
Pilot Refresher Clinic
Wednesday, February 24, 2010

Schedule and Topic For Discussion

- IFR Knowledge
  - Expected Performance And Equipment Required
  - Alternates
  - Airport Environment
  - Fuel And Delays
  - SID and STAR
  - Enroute Procedures
  - Approach Procedures
  - Equipment Problems

Sources

- All Information Taken From:
  - Pilot's Handbook of Aeronautical Knowledge
  - Airplane Flying Handbook
  - Instrument Procedures Handbook
  - Instrument Flying Handbook
  - Practical Test Standards
  - Federal Aviation Regulations

IFR Knowledge – Expected Performance & Equipment Required

Expected Performance: Aircraft & Pilot

- Expected Performance: Pilot
  - Must have a current BFR
  - Must be Instrument Current or have a Current IPC (Instrument Proficiency Check)
  - Instrument Experience Requirements
    - 6 Instrument Approaches, Tracking, and holding within 6 months
  - After the First 6 months?
    - FAA allows a 6 month grace period to become instrument current
    - No longer allowed to use the Instrument Flight Rules
    - Must use an appropriately rated safety pilot
    - What does appropriate rated mean, and what logbook entry do I need?
  - After 12 months?
    - Must conduct either an IPC with a CFII, a DPE, or take a new Instrument Checkride

Expected Performance: Aircraft & Pilot

- What does the PIC need to know
  - Pilots should familiarize themselves with all the facilities and services available along the planned route of flight.
    - Facilities: Runway length, Airport Elevation, Approaches, etc
  - Always know where the nearest VFR conditions can be found, and be prepared to head in that direction if the situation deteriorates.
    - Situation deteriorates: equipment malfunctions

Expected Performance: Aircraft & Pilot

- Expected Performance: Aircraft
  - ATC is expecting the aircraft to climb or descend at a minimum of 500 feet / minute
    - If unable, advise ATC as soon as possible
  - When the aircraft is within 1000 feet of altitude, ATC is expected the aircraft to climb from 500 to 1500 feet / minute
  - If cleared for a DP or STAR, follow the charted altitudes and airspeeds

Expected Performance: Aircraft & Pilot

- Required Equipment
  - Must have VFR Day & Night Equipment in addition to:
- Required Aircraft IFR Equipment
  - Generator (Alternator)
  - Radios
  - Altimeter (Pressure Sensitive)
  - Ball (Inclinometer)
  - Clock (Second Hand Sweep)
  - Attitude Indicator
  - Rate of Turn Indicator
  - Directional Gyro

Expected Performance: Aircraft & Pilot

- Required Inspections
  - Annual Inspection
  - 100-Hour Inspection (If for hire)
  - Pitot Static System (Every 24 Calendar Months)
  - Altimeter (Every 24 Calendar Months)
  - Transponder (Every 24 Calendar Months)
  - VOR (Every 30 Days)

Expected Performance: Aircraft & Pilot

- VOR Checks
  - Airborne Checkpoint (+/- 6°)
  - Ground Checkpoint (+/- 4°)
  - VOT (+/- 4°)
  - Dual (+/- 4°)


Any Questions On Expected
Performance Aircraft & Pilot?

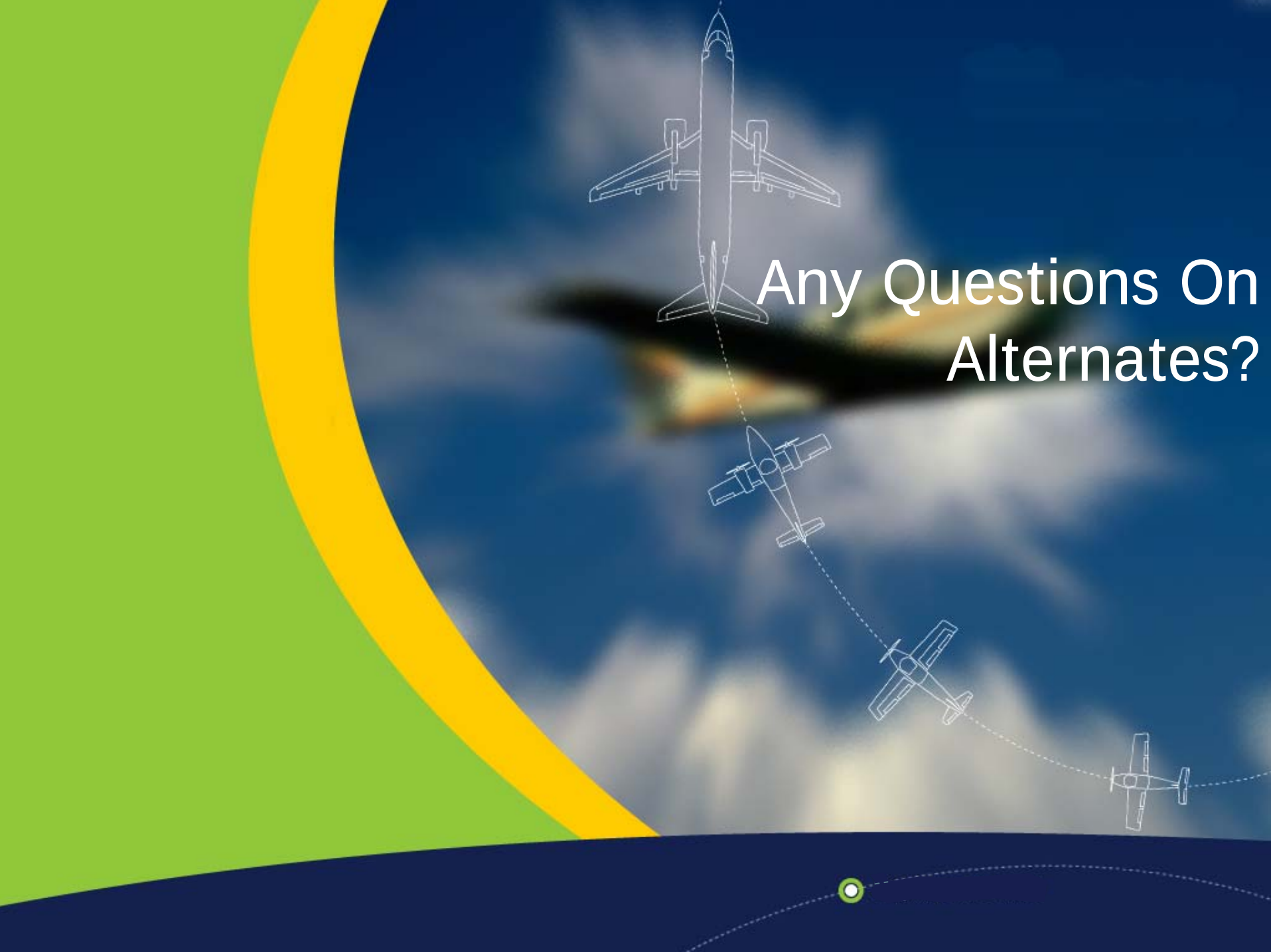
IFR Knowledge – Alternates

Alternates

- Do I need an alternate? (FAR 91)
  - 1 – 2 – 3 Rule
    - 1 hour before or after your ETA
    - 2000 foot ceiling or below
    - 3 miles visibility or below
- Yes, now Which airport can I select?
  - No symbol – airport is good to go
  -  – airport has nonstandard IFR alternate minimums Civil pilots should refer to the Alternate Minimums Section
  -  – signifies that Alternate Minimums are Not Authorized due to unmonitored facility or the absence of weather reporting service.

Alternates

- I need an alternate can I file it?
  - Depending on type of approach into the airport and the weather reported at the ETA
    - Precision Approach – 600 foot ceiling and 2 miles visibility
    - Non Precision Approach – 800 foot ceiling and 2 miles visibility
    - No Published Approach – 1000 foot ceiling and 3 miles visibility
- How low can I go?
  - The minimums published on the approach
    - Precision Approach - 200 foot ceiling and 1/2 mile visibility
    - Non Precision Approach – 400 foot ceiling and 1 mile visibility


Any Questions On
Alternates?

IFR Knowledge – Airport Environment

Airport Environment

- Takeoff Minimums
  - In the event of an emergency, a decision must be made to either return to the departure airport or fly directly to a takeoff alternate.
  - The FAA establishes takeoff minimums for every airport that has published Standard Instrument Approaches. Legally, under 14 CFR 91 a zero/zero departure may be made, but it is never advisable.
  - NACO charts list takeoff minimums only for the runways at airports that have other than standard minimums. These takeoff minimums are listed by airport in alphabetical order in the front of the TPP booklet.
  - If an airport has non-standard takeoff minimums, a T will be placed in the notes sections of the instrument procedure chart.

Airport Environment

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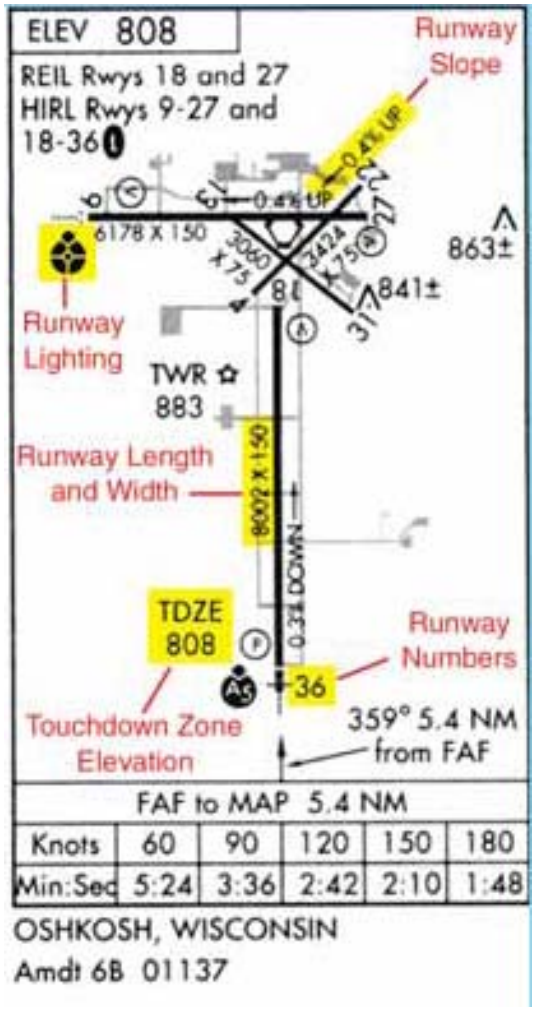
- Airport Diagrams
  - For select airports, NACO prints an airport diagram.
  - It is a full page depiction of the airport that includes the same features of the airport sketch plus additional details such as taxiway identifiers, airport latitude and longitude, and building identification.
  - The airport diagrams are also available in the Airport / Facility Directory

Airport Enviroment



- **Airport Sketches**
  - The sketch is depicted in the lower left or right of an IAP.
  - It depicts the runways, their length, width, and slope, the touchdown zone elevation, the lighting system installed on the end of the runway, and taxiways.


Any Questions On Airport Environment?

IFR Knowledge – Fuel & Delays

Fuel and Delays

- How Much Fuel Is Required?
  - Aircraft must have enough fuel to reach your destination, fly to your alternate, with an additional 45 minutes at cruise power
    - Short Range Tanks:
      - N9732L (CPF 1251), N97755 (CPF 1252), and N99715 (CPF 1254)
    - Long Range Tanks:
      - N99040 (CPF 1253), N9443L (CPF 1255), N659PJ (CPF 1256) N323KW (CPF 1257), N738CP (CPF 1258), and N894CP (CPF 1259)

Fuel and Delays

- Fuel Emergencies
  - Declaring a fuel emergency means you cannot accept anymore undue delay in your flight
  - Declaring an emergency and landing safely will not result in talking to the FAA
  - However declaring and emergency and NOT landing safely, or refusing to declare and emergency and NOT landing safety will result in talking to the FAA
    - These were quoted by an Air Traffic Controller located at Philadelphia International Airport (KPHL)


Any Questions On Fuel and Delays?

IFR Knowledge – SIDs & STARs

Standard Instrument Departures

- SIDs (DPs – Departure Procedures)
  - Departure procedures are preplanned routes that provide transitions from the departure airport to the en route structure.
  - They also allow for efficient routing of traffic and reductions in pilot/controller workloads.
  - Departure design criterion assumes an initial climb of 200 feet per nautical mile after crossing the departure end of the runway (DER) at a height of at least 35 feet

Standard Instrument Departures

D1

01081
CLIMB TABLE

RATE OF CLIMB TABLE

A rate of climb table is provided for use in planning and executing takeoff procedures under known or approximate ground speed conditions.

(ft. per min.)

REQUIRED GRADIENT RATE (ft. per NM)	GROUND SPEED (KNOTS)						
	30	60	80	90	100	120	140
200	100	200	267	300	333	400	467
250	125	250	333	375	417	500	583
300	150	300	400	450	500	600	700
350	175	350	467	525	583	700	816
400	200	400	533	600	667	800	933
450	225	450	600	675	750	900	1050
500	250	500	667	750	833	1000	1167
550	275	550	733	825	917	1100	1283
600	300	600	800	900	1000	1200	1400
650	325	650	867	975	1083	1300	1516
700	350	700	933	1050	1167	1400	1633

SE-3, 13 JUN 2002

REQUIRED GRADIENT RATE (ft. per NM)	GROUND SPEED (KNOTS)					
	150	180	210	240	270	300
200	500	600	700	800	900	1000
250	625	750	875	1000	1125	1250
300	750	900	1050	1200	1350	1500
350	875	1050	1225	1400	1575	1750
400	1000	1200	1400	1600	1700	2000
450	1125	1350	1575	1800	2025	2250
500	1250	1500	1750	2000	2250	2500
550	1375	1650	1925	2200	2475	2750
600	1500	1800	2100	2400	2700	3000
650	1625	1950	2275	2600	2925	3250
700	1750	2100	2450	2800	3150	3500

SE-3, 13 JUN 2002

Ground Speed is 180 knots

Required climb gradient of 300 feet per NM

Given the parameters, you would need to climb at a rate of 900 feet per minute to maintain the required climb gradient.

Standard Instrument Departures

- There are two types of DPs: Obstacle Departure Procedures or Standard Instrument Departures
  - ODPs are only used for obstruction clearance and do not include ATC related climb requirements. An ODP must be developed when obstructions penetrate the 40:1 departure plain.
  - SIDS are designed at the request of ATC in order to increase capacity of terminal airspace. The primary goal is to reduce ATC/pilot workload while providing seamless transitions to the en route structure

Standard Instrument Departures

- DPs are also categorized by equipment requirements as follows:
  - **Non-RNAV DP**. Established for aircraft equipped with conventional avionics using ground-based NAVAIDs
  - **RNAV DP**. Established for aircraft equipped with RNAV avionics; e.g., GPS, VOR/DME, etc. Automated vertical navigation is not required. Prior to using GPS, RAIM availability should be checked with the receiver or a Flight Service Station
  - **Radar DP**. Radar SIDs are established when ATC has a need to vector aircraft on departure to a particular route, NAVAID, or Fix. Radar vectors may also be used to join conventional or RNAV navigation SIDs

Standard Instrument Departures

- **Departure Procedure RESPONSIBILITY**
  - Responsibility for the safe execution of departure procedures rests on the shoulders of both ATC and the pilot.
  - ATC is responsible for specifying the direction of takeoff or initial heading when necessary, and including departure procedures as part of the ATC clearance when pilot compliance for separation is necessary.
  - The pilot must acknowledge receipt and understanding of an ATC clearance, request clarification of clearances, request an amendment to a clearance if it is unacceptable from a safety perspective or cannot be complied with.

Standard Instrument Departures

- **Departures from Tower-Controlled Airports**
  - Normally you request your IFR clearance through ground control or clearance delivery
  - Communication frequencies for the various controllers are listed on departure, approach, and airport charts as well as the A/FD.
  - Once you have received your clearance, it is your responsibility to comply with the instructions as given and notify ATC if you are unable to comply with the clearance

- **Departures from Airports without an operating Control Tower**
  - You should file your flight plan at least 30 minutes in advance
  - During your planning phase, investigate the departure airport's method for receiving an instrument clearance.
  - You can contact the Flight Service Station on the ground by telephone and they will request your clearance from ATC
  - You must depart the airport before the clearance void time; if you fail to depart, you must contact ATC by a specified notification time

Standard Instrument Departures

- **Ground Communications Outlets**
  - This has been developed in conjunction with the capability to contact ATC and AFSS via VHF radio to a telephone connection to obtain an instrument clearance or close a VFR/IFR flight plan
  - You can use four key clicks on your VHF radio to contact the nearest ATC facility and six key clicks to contact the local AFSS, but it is intended to be used only as a ground operational tool
  - The GCO should help relieve the need to use the telephone to call ATC and the need to depart into marginal conditions just to achieve radio contact
  - GCO information is listed on airport charts and instrument approach charts with other communications frequencies

Standard Terminal Arrival Routes

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- **Standard Terminal Arrival Routes**
  - The STAR provides a common method for leaving the en route structure and navigating to your destination
  - Big differences between DPs and Stars
    - DPs start at the pavement and connect to the en route structure. STARs on the other hand, start at the en route structure and they end at a fix or NAVAID
    - Primarily STARs serve multiple airports
  - STAR procedures typically include a standardized descent gradient at and above 10,000 feet MSL of 318 feet per NM, or 3 degrees

Standard Terminal Arrival Routes

- If a speed reduction is needed a general guideline is typically to add 1 NM for each ten knots
- *"Cessna 32G, cleared to the Seattle/Tacoma International Airport as filed. Maintain 12,000. At the Ephrata VOR intercept the 221° radial to CHINS Intersection. Intercept the 284° radial of the Yakima VOR to RADDY Intersection. Cross RADDY at 10,000. Continue via the Yakima 284° radial to AUBRN Intersection. Expect radar vectors to the final approach course."*

Standard Terminal Arrival Routes

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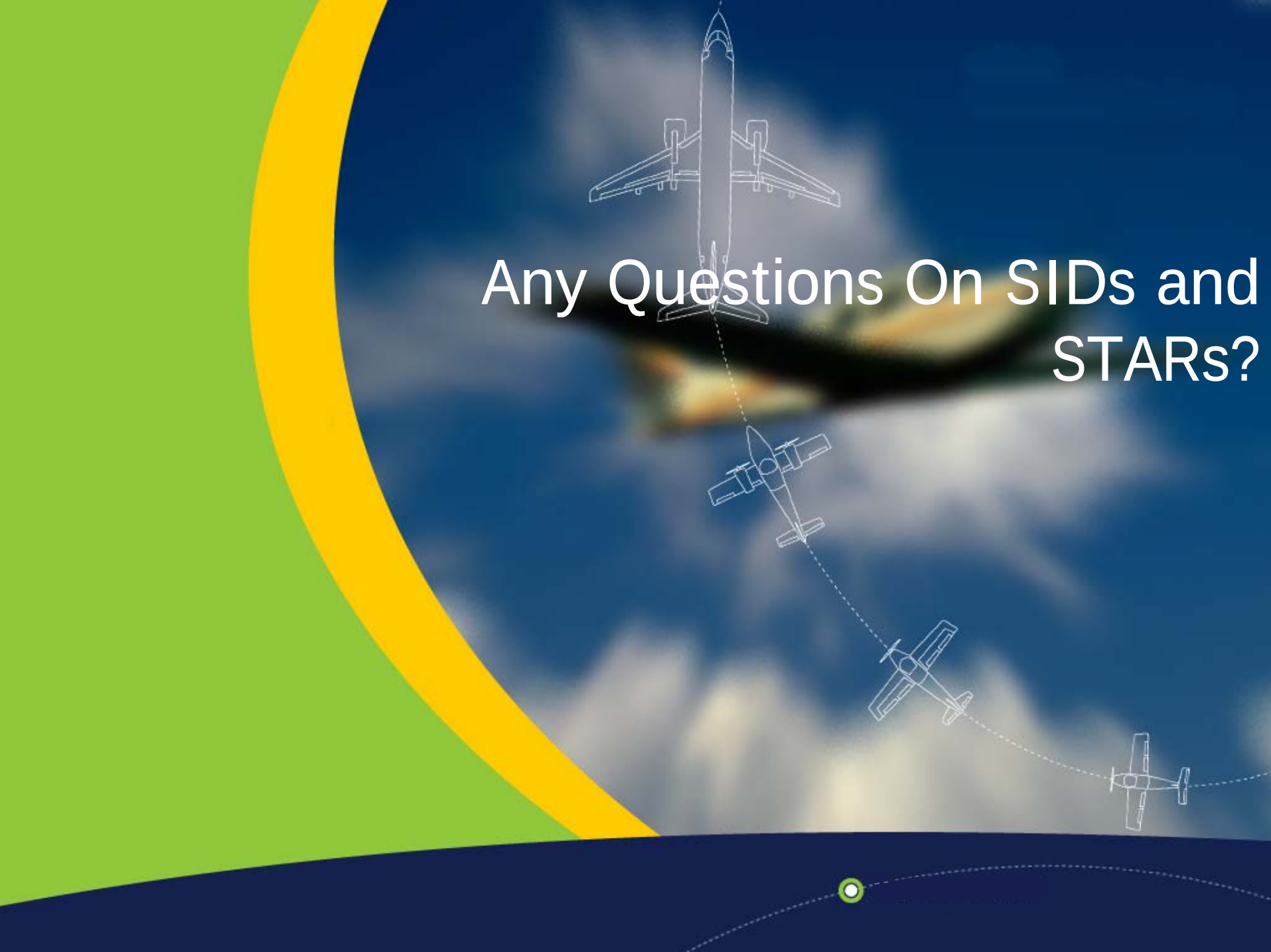
- Standard Terminal Arrival Routes Cont:
  - STARs usually are named according to the point at which the procedure begins
  - The STAR name is usually the same as the last fix on the en route transitions
  - A STAR that commences at the CHINS Intersection becomes the CHINS ONE ARRIVAL.
  - When a significant portion of the arrival is revised, such as an altitude, a route, or data concerning the NAVAID, the number of the arrival changes. For example, the CHINS ONE ARRIVAL is now the CHINS FOUR ARRIVAL
  - In addition, some STARs require that you use DME and/or ATC RADAR


Any Questions On SIDs and STARs?

IFR Knowledge – Cruising and Holding

Holding Procedures

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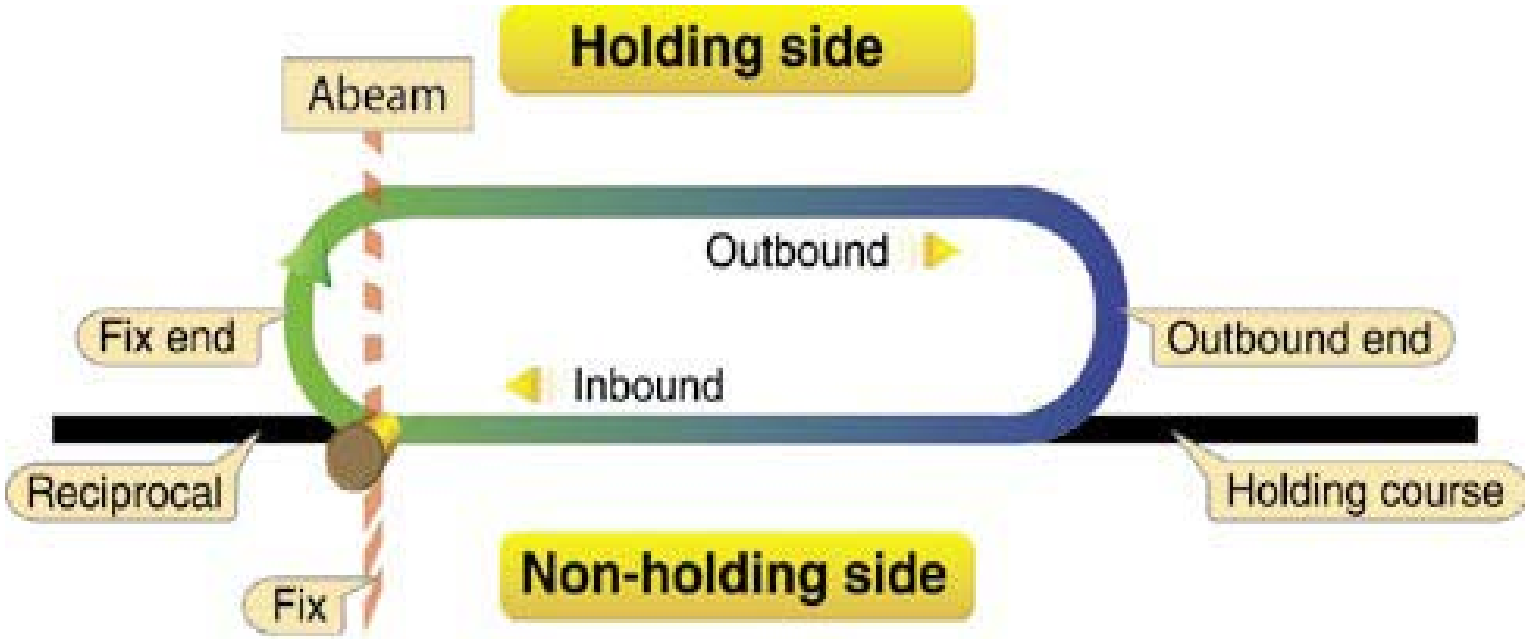
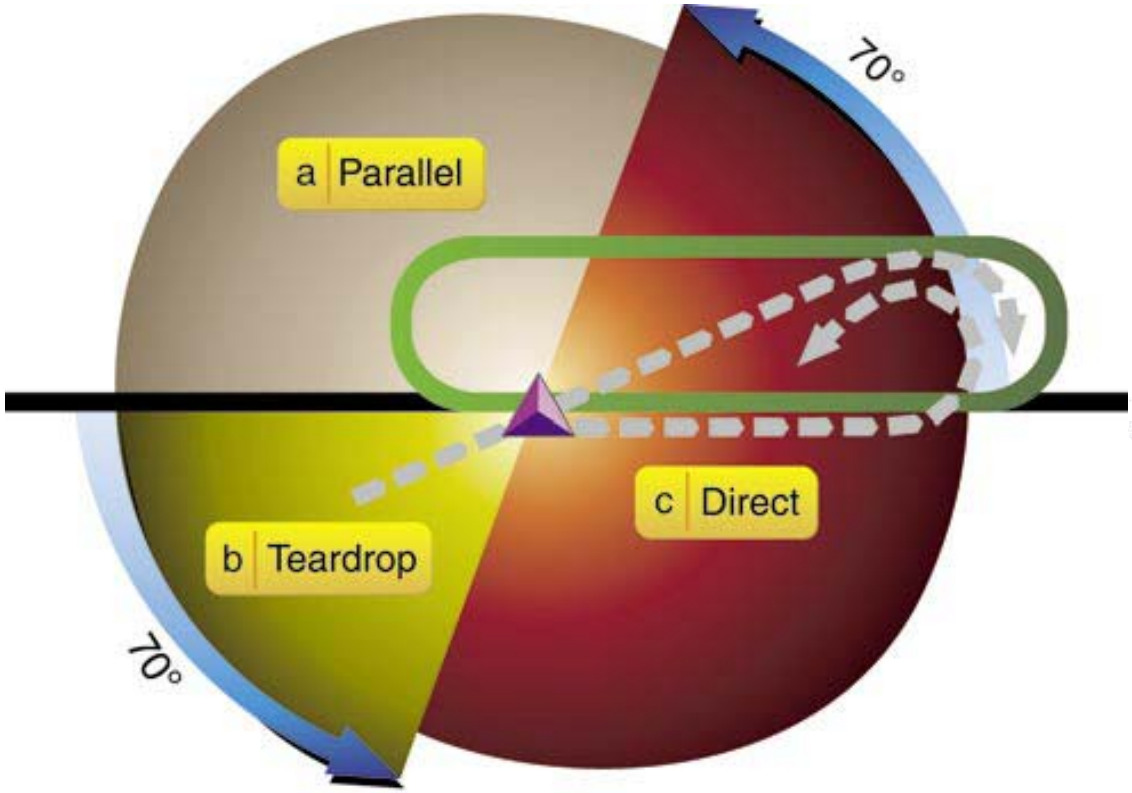
- Holding Procedures
  - Each holding pattern has a fix, a direction to hold, a course or radial, and the direction on which the aircraft is to hold
  - Speed of the aircraft affects the size of a holding pattern therefore speed limits have been set depending on the altitude and ATC need
  - Time plays another factor into a holding pattern. 1 minute legs under 14,000 feet MSL, and 1 minute 30 seconds over 14,001 feet MSL.
  - Time can be replaced by distance if the aircraft has DME or an IFR-certified GPS
  - There are 3 entries for which an aircraft to hold. Originally the FAA mandated the entry, today you can enter every hold from a direct entry if you desire

Holding Procedures



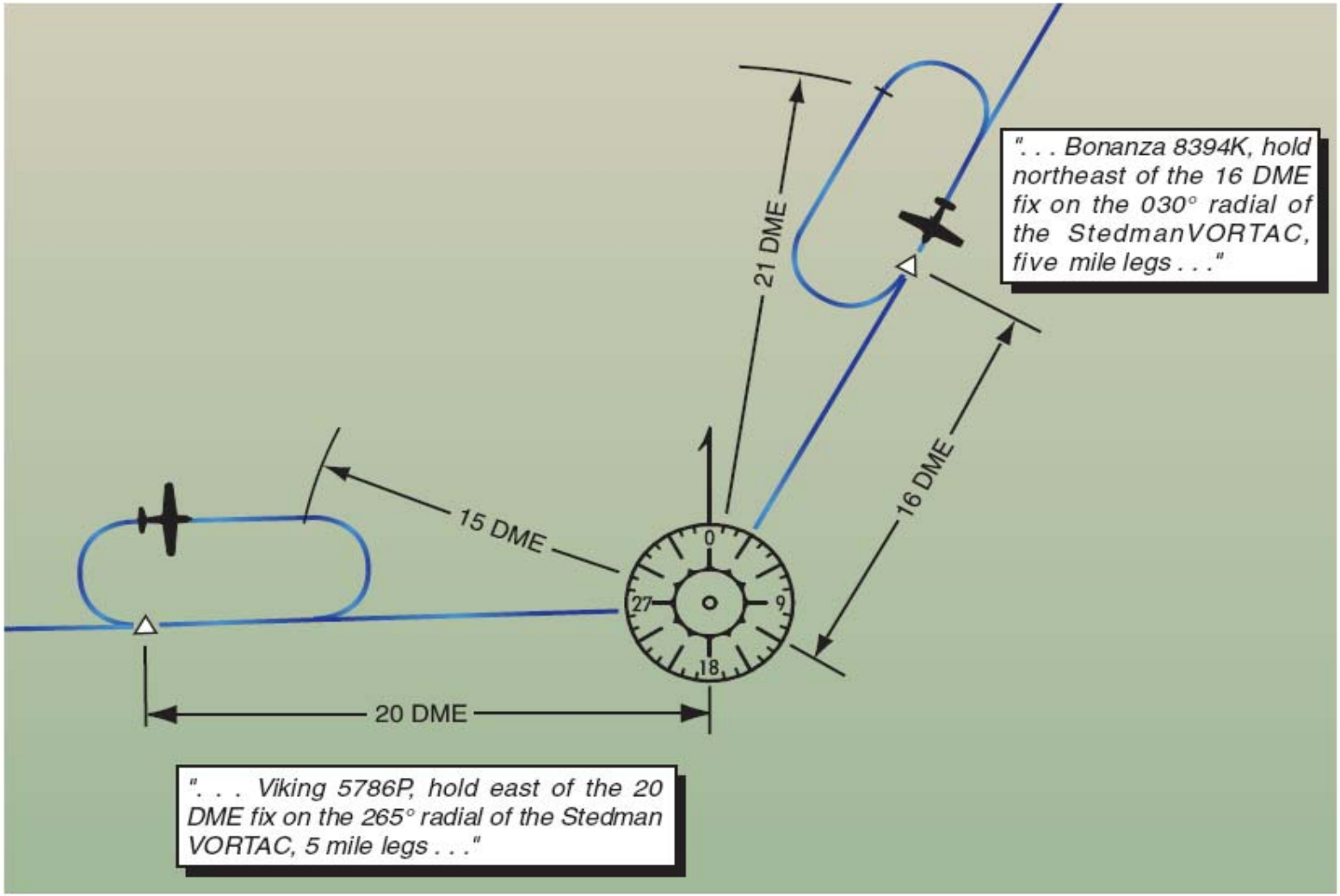
Holding Procedures



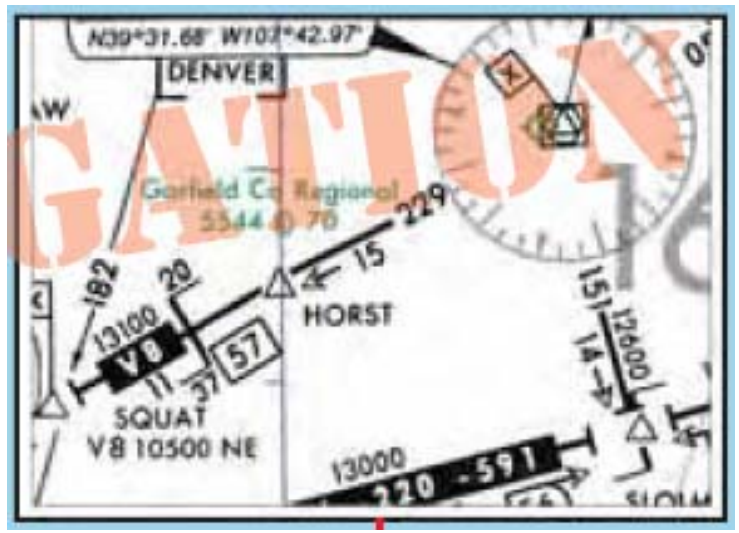
Holding Procedures

- Holding Pattern Speed

Holding Procedures



Holding Procedures

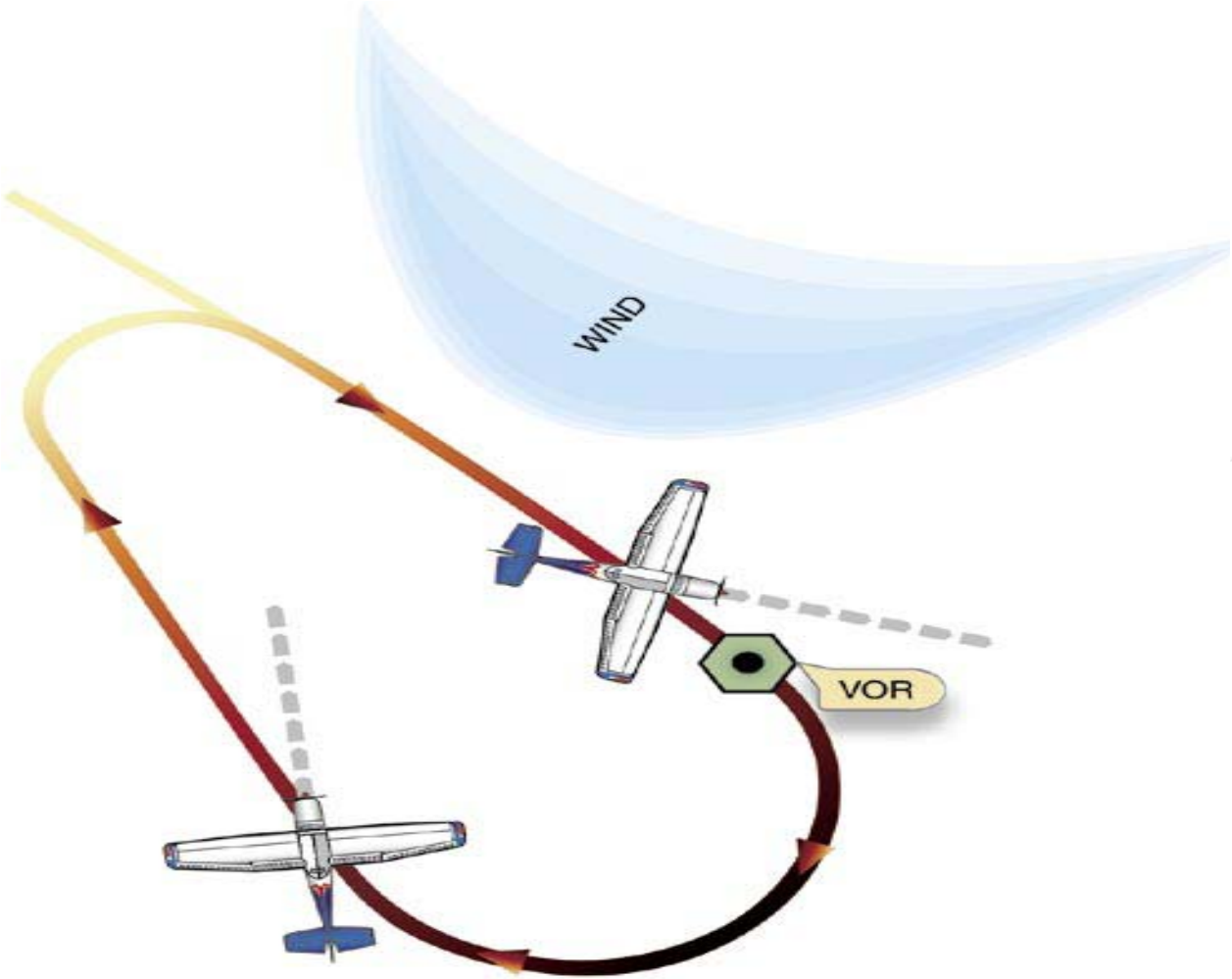


A clearance for an uncharted holding pattern contains additional information:

- Direction to hold from holding fix
- Holding fix
- The holding course (a specified radial, magnetic bearing, airway or route number)
- The outbound leg length in minutes or nautical miles when DME is used
- Nonstandard pattern, if used
- Expect further clearance time

"...Hold west
of Horst Intersection
on Victor 8
5 mile legs
left turns
expect further clearance at 1430."

Holding Procedures




Any Questions On Cruising
and Holding?

IFR Knowledge – Enroute Procedures

Enroute Procedures

- Course To Be Flown
  - Part 91.181 is the basis for the course to be flown
  - Pilots must either fly along the centerline on an airway or, along the direct course between navigational aids
  - The regulation also allows an aircraft to pass clear of other traffic in VFR conditions
  - The procedures used during the en route phase of flight consists of three strata:
    - 1.) Lower Stratum – an airway structure that extends from the base of controlled airspace to FL180.
    - 2.) Second Stratum – contains identifiable Jet Routes from FL180 to FL450
    - 3.) Third Stratum – Random point-to-point navigation above FL450

Enroute Procedures

- **Air Route Traffic Control Centers**
  - ARTCCs provide the central authority for issuing IFR clearances and nationwide monitoring of each IFR flight
  - There are 20 ARTCCs in the United States, and each containing between 20 to 80 sectors
  - Appropriate radar and communication sites are connected to the Centers by microwave links and telephone lines
  - When climbing after takeoff, an IFR flight is either in contact with a radar equipped local departure control or, in some areas, an ARTCC facility
  - As a flight transitions to the en route phase, pilots typically expect a handoff from departure control to a Center frequency if not already in contact with the Center
  - Accepting radar vectors from controllers does not relieve pilots of their responsibility for keeping track of altitude and position when during each phases of flight

Enroute Procedures

- **Preferred IFR Routes**
  - These help pilots to plan a route to minimize route changes, and to aid in the management of air traffic
  - Preferred IFR routes are designed to provide a flow of air traffic in the major terminal and en route flight environments
  - These routes are published in the Airport/Facility Directory for the low and high altitude stratum
  - Routes beginning or ending with a fix indicate that pilots will be routed to these fixes via a SID, vectors, or a STAR
  - Routes where several airports are in proximity they are listed under the principal airport and categorized as a metropolitan area; e.g., New York Metro Area.
  - If more than one route is listed both routes have equal priority for use.

Enroute Procedures

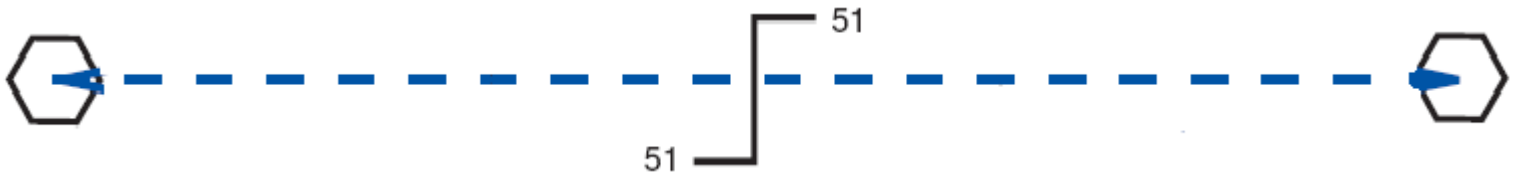
- **Monitoring of Navigation Facilities**
  - VOR, VORTAC, VOR / DME, ILS facilities, NDBs, and Marker Beacons are provided with an internal monitoring feature
  - Internal monitoring is provided at the facility through the use of equipment that causes a facility shutdown if performance deteriorates below established tolerances
  - Older NDBs (both Federal and Non-Federal) do not have the internal feature and therefore are checked at least once each hour
  - ARTCCs are usually the control point for NAVAID facility status.
  - Pilots can also query the appropriate FAA facility if they have questions in flight regarding NAVAID status, or by checking the NOTAMs prior to flight since NAVAIDs and associated monitoring equipment are continuously changing

Enroute Procedures

- **NAVAID Service Volume**
  - Each class of NAVAID (VOR, VOR/DME, or VORTAC) has an established operational service volume to ensure adequate signal coverage and frequency protection
  - When using VORs for direct route navigation, the following guidelines apply:
    - For operations that are off airways below 18,000 feet MSL, pilots should use aids not more than 80 NM apart
  - If using GPS for the route, the pilot can fly outside the service volume of some NAVAIDs, during this operation, the pilot has a responsibility for staying on the authorized direct route
  - ATC uses radar flight following for the purpose of aircraft separation. If ATC initiates a direct route that exceeds NAVAID service volume limits, ATC also provides radar navigational assistance as necessary

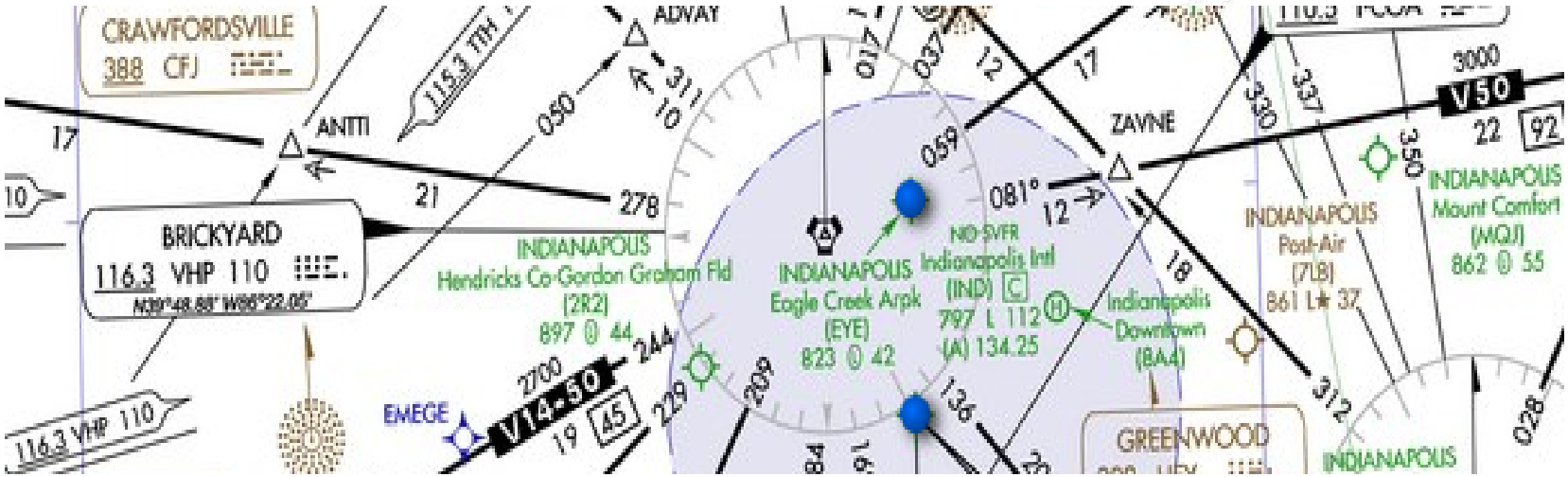
Enroute Procedures

- **Changeover Points**
  - When flying airways, pilots normally change frequencies midway between navigation aids
  - If the navigation signals cannot be received at the midpoint a COP is depicted and shows the distance in NM to each NAVAID
  - COPs indicate the point where a frequency change is necessary to receive course guidance
  - These changeover points divide an airway or route segment and ensure continuous reception of navigation signals at the prescribed minimum en route IFR altitude
  - Where radio frequency interference or other navigation signal problems exist, the COP is placed at the optimum location

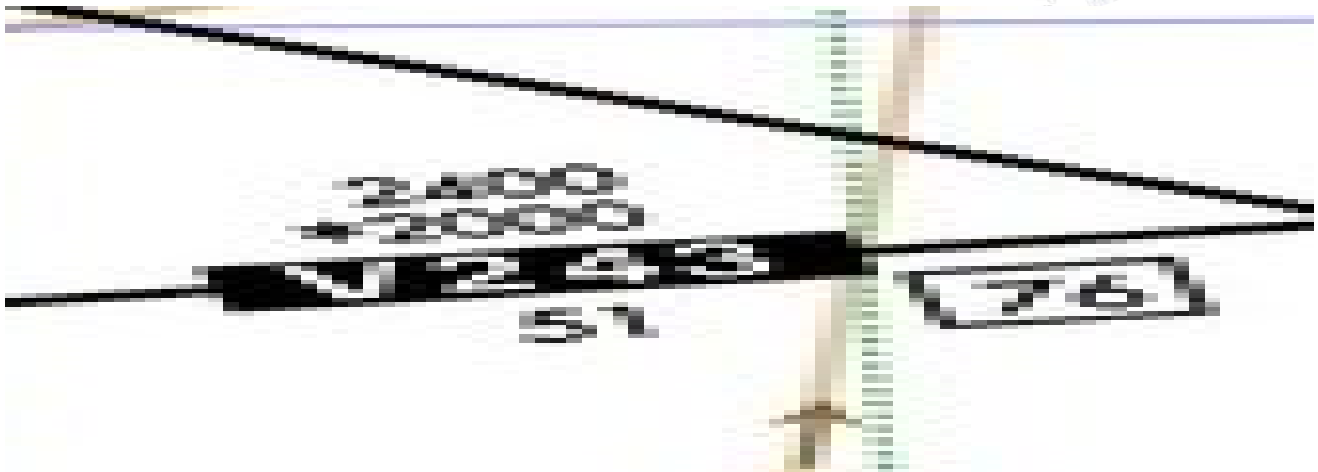


- **IFR Enroute Altitudes**
  - For IFR operations, regulations require that pilots operate their aircraft at or above minimum altitudes
  - Minimum altitude rules are designed to ensure safe vertical separation between the aircraft and the terrain

- **Minimum Enroute Altitude**
  - This is the lowest published altitude that assures acceptable navigational signal coverage and meets obstacle clearance requirements
  - MEAs are established based upon obstacle clearance over terrain and manmade objects, although adequate communication at the MEA is not guaranteed



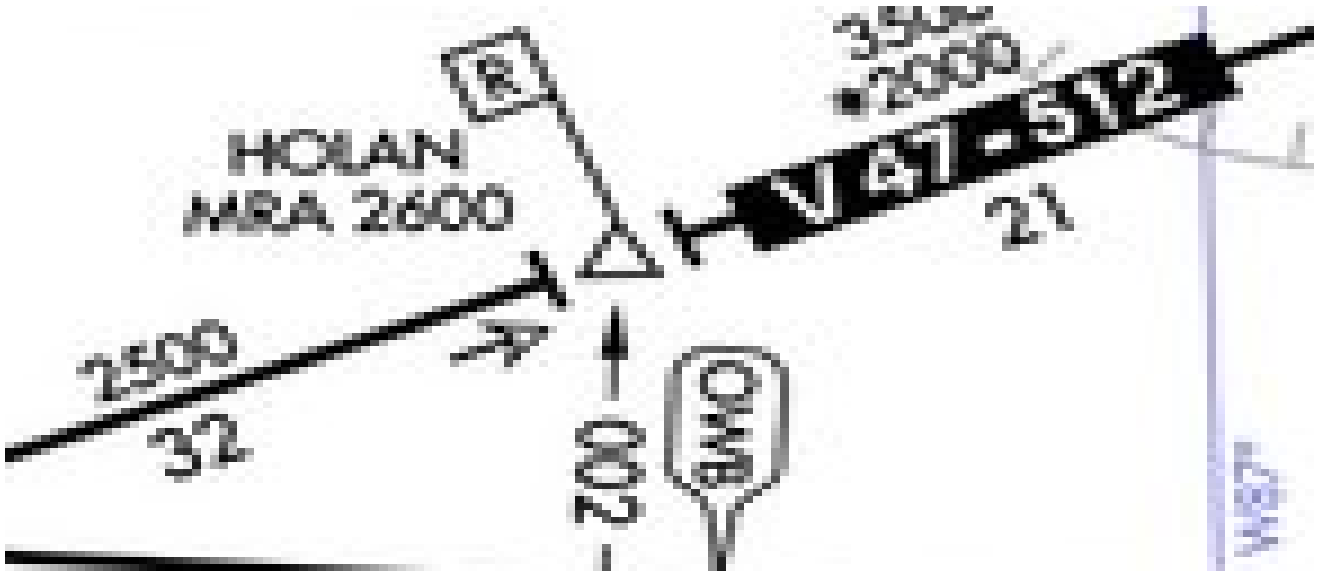
- **Minimum Obstruction Clearance Altitude**
  - This is the lowest published altitude in effect between VOR airways, off-airway routes. This altitude also assures acceptable navigational signal coverage only within 22 NM of a VOR



Enroute Procedures

- **Minimum Vectoring Altitude**
  - These are established for use by ATC when being vectored. The MVA provides 1,000 feet of clearance above the highest obstacle and 2,000 feet in designated mountainous areas
  - Some MVAs may be lower than MEAs, or MOCAs depicted on charts for a given location
- **Maximum Authorized Altitude**
  - This is a published altitude representing the maximum usable altitude for a route segment
  - MAAs represent procedural limits determined by limitations of ground based facilities.

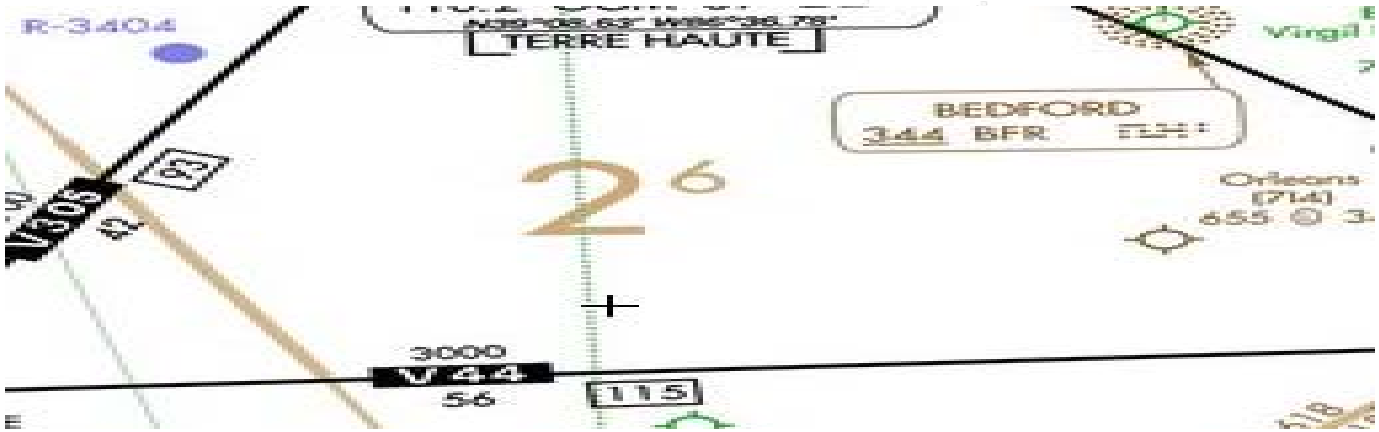
- **Minimum Reception Altitude**
  - This is the minimum altitude that a navigation signal can be received for the route and for off-course NAVAID facilities that determine a fix



Enroute Procedures

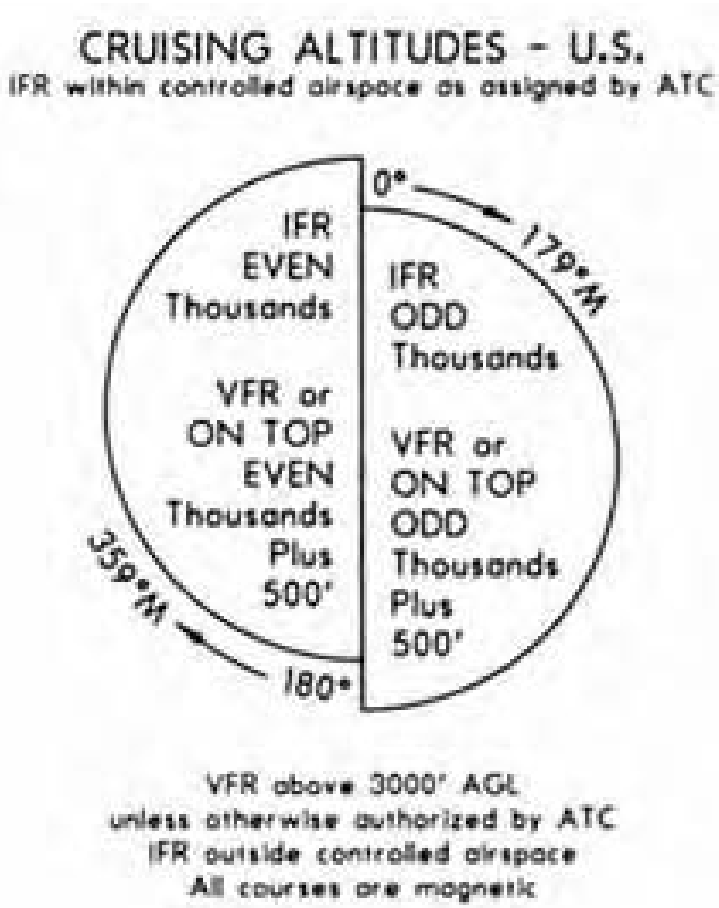
- **Minimum Crossing Altitude**
  - This is the lowest altitude at certain fixes at which the aircraft must cross when proceeding in the direction of a higher minimum en route IFR altitude
  - MCAs are established where obstacles intervene to prevent pilots from maintaining obstacle clearance
  - The standard for determining the MCA is based upon the following climb gradients
    - Sea level through 5,000 feet MSL—150 feet per NM
    - 5000 feet through 10,000 feet MSL — 120 feet per NM
    - 10,000 feet MSL and over — 100 feet per NM

- **Off Route Obstruction Clearance Altitude**
  - This route provides obstruction clearance with a 1,000-foot (nonmountainous) and 2,000-foot (mountainous areas)
  - This altitude may not provide signal coverage.
  - OROCAs are intended primarily as a pilot tool for emergencies and situational awareness



- **IFR Cruising Altitude & VFR-On-Top**
  - In controlled airspace, pilots must maintain the altitude by ATC
  - When operating with a VFR-on-top clearance, any VFR cruising altitude appropriate to the direction of flight that allows the flight to remain in VFR conditions
  - Any change in altitude must be reported to ATC and pilots must comply with all other IFR reporting procedures
  - VFR-on-top is not authorized in Class A airspace

Enroute Procedures



Enroute Procedures

- **Reporting Procedures**
  - These are reports that should be made without a specific request from ATC
    - Leaving one assigned flight altitude for another
    - VFR-on-top change in altitude
    - Leaving any assigned holding fix or point
    - Missed approach
    - Unable to climb or descend at least 500 feet per minute
    - TAS variation from filed speed of 5% or 10 knots, whichever is greater
    - Time and altitude upon reaching a holding fix
    - Loss of NAV/Comm capability
    - Unforecasted weather conditions or other information relating to the safety of flight

- **Non RADAR Reports**
  - If radar contact has been lost the CFRs require pilots to provide ATC with position reports over designated VORs
  - These compulsory reporting points are depicted on NACO IFR en route charts by solid triangles

Enroute Procedures

- Additional Non RADAR Reports
  - Leaving FAF or OM inbound on final approach
  - Revised ETA of more than three minutes

- Position Report
  - Identification – (CPF 1256)
  - Position – (FILMS)
  - Time – (1215z)
  - Altitude/Flight Level – (5000)
  - ETA over the next reporting fix – (MATAN IN 5 MIN)
  - Following reporting point – (VHP VORTAC)
  - Pertinent remarks


Any Questions On Enroute Procedures?

IFR Knowledge – Approach Procedures

Approach Procedures

- **Weather Considerations**
  - Weather conditions generally determine which approaches can be used, or if an approach can even be attempted
  - The primary concerns for approach decision-making are wind speed and direction, ceiling, visibility, and field conditions
    - Wind speed and direction are factors because they often limit the type of approach that can be flown at a specific location
  - An example: Terre Haute International / Hulman Field
    - Visibility – 1 1/2 SM
    - Wind – 140 @ 15
    - Ceiling 500 Feet Overcast

Approach Procedures

- **Approach Speed and Category**
  - Two other critical performance factors are: aircraft approach category and planned approach speed
  - According to 14 CFR Part 97.3 (b), aircraft approach category is based on the landing speed (if not specified 1.3 VS0 at max gross weight)
  - The categories are as follows:
    - Category A: Speed less than 91 knots.
    - Category B: Speed 91 knots or more but less than 121 knots.
    - Category C: Speed 121 knots or more but less than 141 knots.
    - Category D: Speed 141 knots or more but less than 166 knots.
    - Category E: Speed 166 knots or more.

Approach Procedures

- Approach Speed and Category Continued
  - An airplane is certified in only one approach category although a faster approach speed may be used
  - An airplane cannot be flown to the minimums of a slower approach category
  - If a faster approach speed is used the minimums for the appropriate higher category must be used

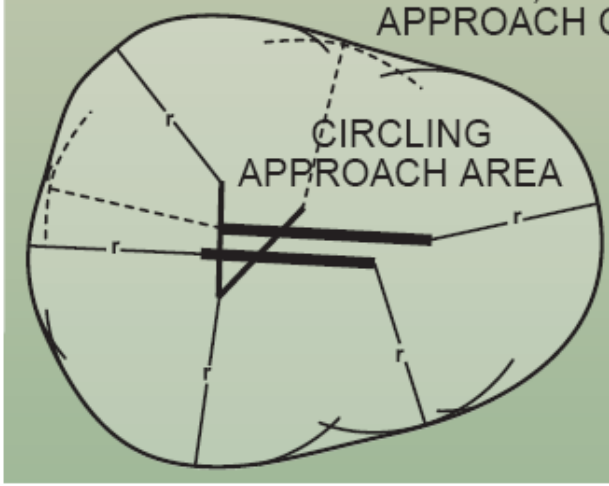
- Circling Approaches
  - Published circling minimums provide obstacle clearance only within the appropriate area of protection based on the approach category speed
  - The circling approach area is the obstacle clearance area for airplanes maneuvering to land on a runway that does not meet the criteria for a straight-in approach
  - A minimum of 300 feet of obstacle clearance is provided in the circling segment
  - Pilots should remain at or above the circling altitude until the airplane is in a position from which a descent to a landing can be made

Approach Procedures

- Circling Approach Diagram

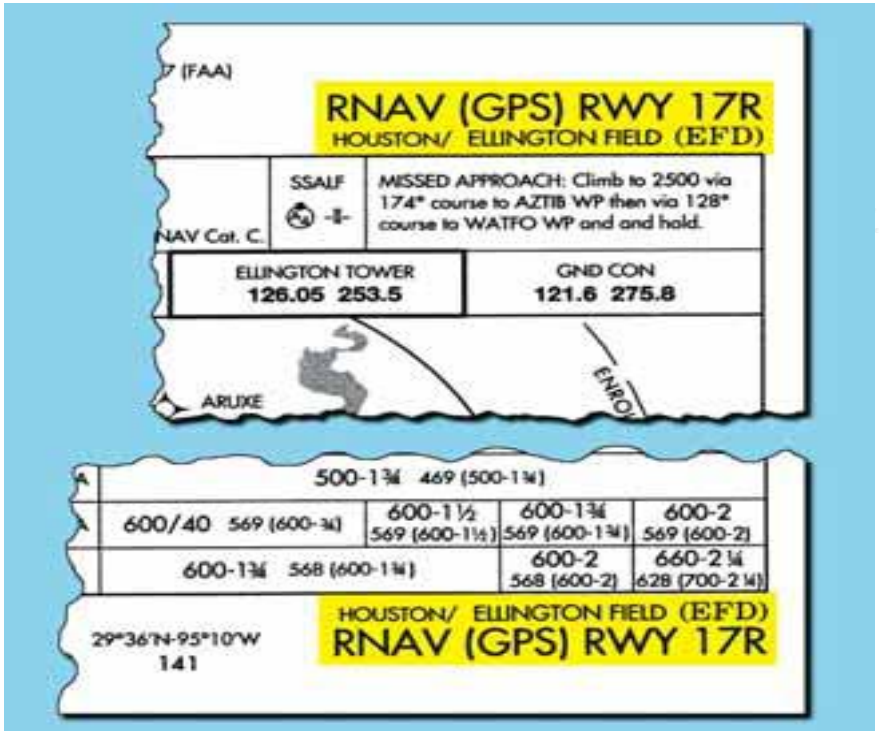
Approach Category	Radius (Miles)
A	1.3
B	1.5
C	1.7
D	2.3
E	4.5

RADII (**r**) DEFINING SIZE OF AREAS, VARY WITH THE APPROACH CATEGORY



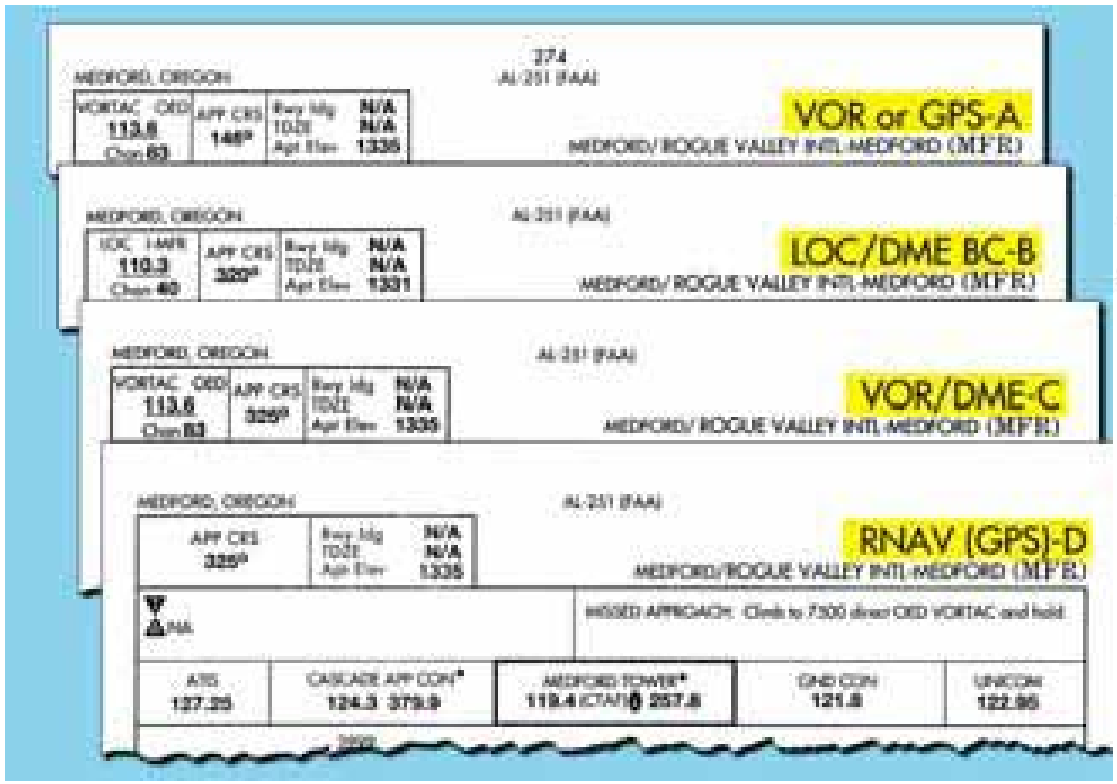
Approach Procedures

- Chart Format – Chart Identification
  - Procedures that allow a pilot to land straight in when conditions permit



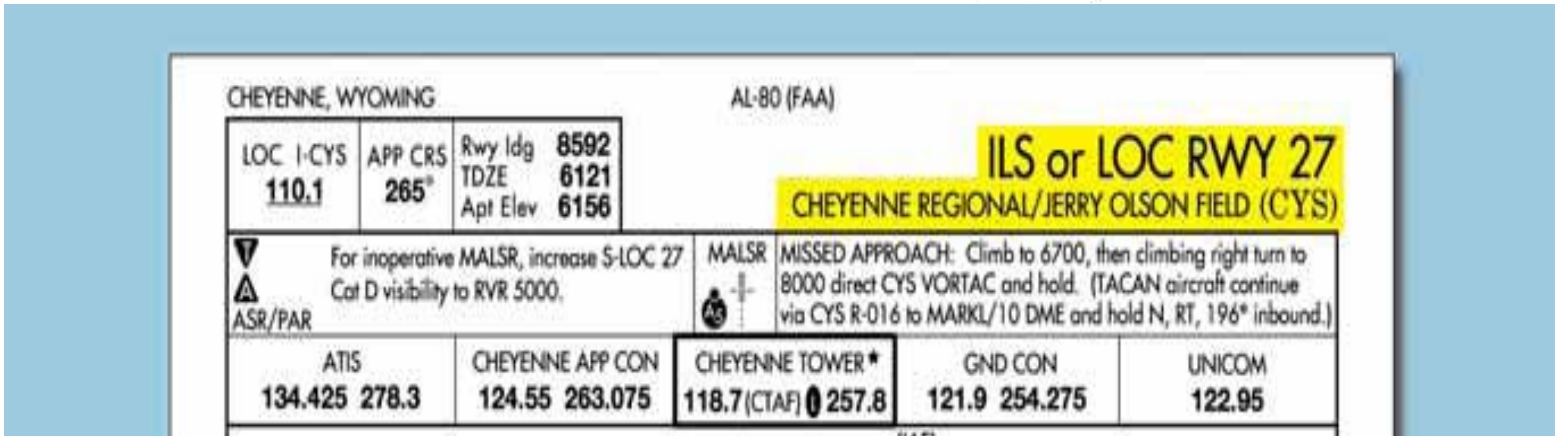
Approach Procedures

- Chart Format – Chart Identification
  - Procedures without Straight-In Minimums



Approach Procedures

- Chart Format – Notes Section
  - Non-Standard Takeoff Minimums, and Non-Standard Alternate Minimums
  - For Inoperative MALSR, increase S-LOC 27 Cat D visibility to RVR 5000
  - Airport has both ASR and PAR ability


CHEYENNE, WYOMING AL-80 (FAA)

ILS or LOC RWY 27
CHEYENNE REGIONAL/JERRY OLSON FIELD (CYS)

LOC I-CYS	APP CRS	Rwy ldg / TDZE / Apt Elev
110.1	265°	8592 / 6121 / 6156

For inoperative MALSR, increase S-LOC 27 Cat D visibility to RVR 5000.

ASR/PAR

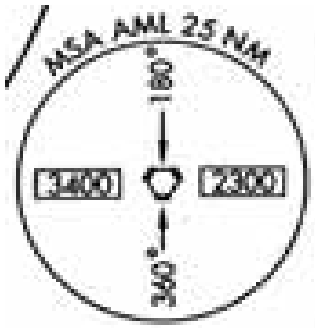
MALSR

MISSED APPROACH: Climb to 6700, then climbing right turn to 8000 direct CYS VORTAC and hold. (TACAN aircraft continue via CYS R-016 to MARKL/10 DME and hold N, RT, 196° inbound.)

ATIS	CHEYENNE APP CON	CHEYENNE TOWER*	GND CON	UNICOM
134.425 278.3	124.55 263.075	118.7 (CTAF) 257.8	121.9 254.275	122.95

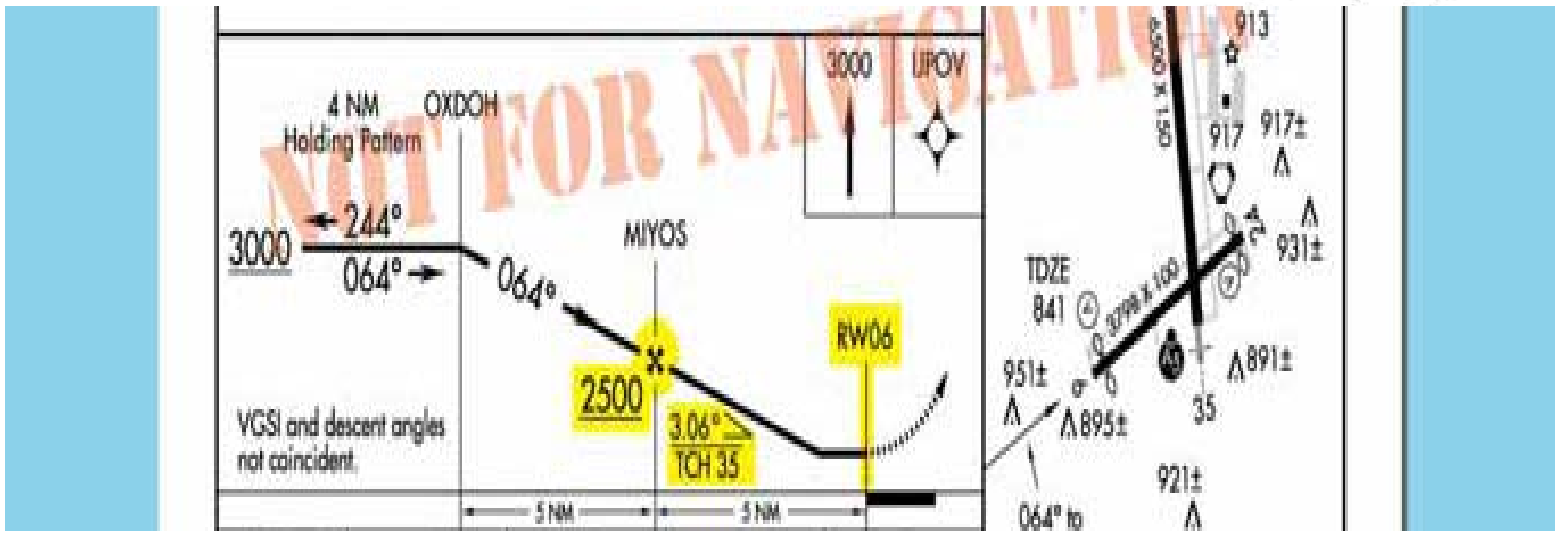
Approach Procedures

- Minimum Safe Altitude
  - These are published for emergency use on IAP charts
  - The MSA is normally based on the primary omnidirectional facility on which the IAP is predicated
  - MSAs are expressed in feet MSL and normally have a 25 NM radius
  - Ideally, a single sector altitude is established and depicted on the planview of approach charts
  - MSAs provide 1,000 feet clearance over all obstructions and may not have acceptable navigation signal coverage



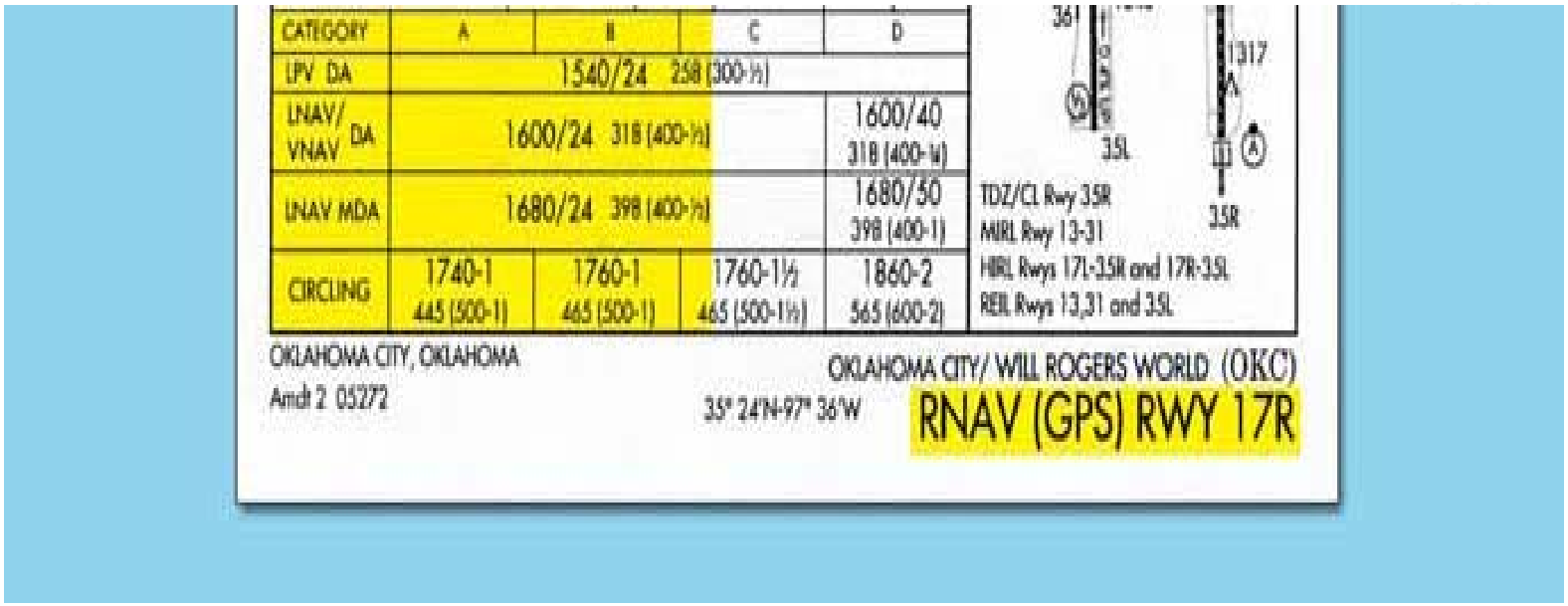
Approach Procedures

- Chart Format – Vertical Navigation Information
  - Maintain 3000 until OXDOH, then maintain at or above 2500 until MIYOS, then descend to the MAP altitude



Approach Procedures

- Chart Format – Vertical Guidance Approach Minimums
  - For Categories A through D maintain 1540 feet and 2400 RVR until the MAP



CATEGORY	A	B	C	D
LPV DA	1540/24 258 (300-½)			
LNAV/VNAV DA	1600/24 318 (400-½)			1600/40 318 (400-¼)
LNAV MDA	1680/24 398 (400-½)			1680/50 398 (400-1)
CIRCLING	1740-1 445 (500-1)	1760-1 465 (500-1)	1760-1½ 465 (500-1½)	1860-2 565 (600-2)

TDZ/CL Rwy 35R
MIRL Rwy 13-31
HIRL Rwys 17L-35R and 17R-35L
REIL Rwys 13,31 and 35L

OKLAHOMA CITY, OKLAHOMA
Amdt 2 05272

OKLAHOMA CITY/ WILL ROGERS WORLD (OKC)
35° 24'N-97° 36'W
RNAV (GPS) RWY 17R

Approach Procedures

- Chart Format – Airport Sketch

Approach Procedures

- Operations below DA, DH, or MDA
  - No pilot may operate an aircraft below the MDA or the DH unless —
    - (1) The aircraft must be in a position to make a normal landing straight in
    - (2) The flight visibility is not less than the visibility prescribed in the approach procedure
    - (3) At least one of the following visual references
      - The threshold.
      - The threshold markings
      - The threshold lights
      - The runway end identifier lights
      - The visual approach slope indicator
      - The touchdown zone or touchdown zone markings
      - The touchdown zone lights
      - The runway or runway markings
      - The runway lights
  - The approach light system only allow a pilot to descend 100 feet above the touchdown zone elevation using the approach lights as a reference

Approach Procedures

- Visual Approaches
  - A visual approach is an ATC authorization for an aircraft on an IFR flight plan to proceed visually to the airport – it is not an IAP
  - Once pilots report the aircraft in sight, they assume the responsibilities for their own separation and wake turbulence avoidance
  - Also, there is no missed approach segment
  - It is authorized when the ceiling is reported or expected to be at least 1,000 feet AGL and the visibility is at least 3 SM
  - Pilots must remain clear of the clouds at all times while conducting a visual approach

Approach Procedures

- Instrument Landing Systems
  - A system that allows an aircraft both vertical and horizontal guidance to land in IMC conditions
- ILS Approach Categories
  - There are three general classifications of ILS approaches — CAT I, CAT II, and CAT III
    - CAT I — DH 200 feet and RVR 2,400 feet
    - CAT II — DH 100 feet and RVR 1,200 feet
    - CAT IIIa — No DH or DH below 100 feet and RVR not less than 700 feet
    - CAT IIIb — No DH or DH below 50 feet and RVR less than 700 feet but not less than 150 feet
    - • CAT IIIc — No DH and no RVR limitation
  - To date, no U.S. operator has received approval for CAT IIIc approaches

Approach Procedures

- VOR Approach
  - VOR approaches use VOR facilities both on and off the airport to establish approaches
  - All VOR approaches are nonprecision approaches, and can provide MDAs as low as 250 feet above the runway
  - VOR also offers a flexible advantage in that an approach can be made toward or away from the navigational facility
  - When DME is included in the title of the VOR approach, operable DME must be installed in order to fly the approach
- NDB Approach
  - NDB approach can be designed using facilities both on and off the airport
  - For the NDB to be considered an on-airport facility, the facility must be located within one mile of any portion of the landing runway

Approach Procedures

- **Localizer Approaches**
  - The localizer approach system can provide both precision and nonprecision approach capabilities to a pilot
  - Typically, when the localizer is discussed, it is thought of as a nonprecision approach
  - In either case, the localizer provides a nonprecision approach using a localizer transmitter installed at a specific airport
  - A localizer is always aligned within 3 degrees of the runway, and it is afforded a minimum of 250 feet obstacle clearance in the final approach area
- **Localizer Back Course**
  - In cases where an ILS is installed, a back course may be available in conjunction with the localizer
  - The back course does not offer a glide slope and it can project a false glide slope signal and should be ignored
  - Reverse sensing will occur on the back course using standard VOR equipment


Any Questions On Approach Procedures?

IFR Knowledge – Equipment Problems

Equipment Problems

- **Communication Failure**
  - Two-way radio communication failure procedures for IFR operations are outlined in 14 CFR Part 91.185
  - Pilots can use the transponder to alert ATC to a radio communication failure by squawking code 7600
    - AIM suggests 7600 for 1 minute and then 7700 for the remainder of the flight
  - If only the transmitter is INOP, listen for ATC instructions on any operational receiver (This could also be any VOR, VOR / DME, VORTAC, ILS, or NDB frequency)
  - If the radio fails in VFR conditions, continue the flight under VFR conditions and land as soon as practicable

Equipment Problems

- **Communication Failure Under IFR**
  - If pilots must continue their flight under IFR conditions after experiencing two-way radio communication failure, they should fly one of the following routes:
    - 1.) The route assigned by ATC in the last clearance
    - 2.) If being radar vectored, the direct route from the point of radio failure to the fix, route, or airway
    - 3.) The route ATC has advised to expect in a further clearance
    - 4.) The route filed in the flight plan.
  - The altitude to fly after a communication failure can be found in Part 91.185
    - The altitude in the last ATC clearance.
    - The minimum altitude for IFR operations.
    - The altitude ATC has advised to expect


QUESTIONS