

Area of Operation **VIII** - Task **D**

Circling Approach

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Key References:

- Instrument Flying Handbook
- Instrument Procedures Handbook
- AIM

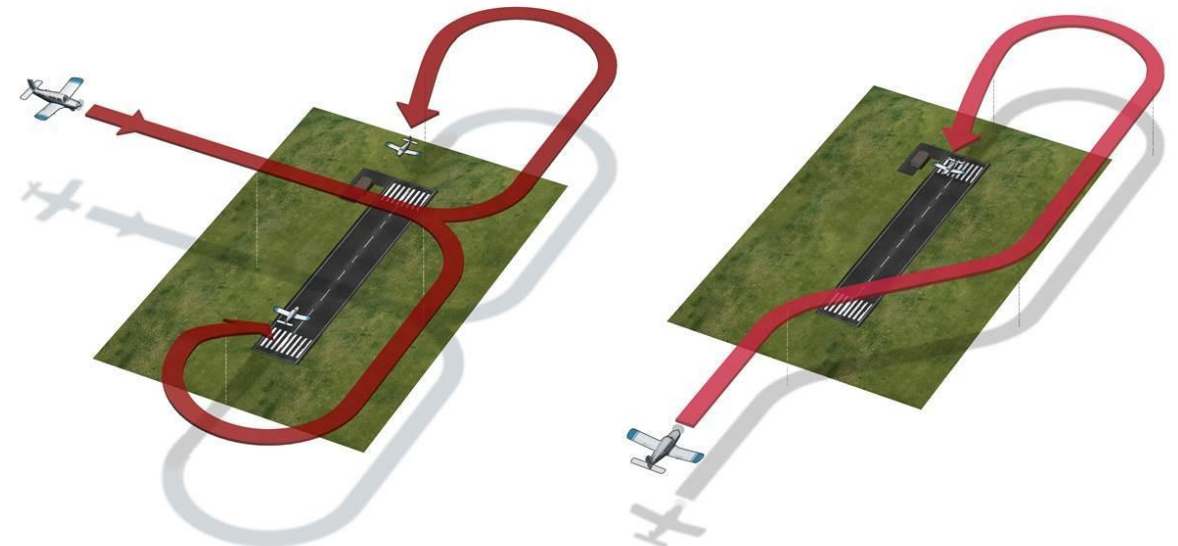
- **What:** Visual maneuver to land after an IFR approach. Usually offers the highest minimums.
- **Why:** Multiple scenarios require the pilot to maneuver the airplane within the airport environment for landing
- **Scenarios for use of a Circling Approach**
 - Intention to land in a different runway than the published approach (e.g. winds, weather, no app avail, obstructions, etc)

- When only a Circling Approach is published (e.g. **VOR-A**)

- ✓ >30° difference between the approach course and rwy centerline
- ✓ >400ft/nm descent gradient from FAF to TCH (too steep)
- ✓ Runway not clearly defined on the airfield

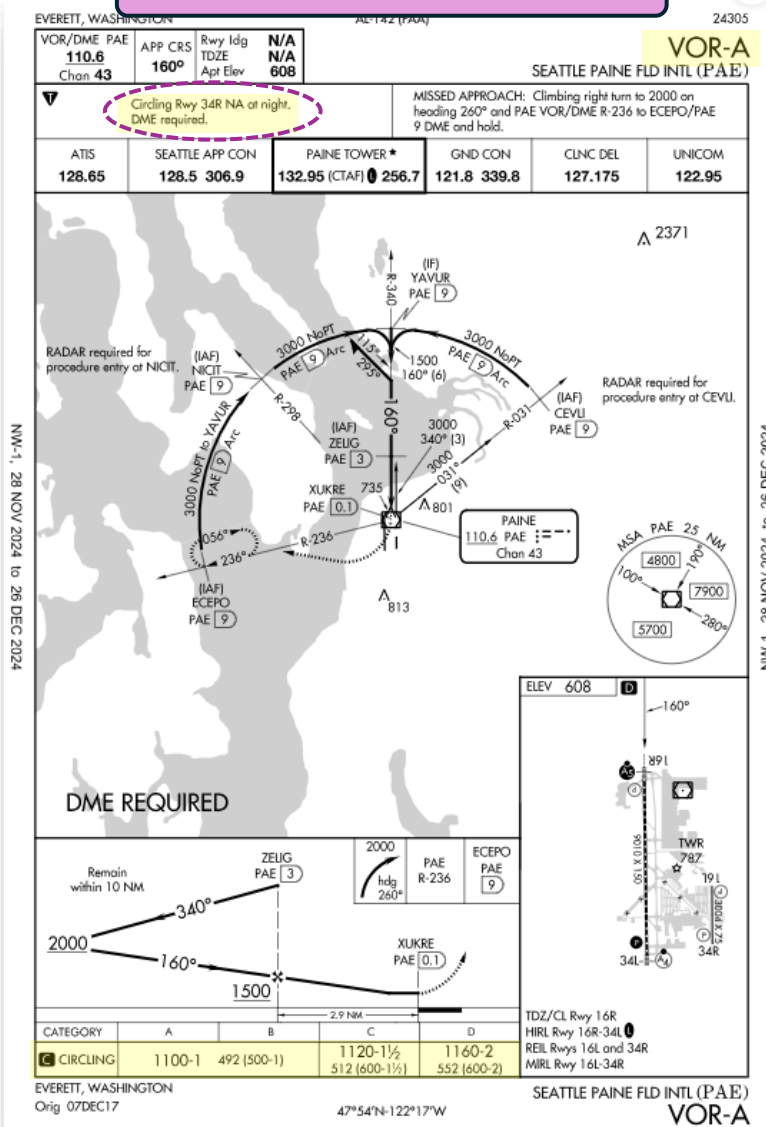
If towered airport, expect tower to give you instructions on which side to circle

MEDFORD, OREGON		AL-251 (FAA)		VOR-A	
VORTAC	113.6	APP CRS	140°	Rev Idg	N/A
TDZE	1335	TDZE	N/A	TDZE	N/A
Chon	83	Chon	83	Chon	83
MISSED APPROACH: Climb to 3000, then descend to 2500.					
MEDFORD, OREGON		AL-251 (FAA)		LOC/DME BC-B	
VORTAC	110.3	APP CRS	323°	Rev Idg	N/A
TDZE	1335	TDZE	N/A	TDZE	N/A
Chon	40	Chon	40	Chon	40
MISSED APPROACH: Climb to 3000, then descend to 2500.					
MEDFORD, OREGON		AL-251 (FAA)		VOR/DME-C	
VORTAC	113.6	APP CRS	325°	Rev Idg	N/A
TDZE	1335	TDZE	N/A	TDZE	N/A
Chon	83	Chon	83	Chon	83
MISSED APPROACH: Climb to 3000, then descend to 2500.					
MEDFORD, OREGON		AL-251 (FAA)		RNAV (GPS)-D	
APP CRS	328°	Rev Idg	N/A	TDZE	N/A
TDZE	N/A	TDZE	N/A	TDZE	N/A
Chon	83	Chon	83	Chon	83
Circling to Rwy 10 NA at night. DME/DME RNP-0.3 NA. Visibility reduction by helicopters NA. When local altimeter setting not received, procedure NA.					
ATIS	127.25	CASCADE APP CON*	124.3 379.9	MEDFORD TOWER*	119.4 (CTAF) 257.6
				GND CON	121.8
				UNICOM	122.95

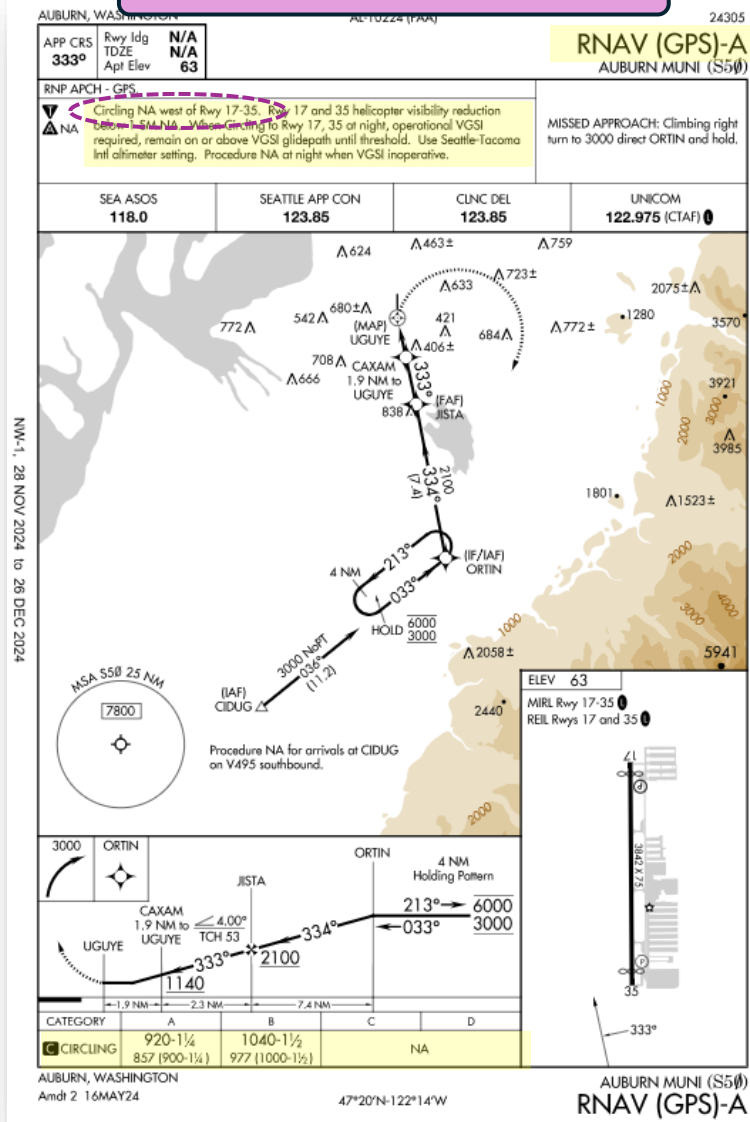


2. Approach Charts

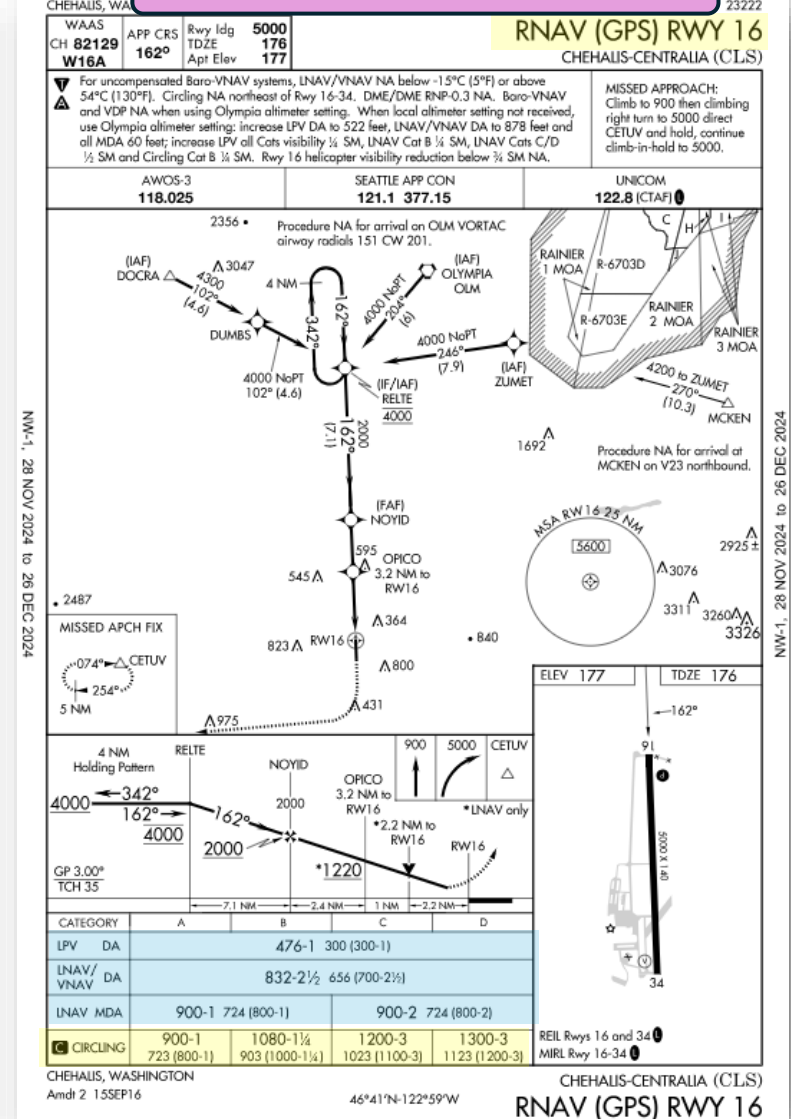
Runway not defined




Too Step (417ft/nm), not aligned



Landing on 34 → Circling is the only option



3. Protected Circling Area

- Aircraft must remain in their respective category **protected area**
 - The faster the aircraft, the larger the protected area
 - **Minimums provide at least 300' of obstacle clearance in the protected area**
- **Protected area depends on when the approach was designed**
 - Standard Circling Minimums
 -  Enhanced Circling Minimums (developed after late 2012)
 - *To account for TAS when MDAs in higher altitudes*
 - Dimension located on B2 of the TPP

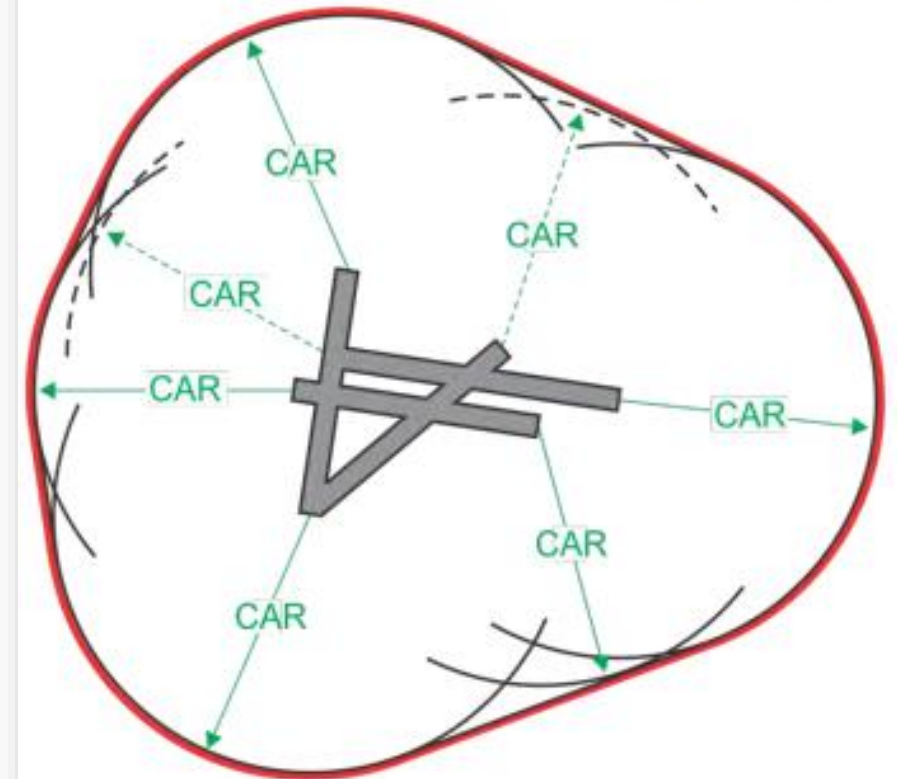
Obstacle Evaluation Area (OEA) dictates the MDA

- Lines equal to the CAR (**Circling Approach Radius**) are drawn from each landing threshold and then connected


$$CAR = 2 \times \frac{(V_{KTAS}+25)^2}{\tan(bank_{angle}) \times 68625.4} + S$$

CAT	Bank _{angle}	Straight Segment (S)
A	25	0.4
B	25	0.4
C	20	0.5
D	20	0.6
E	22	0.7

Figure 2-7-1. Construction of Circling Approach OEA



3. Protected Circling Area

- Stay within that distance and you are protected
 - For most of GA trainers (e.g. C172) that's 1.3nm
- Expanded circling radius are denoted by  in the plate

		1120			TCH 53
		2.4 NM	2.3 NM	7 NM	
CATEGORY	A	B	C	D	
LPV DA	459-1 1/8	396 (400-1 1/8)		NA	
LNAV/VNAV DA	702-1 3/4	639 (700-1 3/4)		NA	
LNAV MDA	740-1	677 (700-1)		NA	
CIRCLING	920-1 1/4 857 (900-1 1/4)	1040-1 1/2 977 (1000-1 1/2)		NA	


6000	←315°	1600	I-BFI 4.9	I-BFI 3.4	I-BFI 1.7
2200	135°	1600	RADAR		
GS 3.00°		1600			
TCH 39					
		5.4 NM	1.6 NM	1.6 NM	1.7 NM
CATEGORY	A	B	C	D	
S-ILS 14R*		308/40	290 (300-3/4)		
S-LOC 14R	600/40	582 (600-3/4)	600-1 3/4	582 (600-1 3/4)	
CIRCLING	760-1 738 (800-1)	880-1 1/4 858 (900-1 1/4)	960-2 3/4 938 (1000-2 3/4)	960-3 938 (1000-3)	

TERMS/LANDING MINIMA DATA 00000

CIRCLING APPROACH OBSTACLE PROTECTED AIRSPACE


The circling MDA provides vertical obstacle clearance during a circle-to-land maneuver. The circling MDA protected area extends from the threshold of each runway authorized for landing following a circle-to-land maneuver for a distance as shown in the tables below. The resultant arcs are then connected tangentially to define the protected area.

STANDARD CIRCLING APPROACH MANEUVERING RADIUS

Circling approach protected areas developed prior to late 2012 used the radius distances shown in the following table, expressed in nautical miles (NM), dependent on aircraft approach category. The approaches using standard circling approach areas can be identified by the absence of the  symbol on the circling line of minima.

Circling MDA in feet MSL	Approach Category and Circling Radius (NM)				
	CAT A	CAT B	CAT C	CAT D	CAT E
All Altitudes	1.3	1.5	1.7	2.3	4.5

EXPANDED CIRCLING APPROACH MANEUVERING AIRSPACE RADIUS

Circling approach protected areas developed after late 2012 use the radius distance shown in the following table, expressed in nautical miles (NM), dependent on aircraft approach category, and the altitude of the circling MDA, which accounts for true airspeed increase with altitude. The approaches using expanded circling approach areas can be identified by the presence of the  symbol on the circling line of minima.

Circling MDA in feet MSL	Approach Category and Circling Radius (NM)				
	CAT A	CAT B	CAT C	CAT D	CAT E
1000 or less	1.3	1.7	2.7	3.6	4.5
1001-3000	1.3	1.8	2.8	3.7	4.6
3001-5000	1.3	1.8	2.9	3.8	4.8
5001-7000	1.3	1.9	3.0	4.0	5.0
7001-9000	1.4	2.0	3.2	4.2	5.3
9001 and above	1.4	2.1	3.3	4.4	5.5

4. How to Circle

Use sound judgment → Circling may require maneuvers at low altitude, at low airspeed, and in marginal weather

Circling maneuvers may be made while VFR or other flying is in progress at the airport

1. ATC/Tower Clearance for the Approach

- If towered airport → Tower provides circling instructions/clearance
- Comply with clearances and restrictions – if unsafe or not understood, query ATC

2. Passing the FAF, descend to circling minimums

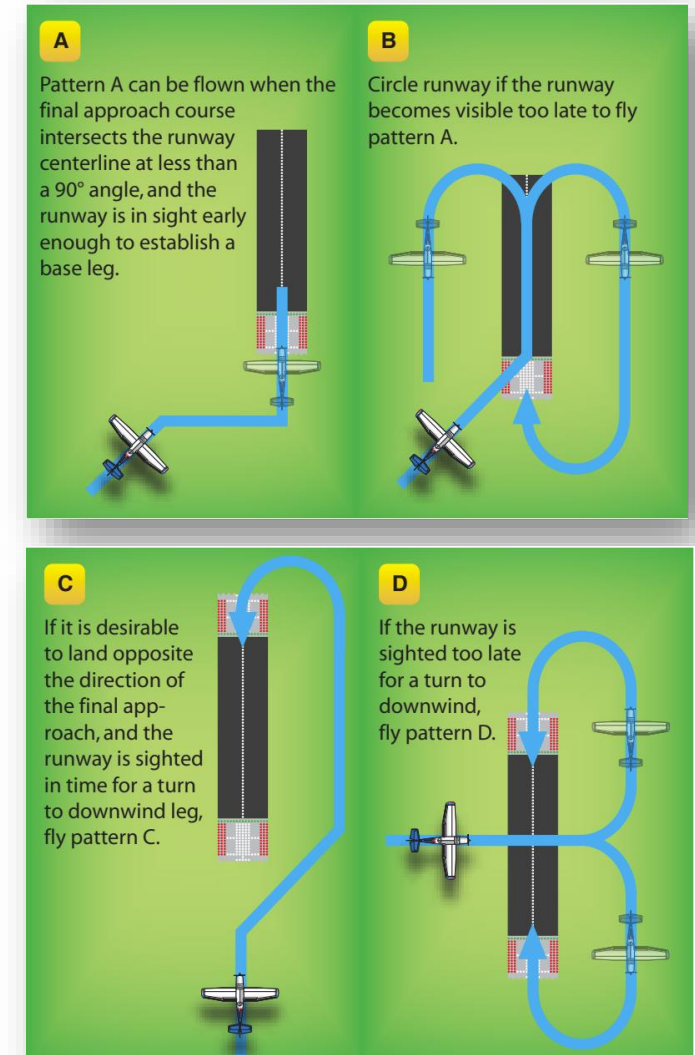
- If visual prior to the minimums: consider leveling off higher (e.g VFR traffic pattern)

3. **Once visual and airport in sight**, inform tower (or CTAF) and:

- Begin the circle upon inside the protected area
- Remain within the protected area
- Maneuver the shortest path to the base/downwind leg, considering weather conditions
There is no restriction from passing over the airport or other runways

4. **Remain at/above MDA** until in a position to land

5. **If visual contact to the airport is lost** at any time → **go missed**



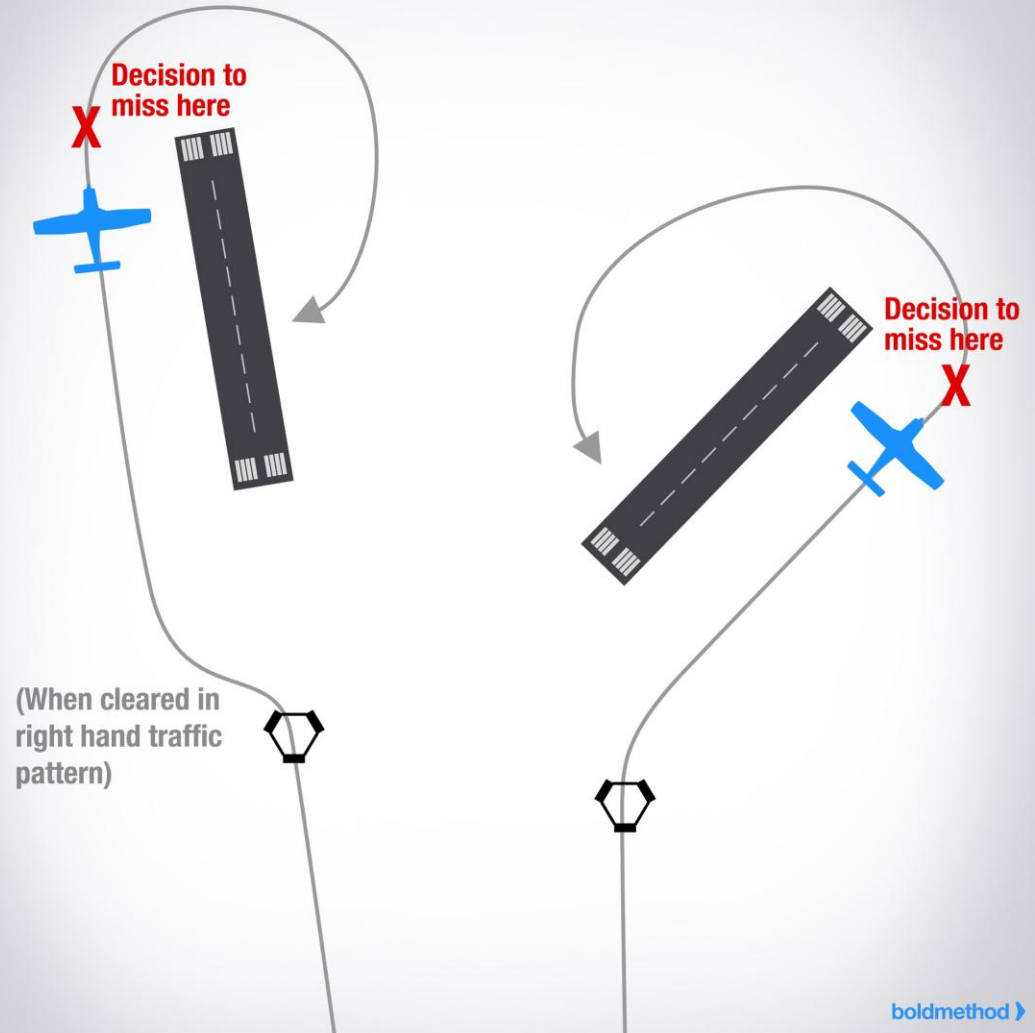
5. Missed Approach from a Circle

1. Maintain visual contact w/ the rwy of intended landing
2. If visual contact is lost
 - Fly the missed appr for the instrument appr you were cleared
 - Start a climbing turn toward the landing runway
 - Remain in the protected area until established on the missed approach procedure
3. Inform Tower/ATC when able

This is how it will look like



Circling Missed Approach



Questions?

