***T-44A Briefing Guides***



EVENT: **I4104**

**SYLLABUS NOTES:**

Emphasis for I4104 is VOR and TACAN approaches.

c. Minimum of 4 approaches per event and include at least 2 procedure turn approaches. Normal two-engine approaches should be emphasized in this block, but may introduce minor malfunctions.

d. Each event shall include a minimum of one approach with the FD and one without.

e. Holding should be accomplished and graded on at least two events, one of which should be GPS holding.

f. All events shall include a missed approach and should include at least two circling missed approaches in the block.

g. One approach per event with IP as PF and SMA as PM, emphasizing CRM callouts and radio communications.

h. SMAs shall bring one DD 175 flight plan per SMA and one DD 175-1 per aircraft for their planned profile to every brief. SMAs shall draft a flight plan that will execute the required maneuvers for the events.

**SPECIAL SYLLABUS REQUIREMENTS:** None for I4104.

**DISCUSS ITEMS:** Needle/DME vs. geographic location, point-to-point navigation, NAVAID characteristics (VOR, TACAN, and NDB), VOR/TAC/NDB approach procedures, circling procedures and circling missed approach, (FAA vs. ICAO circling), Procedure Track (arc/radial combination and teardrop), and VDP.

**Needle/DME vs. geographic orientation:**

You live on the tail of the needle. Push the head and pull the tail. Tail always rises, head always falls. All that jazz.

**Point-to-point navigation:**

 Tune in NAVAID

 Dial in the desired radial in the CDI

Turn in the shortest direction between the heads of the RMI and CDI needles (REMEMBER, you can use the TACAN

needle on the HSI to make it easier!)

 If you are moving to the same DME on your desired radial that you are currently at, fly directly in

the center of the HSI and CDI needles. If you want to gain DME (eg. Moving from 10 to 20

DME) favor the CDI needle. If you want to lose DME, favor the HSI needle (this means you are flying towards the station and losing DME).

**NAVAID characteristics (VOR, TACAN, NDB):**

Station passage: VOR and VOR/DME – When the TO-FROM indicator makes the first positive change to FROM. If RMI only, determined when the bearing pointer passes 90° to the inbound course.

 TACAN – Passage when the range indicator stops decreasing (min. DME).

ADF – When bearing pointer passes 90° to the inbound course. When established in holding, passage when the pointer moves past the 45° index on RMI

**VOR –**

11-217 Info -

### 6.2.1. VOR Frequency. VORs operate within the 108.0 to 117.95 MHz, or very high frequency (VHF) and have a power output necessary to provide coverage within their assigned operational service volume. The equipment is subject to line-of-sight restriction, and its range varies proportionally to the altitude of the receiving equipment.

6.2.3. Accuracy. The accuracy of course alignment of the VOR is excellent, being generally plus or minus 1°, but no more than 2.5°.

6.2.4. Identification. The only positive method of identifying a VOR is by its Morse code identification (either aural or alphanumeric display that meets the requirements of chapter 7) or by the recorded automatic voice identification.

AIM Info –

**(a**) Certain propeller revolutions per minute (RPM) settings or helicopter rotor speeds can cause the VOR Course Deviation Indicator to fluctuate as much as plus or minus six degrees. Slight changes to the RPM setting will normally smooth out this roughness. Pilots are urged to check for this modulation phenomenon prior to reporting a VOR station or aircraft equipment for unsatisfactory operation.

**1.** Should an error in excess of plus or minus 4 degrees be indicated through use of a ground check, or plus or minus 6 degrees using the airborne check, Instrument Flight Rules (IFR) flight shall not be attempted without first correcting the source of the error.

**DME –**

11-217 Info -

6.5.1. Operation. In the operation of DME, paired pulses at a specific spacing are sent out from the aircraft and are received at the ground station. The ground station then transmits paired pulses back to the aircraft at the same pulse spacing but on a different frequency. The time required for the round trip of this signal exchange is measured in the airborne DME unit and is translated into distance in nautical miles from the aircraft to the ground station.

6.5.2. Line-Of-Sight Principle. Operating on the line-of-sight principle, DME furnishes distance information with a very high degree of accuracy. Reliable signals may be received at distances up to 199 NM at line-of-sight altitude with an accuracy of better than ½ mile or 3 percent of the distance, whichever is greater. Distance information received from DME equipment is slant range distance and not actual horizontal distance.

6.5.5.1. NOTE: DME unlocks can occur periodically due to ground station overload when more than 100 aircraft interrogations are received at the same time. This problem is most likely to occur at locations of heavy traffic (i.e. Chicago-O Hare).

**TACAN –**

11-217 Info –

6.3.2. TACAN Ground Equipment. TACAN ground equipment consists of either a fixed or mobile transmitting unit. The airborne unit in conjunction with the ground unit reduces the transmitted signal to a visual presentation of both azimuth and distance information. TACAN operates in the ultra high frequency (UHF) band of frequencies. The system presently has a total of 252 channels available and is identified by two sets of channel numbers from 1 to 126, with suffixes ''X'' or ''Y'' for discrimination between the sets.

**NDB –**

11-217 –

6.11.1. Frequencies. NDB is a low, or medium, or ultra high frequency radio beacon that transmits nondirectional signals whereby an aircraft properly equipped can automatically determine and display bearing to any radio station within its frequency and sensitivity range. These facilities normally operate on frequencies between 190 and 1750 kHz or 275-287 MHz and transmit a continuous carrier keyed to provide identification except during voice transmission.

6.11.2. Compass Locator. When a radio beacon is used in conjunction with the ILS markers, it is called a "compass locator." Sometimes the low-powered NDB [i.e. compass locator] will be a stand alone NAVAID with limited range (usually less than 15 miles). These locators may be identified by an “L” and the use of the two-digit identifier.

6.11.3. Identification. Most radio beacons within the U.S. transmit a continuous three-letter identifier. A two-letter identifier is normally used in conjunction with an ILS. Some NDBs have only a one-letter identifier. Outside of the contiguous U.S., one, two, or three-letter identifiers are transmitted; for example, BB.

### 6.11.5. Disturbances. Radio beacons are subject to disturbances that may result in erroneous bearing information. Such disturbances result from intermittent or unpredictable signal propagation due to such factors as lightning, precipitation, static, etc. At night, radio beacons are vulnerable to interference from distant stations. Nearly all disturbances that affect the ADF bearing also affect the facility's identification. Noisy identification usually occurs when the ADF needle is erratic. Voice, music, or erroneous identification will usually be heard when a steady false bearing is being displayed.

#### 6.11.5.1. WARNING: Since ADF receivers do not have a "flag" to warn the pilot when erroneous bearing information is being displayed, the pilot must continuously monitor the NDBs identification.

**VOR/TAC approach procedures:**

Configure 3 NM prior to FAP or no later than FAP. Timing outbound and on barb – 1 minute for standardization. Never rely solely on CDI, use needles for backup. MAP – DME, timing, station passage or radar fix. Always use timing to back up DME.

11-217 Info -

**NDB approach procedures:**

Configure established on inbound course or no later than FAP. Timing outbound and on barb, 1 minute for standardization. Can only use the needle so pull tail, push head. MAP based on timing or station passage.

**Circling approaches:**

Circling MDA gives you 300 ft. protection from obstacles in the protected area.

**Circling missed approach:**

Climbing turn towards landing runway while remaining within the circling area. Immediately followed by interception and execution of the missed approach procedure. Comply with the intent of the missed approach procedure/instructions.

**FAA vs. ICAO procedures:**

 Circling Approach Obstacle Clearance Protected Area:
FAA - The protected area is much smaller in the USA (1.3 A, 1.5 B, 1.7 mile radius for approach category C and 2.3 mile radius for category D), this is well below ICAO requirements, and makes the circling approach even more difficult and dangerous.
ICAO -Requires a much larger area. Circling area radius from threshold in ICAO (DOC 8168 OPS/ 611PANS-OPS-4, page 3-26): A: 1.68nm; B: 2.66nm; C: 4.20nm; D: 5.28nm; E: 6.94nm. The maximum speeds are A: 100KIAS; B: 135KIAS; C: 180KIAS; D:205KIAS; E: 240KIAS. The radius is the distance from the threshold used to determine the circling area.

**Procedure track (arc/radial combination and teardrop):**

 Radial to Arc: About .8 miles works with no wind for a 90° intercept at 150 KIAS.

Arc to Radial: Five radials works will as no-wind lead point for 90° turn at 150 KIAS at 10DME.