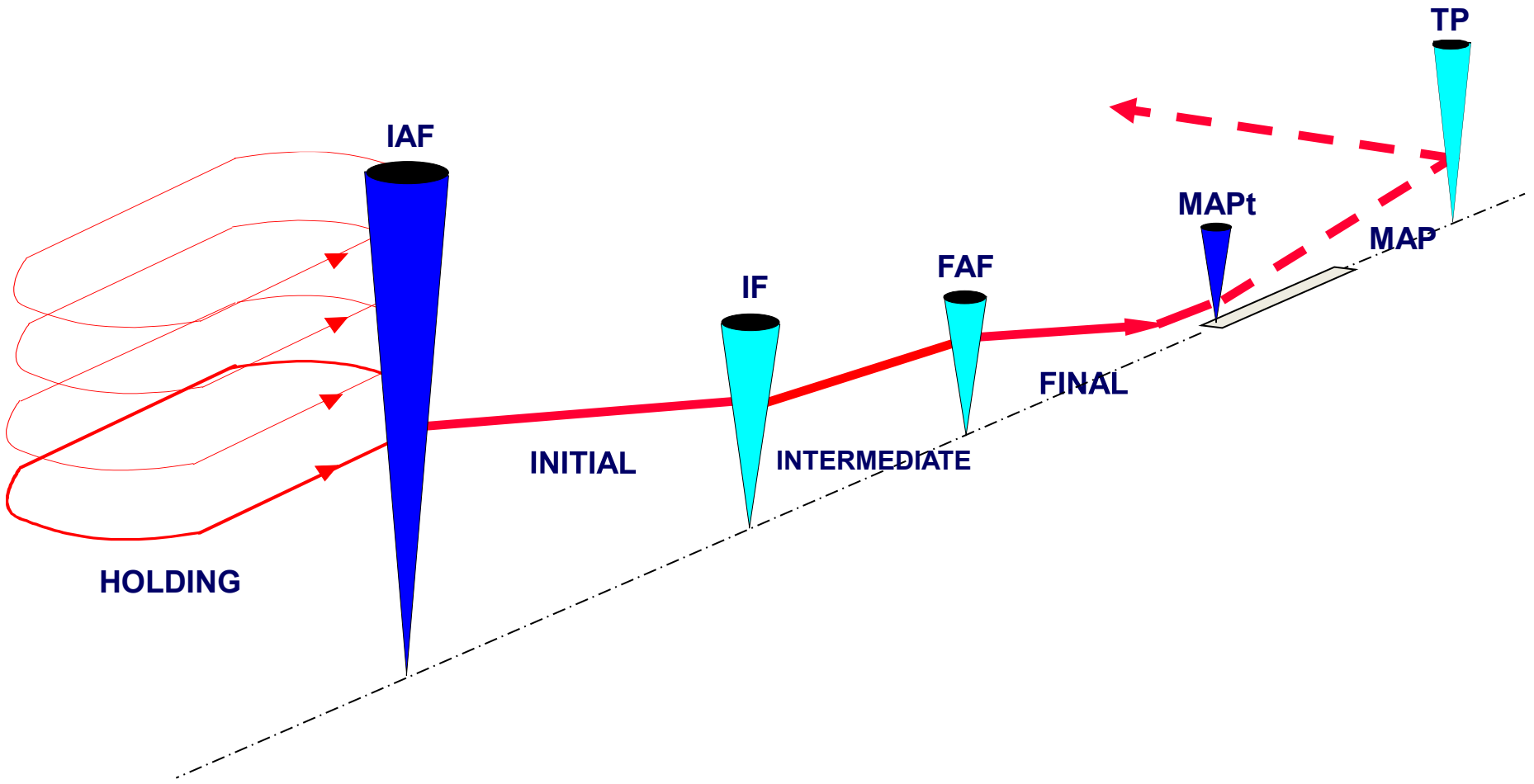
NPA MISSED APPROACH PROCEDURE

APAC FPP, ICAO

PURPOSE

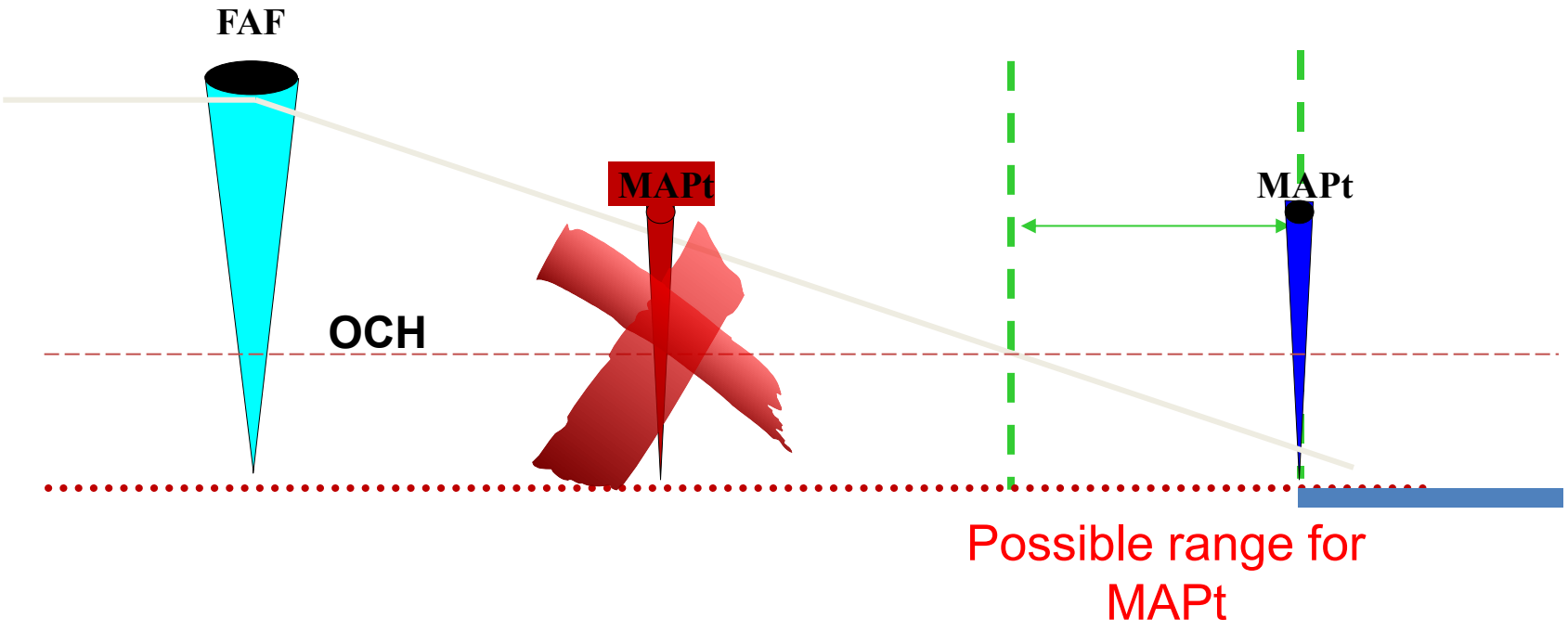
- To fly along a safe path in case of an unsuccessful attempt for an approach to land and in order to:
  - Join a Holding Pattern
  - Initiate another approach
  - Fly to an en-route point

OVERVIEW



OVERVIEW

- MAPt Location



OVERVIEW

- Straight MAP: FAT & MAP track differ by ≤ 15°
- Turning MAP: FAT & MAP track differ by >15°

CONTENTS

- 3 Phases:
  - Initial Phase – From the Earliest MAPt to the Start of Climb (SOC)
  - Intermediate Phase – Period of straight stable climb with 30m/98’ MOC
  - Final Phase – Begins when 50m/164’ MOC is achieved or a Turn is specified; and ends at e.g. Holding Fix

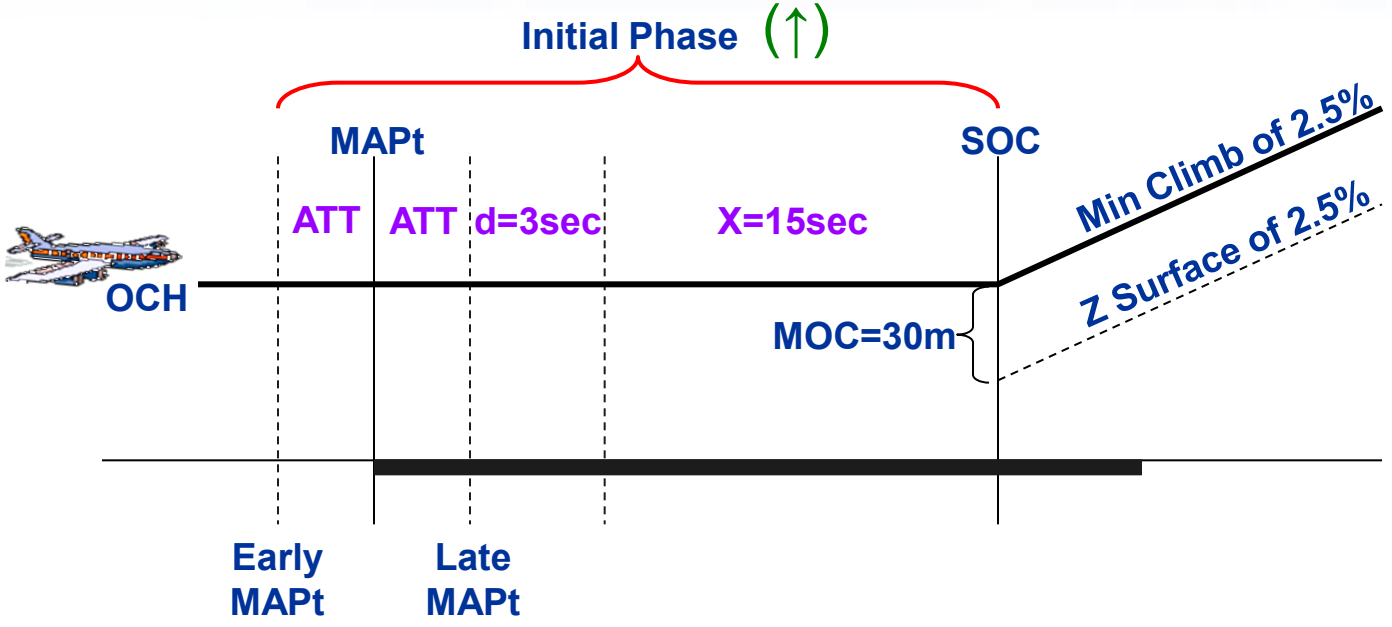
INITIAL PHASE

- It is a level transition segment during which the aircraft accelerates and configure to achieve 2.5% climb

- From: Early MAPt
- To: SOC (It is not a fix and it is never displayed on chart)

- 3 Components in the Initial Phase:
  - Early & Late ATT NAV Tolerance of the MAPt (No NAV TOL if the MAPt is over a facility)
  - Pilot Reaction (d=3 sec)
  - Aircraft Transition (x=15 sec)

INITIAL PHASE



- Parameters for Calculation:
  - Final Approach IAS converted to TAS at AD EL
  - Plus 10kts Tail Wind

INITIAL PHASE – EXERCISE 1

- Calculate the Distance (MAPt-SOC) for CAT C aircraft with AD EL of 2000' and NAV ATT of +/-0.3NM:

IAS (Final Approach) = 160kts

TAS (at 2000') = 160*1.0567 = 170kts

170kts + 10kts Tail Wind = 180kts

(d+x) = 180kts*18sec/3600 = 0.9NM

∴ **MAPt-SOC = 0.3+0.9 = 1.2NM** (↑)

- For the same RWY, calculate MAPt-SOC for CAT D:

∴ **MAPt-SOC = 0.3+1.03 = 1.33NM** (↑)

INITIAL PHASE – EXERCISE 2

- Calculate MAPt-SOC for CAT C aircraft with AD EL of 3000' Early ATT=0.75NM and Late ATT = 0.66NM:

∴ MAPt-SOC = 0.91+0.66 = 1.57NM

For the same MAPt in a procedure, MAPt-SOC is different for different CAT of aircraft. But bear in mind that SOC is not a fix and it is never displayed on chart…

INITIAL PHASE

Protection Area :

- Continuation from guidance on Final Segment
  - No change in track guidance allowed

- Continuation of final approach protection area

MOC:

- MOC of Final Segment

CONTENTS

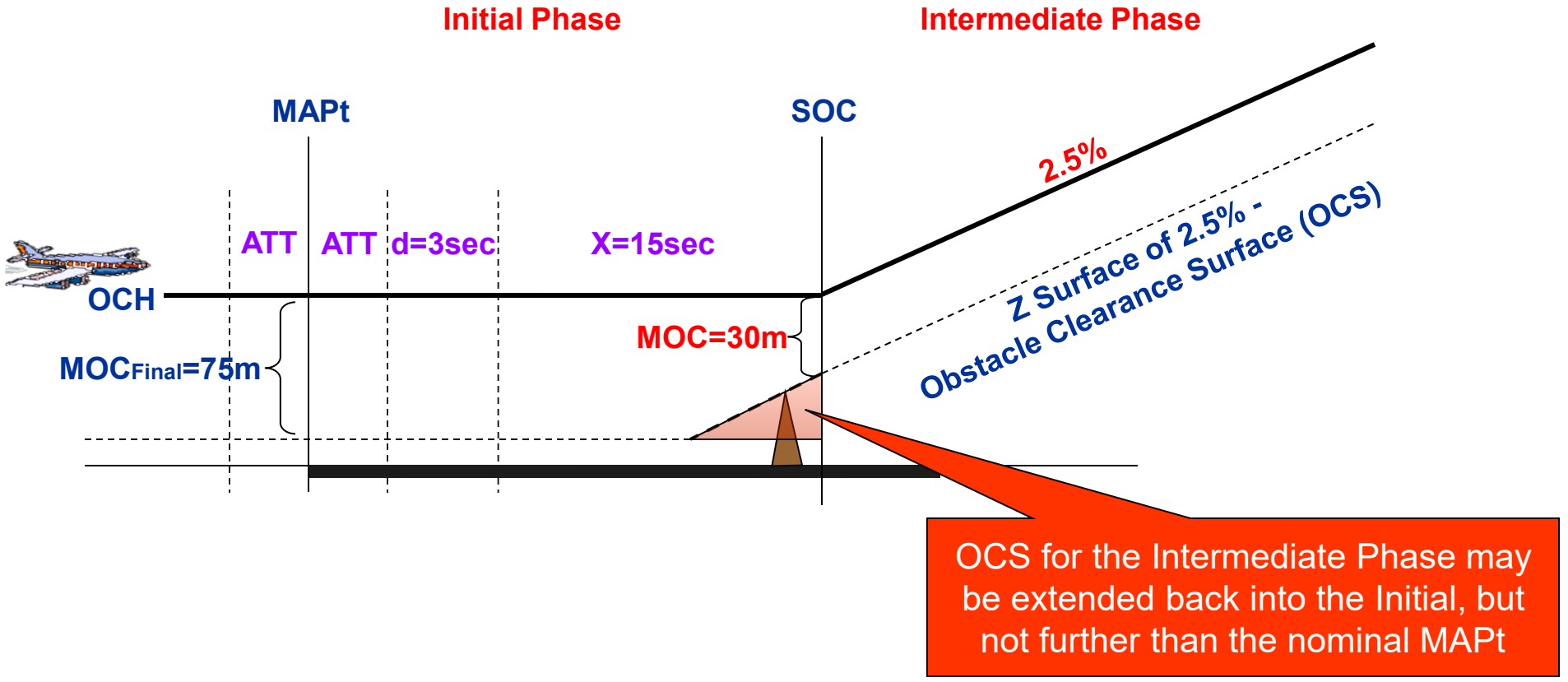
- 3 Phases:
  - Initial Phase
  - Intermediate Phase
  - Final Phase

INTERMEDIATE PHASE

- It is a stable and straight climb segment with minimum gradient of 2.5% (Max: 5%)
- Track can be changed by maximum of 15°
- Protection area based on track guidance from Final Approach Segment or from other suitable facilities

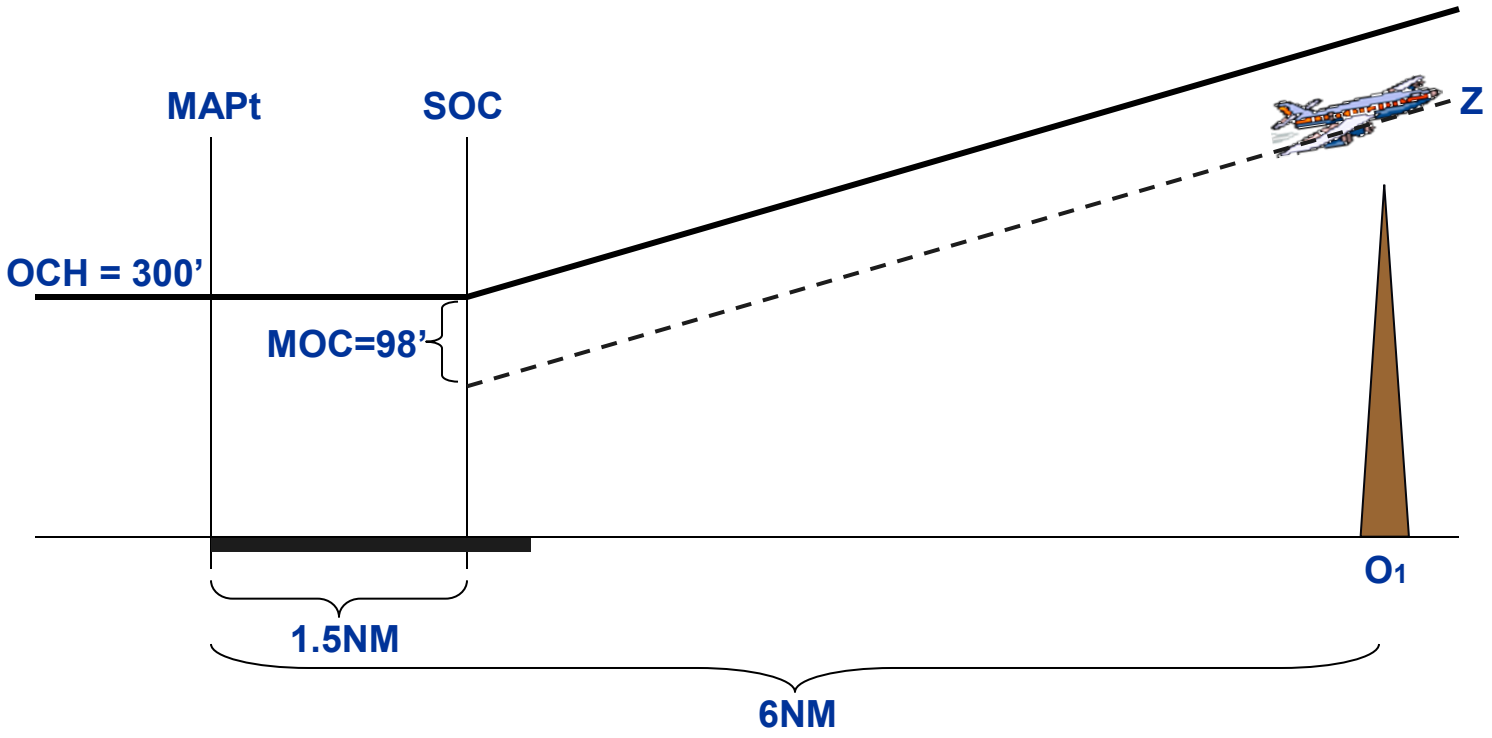
- MOC: 30m/98′
- Begins: SOC
- Ends: A point where 50m/164′ MOC is achieved & thereafter maintained and/or where a turn is designated (50m MOC is also required to designate a turn)

INTERMEDIATE PHASE



INTERMEDIATE PHASE – EXERCISE 1

- What is the maximum height of O_1 (H_{max})?

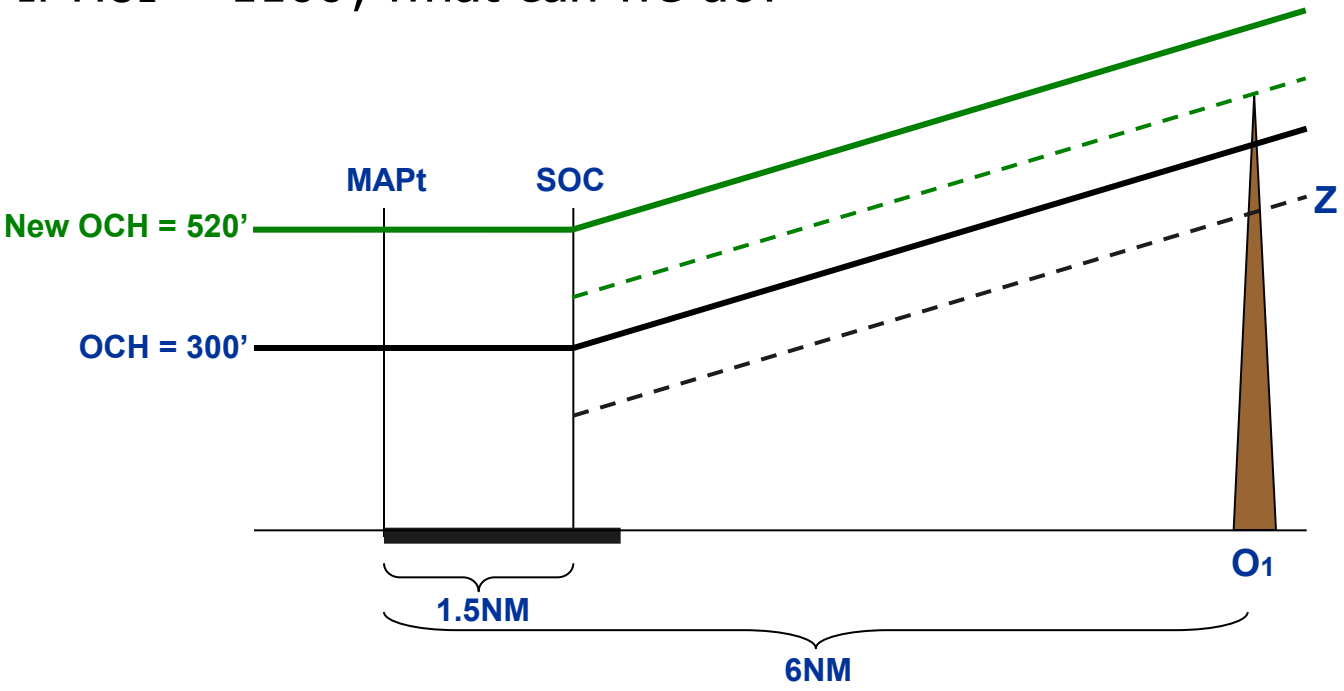


- Hint: Find the height of Z-Surface over O_1

  $Z_z = 202 + 683 = 885'$ (↓) $\therefore H_{max} = 885'$

INTERMEDIATE PHASE – EXERCISE 1

- If Ho_1 = 1100′, what can we do?



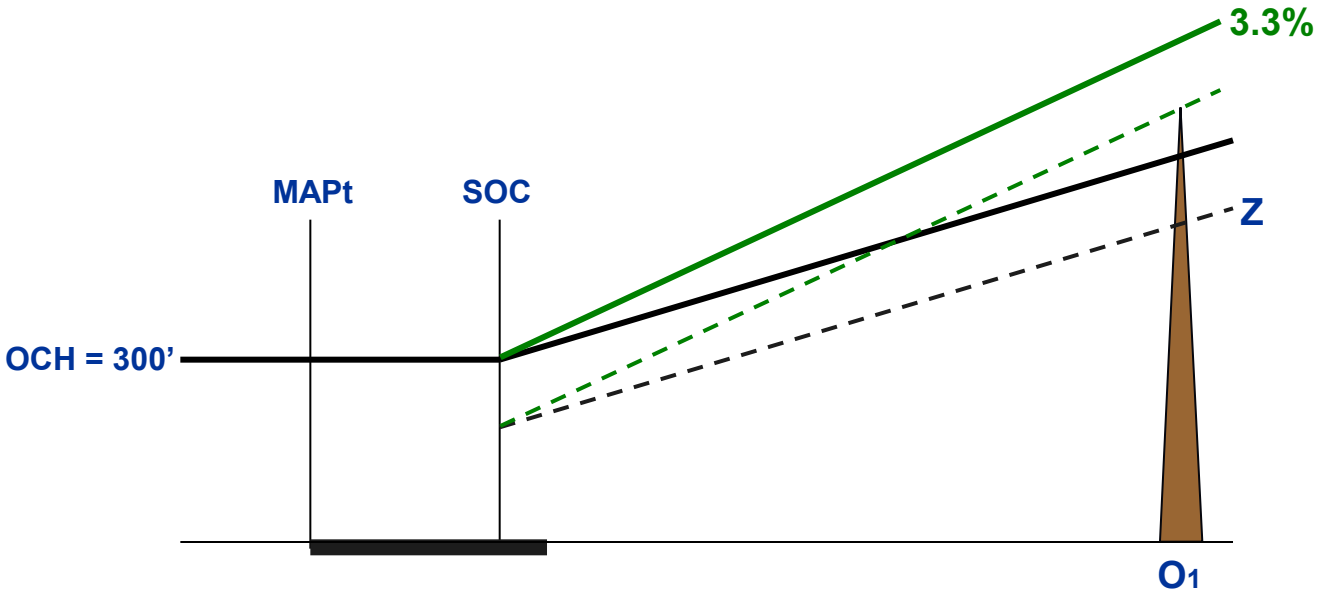
- Penetration: 1100-885 = 215′

  Method 1:

  New OCH = 300 + 215 = 515′ ≈ 520′ (↑)

Rare!
Not Preferable

INTERMEDIATE PHASE – EXERCISE 1



Method 2: Establish a new Climb Gradient

Hint: MAP Climb Gradient = ($RH_{A/C}$–OCH)/DIST

New Gradient = 3.3% (↑)

Publish: OCH for 2.5% = 520'

OCH for 3.3% = 300' (until passing 1198'..)

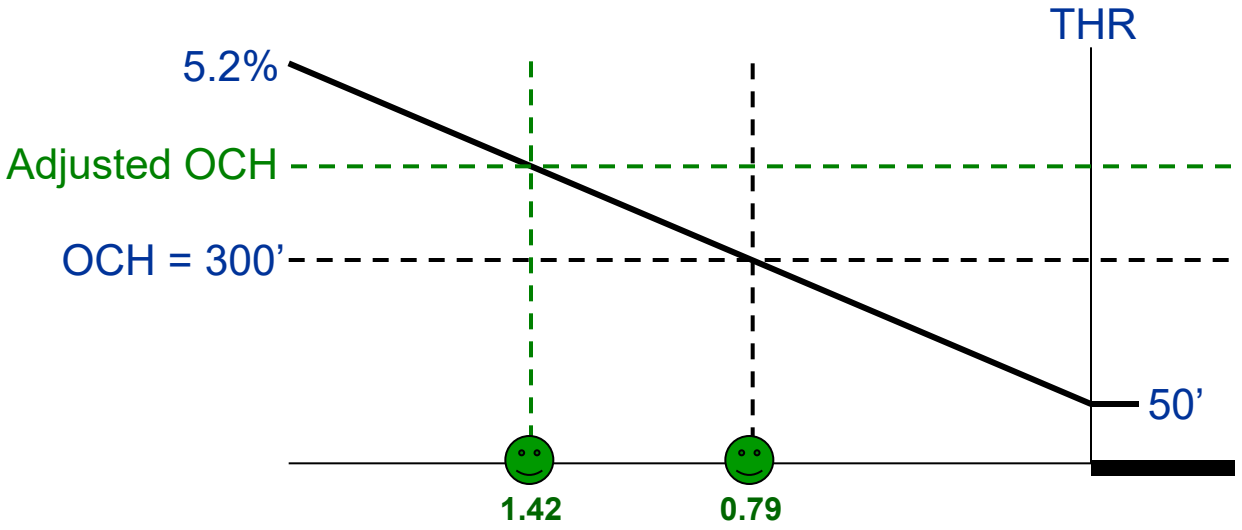
INTERMEDIATE PHASE – EXERCISE 1

Method 3: Move the MAPt

By 1.42NM (↑)

Quite Far!
Normally 1NM

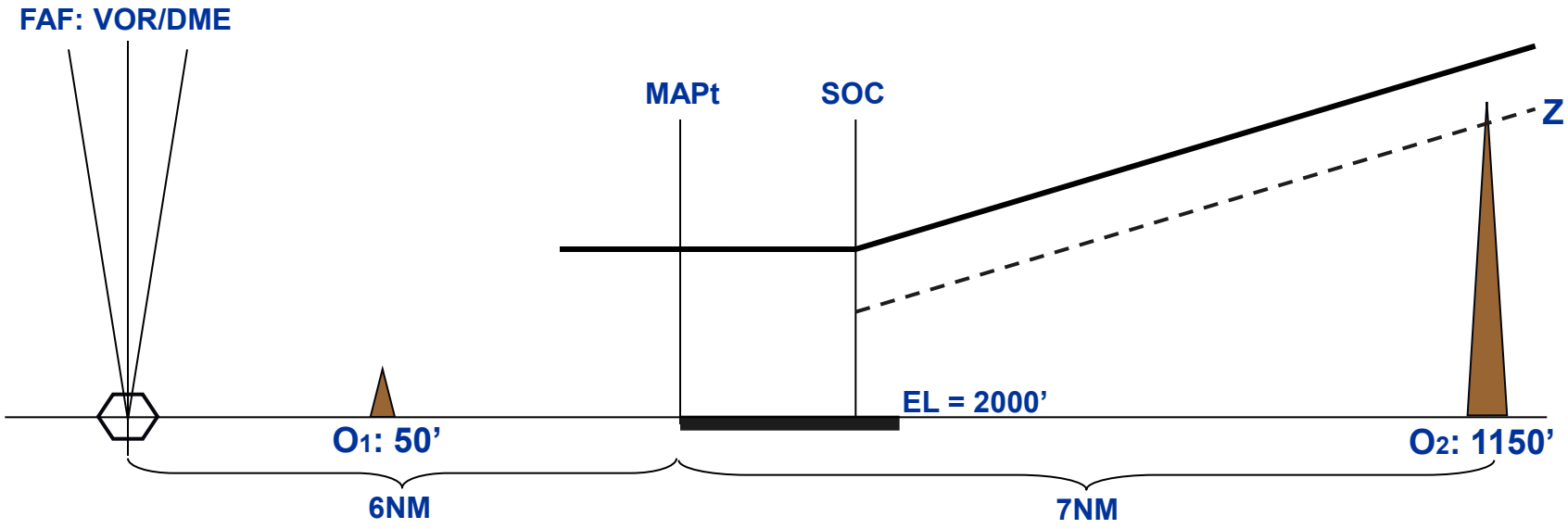
Earliest Location of MAPt?



∴ Earliest Location of MAPt = 0.79NM (↓)

INTERMEDIATE PHASE – EXERCISE 2

- Calculate OCH for CAT C:



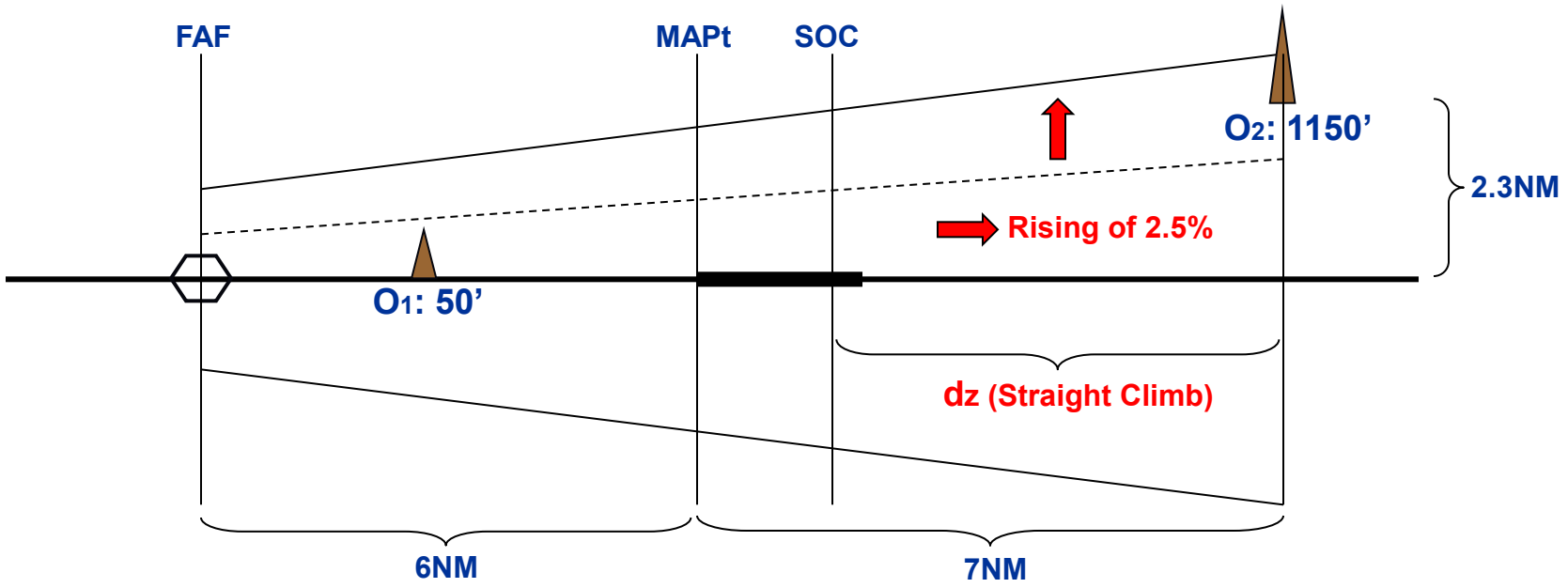
Hint: Calculate OCA/H for Final

Calculate OCA/H in MAP

If penetration, use methods 1-3 of Exercise 1

INTERMEDIATE PHASE – EXERCISE 2

- If O2 is off the CL by 2.3NM, any penetration?



CONTENTS

- 3 Phases:
  - Initial Phase
  - Intermediate Phase
  - Final Phase

FINAL PHASE

- **Begins when:**
  - **50m/164′ MOC is achieved**
  - **Or a Turn is specified**
- **Ends at:**
  - **Holding pattern**
  - **New approach**
  - **En-route**

FINAL PHASE

- Turn is required to
  - avoid obstacle in the direction of straight MAP
  - reach another trajectory
- Turning MAP
  - Track change from Final to MAP ＞15°
- Turn at a designated altitude/height
  - TNA/H
- Turn at a designated turning point
  - "TP"
- Turn over the MAPt

FINAL PHASE

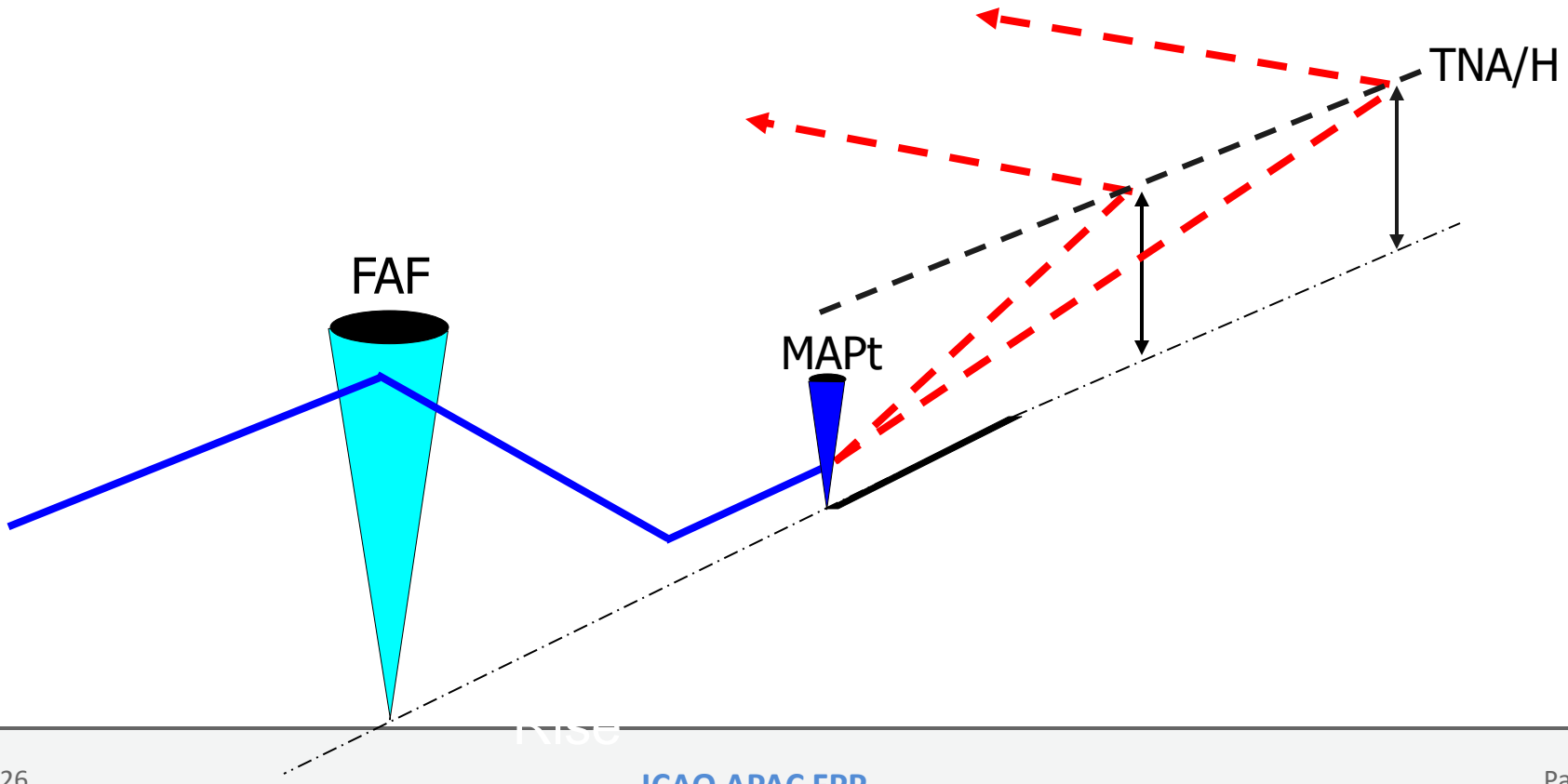
- **Parameters:**
  - **IAS: Final MAP Speed (may be reduced to Intermediate MAP Speed)**
  - **Altitude: AD EL + 1000′ (300m) or Defined TNA**
  - **Temperature: ISA +15°**
  - **Wind: 30kts**
  - **Pilot Reaction Time: 3 sec**
  - **Bank Time (15° Bank Angle): 3 sec**
  - **MOC: 50m**

FINAL PHASE – TNA/H

- Turn at Altitude/Height (TNA/H)
  - Aircraft continues on the Final Track until reaching a specified Altitude/Height (TNA/H), then to a specified track
- Early Turn Point
  - Early MAPt Tolerance
  - It is the early ATT for the FAF unless a statment on the Approach Chart that prohibits turns prior to the MAPt is included ('No turn prior to MAPt')
- Late Turn Point
  - Point (Distance) where the aircraft climb gradient reaches the TNA/H, plus 'C' (6 sec)
- Turn Initiation Area (TIA) is bounded by:
  - Early TP (Early MAPt)
  - Point where the aircraft climb gradient reaches the TNA/H
  - On the sides by the trapeziod for the NAV guidance

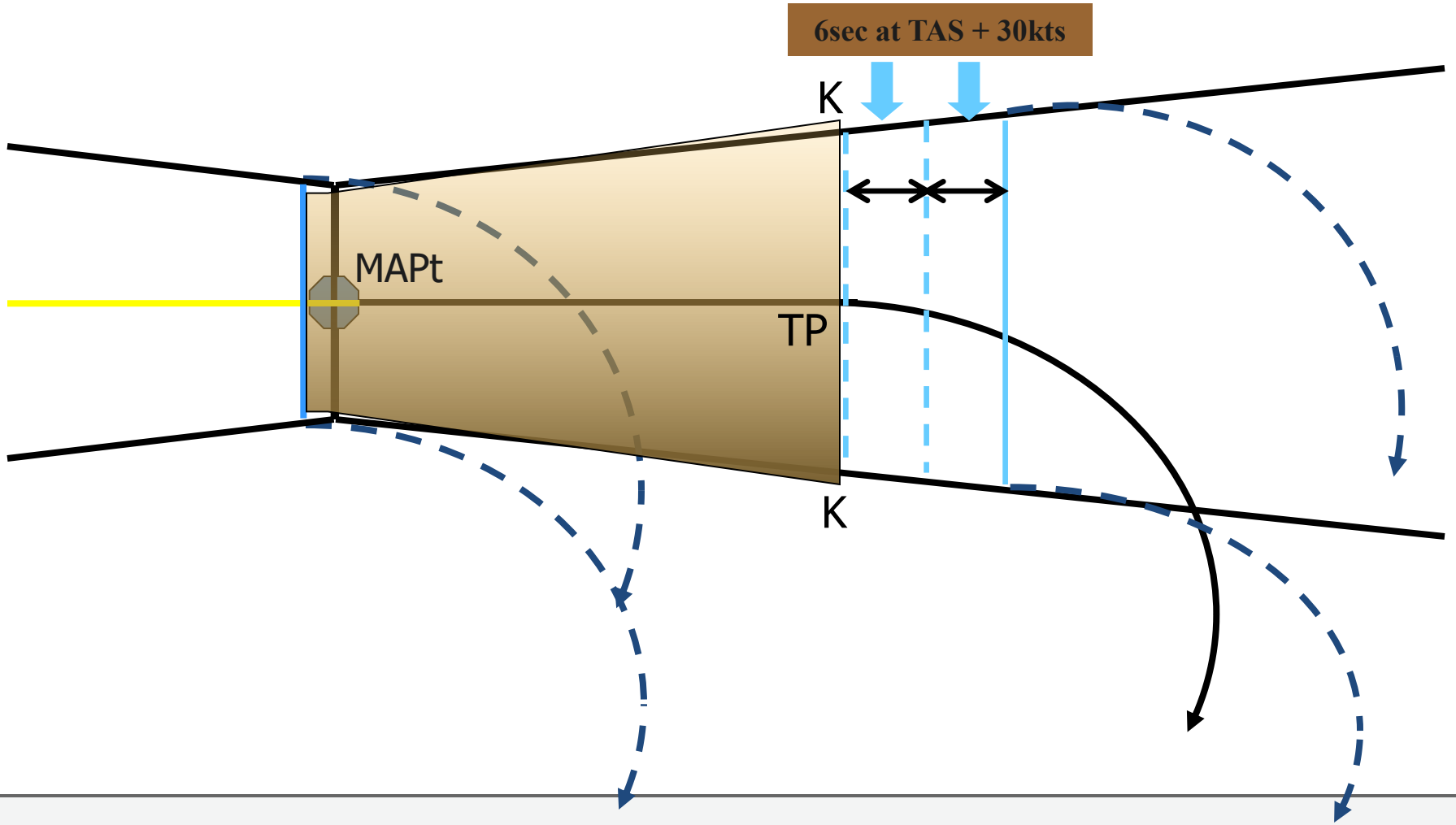
FINAL PHASE – TNA/H

- Turning at Altitude/Height (TNA/H)
  - E.g. At 1000’ turn left to ... & no turn before the MAPt



FINAL PHASE – TNA/H

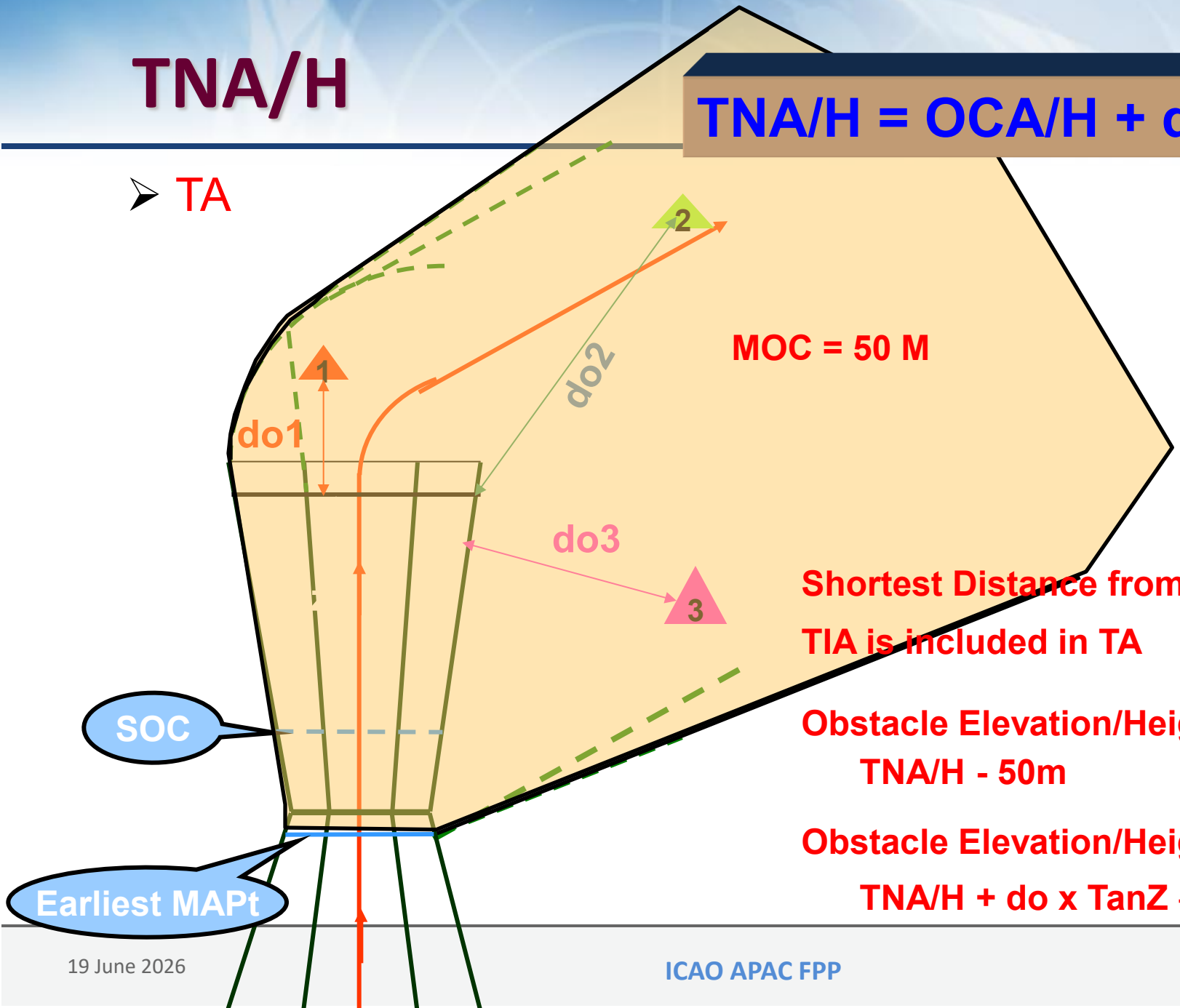
- TIA: All points where turn can be initiated



TNA/H

TNA/H = OCA/H + dz x TanZ

- TA



MOC = 50 M

Shortest Distance from TIA Boundary

TIA is included in TA

Obstacle Elevation/Height in TIA

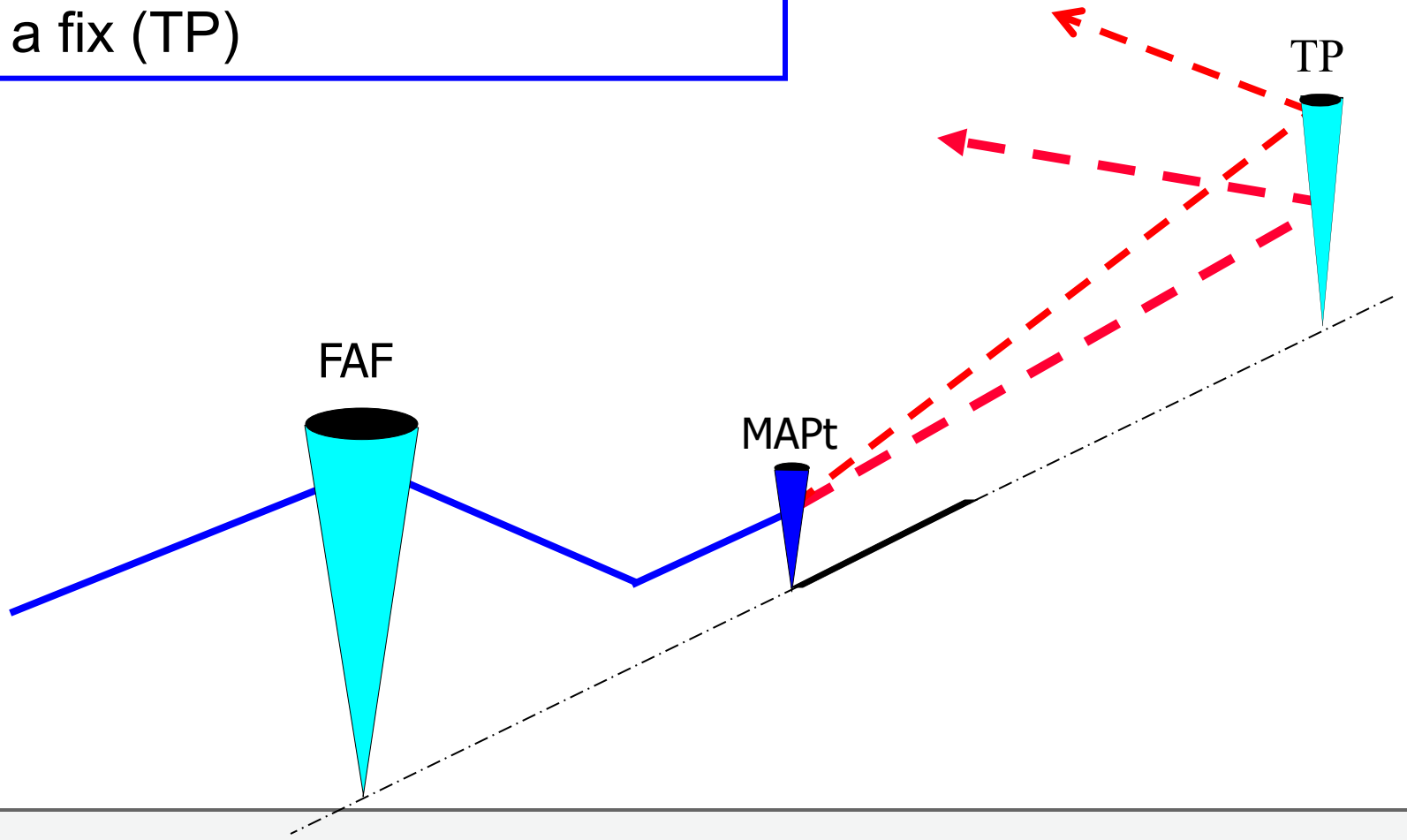
TNA/H - 50m

Obstacle Elevation/Height in TA

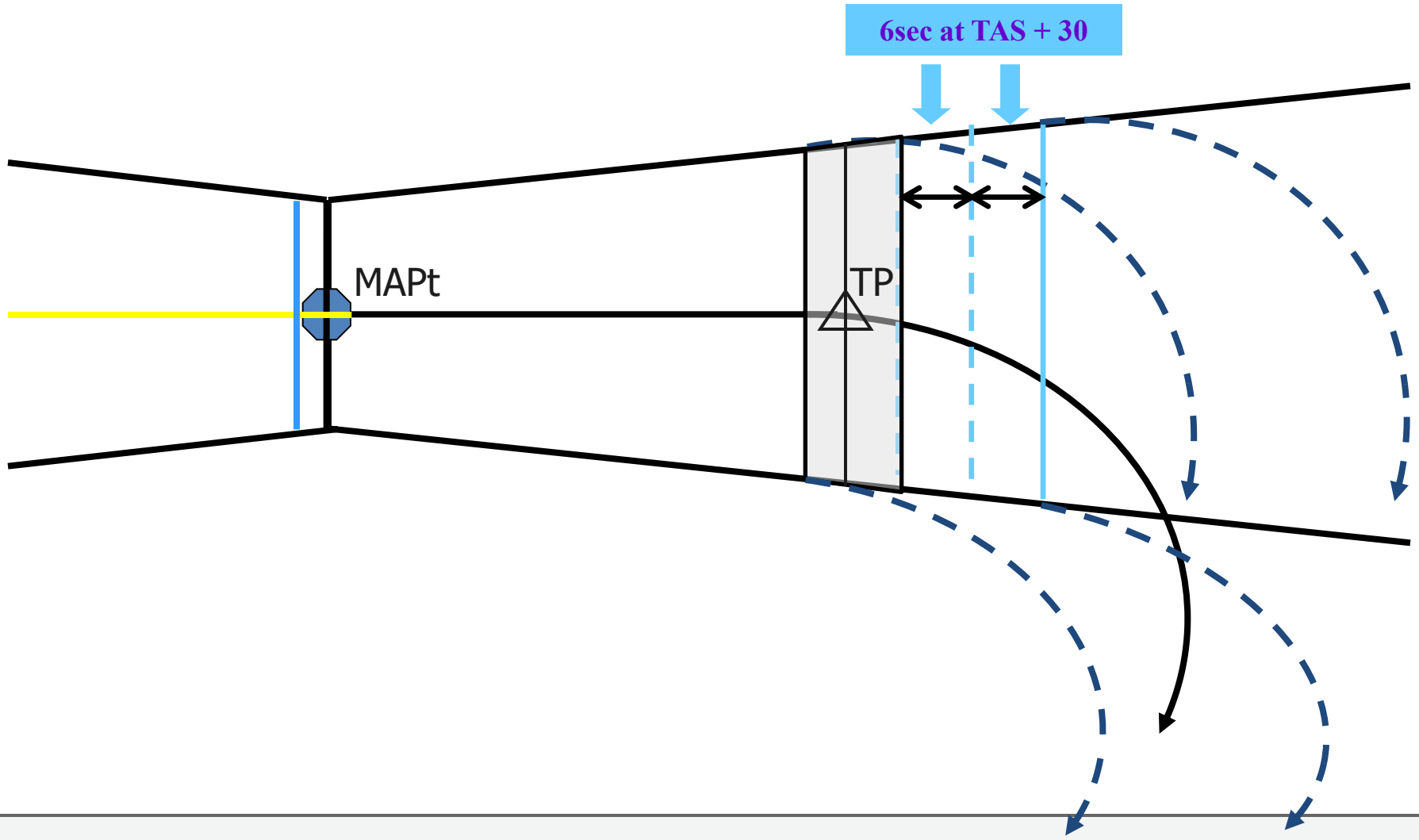
TNA/H + do x TanZ - MOC

FINAL PHASE – TP

Aircraft turns when flying over a fix (TP)

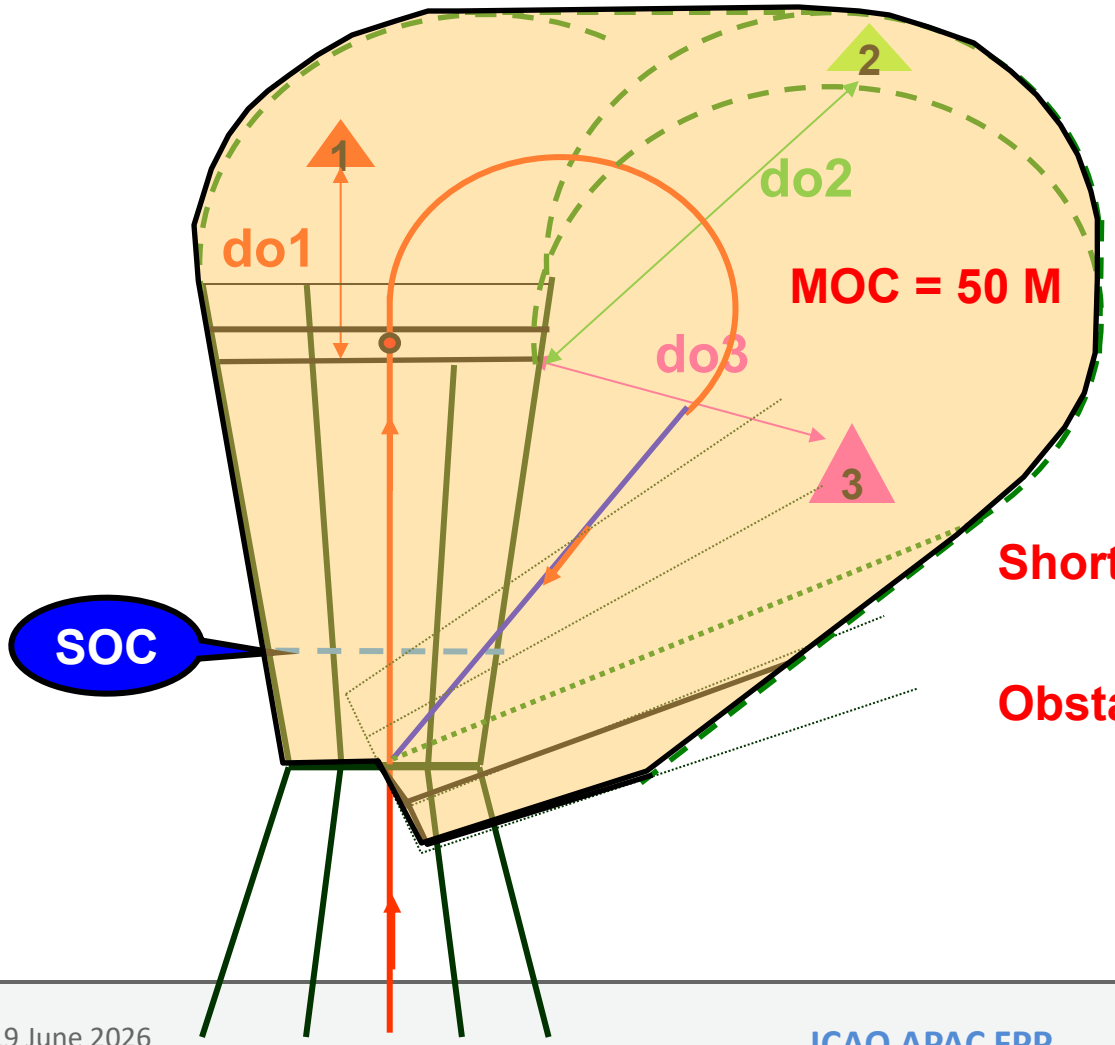


FINAL PHASE – TP



TP

- TA



Shortest Distance from KK Line

Obstacle Elevation/Height in TA

OCA/H + (dz + do) x TanZ - MOC


故宫博物院