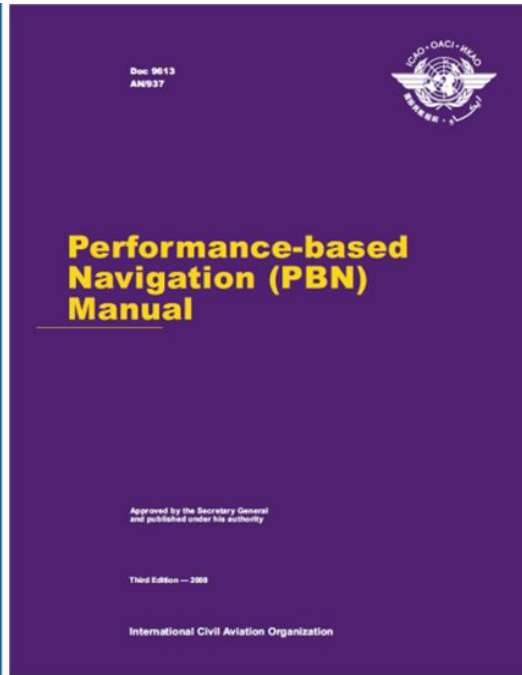
Chapter 01

# ICAO References

## PANS-ATM Doc 4444



## PBN Manual Doc 9613



## SOIR Manual Doc 9643



# EoR Definitions

## FAA

***Operational concept that utilizes RNP (AR) approach procedures in simultaneous approach operations. EoR refers to an operation where an aircraft may be considered established on an initial path, not aligned with the landing to a straight-in final, without requiring either 1,000 feet vertical or 3NM radar separation from aircraft established on other approved simultaneous instrument approaches to parallel runways.***

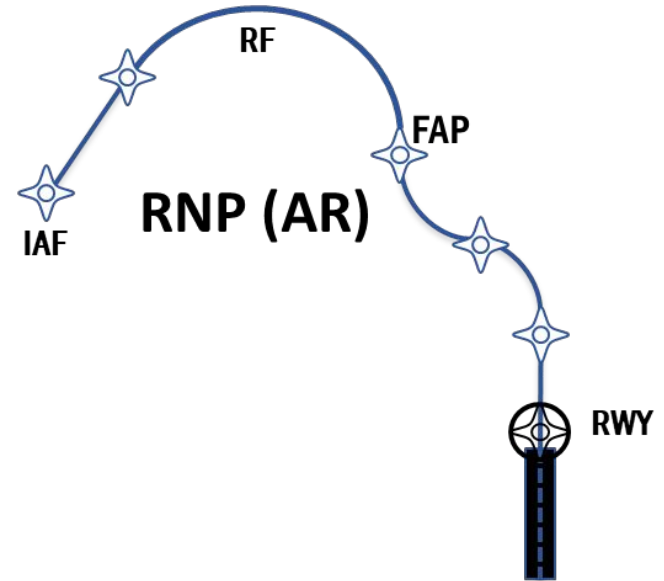
## ICAO

***Operation for simultaneous approaches that considers aircraft conducting an RNP AR APCH procedure eligible for Simultaneous Operations on parallel or near-parallel Instrument Runways.***

# RNP (AR) approaches

## Characteristics

- *Final approach segment:*
  - *Vertical guidance (BARO)*
  - *Curved path allowed (RF legs)*
  - *RNP from 0.3 (standard) down to 0.1*
- *Missed approach segment*
  - *RNP 0.3 (standard)*
  - *Curved path allowed (RF legs)*

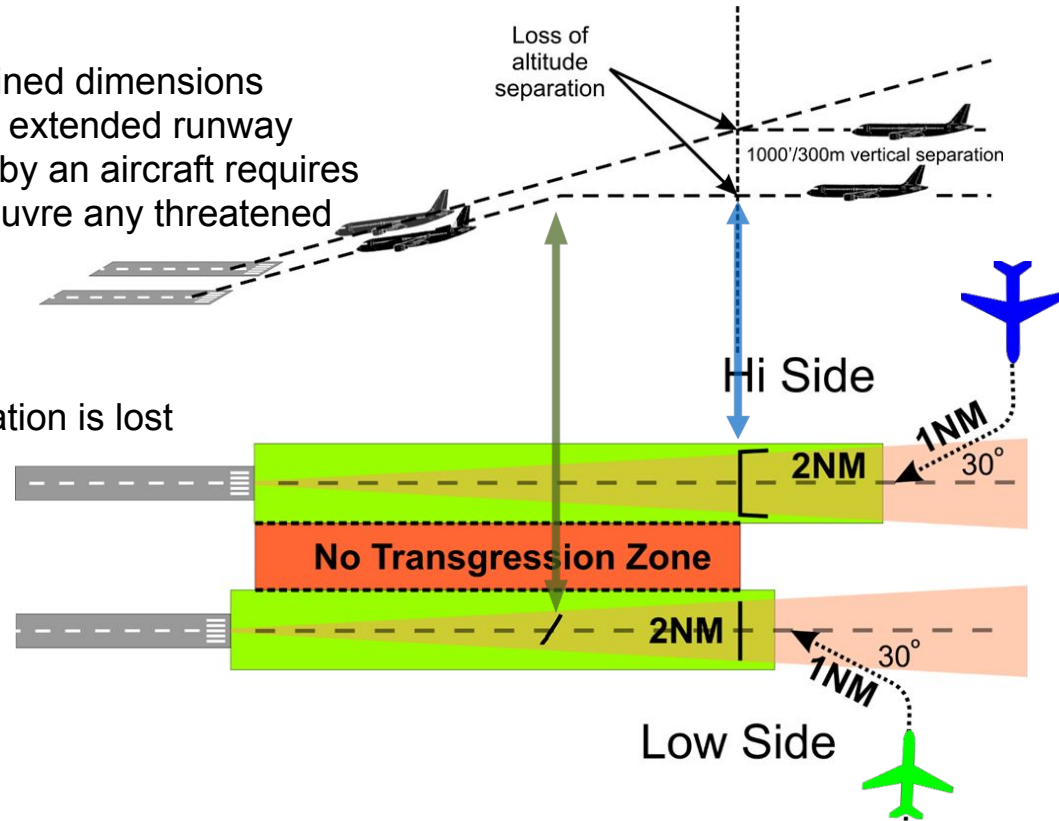


# Simultaneous approach operations (I)

## Mode 1 - Simultaneous Independent parallel approaches (non EoR)

NTZ: a corridor of airspace of defined dimensions located centrally between the two extended runway centre lines, where a penetration by an aircraft requires a controller intervention to manoeuvre any threatened aircraft on the adjacent approach

- 2000' / 610m wide
- Starts where altitude separation is lost



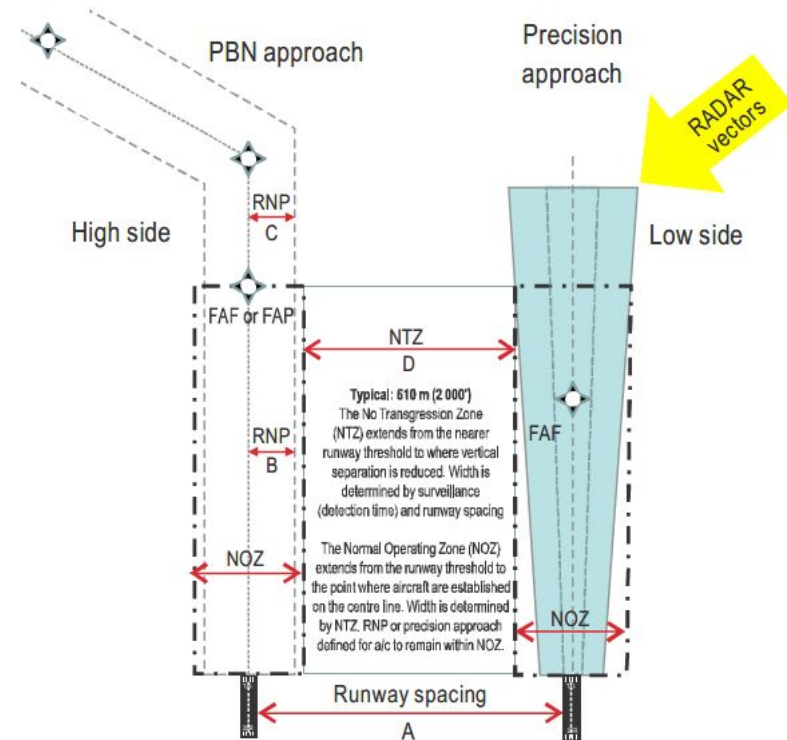
# Simultaneous approach operations (II)

## Mode 1 - Simultaneous Independent parallel approaches

where **radar separation minima between aircraft on adjacent extended runway centre lines are not prescribed**

Instrument Approach Type	Simultaneous Approach OK?
ILS	Green
GLS	Green
MLS	Green
SBAS CAT I	Green
RNP-AR	Green
RNP-AR (non-conforming)	Yellow
RNP (LNAV/VNAV) (LPV)	Yellow
RNP (LNAV)	Red
LOC	Red
VOR	Red
NDB	Red

Mode 1 operations table 2.2 ICAO 9643

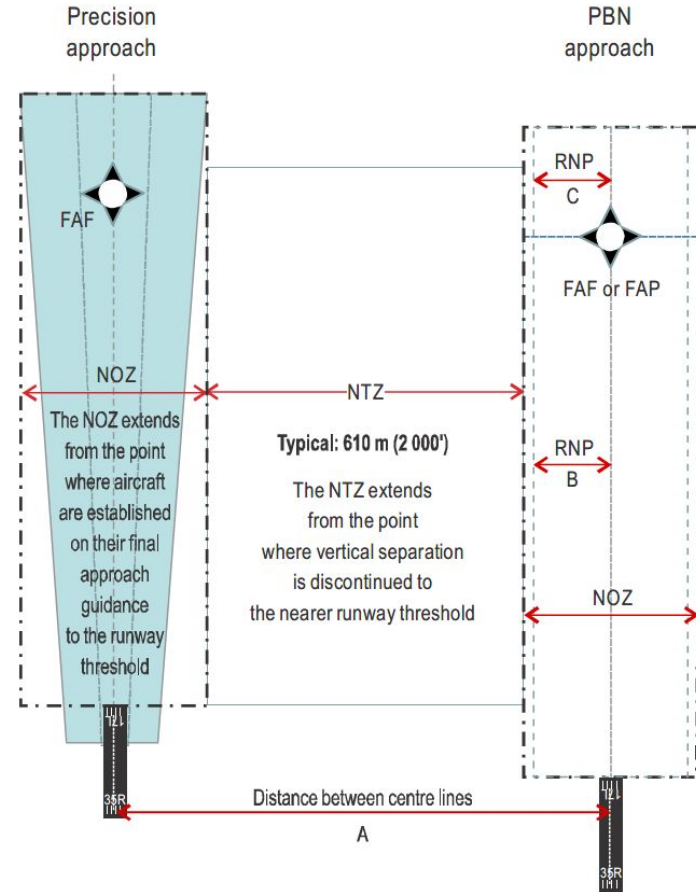


# Simultaneous approach operations (III)

## Mode 1 - RNP AR mode 1 conforming

*For any RNP AR segment, the designated RNP value (C and B) not exceeding...*

- ... $1/4$  of the distance between runway centre lines [A/4]
- ... $1/2$  the difference between runway centre lines and the designated NTZ  $[(A-NTZ)/2]$

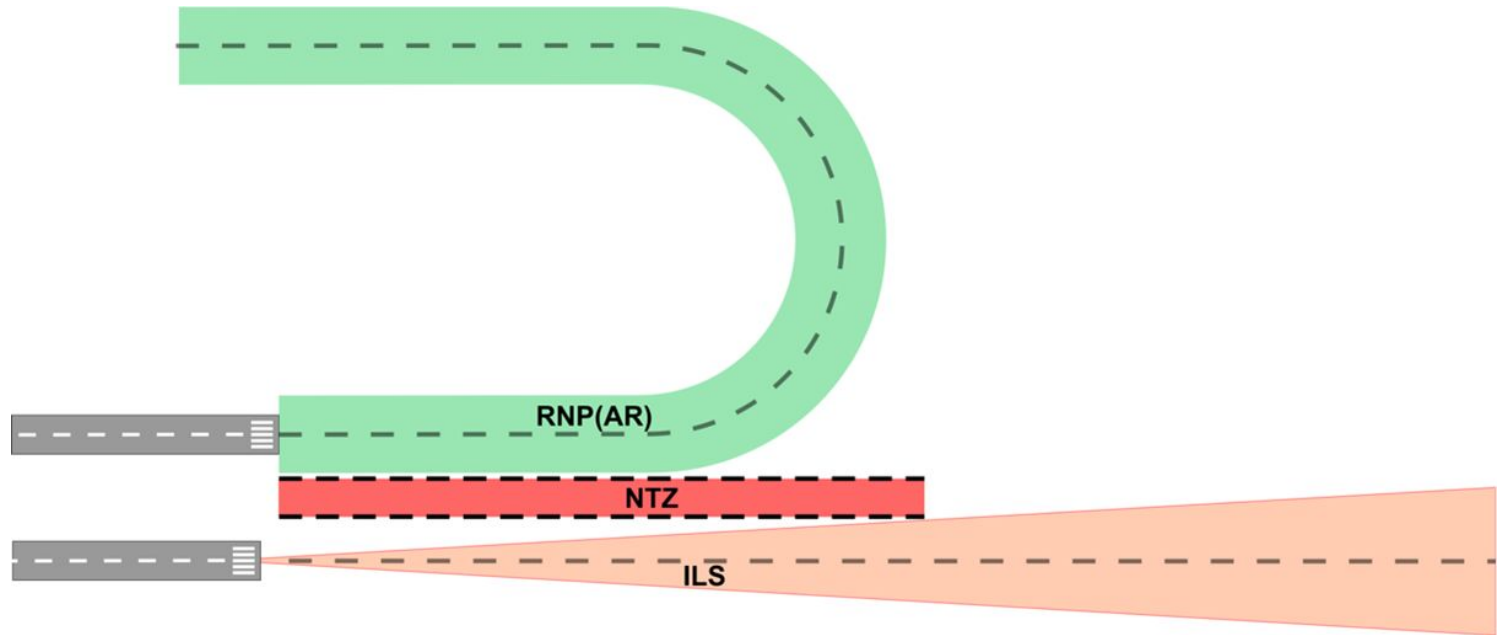


# EoR Operational concept description

Chapter 02

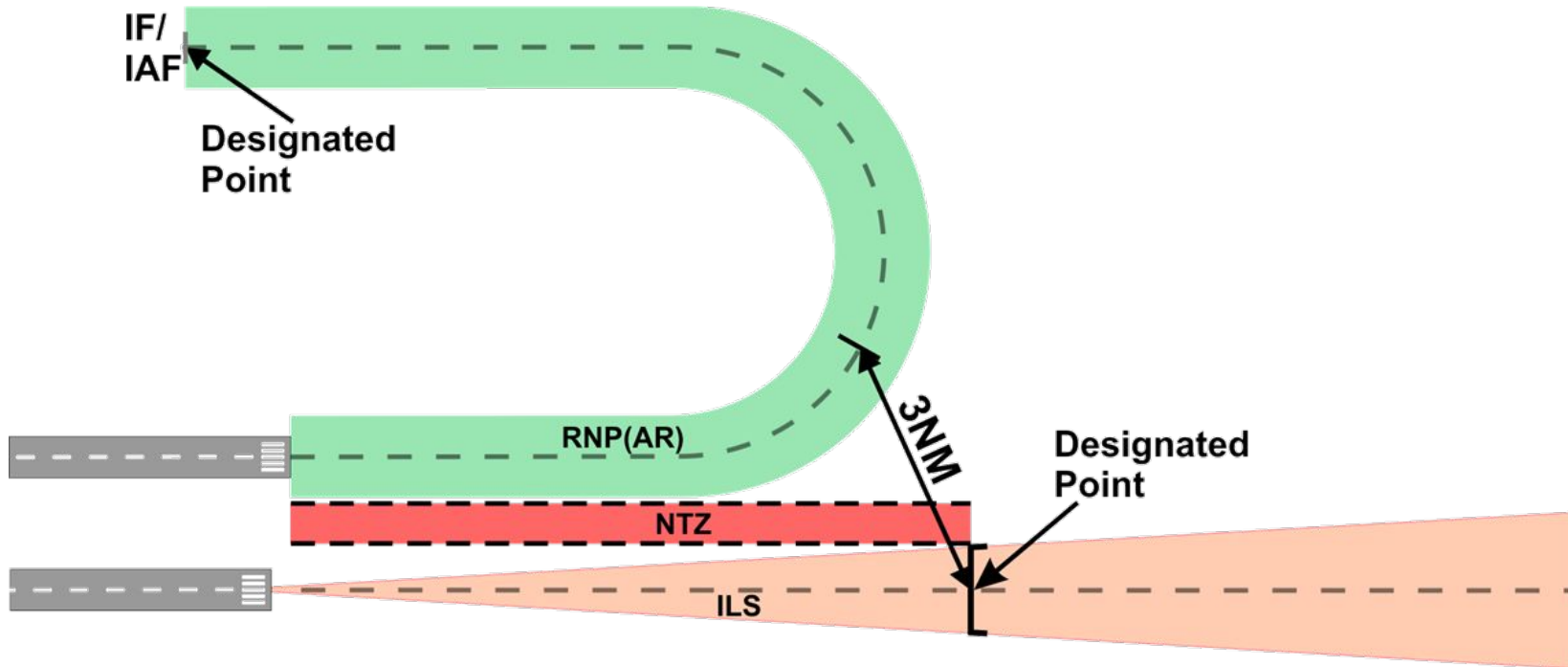
# Established on RNP AR (I)

- EoR considers aircraft stabilized on an RNP(AR) approach to be similarly established to aircraft flying an ILS for the purposes of simultaneous approach separation
- EoR provides an alternate means to separate aircraft during the turn to the final approach phase of SOIR.
- Other requirements for SOIR continue to apply.



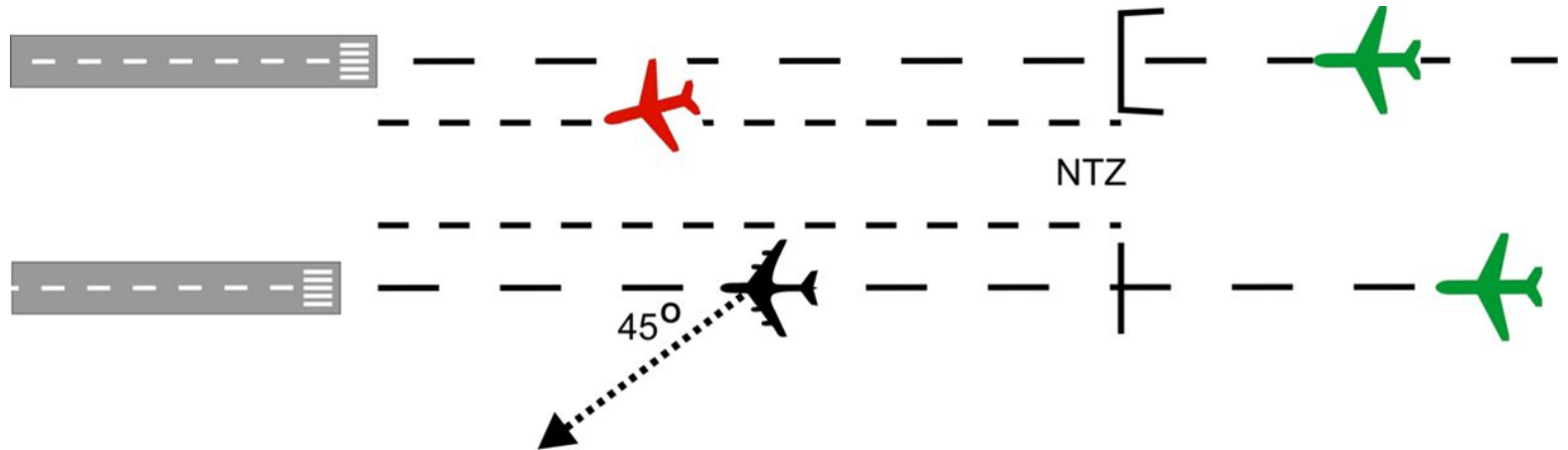
# Established on RNP AR (II)

Aircraft are required to be established on their respective approach procedures before discontinuing 5.6km (3NM) separation represented by a Designated Point.



# Break-out procedures

- When an aircraft is observed penetrating the NTZ, the aircraft on the adjacent approach track shall be instructed to immediately climb and turn to the assigned altitude/height and heading in order to avoid the deviating aircraft
- If, after reporting that it is established on the RNP AR APCH procedure, the aircraft is unable to execute the procedure, the pilot is required to notify the controller immediately with a proposed course of action and thereafter follow ATC instructions (e.g. break-out procedure).

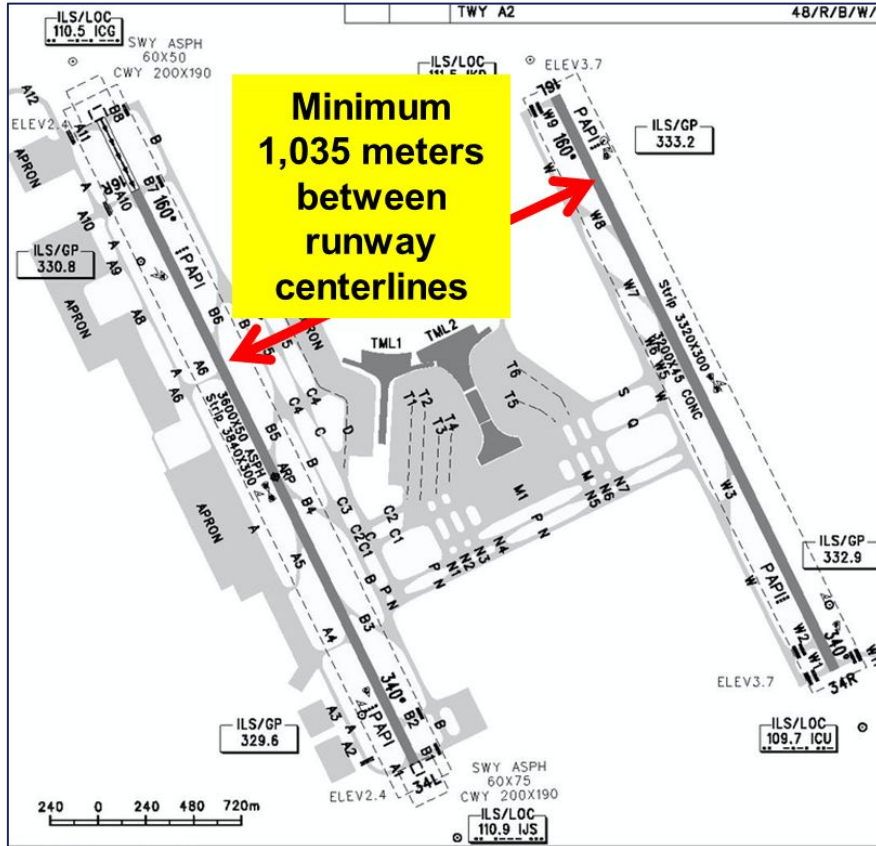


# Operational requirements



Chapter 03

# Aerodrome requirements



ATS surveillance system requirements are dependent on runway centre line spacing (ICAO Annex 14 and ICAO 9643)

# ATS requirements

Once aircraft has established communication with APP control, the flight crew is to be advised that independent parallel approaches are in use (ATIS could be use for this purpose)

**Separate controllers** should be **responsible for the sequencing and spacing** of arriving aircraft to **each runway**

Application of appropriate wake turbulence separation is required between aircraft on the same approach

An aircraft established on the final approach course or track is separated from another aircraft established on an adjacent parallel final approach course or track, provided neither aircraft penetrates the NTZ as depicted on the situation display

# Monitoring controller

The **approaches** are monitored by (monitoring controller):

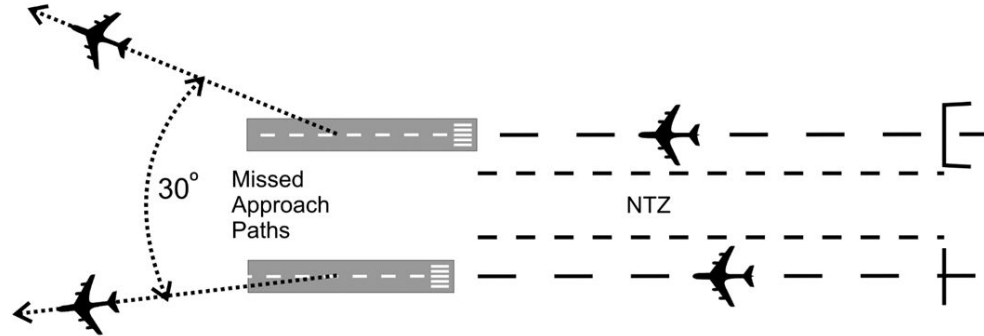
- a **separate monitoring controller for each runway**; or
- a **single controller for no more than two runways**...(with an approved **safety assessment**)

Particularities:

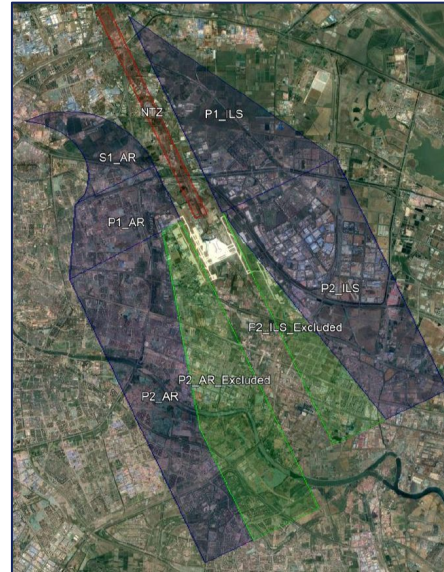
- Monitor the aircraft to ensure no penetration of the NTZ.
- Have no airspace but are responsible for monitoring the trajectories of aircraft on Simultaneous Independent Approach procedures once those aircraft are abeam the NTZ
- Have no specific frequencies assigned but instead listen to, and have override capability on, the corresponding ATCT frequency

# Instrument Approach procedures

- The missed approach track for one approach diverges by at least 30 degrees from the missed approach track of the adjacent approach



- an obstacle survey and evaluation is completed, as appropriate, for the areas adjacent to the final approach segments (PAOAS) to protect the break-out procedures



# Thank you



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