Tentative Agenda

	9:00-10:30 (90mins)	10:45-12:00 (90mins)	Lunch	13:20-14:50 (90mins)	15:00-16:30 (90mins)
15 June 2026 Monday	Registration & Introduction	Review of Pre-course Assignment		General Overview -Aircraft Classification -MOC	Speed Conversion* & Turn Calculation*
16 June 2026 Tuesday	Wind Effect & Turn Parameters	Wind Effect* & Turn Parameters*		Fix Tolerance	Fix Tolerance
17 June 2026 Wednesday	NPA -General Criteria Initial Segment	NPA Initial Segment*		NPA Intermediate Segment	NPA Intermediate Segment*
18 June 2026 Thursday	NPA Final Segment	NPA Final Segment* OCA/H*		NPA Final Segment* OCA/H* NPA VSS	NPA Final Segment* OCA/H* NPA VSS
19 June 2026 Friday	Missed Approach -Initial Phase	Missed Approach -Intermediate Phase -Turning MAP		Missed Approach -Intermediate Phase -Turning MAP	Missed Approach -Intermediate Phase* -Turning MAP

Notes:

1. All scheduling is in Beijing time(UTC+8).
2. Topics with * will be followed by a short practical exercise.
3. Each presentation is followed by a 10-minute Q&A session.

WIND EFFECT

APAC FPP, ICAO

OBJECTIVES

- At the end of the lecture, student is expected to know:
  - Wind Effect on Aircraft Trajectory
  - How to construct a Wind Spiral
  - How to construct a Bounding Circle

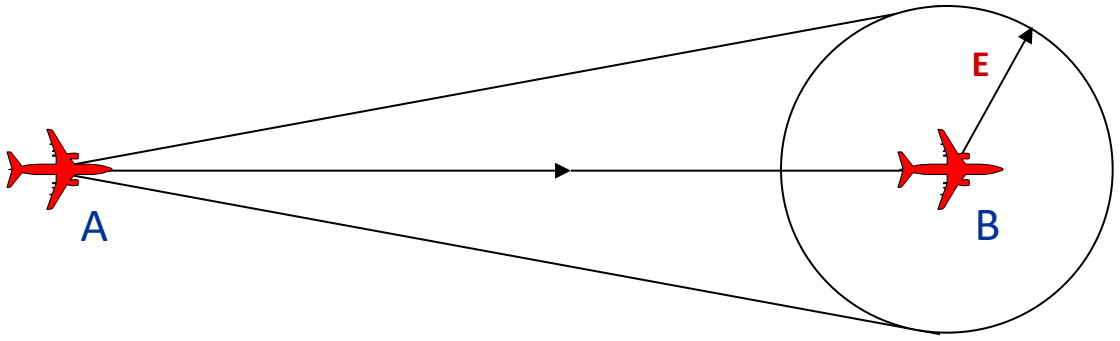
WIND EFFECT

- It is practically impossible to assume how the pilot will correct the effective wind drift. For that reason, it has been decided to take into account the flight paths resulting from a non-corrected wind **drift**.

WIND EFFECT

ALONG A DEAD RECKONING (DR) TRACK

- Wind effect is applied omni-directionally around the position of the aircraft. It gives the maximum deviation around the nominal (theoretical) position

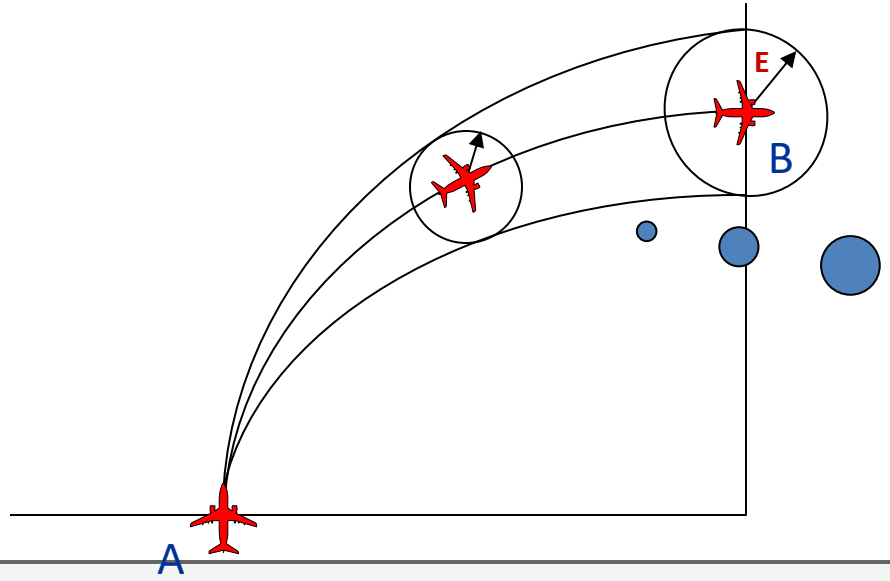


E: Distance the aircraft is blown (Wind Effect)

WIND EFFECT

DURING A TURN

- The outer and inner boundaries of a turn protection area are the spirals resulting from the use of an omni directional wind effect applied along the nominal flight path (path in still air) during the turn



How to construct a turn protection area??

WIND EFFECT

- Wind speed is given by a formula depending on the altitude. It is the result of a general survey conducted all over the world:

$$W = 2h + 47$$

(h: in thousands of ft)

- States which can organize a national survey are allowed to produce their own formulas.

WIND EFFECT

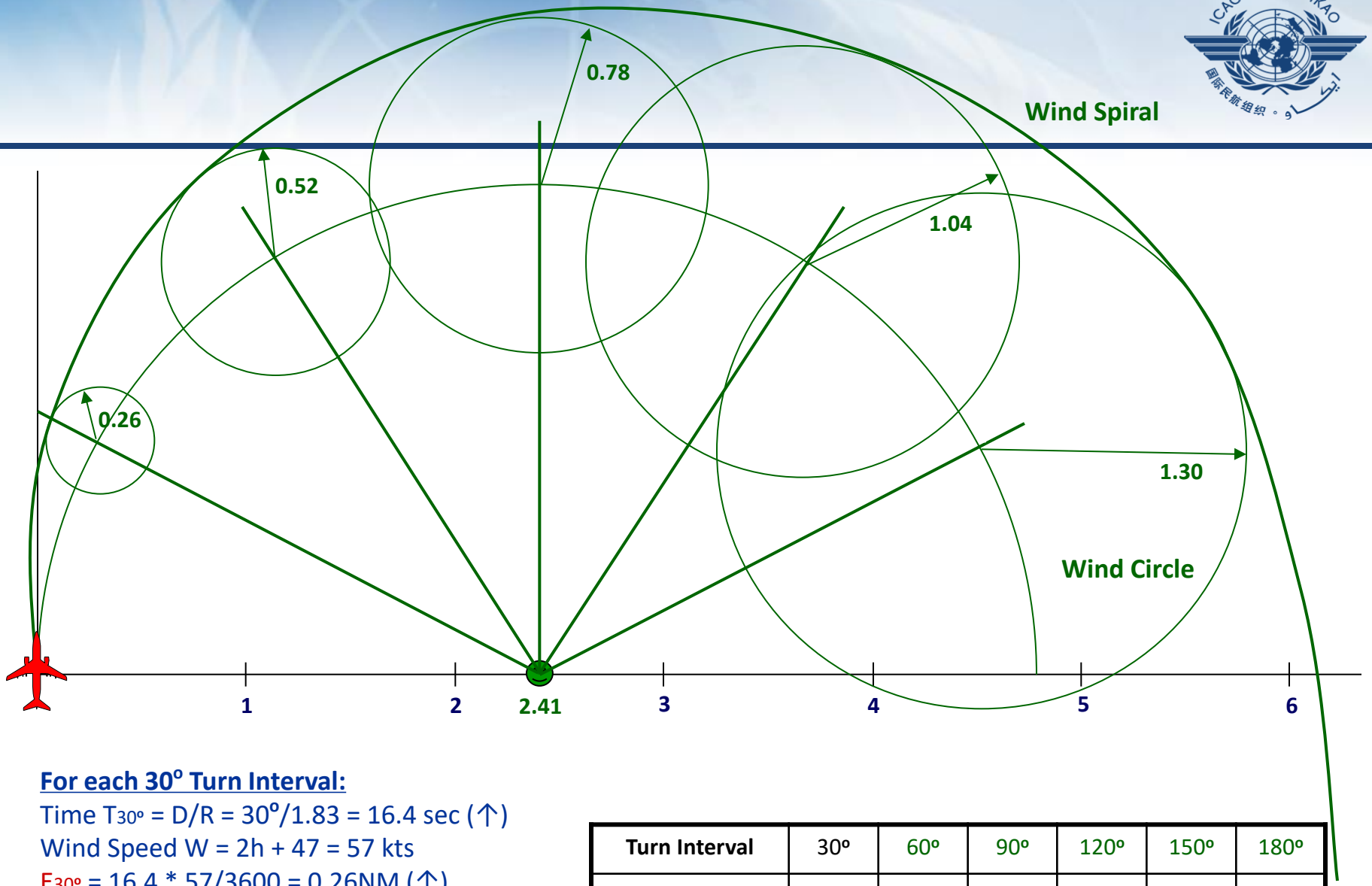
- The wind effect (E) is calculated for each point of the trajectory by multiplying the wind speed by the time of flight from the last checked position
- A checked position is a point along the path where the pilots can precisely check its position e.g. *overflying a navigation facility/fix*

$$E = W \times T$$

- E in m
- T in time of flight in s
- W in m/s

WIND EFFECT – EXERCISE 1

- How to calculate E and construct the turn protection area?
- For a CAT D aircraft turning at 5000’ in Initial Segment:
  - IAS = 250 kts
  - TAS = 250 * 1.1059 = 277 kts (↑)
  - R = 1.83 °/s (↓)
  - r = 2.41NM(↑)



For each 30° Turn Interval:

Time $T_{30°}$ = D/R = 30°/1.83 = 16.4 sec (↑)

Wind Speed W = 2h + 47 = 57 kts

$E_{30°}$ = 16.4 * 57/3600 = 0.26NM (↑)

Turn Interval	30°	60°	90°	120°	150°	180°
E	0.26	0.52	0.78	1.04	1.30	…

For smaller Turn Interval…

WIND EFFECT

- Wind Spiral

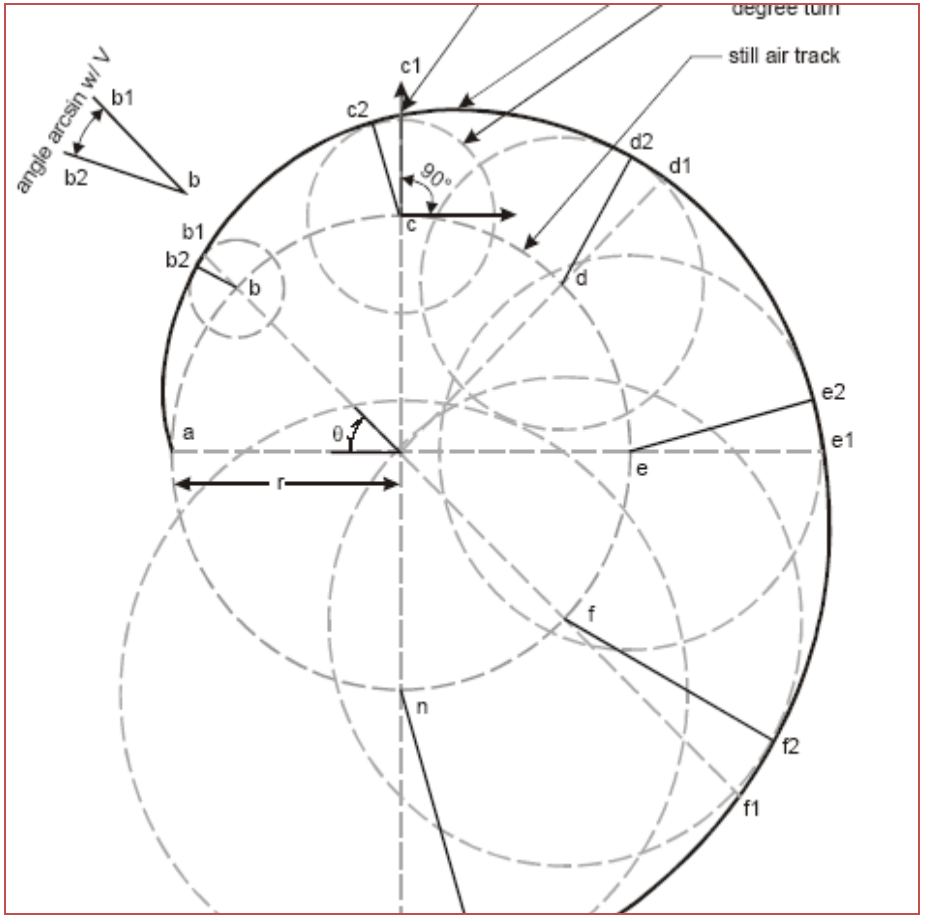


Figure I-2-3-4

WIND EFFECT

- Bounding Circle

Bounding Circles – For Obstacle Consideration

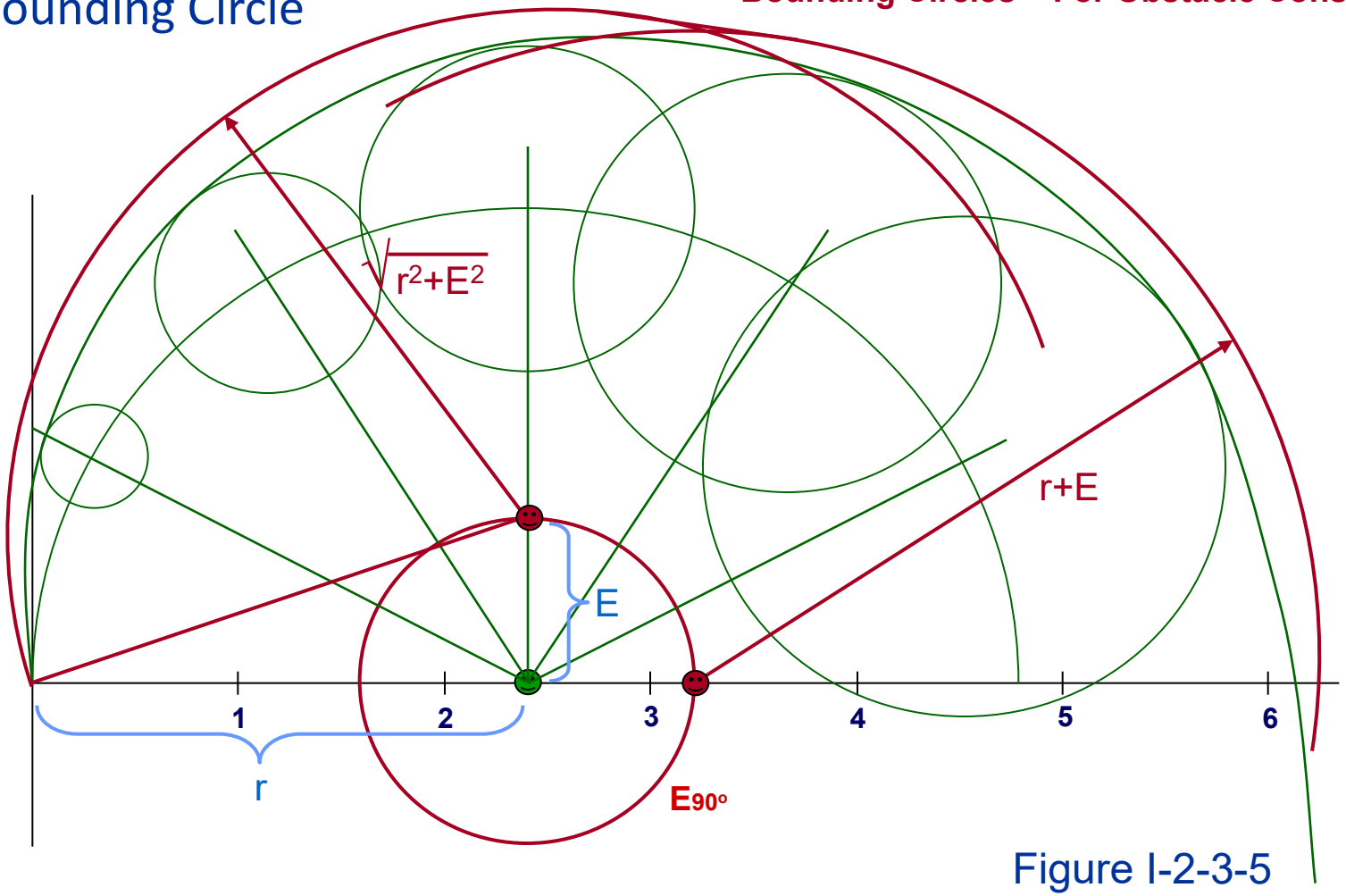


Figure I-2-3-5

WIND EFFECT – EXERCISE 2

- For CAT C aircraft turning at 6000’ in Initial Segment, Construct Wind Spiral and Bounding Circles:
  - IAS = 240 kts
  - TAS = 240 * 1.1231 = 270 kts (↑)
  - R = 1.88 °/s (↓)
  - r = 2.29NM(↑)
  - Wind = 59 kts
  - T_{30^o} = 30/1.88 = 15.96 (↑)
  - E_{30^o} = 59 * 15.96/3600 = 0.27NM (↑)

Turn Interval	30°	60°	90°	120°	150°	180°
E	0.27	0.54	0.81	1.08	1.35	1.62

  - $\sqrt{r^2+E^2}$ = 2.43 (↑)
  - r+E = 3.10 (↑)

WIND EFFECT – EXERCISE 2