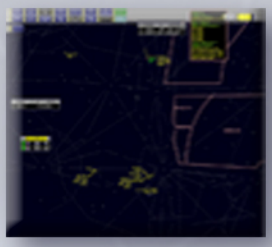
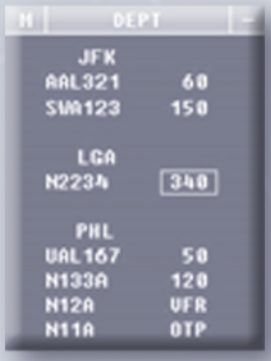
FAA Lesson Plan



En Route Stage 4
Radar Controller Training



Instructor

Radar Departures and Arrivals
Lesson 10

55055

V.1.06

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LESSON PLAN DATA SHEET

COURSE NAME:	RADAR CONTROLLER TRAINING
COURSE NUMBER:	55055
LESSON TITLE:	RADAR DEPARTURES AND ARRIVALS
DATE REVISED:	2014-04
VERSION:	V.1.06
REFERENCES:	JO 7110.65V, Air Traffic Control; JO 7210.3Y, Facility Operation and Administration; Aeronautical Information Manual (AIM); Airport Digital Directory; TI 6110.100, Air Traffic Manual: R-Position User Manual
HANDOUTS:	NONE
EXERCISES:	NONE
END-OF-LESSON TEST:	YES *(REFER TO 55055-ELT10.PDF)*
PERFORMANCE TEST:	NONE
MATERIALS:	NONE
OTHER PERTINENT INFORMATION:	THIS LESSON IS BASED ON ERAM BUILD EAC1500. THE LESSON HAS BEEN REVIEWED AND REFLECTS CURRENT ORDERS AND MANUALS AS OF APRIL 2014.

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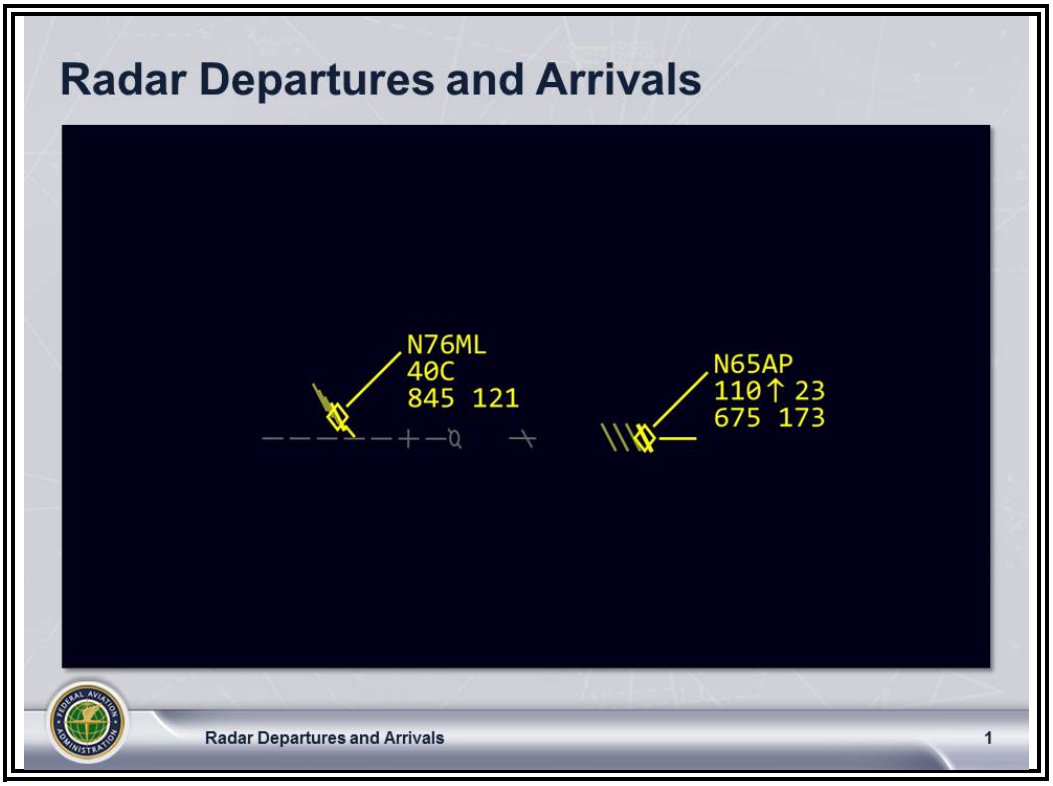
INTRODUCTION



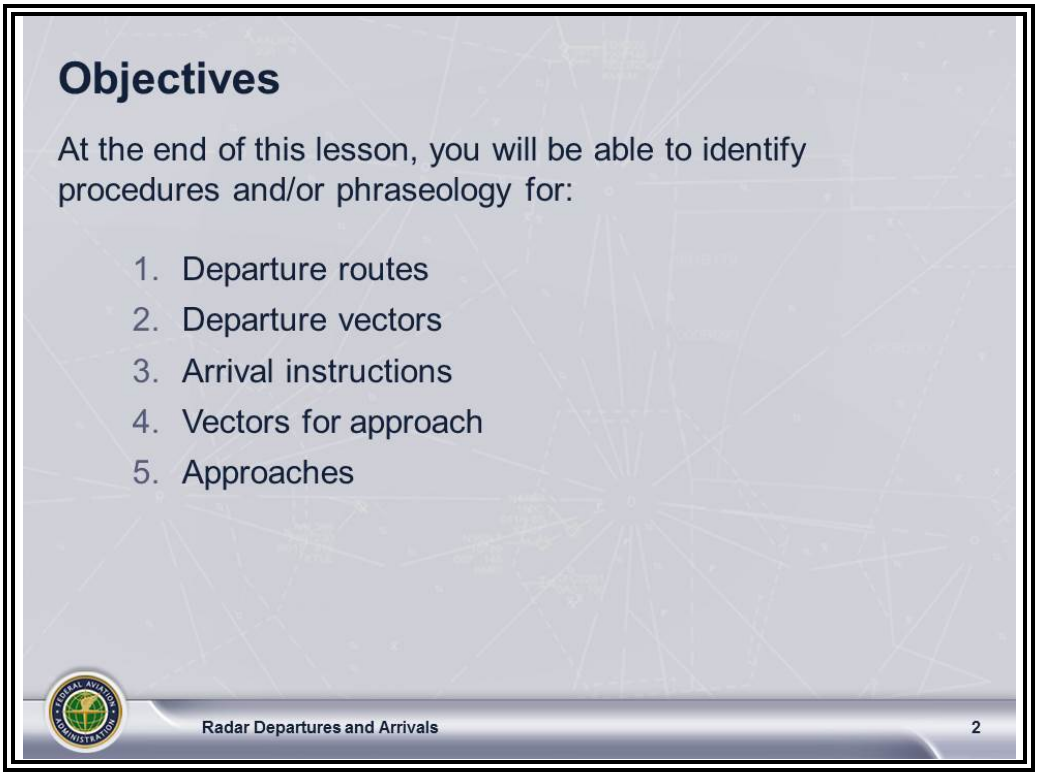
To expedite the flow of arrivals and departures, you must be able to incorporate the radar procedures presented in this lesson into your work routine.

Purpose

In this lesson we will cover radar departure and arrival procedures as well as the associated phraseology.

INTRODUCTION *(Continued)*

Objectives



☞ ***NOTE:*** *Review the lesson objectives.*

DEPARTURE PROCEDURES

Definitions
JO 7110.65, Pilot/Controller Glossary;
AIM, par. 1-2-1, b1;
TI 6110.100, Glossary;
Airport Facility Directory

📖 **Preferential Departure Route** (PDR) is a specific departure route from an airport or terminal area to an en route point where there is no further need for flow control.

📖 **Adapted Departure Route** (ADR) is an ATC auto route that replaces the route of flight from the departure airport to a designated transition fix.

📖 **Preferential Departure and Arrival Route** (PDAR) is a route between two terminals which are within or immediately adjacent to one ARTCC's area. PDARs are not synonymous with Preferred IFR Routes but may be listed as such as they do accomplish essentially the same purpose.

📖 **Adapted Departure Arrival Route** (ADAR) is an ATC auto route that replaces the filed route from the departure airport to the destination airport.

📖 **Preferred IFR Routes** are routes established between busier airports to increase system efficiency and capacity. They normally extend through one or more ARTCC areas and are designed to achieve balanced traffic flows among high density terminals. Preferred IFR Routes are listed in the Airport/Facility Directory. Preferred IFR Routes are correlated with DPs and STARs and may be defined by airways, jet routes, direct routes between NAVAIDs, Waypoints, NAVAID radials/ DME, or any combinations thereof.

📖 **Instrument Departure Procedure** (DP) is a preplanned instrument flight rule (IFR) departure procedure published for pilot use, in graphic or textual format, that provides obstruction clearance from the terminal area to the appropriate en route structure. There are two types of DP, Obstacle Departure Procedure (ODP), printed either textually or graphically, and, Standard Instrument Departure (SID), which is always printed graphically.

📖 **CLIMB VIA –** An abbreviated ATC clearance that requires compliance with the procedure lateral path, associated speed restrictions, and altitude restrictions along the cleared route or procedure.

Continued on next page

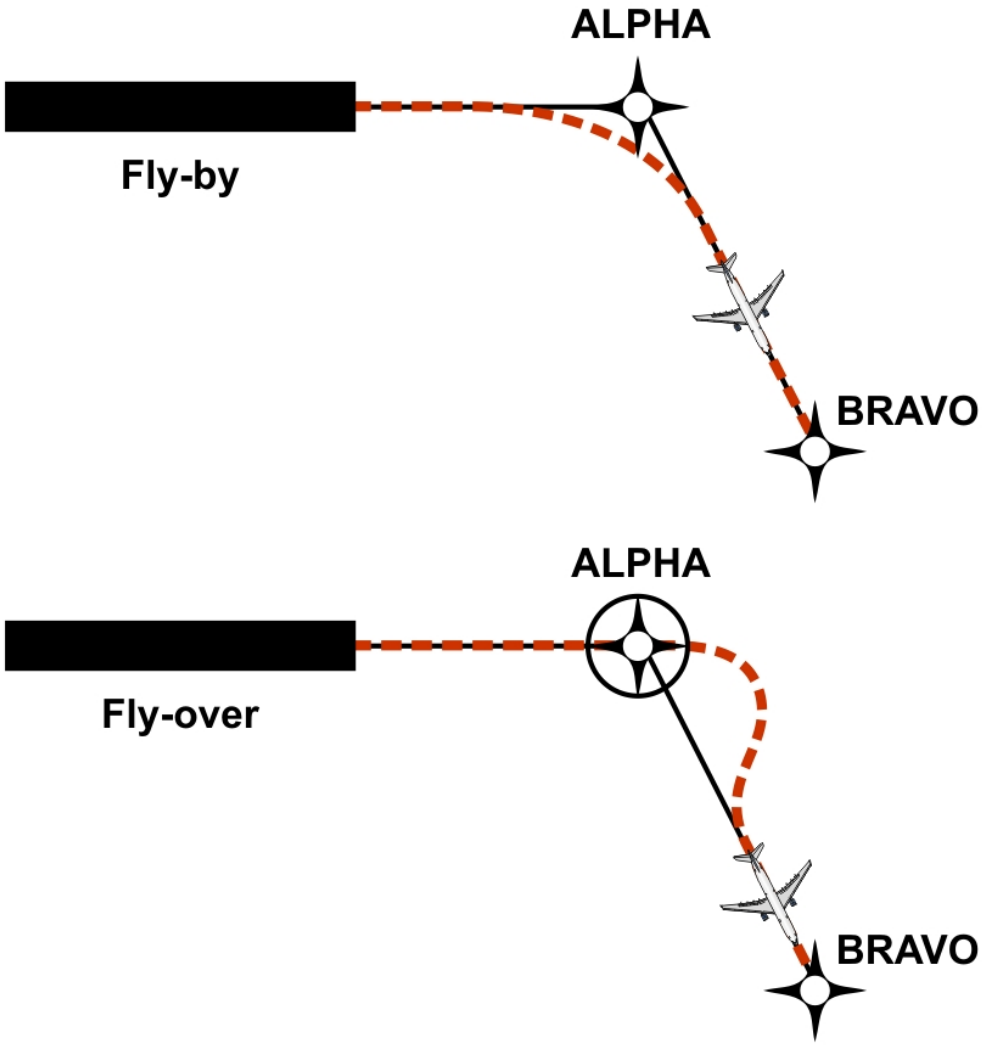
DEPARTURE PROCEDURES *(Continued)*

Definitions (Cont'd)
JO 7110.65, Pilot/Controller Glossary;
AIM, par. 1-2-1, b1;
TI 6110.100, Glossary;
Airport Facility Directory

Waypoints - A waypoint is a predetermined geographical position that is defined in terms of latitude/longitude coordinates. Waypoints may be a simple named point in space or associated with existing navaids, intersections, or fixes. A waypoint is most often used to indicate a change in direction, speed, or altitude along the desired path. RNAV procedures make use of both fly−over and fly−by waypoints.

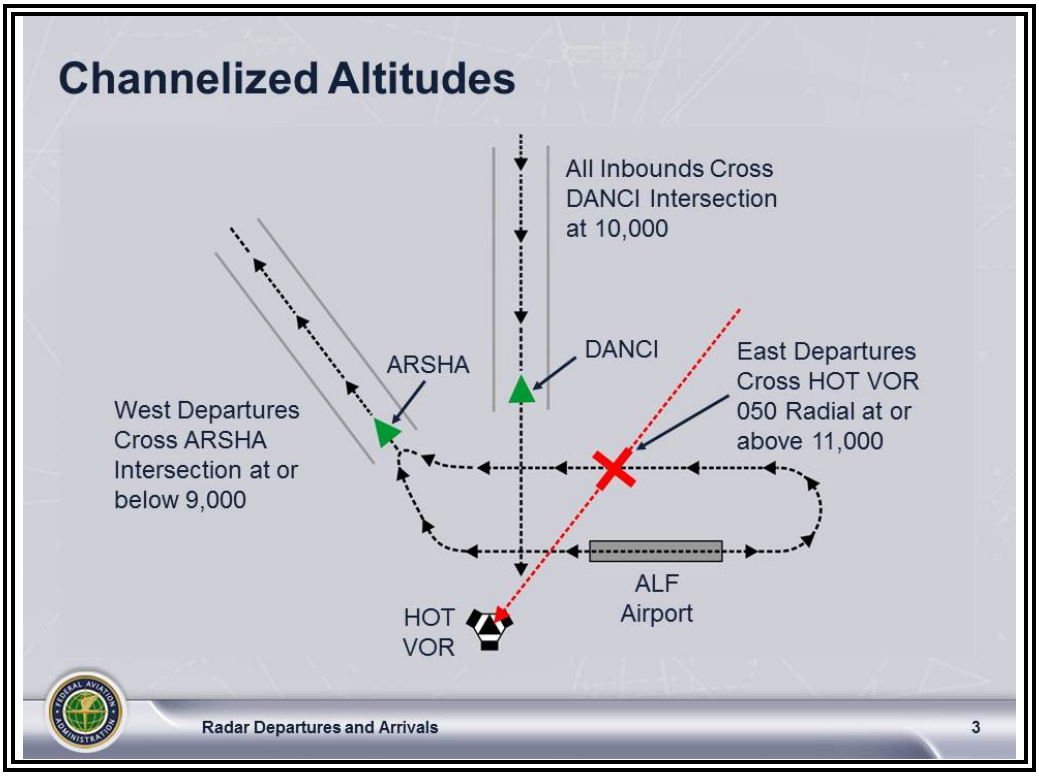
Fly-by Waypoint - Fly-by waypoints are used when an aircraft should begin a turn to the next course prior to reaching the waypoint separating the two route segments. This is known as turn anticipation.

Fly-over Waypoint - Fly-over waypoints are used when the aircraft must fly over the point prior to starting a turn.



DEPARTURE PROCEDURES *(Continued)*

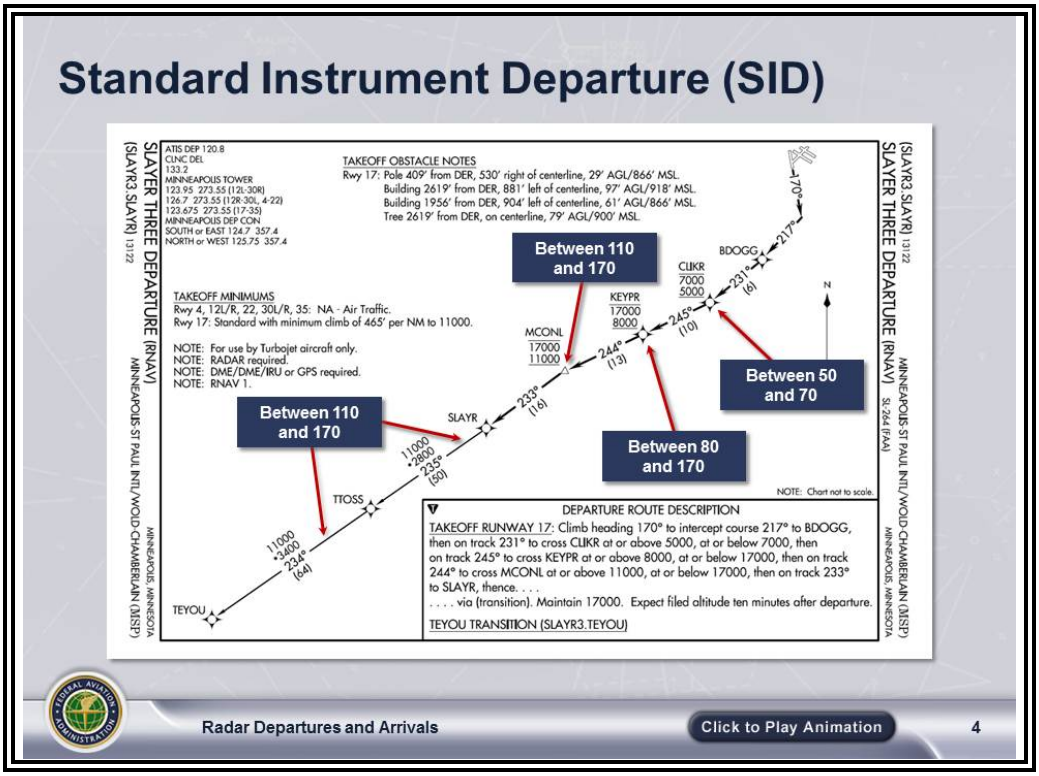
Standard Departure Routes and Channelized Altitudes
JO 7110.65, par. 5-8-1



- Use standard departure routes and channelized altitudes whenever practical to reduce coordination. Do not, however, assign these routes solely to provide for possible radar or communication failure.
  - Standard departure routes may include PDRs, ADRs, PDARs, ADARs, Preferred IFR Routes and/or Standard Instrument Departures (SIDs).
  - May be unpublished and unknown to the pilot
  - May be specified by Letter of Agreement (LOA) or Facility Directive
  - Are used to channelize departure and arrival routes

DEPARTURE PROCEDURES *(Continued)*

Instrument Departure Procedures
JO 7110.65, pars. 4-3-2, 4-5-7; Pilot/Controller Glossary



Click 4 times to animate.

- There are two types of DPs:
  - Standard Instrument Departures (SIDs); always printed graphically
  - Obstacle Departure Procedures (ODPs); printed either textually or graphically
- SIDs
  - SIDs are designed to expedite clearance delivery and to facilitate transition between takeoff and en route operations.
  - Each SID is presented as a separate chart and may serve a single airport or more than one airport in a given geographical location.
  - Assign a SID (including transition if necessary).
    - Assign a PDR or the route filed by the pilot, only when a SID is not established for the departure route to be flown, or the pilot has indicated that he/she does not wish to use a SID.

Continued on next page

DEPARTURE PROCEDURES *(Continued)*

Instrument Departure Procedures (Cont'd)
JO 7110.65, pars. 4-2-5, 4-3-2, 4-5-7; Pilot/Controller Glossary

✈ **Phraseology**

"(SID name and number) DEPARTURE."

or

"(SID name and number) DEPARTURE, (transition name) TRANSITION."

Example: "CLEARED SLAYER THREE DEPARTURE."

Example: "CLEARED MINNE FOUR DEPARTURE, EASON TRANSITION."

NOTE: Departure procedure descriptive text contained within parentheses (for example, "Jimmy One (RNAV) Departure") are not included in departure clearance phraseology.

⊙ Assigning a SID:

- For an aircraft on a direct routing to a SID waypoint/fix, assign an altitude to cross the waypoint/fix if no altitude is depicted at the waypoint/fix.
- If it is necessary to assign a crossing altitude which differs from the SID altitude, emphasize the change to the pilot.

✈ **Phraseology**

"(SID name and number) DEPARTURE, EXCEPT CROSS (revised altitude information)."

Example: ""SLAYER THREE DEPARTURE, EXCEPT CROSS MCONL AT OR ABOVE ONE TWO THOUSAND."

- Specify altitudes when they are not included in the SID.

✈ **Phraseology**

"(SID name and number) DEPARTURE. CROSS (fix) AT (altitude)."

Example: "SLAYER THREE DEPARTURE. CROSS SLAYER AT ONE SEVEN THOUSAND."

- Altitude may be omitted if the top altitude (the charted "maintain" altitude) is published in the SID route description.
- When route or altitude in a previously issued clearance is amended, restate all applicable altitude restrictions.

NOTE: Restating previously issued altitude to "maintain" is an amended clearance. If altitude to "maintain" is changed or restated, whether prior to departure or while airborne and previously issued altitude restrictions are omitted, altitude restrictions are canceled, including SID altitude restrictions if any.

Continued on next page

Instrument Departure Procedures (Cont'd)
JO 7110.65, pars. 4-2-5, 4-3-2, 4-5-7; Pilot/Controller Glossary

- Use one of the following when the SID contains published crossing restrictions:

  – When the top altitude is included in the SID route description, instruct aircraft to "climb via SID."

"CLIMB VIA (SID name and number)."

Example: "CLIMB VIA THE SLAYER THREE DEPARTURE."

Example: "CLEARED TO JOHNSTON AIRPORT, VIA SCOTT ONE DEPARTURE, JONEZ TRANSITION, Q-ONE FORTY-FIVE. CLIMB VIA SID."

  – Without a published top altitude or when an interim altitude is issued, instruct the aircraft to "climb via SID except (altitude assignment/change)."

✈ **Phraseology**

"CLIMB VIA (SID name and number) except maintain (altitude).

Example: "CLIMB VIA THE SLAYER THREE DEPARTURE, EXCEPT MAINTAIN ONE FIVE THOUSAND."

⊙ When cleared for SIDs that contain published speed restrictions, the pilot must comply with those restrictions independent of any "climb via" clearance. A clearance to "climb via" authorizes pilots:

- When used in the IFR departure clearance, in a Pre Departure Clearance or when subsequently cleared after departure to a waypoint depicted on a SID, to join a procedure after departure or resume a procedure.

- When vertical navigation is interrupted and an altitude is assigned to maintain which is not contained on the published procedure, to climb from that previously-assigned altitude at pilot's discretion to the altitude depicted for the next waypoint. ATC must ensure obstacle clearance until the aircraft is established on the lateral and vertical path of the SID.

- Once established on the depicted departure, to climb and to meet all published or assigned altitude and speed restrictions.

Continued on next page

DEPARTURE PROCEDURES *(Continued)*

Instrument Departure Procedures (Cont'd)
JO 7110.65, pars. 4-2-5, 4-3-2, 4-5-7; Pilot/Controller Glossary

⊙ When an aircraft has been issued an interim altitude and after departure ATC can subsequently clear the aircraft to climb to the original top altitude published in the SID, instruct aircraft to "climb via SID."

"CLIMB VIA SID."

⊙ When issuing a new altitude and compliance with published restrictions is still required instruct aircraft to "climb via SID except maintain (altitude)."

✈ **Phraseology**

"CLIMB VIA (SID name and number), EXCEPT CROSS (fix, point, waypoint), (revised altitude information)."

Example: "PROCEED DIRECT DVINE, CLIMB VIA THE SUZAN TWO DEPARTURE EXCEPT CROSS MKALA AT OR ABOVE SEVEN THOUSAND."

✈ **Phraseology**

"CLIMB VIA SID EXCEPT AFTER (waypoint name), MAINTAIN (altitude)."

Example: "CLIMB VIA SID EXCEPT AFTER BARET, MAINTAIN FLIGHT LEVEL ONE NINER ZERO."

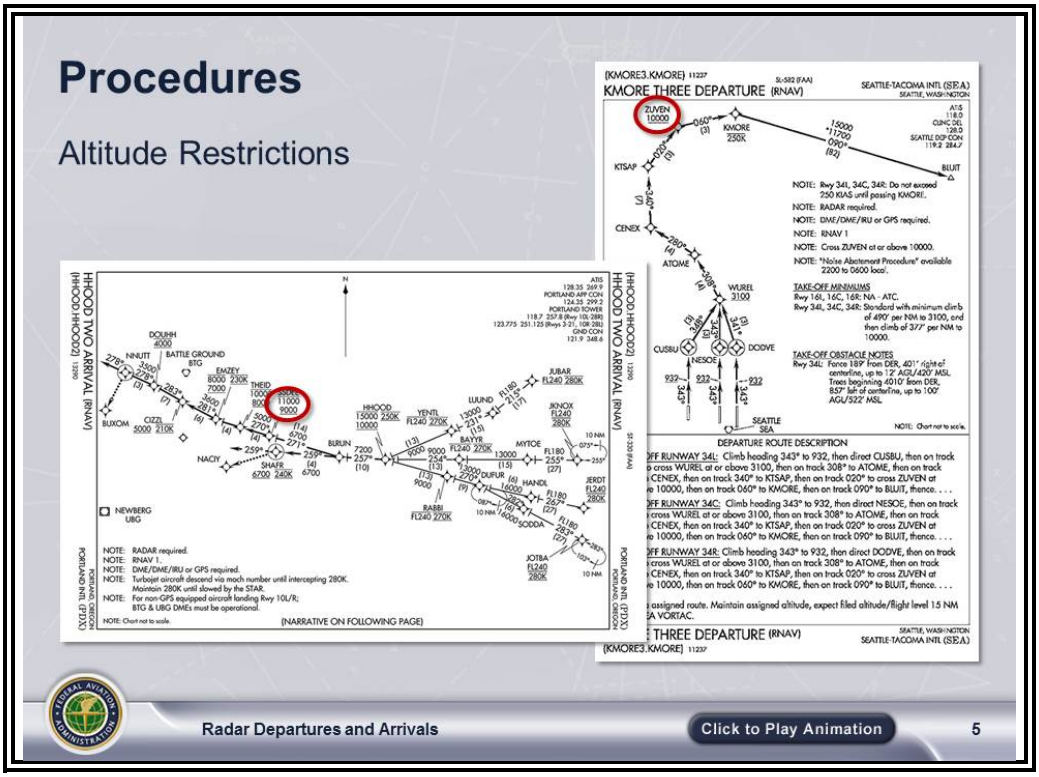
⊙ Pilots cleared for vertical navigation using the phraseology "climb via" must inform ATC, upon initial contact, of the altitude leaving and any assigned restrictions not published in the procedure.

NOTE: Considering the principle that the last ATC clearance issued has precedence over the previous, the phraseology "maintain (altitude)" alone cancels previously issued altitude restrictions, including SID altitude restrictions unless they are restated or modified, and authorizes an unrestricted climb. Speed restrictions remain in effect unless the controller explicitly cancels the speed restrictions.

☞ ***NOTE:*** *Speed control on Climb/Descend Via clearances will be covered in a later lesson.*

DEPARTURE PROCEDURES *(Continued)*

Instrument Departure Procedures
JO 7110.65, pars. 4-3-2, 4-5-7; Pilot/Controller Glossary



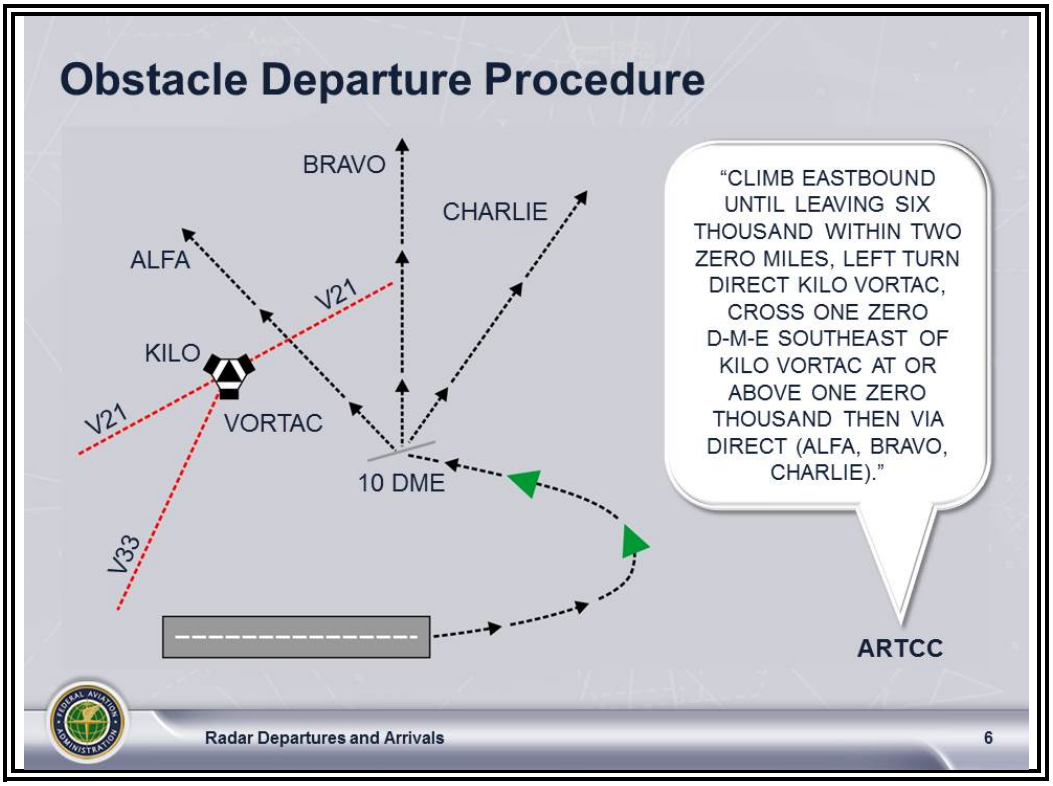
- As an Air Traffic Controller it is important to have full comprehension of the SID/Standard Terminal Arrival (STAR) being issued.
- When issuing Climb/Descend Via clearances, it is imperative to understand all aspects pertaining to the issued procedures including but not limited to:

Click 6 times to highlight each bulleted item.

- Altitude restrictions
- Speed restrictions
- Routing
- Fly-by waypoints
- Fly-over waypoints
- Headings

DEPARTURE PROCEDURES *(Continued)*

Instrument Departure Procedures (Cont'd)
JO 7110.65, pars, 4-2-5, 4-3-2; Pilot/Controller Glossary



⊙ ODPs

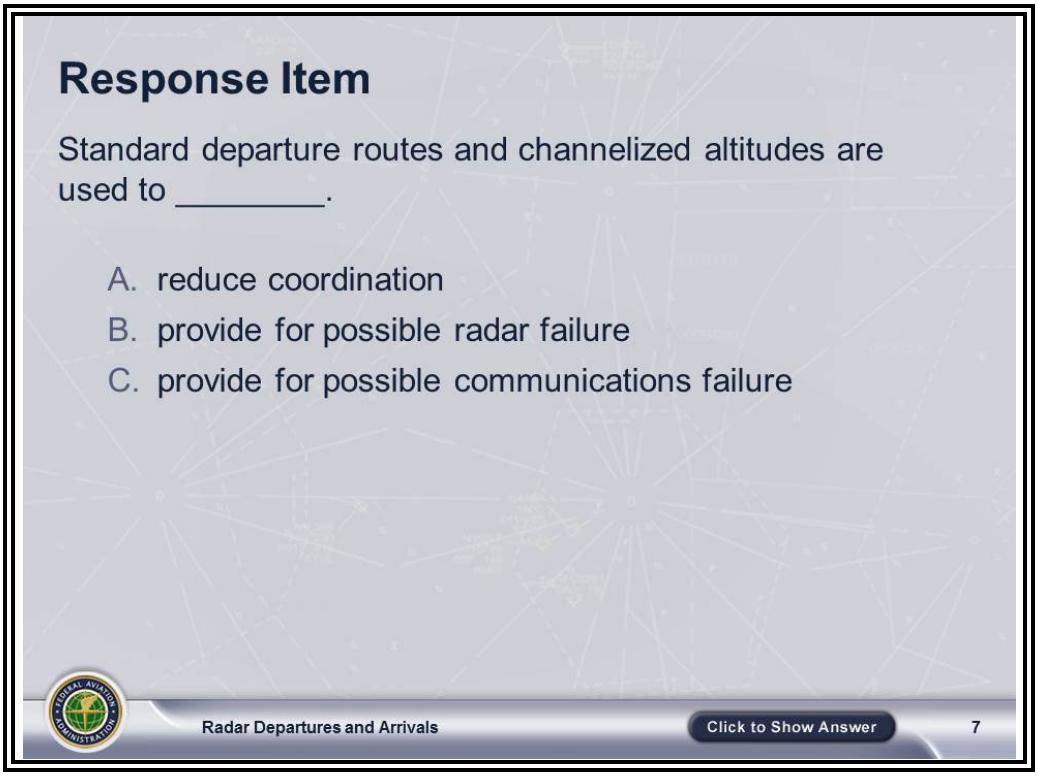
- Are recommended for obstruction clearance and may be flown without ATC clearance unless an alternate departure procedure (SID or radar vector) has been specifically assigned by ATC.
- Where only textually described obstacle departure procedures have been published for a location and pilot compliance is necessary to ensure separation, include the procedure as part of the ATC clearance.
- Crossing altitudes and speed restrictions on ODPs are mandatory and cannot be canceled by ATC.

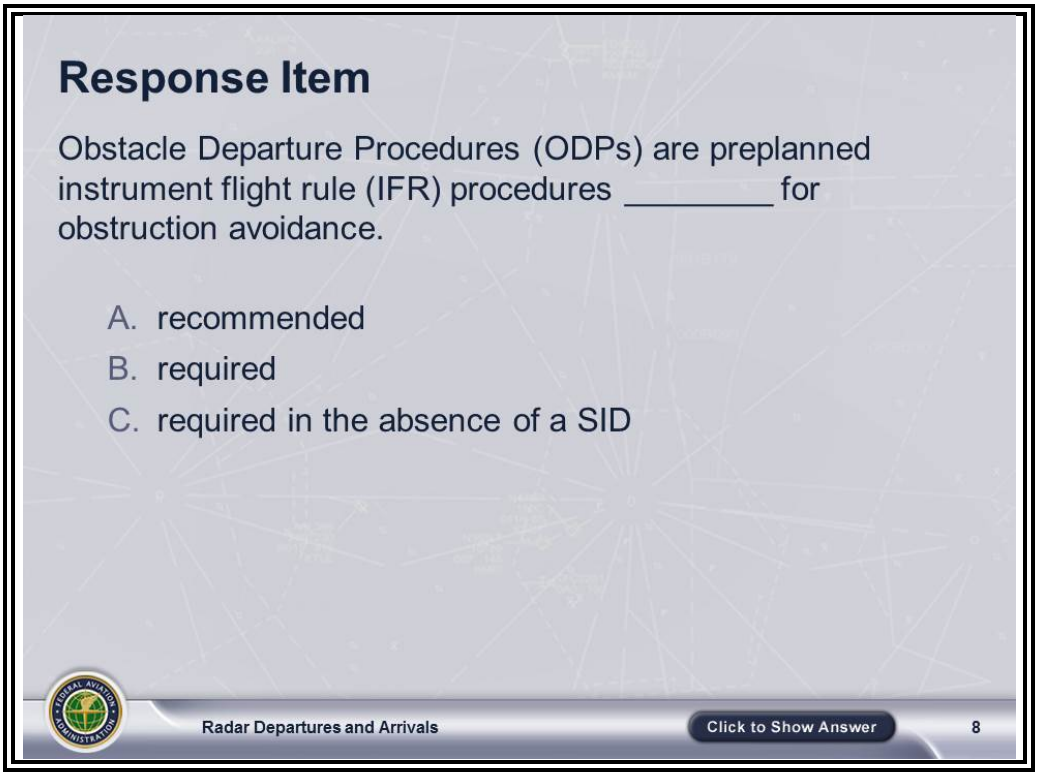
✈ **Phraseology**

"DEPART VIA THE (airport name) (runway number) DEPARTURE PROCEDURE."

DEPARTURE PROCEDURES *(Continued)*

Review

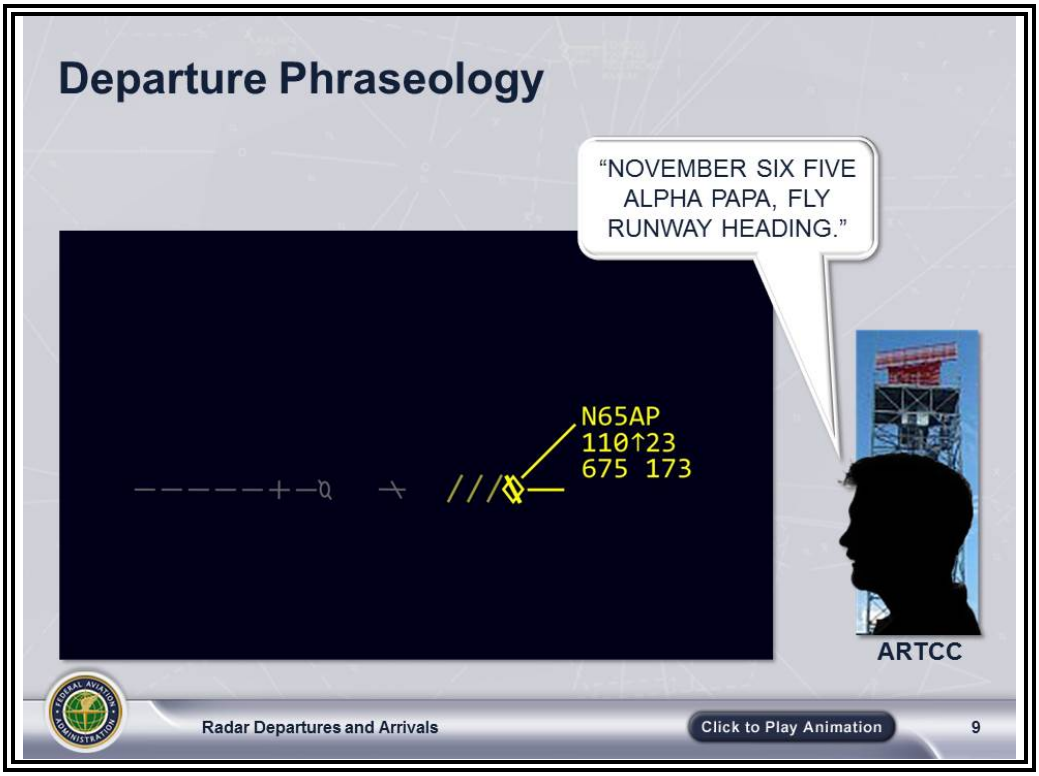




SLIDE ANSWERS: Slide 7 = A; Slide 8 = A

DEPARTURE VECTORS

Initial Heading
JO 7110.65, pars. 4-3-2 and 5-8-2



⊙ Assign a heading before departure to:

- An aircraft vectored immediately after departure, and
- An aircraft cleared via SIDs designed to begin with a vector to the initial waypoint

Click to animate.

✈ **Phraseology**

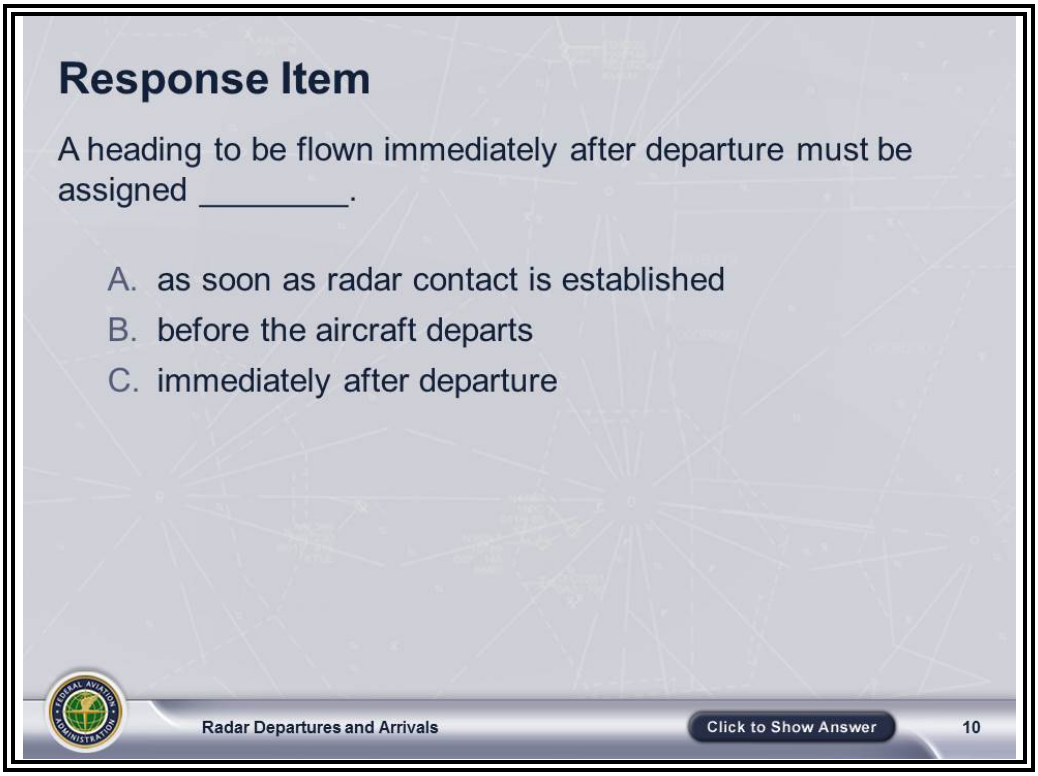
"FLY RUNWAY HEADING."

"TURN LEFT/RIGHT, HEADING (degrees)."

☞ ***NOTE:*** *Discuss reasons why you might vector a departure immediately after takeoff; e.g., for terrain avoidance, obstruction avoidance, noise abatement, operational advantage.*

DEPARTURE VECTORS *(Continued)*

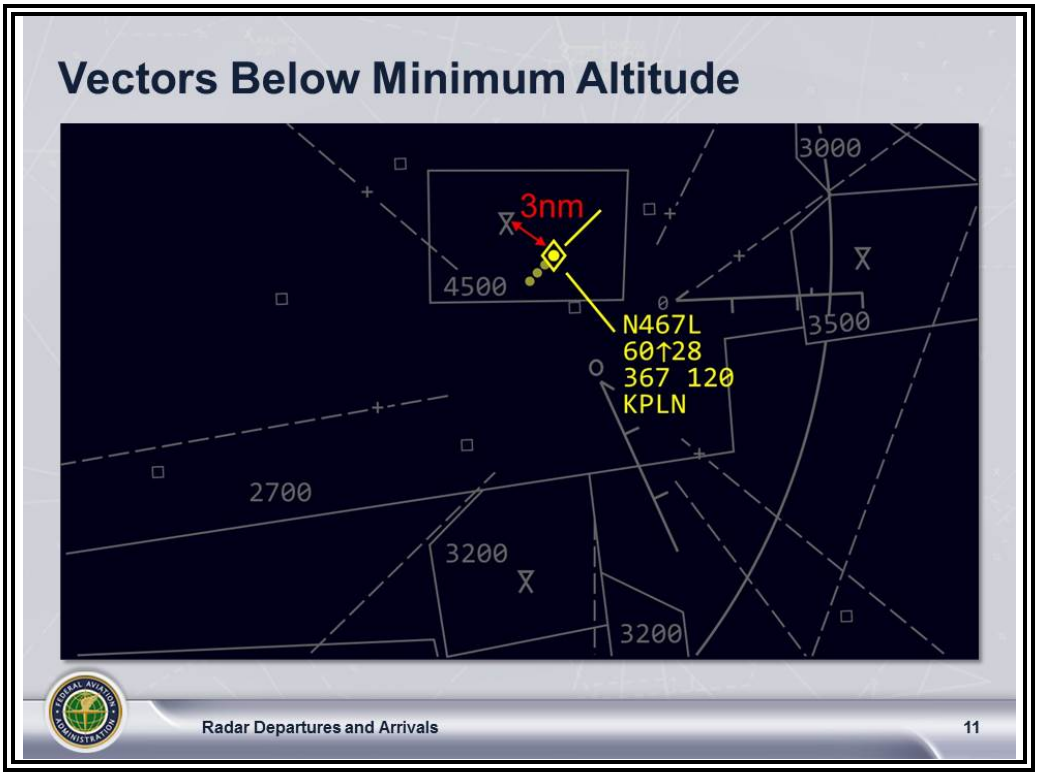
Review



SLIDE ANSWER: B

DEPARTURE VECTORS *(Continued)*

Vectors Below Minimum Altitude
JO 7110.65, par. 5-6-3



- Except in en route automated environments where more than 3 miles separation is required:
  - You may vector an IFR departure or an aircraft conducting a missed approach before it reaches the minimum altitude for IFR operations, under the following conditions:
    - The aircraft is in controlled airspace.
    - The aircraft is within 40 miles of the radar antenna.

Continued on next page

DEPARTURE VECTORS *(Continued)*

Vectors Below Minimum Altitude (Cont'd)
JO 7110.65, par. 5-6-3

- Obstructions are shown on the Situation Display, and the aircraft is climbing to an altitude of at least 1,000 feet above the obstruction.

  → If the flight path of the aircraft is 3 miles or more from the obstruction, the aircraft must be vectored to maintain at least 3 miles separation from the obstruction until the aircraft reports leaving an altitude above the obstruction.

  → If the flight path is less than 3 miles from the obstruction, vector the aircraft to increase lateral separation from the obstruction until the 3-mile minimum is achieved or the aircraft reports leaving an altitude above the obstruction.

NOTE: A facility directive is required to determine areas where 3-mile separation applies and where vectors below the minimum IFR altitude are authorized.

DEPARTURE VECTORS *(Continued)*

VFR Departures
JO 7110.65, par. 4-2-8;
AIM, par. 5-2-7

⊙ Instructions to departing VFR or pop-up VFR requesting IFR:

- Issue IFR clearance to a VFR aircraft when it is approaching a fix where it proposes to start IFR operations.

✈ **Phraseology**

Click 4 times to display phraseology.

"CLEARED TO (destination) AS FILED."

(May be used with abbreviated departure clearance procedures.)

- Before issuing a clearance to an aircraft below the minimum altitude for IFR operations, and you are aware the pilot is unable to climb in VFR conditions to the Minimum IFR Altitude (MIA), ask if pilot is able to maintain terrain and obstruction clearance during a climb to the MIA.
  - If pilot is able to maintain terrain and obstruction separation, issue appropriate clearance.
  - If unable to maintain terrain and obstruction separation, instruct pilot to maintain VFR and to state intentions.

Continued on next page

DEPARTURE VECTORS *(Continued)*

VFR Departures (Cont'd)
JO 7110.65, par. 4-2-8; AIM, par. 5-2-7

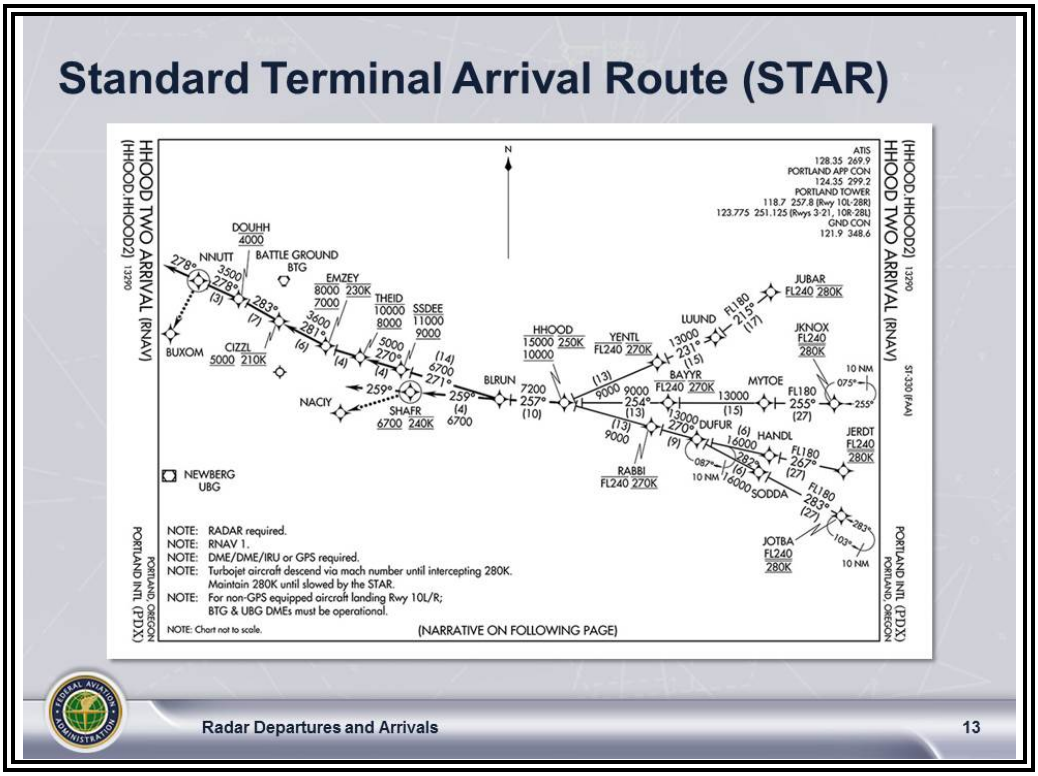
- If appropriate, apply provisions of Order JO 7110.65, par. 10-2-7, VFR Aircraft in Weather Difficulty or 10-2-9, Radar Assistance Techniques.

- Pilots of pop-up aircraft are responsible for terrain and obstruction clearance until reaching MIA or Minimum En Route Altitude (MEA).

- Do not assign (or imply) specific course guidance that will (or could) be in effect below the MIA or MEA. Doing so transfers terrain/obstruction clearance responsibility to the controller.

RADAR ARRIVALS

STAR Definition
JO 7110.65, Pilot/Controller Glossary



A **Standard Terminal Arrival (STAR)** is a preplanned IFR air traffic control arrival procedure published for pilot use in graphic and/or textual form. STARs provide transition from the en route structure to an outer fix or an instrument approach fix/arrival waypoint in the terminal area.

Assign a STAR
JO 7110.65, par. 4-7-1 b

- Assign a STAR and transition to any aircraft in lieu of other routes, for example, airways or preferential arrival routes when the routings are the same.
- The clearance must include the name and transition, if necessary, of the STAR/RNAV STAR/FMSP to be flown.

NOTE: Arrival procedure descriptive text contained within parentheses (for example, “Devine One (RNAV) Arrival”) are not included in arrival clearance phraseology.

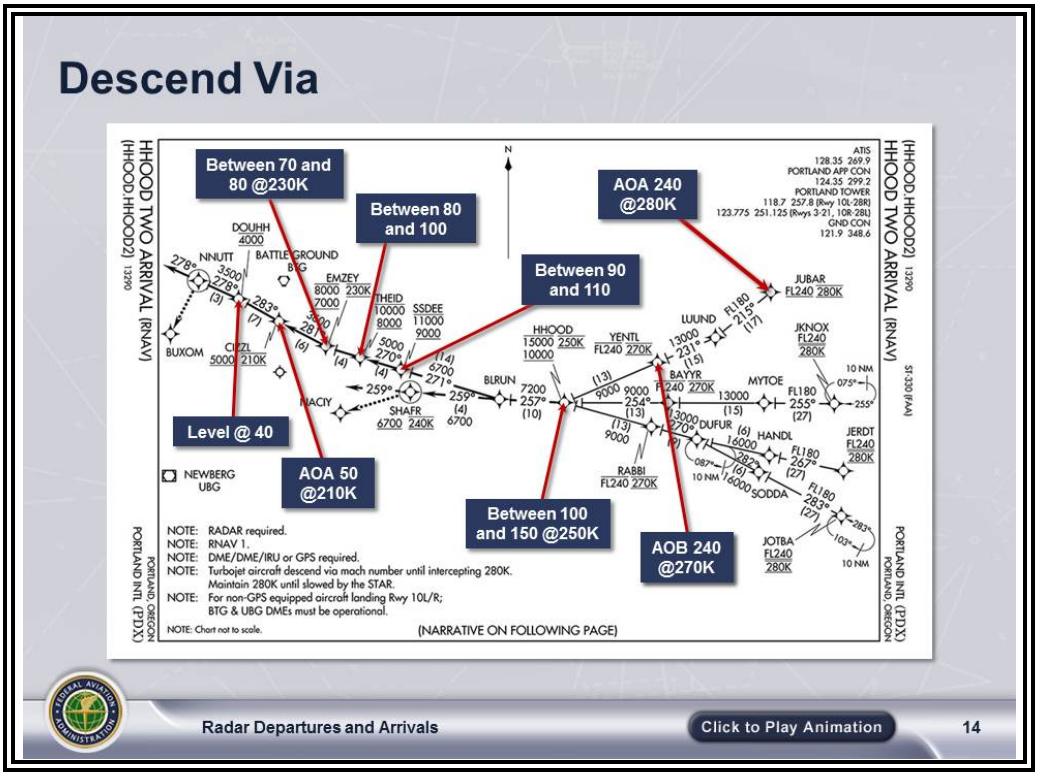
Phraseology

“(STAR/RNAV STAR/FMSP name and number) ARRIVAL.”

“(STAR/RNAV STAR/FMSP name and number) ARRIVAL, (transition name) TRANSITION.”

RADAR ARRIVALS *(Continued)*

Descend Via
JO 7110.65,
par. 4-5-7;
Pilot/Controller
Glossary



DESCEND VIA – An abbreviated ATC clearance that requires compliance with a published procedure lateral path and associated speed restrictions and provides a pilot-discretion descent to comply with published altitude restrictions.

- When cleared for STARs that contain published speed restrictions, the pilot must comply with those speed restrictions independent of any descend via clearance, unless otherwise cleared by ATC. A clearance to "descend via" authorizes pilots:

  - To descend at pilot discretion to meet published restrictions and laterally navigate on a STAR. Pilots navigating on a STAR must maintain the last assigned altitude until receiving clearance to descend via. Once departing an altitude the pilot may not return to that altitude without an ATC clearance.

Phraseology

"DESCEND VIA (STAR name and number)."

Example: "DESCEND VIA THE HHOOD TWO ARRIVAL."

Continued on next page

RADAR ARRIVALS *(Continued)*

Descend Via (Cont'd)
JO 7110.65, par. 4-5-7
Pilot/Controller Glossary

- When cleared to a waypoint depicted on a STAR, to descend from a previously assigned altitude at pilot's discretion to the altitude depicted for that waypoint. ATC assigned altitudes must ensure obstacle clearance.

✈ **Phraseology**

"CROSS (fix, waypoint) AT OR ABOVE (altitude), THEN DESCEND VIA (STAR name and number)."

Example: "CROSS LUUND AT OR ABOVE ONE THREE THOUSAND, THEN DESCEND VIA THE HHOOD TWO ARRIVAL."

Example: "PROCEED DIRECT MYTOE, CROSS MYTOE AT OR ABOVE ONE THREE THOUSAND, THEN DESCEND VIA THE HHOOD TWO ARRIVAL."

Click 8 times to animate.

☞ ***NOTE:*** *Discuss each STAR waypoint on the route, pointing out the speed and altitude restrictions as the aircraft navigates the STAR.*

- Once established on the depicted arrival, to descend to meet all published or assigned altitude and/or speed restrictions. Where speed restrictions are published at the waypoint/fix pilots will begin slowing to comply with the restriction prior to reaching the waypoint/fix.

⊙ Pilots cleared for vertical navigation using the phraseology "descend via" must inform ATC upon initial contact.

⊙ For an aircraft on a direct routing to a STAR waypoint/fix, assign an altitude to cross the waypoint/fix if no altitude is depicted at the waypoint/fix.

⊙ A "descend via" clearance must not be used where procedures contain only published "expect" altitude and/or speed restrictions.

⊙ "Descend via" may be used on procedures that contain both "expect" and required altitude and speed restrictions only if altitude and/or speed restrictions or alternate restrictions are issued for the fix/waypoint associated with all expect restrictions.

NOTE: Pilots are not expected to comply with published "expect" restrictions in the event of lost communications, unless ATC has specifically advised the pilot to expect these restrictions as part of a further clearance.

⊙ "Descend via" clearances may also be issued if an aircraft is past all fixes/waypoints that have expect restrictions.

Continued on next page

RADAR ARRIVALS *(Continued)*

Descend Via (Cont'd)
JO 7110.65, par. 4-5-7

✈

Phraseology

- If it is necessary to assign a crossing altitude which differs from the STAR altitude, emphasize the change to the pilot.

"DESCEND VIA THE (STAR name and number) ARRIVAL EXCEPT AFTER (fix) MAINTAIN (revised altitude information)."

Example: "UNITED 454 DESCEND VIA HHOOD TWO ARRIVAL EXCEPT AFTER HHOOD MAINTAIN ONE ZERO THOUSAND."

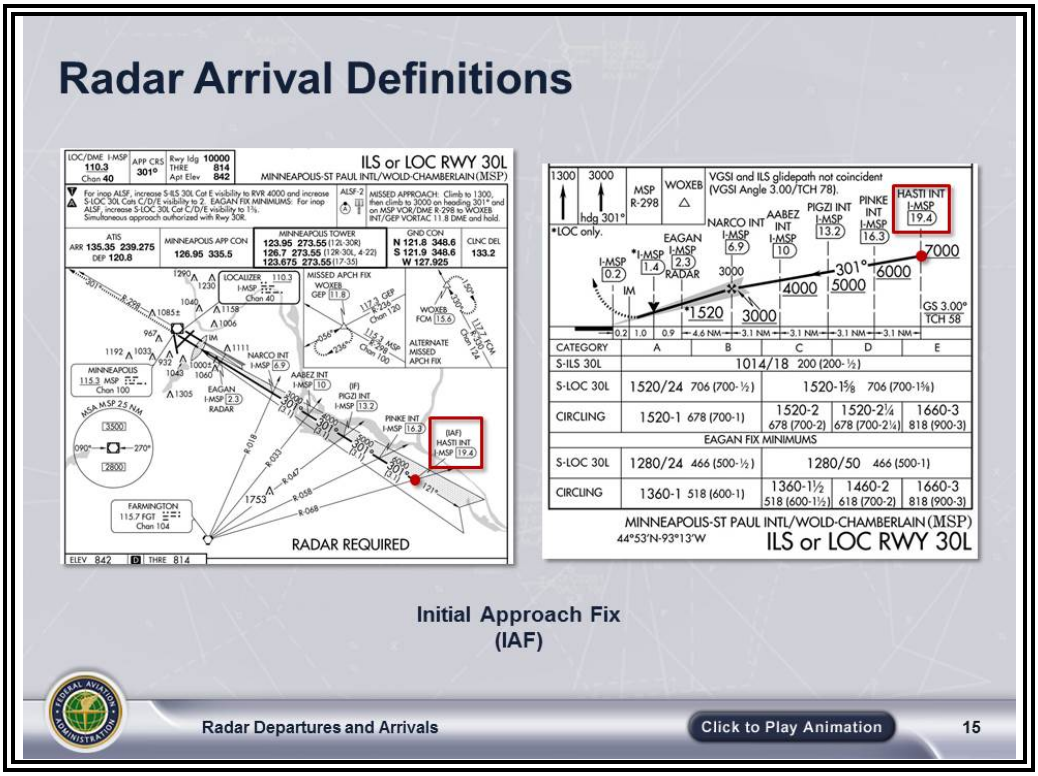
- Assign an interim altitude or assign a bottom altitude (the lowest altitude authorized) not contained on a STAR, if necessary.

NOTE: Considering the principle that the last ATC clearance issued has precedence over the previous, the phraseology "maintain (altitude)" alone cancels previously issued altitude restrictions, including STAR altitude restrictions unless they are restated or modified, and authorizes an unrestricted descent. Speed restrictions remain in effect unless the controller explicitly cancels the speed restrictions.

NOTE: Local procedures and LOAs may require center controllers to specify transitions or runway direction as part of a descend via clearance.

RADAR ARRIVALS *(Continued)*

Radar Arrival Definitions
JO 7110.65, Pilot/Controller Glossary



Click 1 to display IAF.

Initial Approach Fix (IAF) The fixes depicted on instrument approach procedure charts that identify the beginning of the initial approach segment(s)

Click 2 to display IF.

Intermediate Fix (IF) The fix that identifies the beginning of the intermediate approach segment of an instrument approach procedure. The fix is not normally identified on the instrument approach chart as an intermediate fix (IF).

Click 3 to display approach gate.

The **approach gate** is an imaginary point used within ATC as a basis for vectoring aircraft to the final approach course. The gate will be established along the final approach course 1 mile from the final approach fix on the side away from the airport and will be no closer than 5 miles from the landing threshold.

Continued on next page

RADAR ARRIVALS *(Continued)*

Radar Arrival Definitions (Cont'd)
JO 7110.65, Pilot/Controller Glossary

Click 4 to display FAF.

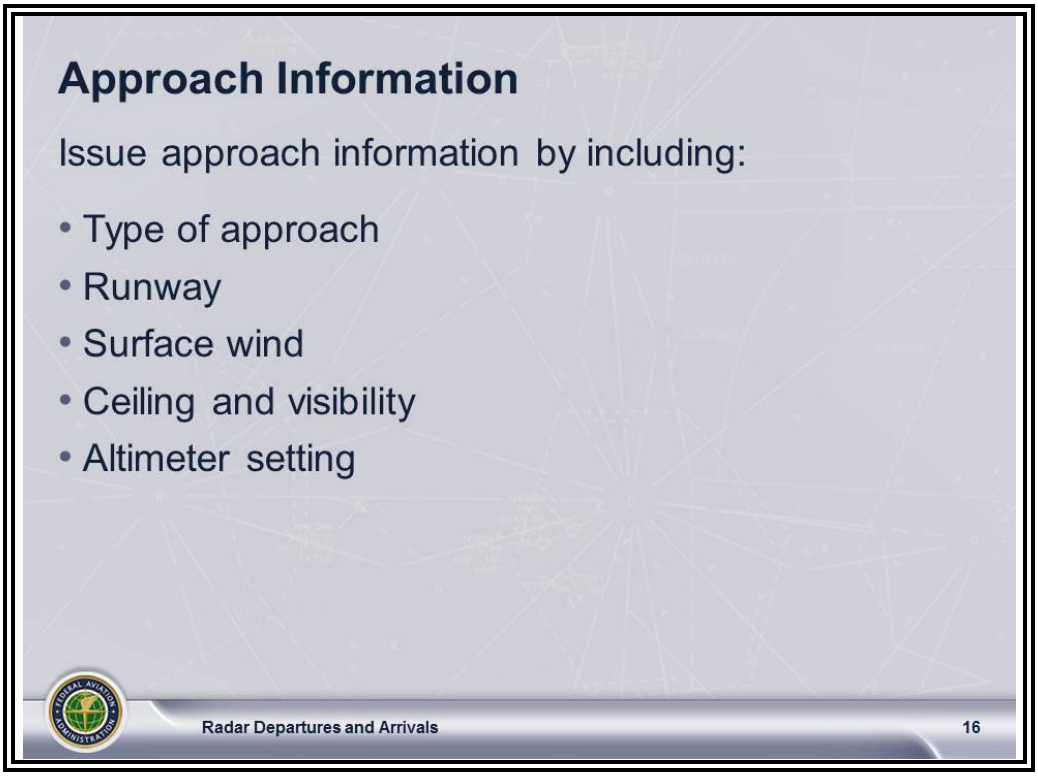
Click 5 to display Final approach (IFR).

📖 **Final Approach Fix (FAF)** is the fix from which the final approach (IFR) to an airport is executed and which identifies the beginning of the final approach segment. The FAF is designated on approach charts by the maltese cross symbol for non-precision approaches and the lightning bolt symbol for precision approaches.

📖 **Final approach (IFR)** is the flight path of an aircraft that is inbound to an airport on a final instrument approach course, beginning at the final approach fix or point and extending to the airport or the point where a circle-to-land maneuver or a missed approach is executed.

📖 **Special instrument approach procedures** are approved by the FAA for individual operators but are not published.

Approach Information
JO 7110.65, pars. 2-7-2, 4-7-10, 4-7-12



⊙ Issue approach information by including the following:

- Approach clearance or type of approach to expect, if:
  - Two or more approaches are published, and
  - Clearance limit does **not** indicate which approach is in use.
- Runway, if different from the one to which the approach is made
- Surface wind
- Ceiling and visibility, if the:
  - Reported ceiling is below 1,000 feet or the highest circling minimum (whichever is greater), or
  - Visibility is less than 3 miles.
- Altimeter setting:
  - Approximately 50 miles from the destination airport

Continued on next page

RADAR ARRIVALS *(Continued)*

Approach Information (Cont'd)
JO 7110.65, pars. 2-7-2, 4-7-10, 4-7-12

⊙ Before issuing an approach clearance or en route descent, and subsequently as changes occur, inform an aircraft of any abnormal operation of approach and landing aids and of destination airport conditions that you know of that might restrict an approach or landing.

⊙ Approach information contained in the Automatic Terminal Information Service (ATIS) broadcast may be omitted if the pilot states the current ATIS code.

⊙ For pilots destined to an airport without ATIS, surface wind, ceiling and visibility, and altimeter may be omitted if the pilot advises receipt of the automated weather.

⊙ When the official weather report includes the remarks “pressure falling rapidly,” issue changes in altimeter setting to aircraft executing a nonprecision instrument approach as frequently as practical.

⊙ Upon pilot request, inform the pilot of the AWOS/ASOS frequency.

- If appropriate, advise the pilot that airport weather is unavailable.

✈ **Phraseology**

“(Airport) AWOS/ASOS WEATHER AVAILABLE ON (frequency).”

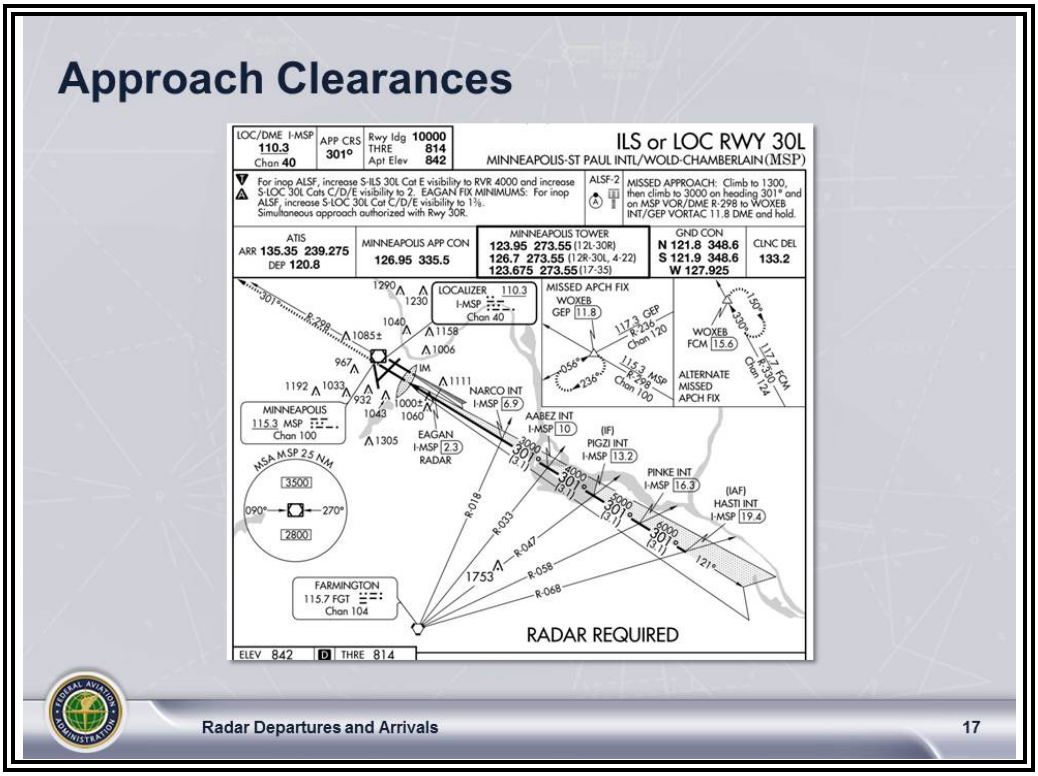
⊙ Issue special weather observations unless they are included in the ATIS and the pilot states the current ATIS code.

⊙ Advise pilots when the ILS is inoperative.

✈ **Phraseology Example**

“EXPECT VISUAL APPROACH RUNWAY TWO FIVE RIGHT, RUNWAY TWO FIVE RIGHT, I-L-S NOT OPERATIONAL.”

Approach Clearances
JO 7110.65, par. 4-8-1



- ⊙ Clear aircraft for standard or special instrument approach procedures only.
  - Standard instrument approach procedures (SIAP) must begin at an initial approach fix (IAF) or an intermediate fix (IF) if there is not an IAF.
  - Where adequate radar coverage exists, radar facilities may:
    - Vector aircraft to the final approach course.
    - Clear an aircraft to any fix 3 NM or more prior to the FAF, along the final approach course, at an intercept angle not greater than 30 degrees.
  - Clearances authorizing instrument approaches are issued on the basis that, if visual contact with the ground is made before the approach is completed, the entire approach procedure will be followed unless the pilot receives approval for a contact approach, is cleared for a visual approach, or cancels their IFR flight plan.
  - A pilot is required to receive a clearance to conduct a procedure turn when vectored to a final approach course or fix, conducting a timed approach, or when the procedure specifies NO PT.

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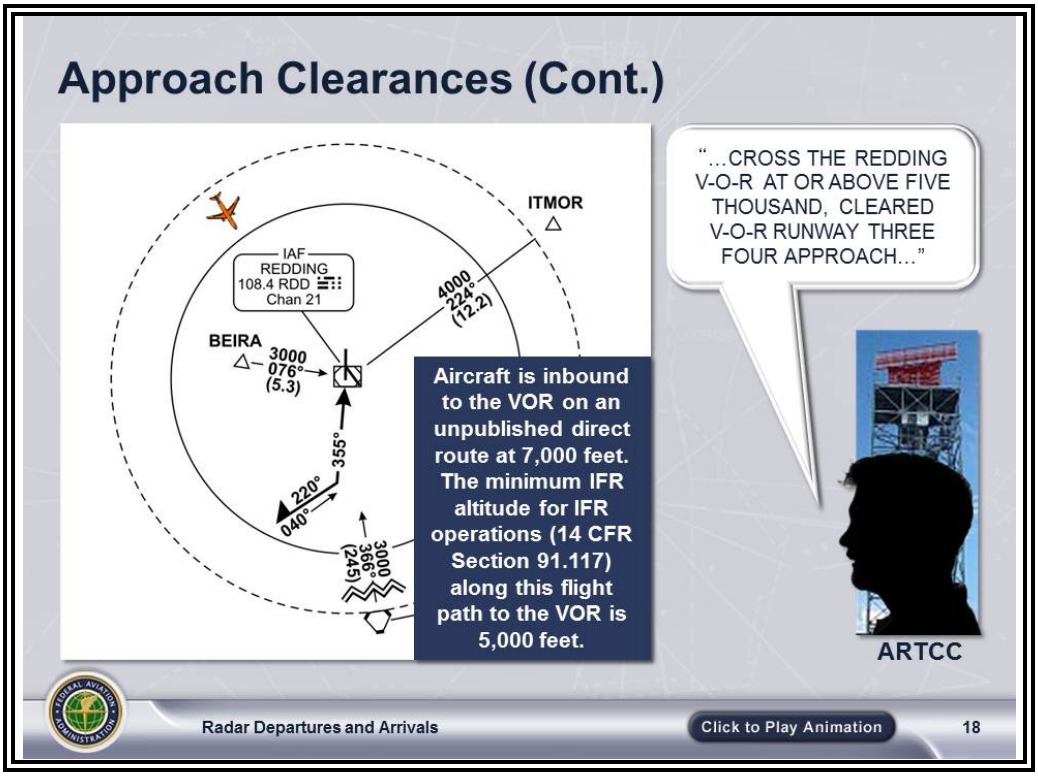
RADAR ARRIVALS *(Continued)*

Approach Clearances (Cont'd)
JO 7110.65, par. 4-8-1



- For aircraft operating on unpublished routes, issue the approach clearance only after the aircraft is:
  - Established on a segment of a published route or instrument approach procedure, or
  - Assigned an altitude to maintain until the aircraft is established on a segment of a published route or instrument approach procedure.

NOTE: The altitude assigned must assure IFR obstruction clearance from the point at which the approach clearance is issued until established on a segment of a published route or instrument approach procedure.

Click 4 times to animate.

☞ ***NOTE:*** *Use the slide to present two approach clearance examples.*

- Do not clear an aircraft direct to the FAF unless it is also an IAF, wherein the aircraft is expected to execute the depicted procedure turn or hold-in-lieu of procedure turn.

Continued on next page

RADAR ARRIVALS *(Continued)*

Approach Clearances (Cont'd)
JO 7110.65, par. 4-8-1

⊙ For RNAV-equipped aircraft operating on unpublished routes, issue approach clearance for conventional or RNAV SIAP only if the aircraft is:

- Established on a heading or course direct to the IAF at an intercept angle not greater than 90 degrees and is assigned an appropriate altitude.
- Radar monitoring is required until the aircraft is established on a segment of the instrument approach procedure for RNAV (RNP) approaches when no procedure turn or hold-in-lieu of procedure turn will be executed.
- Established on a heading or course direct to the IF at an angle not greater than 90 degrees, provided the following conditions are met:
  - Assign an appropriate altitude that will permit a normal descent to the FAF.
  - Radar monitoring is provided to the IF.
  - The SIAP must identify the intermediate fix with the letters IF.
- Established on a heading or course direct to a fix between the IF and FAF, at an intercept angle not greater than 30 degrees, and is assigned an appropriate altitude.

⊙ Intercept angles greater than 90 degrees may be used when a procedure turn pattern or arrival holding is depicted and the pilot will execute the procedure.

⊙ If the angle of intercept angle is 90 degrees or less, the aircraft must be instructed to conduct a straight-in approach if ATC does not want the pilot to execute a procedure turn or hold-in-lieu of procedure turn.

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RADAR ARRIVALS *(Continued)*

Approach Clearances (Cont'd)
JO 7110.65, par. 4-8-1

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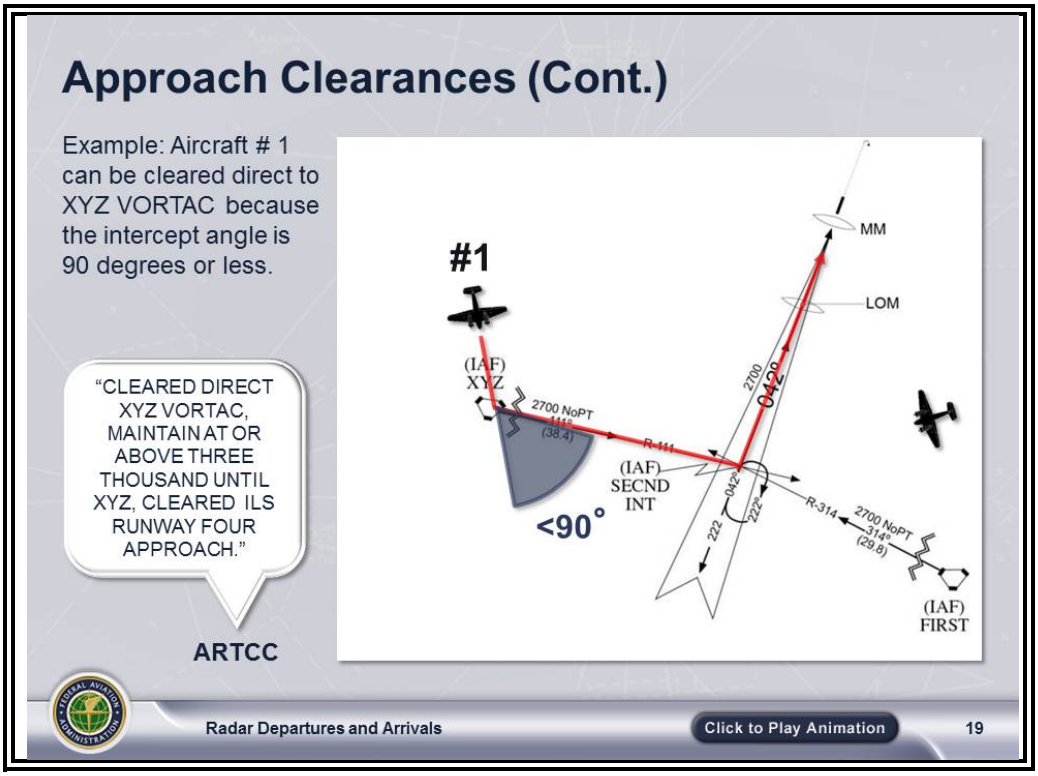
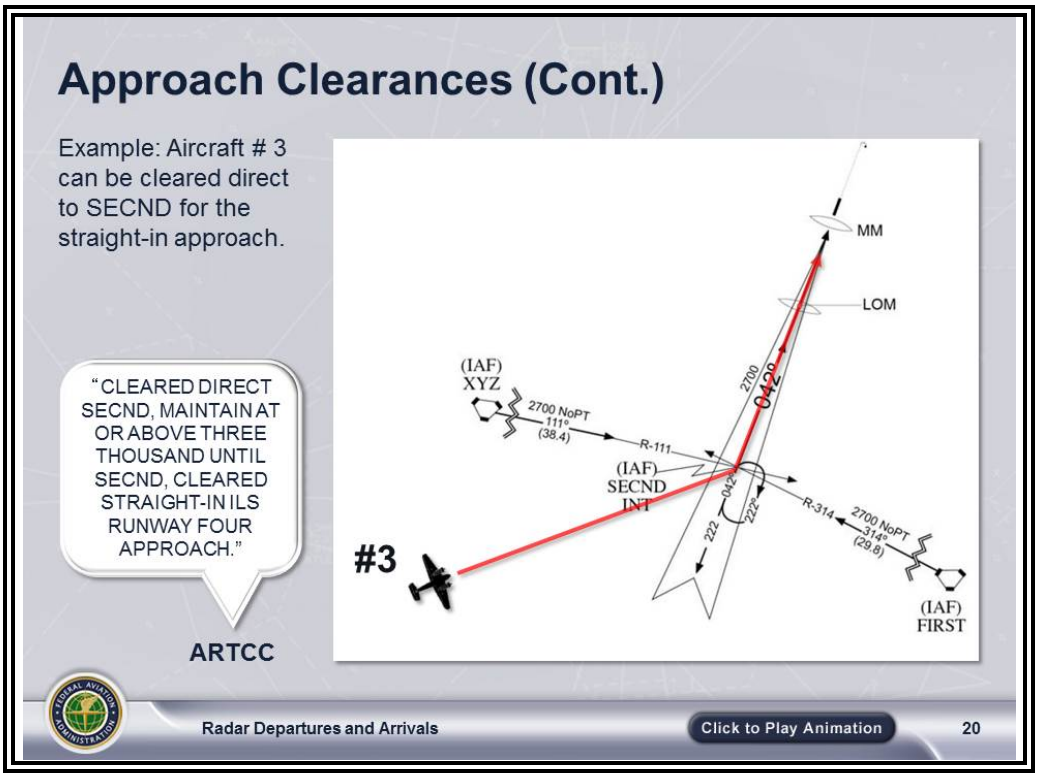


Click once to animate.



☞ ***NOTE:*** *Use slides to present three approach clearance examples.*

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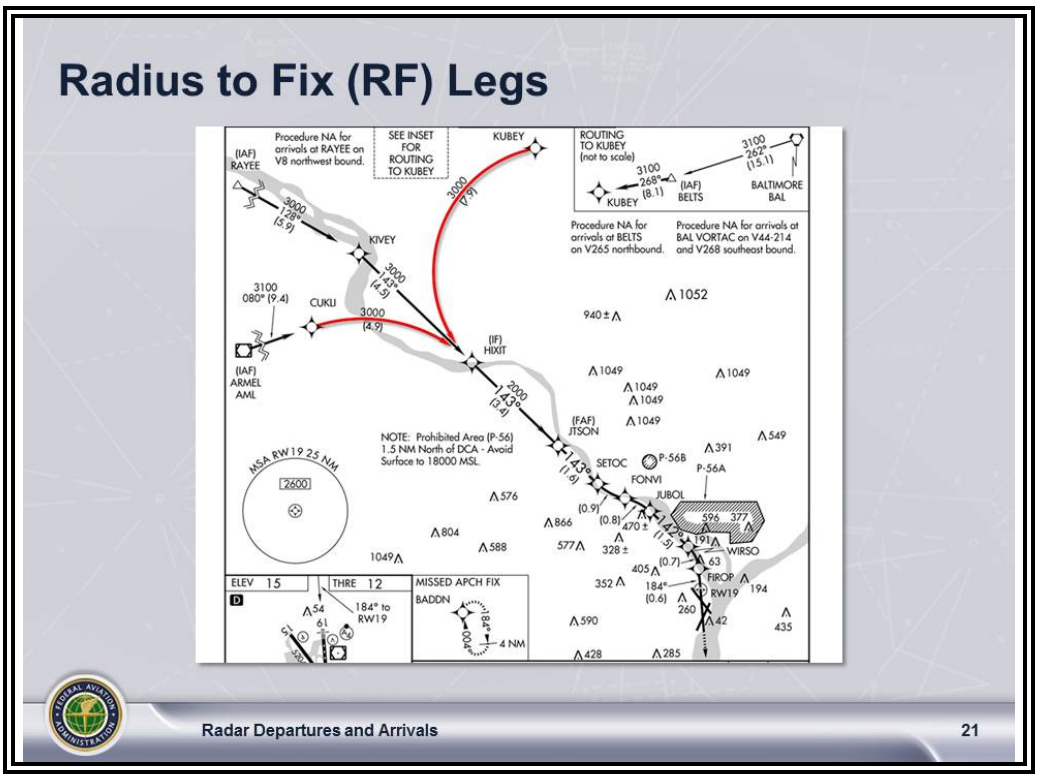
RADAR ARRIVALS *(Continued)*

Approach Clearances (Cont'd)
JO 7110.65, par. 4-8-1



- Clear RNAV-equipped aircraft conducting RNAV instrument approach procedures that contain radius to fix (RF) legs:
  - Via published transitions, or
  - On a heading or course direct to the IAF when a hold-in-lieu of procedure turn is published and the pilot will execute a procedure, or
  - On a heading or course direct to the IAF/IF, at intercept angles no greater than 90 degrees and the distance to the waypoint beginning the RF leg is 6NM or greater, or
  - With radar monitoring, on a heading or course direct to any waypoint 3 miles or more from the waypoint that begins the RF leg, at an intercept angle not greater than 30 degrees.
  - Do not clear aircraft direct to any waypoint beginning or within an RF leg.

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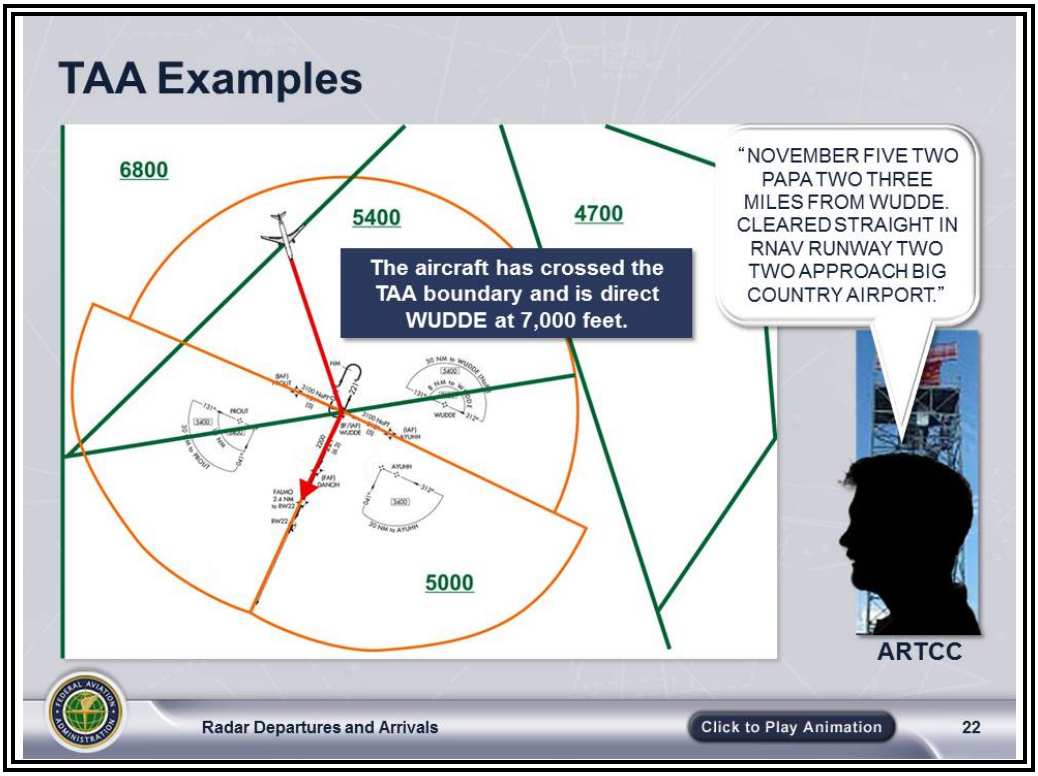
RADAR ARRIVALS *(Continued)*

Approach Clearances (Cont'd)
JO 7110.65, pars. 5-9-4, 4-8-1



- For RNAV approaches where a Terminal Arrival Area (TAA) has been established:
  - Inform the aircraft of its position relative to the appropriate initial approach fix and issue the approach clearance.

Click 3 times to animate.

☞ ***NOTE:*** *Use the slide to present three approach clearance examples.*

- For aircraft operating on unpublished routes, issue the approach clearance only after the aircraft is:
  - Established on a segment of a published route or instrument approach procedure, or
  - Assigned an altitude to maintain until the aircraft is established on a segment of a published route or instrument approach procedure.
- For GPS UNRELIABLE NOTAMS, inform pilots requesting a GPS or RNAV approach that GPS is unreliable and clear the aircraft for the approach.
  - This advisory may be omitted if contained in the Automated Terminal Information System (ATIS) broadcast.

Continued on next page

RADAR ARRIVALS *(Continued)*

Approach Clearances (Cont'd)
JO 7110.65, pars. 5-9-4, 4-8-1

⊙ For pilot reported GPS anomalies, advise subsequent aircraft requesting a GPS or RNAV approach that GPS is unreliable, and clear the aircraft for the approach.

- This advisory may be discontinued after 15 minutes if no subsequent reports are received.

✈ **Phraseology**

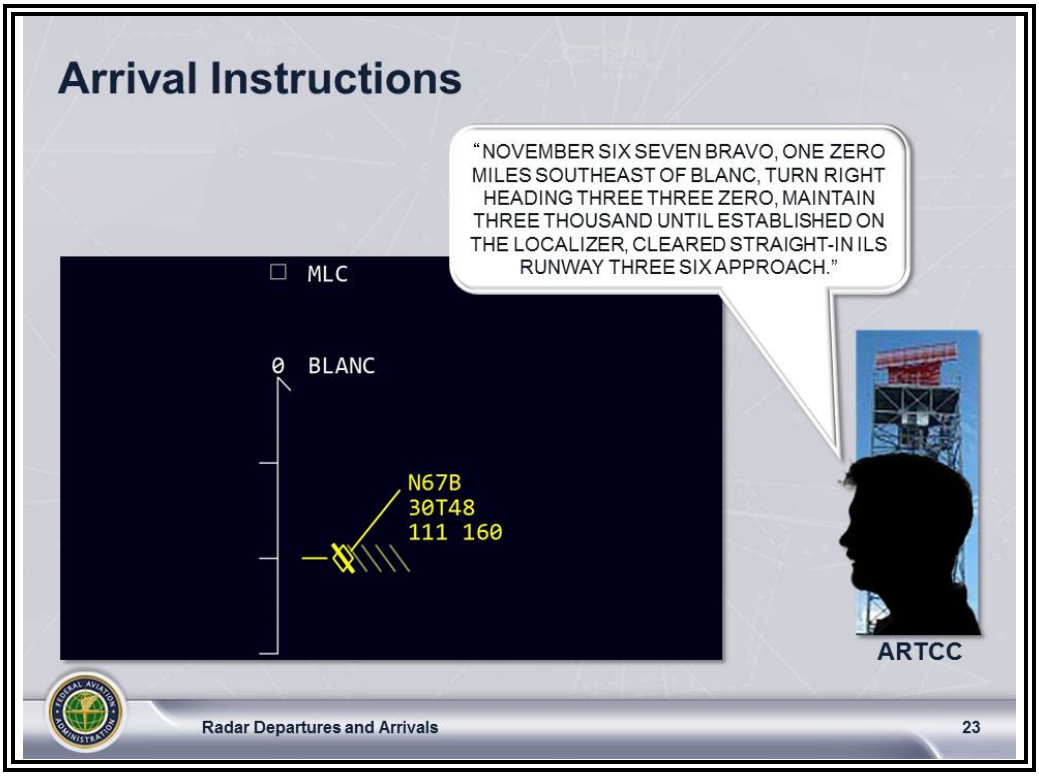
"CLEARED (approach) GPS UNRELIABLE."

⊙ For Wide Area Augmentation System (WAAS) UNAVAILABLE NOTAMS, advise aircraft requesting a GPS or RNAV approach that WAAS is unavailable and clear the aircraft for the approach.

- This advisory may be omitted if contained in the ATIS broadcast.

RADAR ARRIVALS *(Continued)*

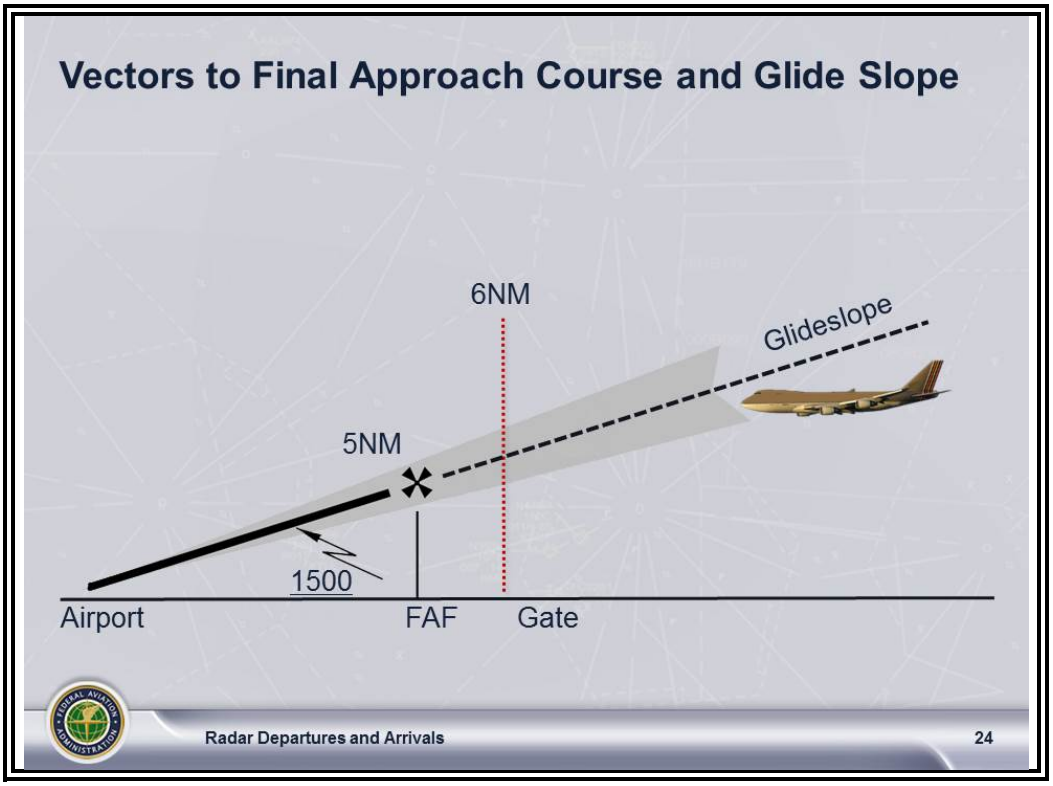
Arrival Instructions
JO 7110.65, par. 5-9-4



- ⊙ Issue all of the following instructions to an aircraft before it reaches the approach gate.
  - Position relative to a fix on the final approach course
    - If none is portrayed on the Situation Display or prescribed in the procedure, issue position information relative to the navigation aid that provides final approach guidance or relative to the airport.
  - Vector to intercept the final approach course, if required
  - Approach clearance, except when conducting a radar approach and only after aircraft is:
    - Established on a segment of a published route or instrument approach procedure, or
    - Assigned an altitude to maintain until it is established on a segment of a published route or instrument approach procedure.

RADAR ARRIVALS *(Continued)*

Vectors to Final Approach Course
JO 7110.65, par. 5-9-1



NOTE: This slide is an example of vectors for a precision approach.

⊙ Vector aircraft to intercept the final approach course at least 2 miles outside the approach gate, unless one of the following exists:

- Aircraft may be vectored to intercept closer than 2 miles outside the approach gate, but no closer than the approach gate if:
  - Reported ceiling is at least 500 feet above Minimum Vectoring Altitude (MVA)/Minimum IFR Altitude (MIA), and
  - Visibility is at least 3 miles.
- The pilot specifically requests.
  - Aircraft may be vectored to intercept inside the approach gate, but no closer than the final approach fix.

EXCEPTION: The conditions above do not apply to RNAV aircraft being vectored for a GPS or RNAV approach.

Continued on next page

RADAR ARRIVALS *(Continued)*

Vectors to Final Approach Course (Cont'd)
JO 7110.65, par. 5-9-1

⊙ For a precision approach, aircraft must be at an altitude:

- Below glideslope/glidepath, and
- Above the minimum glideslope intercept altitude specified on the approach procedure chart.

⊙ For a nonprecision approach, aircraft must be at an altitude that allows descent in accordance with the published procedure.

⊙ The following provisions must be met before vectoring to the final approach course:

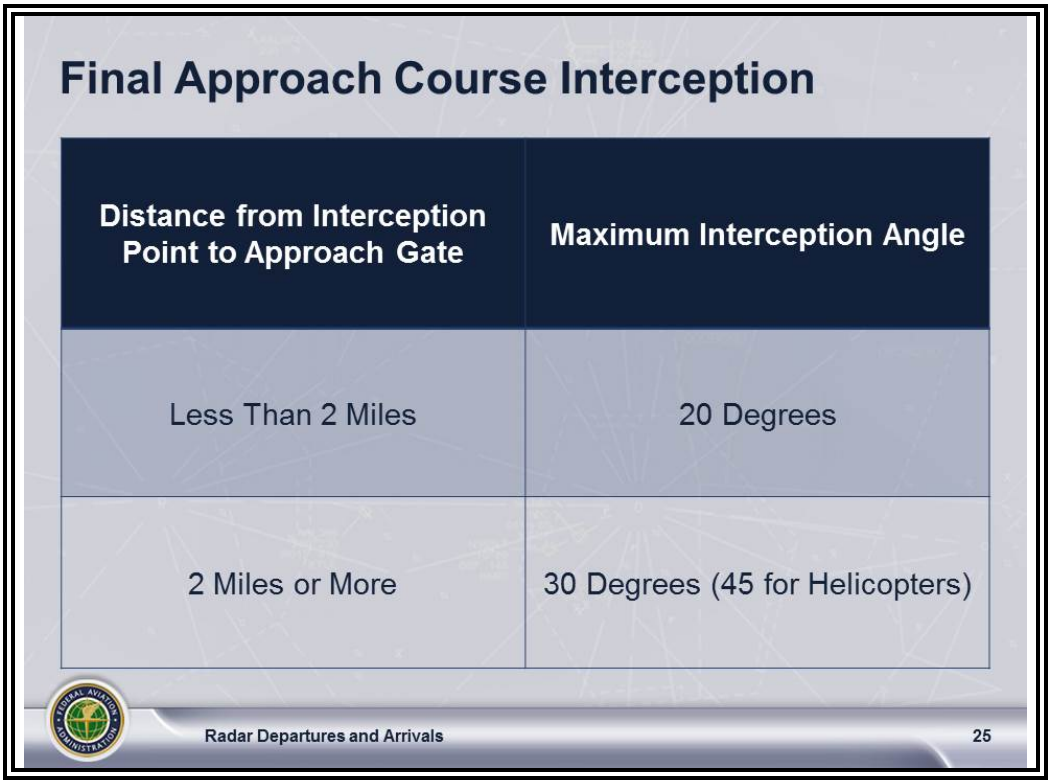
- The approach gate and a line depicting the final approach course must be displayed on the Situation Display.
  - Final approach course depicted must start at or pass through the approach gate and extend away from the airport.
    - → Precision approach - Line length must extend at least to the maximum range of the localizer.
    - → Nonprecision approach - Line length must extend at least 10NM outside the approach gate.

NOTE: Localizer depictions on your map may extend beyond the published segment of an approach. When intercepting the localizer outside the published segment, assign an altitude to maintain until established on a published segment.

- Maximum range selected on the Situation Display is 150NM unless an adjacent Situation Display is:
  - Set at 125NM or less
  - Configured for the approach in use
  - Used for the vector to the final approach course

RADAR ARRIVALS *(Continued)*

Final Approach Course Interception
JO 7110.65, par. 5-9-2



- Assign headings to allow interception on a track that does not exceed the interception angles shown.
- If deviations from final approach course are observed after initial interception, apply the following:
  - Outside the approach gate:
    - Assign headings to allow interception on a track that does not exceed interception angles.
    - Vector aircraft for another approach, if necessary.
  - Inside the approach gate:
    - Inform the pilot of position and ask intentions.

✈ **Phraseology**

"(Ident) (distance) MILE(S) FROM THE AIRPORT, (distance) MILE(S) RIGHT/LEFT OF COURSE, SAY INTENTIONS."

Continued on next page

RADAR ARRIVALS *(Continued)*

Final Approach Course Interception (Cont'd)
JO 7110.65, par. 5-9-2

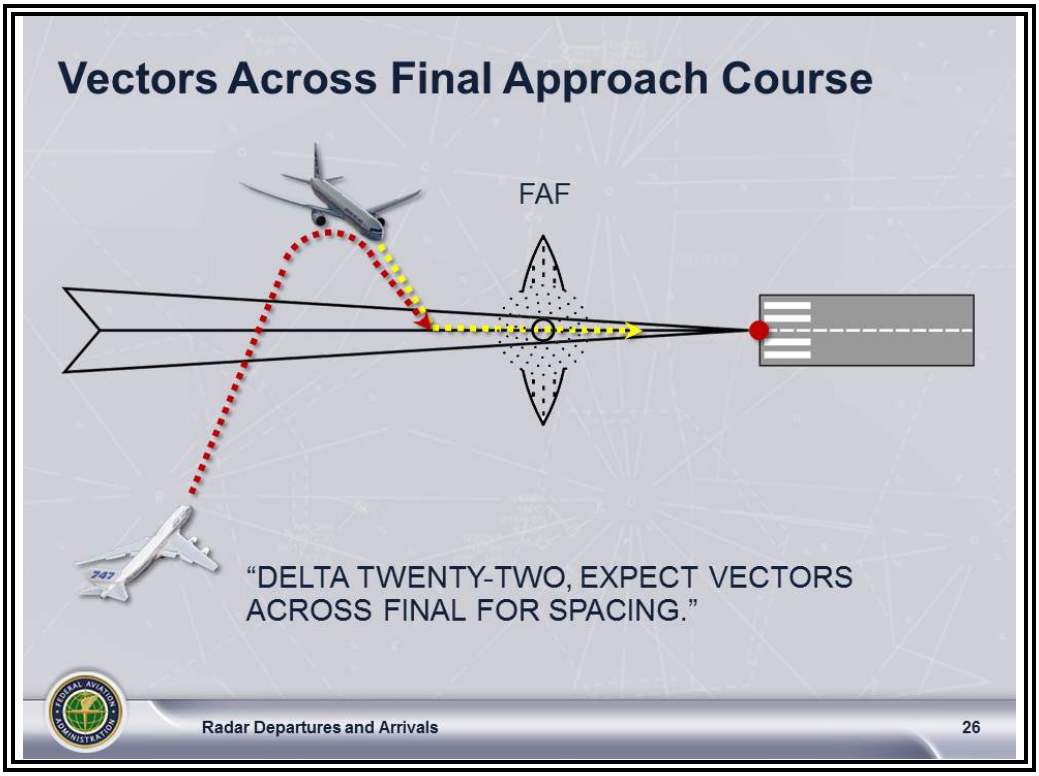
⊙ When using a Situation Display range above 125NM, solicit and receive a pilot report that the aircraft is established on the final approach course.

- If the pilot has not reported established by the final approach gate:
  - Inform the pilot of position and ask intentions.

NOTE: It may be difficult to accurately determine small distances when using very large range settings.

RADAR ARRIVALS *(Continued)*

Vectors Across Final Approach Course
JO 7110.65, par. 5-9-3



⊙ Vectors across the final approach course:

- Inform aircraft when a vector will take it across the final approach course and state the reason.

NOTE: In the event you are unable to inform the aircraft, the pilot is not expected to turn inbound on the final approach course unless approach clearance has been issued.

✈ **Phraseology**

"EXPECT VECTORS ACROSS FINAL FOR (purpose)."

RADAR ARRIVALS *(Continued)*

Communication Change
JO 7110.65, pars. 4-8-8, 5-9-4

⊙ Instruct aircraft to change frequency prior to the final approach fix by instructing the aircraft to do one of the following:

- Monitor local control frequency, reporting to the tower when over the approach fix.
- Contact the tower on the local control frequency.
- Contact the final controller (if radar service will be provided on final on a different frequency).
- When radar is used to establish the final approach fix:
  - Contact tower on local control frequency (after aircraft is advised it is over the final approach fix).

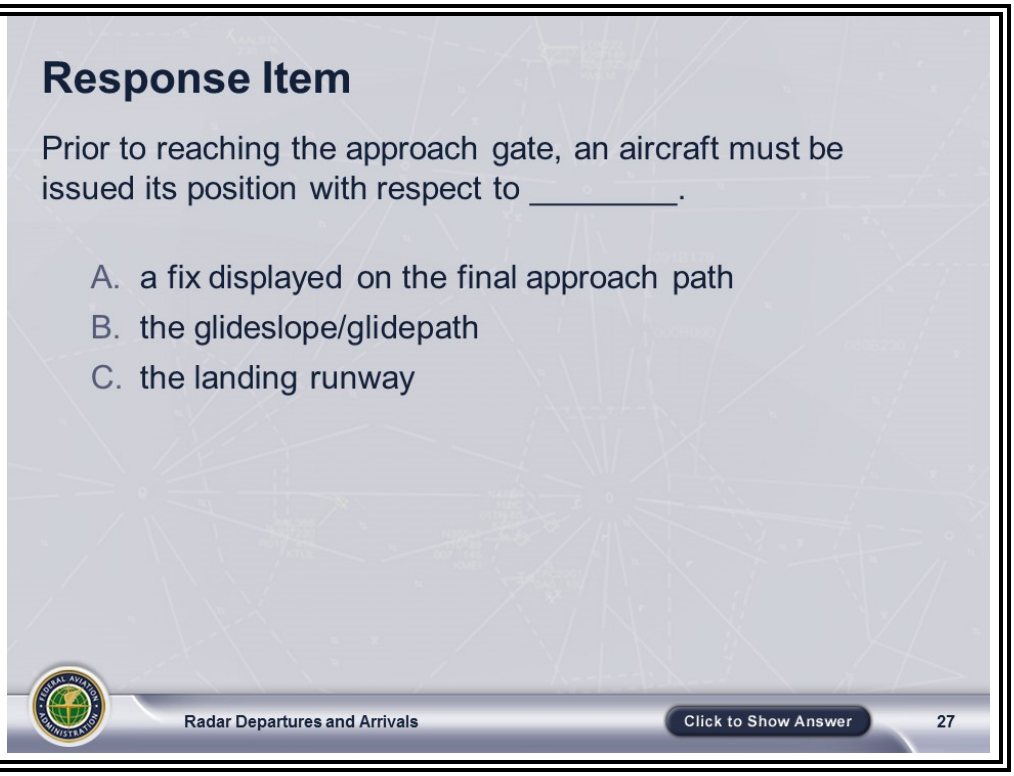
⊙ If an IFR aircraft intends to land at an airport not serviced by a tower or FSS:

- Approve a change to the advisory service frequency when you no longer require direct communications.

✈ **Phraseology**

"CHANGE TO ADVISORY FREQUENCY APPROVED."

Review



SLIDE ANSWER: A

VISUAL APPROACHES

Visual Approach Definition
JO 7110.65, Pilot/Controller Glossary

A **visual approach** is an approach conducted on an IFR flight plan that authorizes the pilot to proceed visually and clear of clouds to the airport. The pilot must at all times have either the airport or the preceding aircraft in sight. This approach must be authorized and under the control of the appropriate air traffic control facility. Reported weather at the airport must be ceiling at or above 1,000 feet and visibility 3 miles or greater.

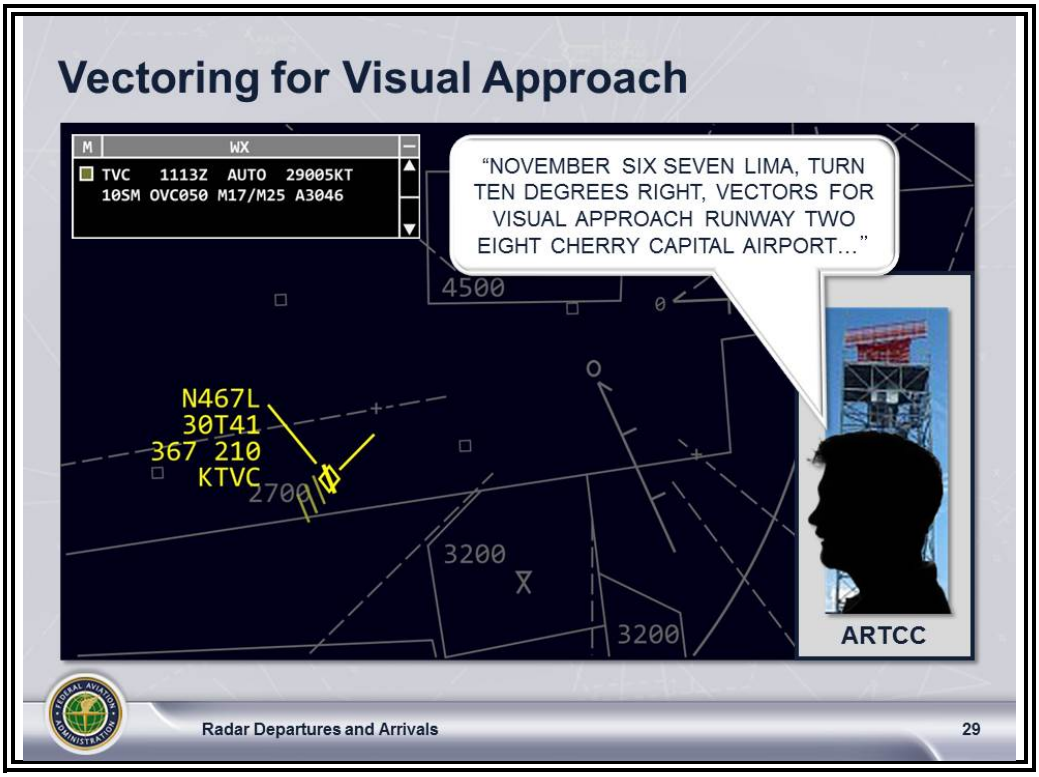
Visual Approach
JO 7110.65, par. 7-4-1

A Visual Approach:

- Is **not** an instrument approach procedure
- Has **no** missed approach segment
  - If aircraft is unable to complete visual approach:
    - Handle it as any go-around.
    - Provide appropriate separation.

VISUAL APPROACHES *(Continued)*

Vectoring For Visual Approach
JO 7110.65, par. 7-4-2



⊙ Vector aircraft for a visual approach:

- At airports with weather reporting service if:
  - Ceiling is at least 500 feet above MVA/MIA, and
  - Visibility is 3 miles or greater.
- At airports without weather reporting service if:
  - There is reasonable assurance that descent and flight to the airport can be made visually, and
  - Pilot has been informed that weather is **not** available.

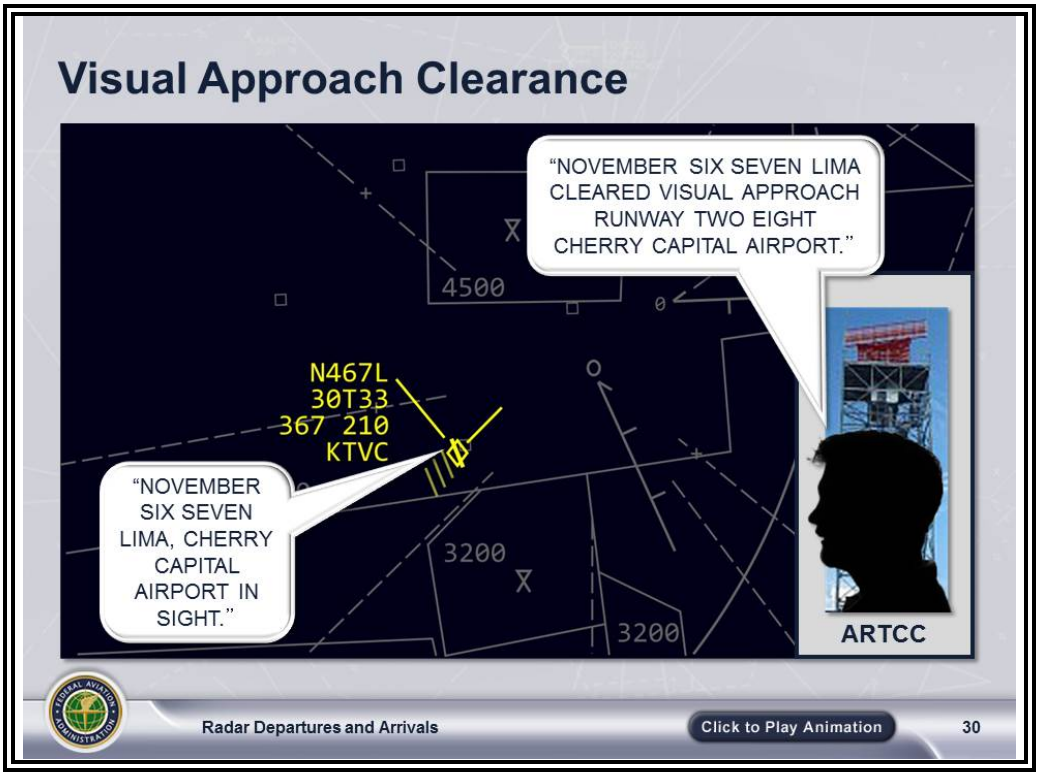
NOTE: A pilot request for a visual approach indicates that descent and flight to the airport can be made VFR.

✈ **Phraseology**

"(Ident) FLY HEADING or TURN RIGHT/LEFT HEADING (degrees) VECTOR FOR VISUAL APPROACH TO (airport name); (if appropriate) WEATHER NOT AVAILABLE."

VISUAL APPROACHES *(Continued)*

Clearance For Visual Approach
JO 7110.65, par. 7-4-3



- Clear aircraft for visual approaches using the following procedures.
- Controllers may initiate, or pilots may request, a visual approach even when an aircraft is being vectored for an instrument approach and pilot subsequently reports:
  - At airports with an operating control tower:
    - "Airport or runway in sight"
  - At airports without a control tower:
    - "Airport in sight"

Click to animate.

Continued on next page

VISUAL APPROACHES *(Continued)*

Clearance For Visual Approach (Cont'd)
JO 7110.65, par. 7-4-3

⊙ Ensure that:

- All potential conflicts have been resolved.
- An overtaking aircraft has been advised of its distance and speed difference from the preceding aircraft.
- Weather conditions at airport are VFR or that the pilot is informed that weather is not available for the destination airport.

⊙ If pilot requests, advise the pilot of the frequency to receive weather information where AWOS/ASOS is available.

☞ ***NOTE:*** *Briefly discuss AWOS/ASOS, which are automated weather reporting systems consisting of various sensors, a processor, and a computer generated voice subsystem. This weather data is broadcast locally, minute by minute, directly to the pilot.*

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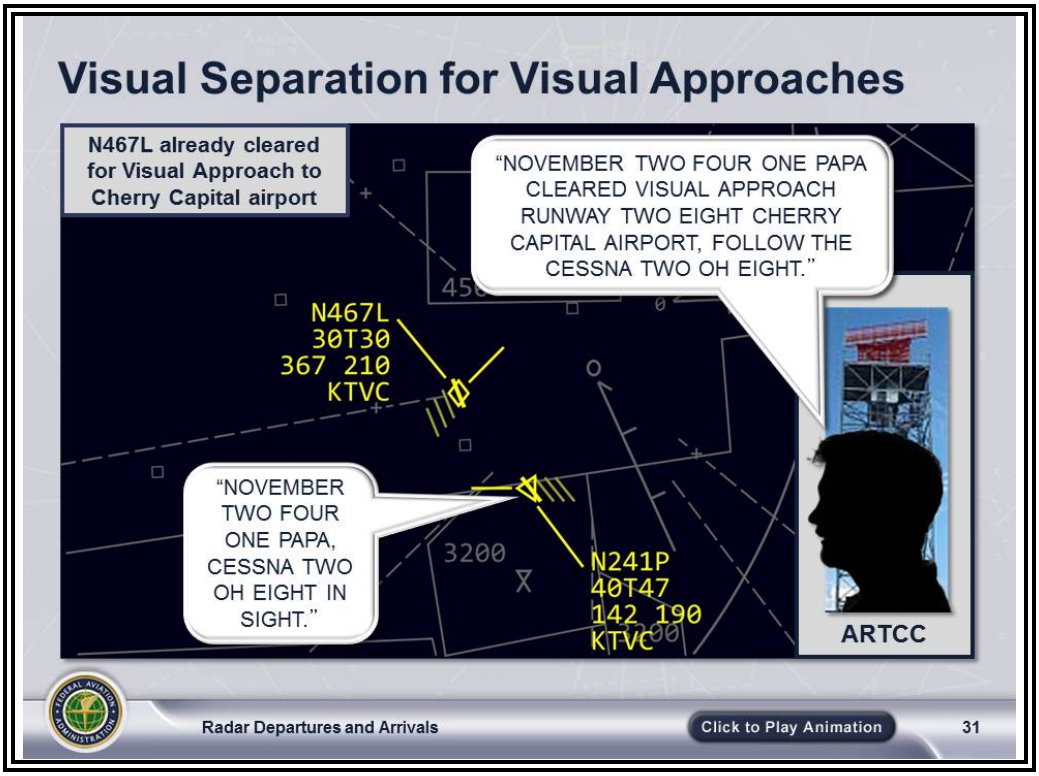
VISUAL APPROACHES *(Continued)*

Clearance For Visual Approach (Cont'd)
JO 7110.65, par. 7-4-3



⊙ Clear an aircraft for a visual approach when:

- Aircraft is number one in approach sequence, or
- Pilot reports preceding aircraft in sight and is instructed to follow it or
- Pilot reports airport or runway in sight (but not preceding aircraft) and radar separation is maintained until visual separation is provided.

Click 3 times to animate.

☞ ***NOTE:*** *Discuss the example provided on the slide.*

⊙ All aircraft following a heavy/B757 are informed of airplane manufacturer and model.

✈ **Phraseology Example**

"CHEROKEE ONE EIGHT GOLF, FOLLOWING A BOEING SEVEN FIFTY-SEVEN, 12 O'CLOCK, SIX MILES."

or

"CESSNA THREE FOUR JULIET, FOLLOWING A SEVEN FIFTY-SEVEN, 12 O'CLOCK, SIX MILES."

VISUAL APPROACHES *(Continued)*

General Information
JO 7110.65, pars. 4-7-10, 7-4-3

⊙ At controlled airports:

- Inform tower of aircraft's position prior to transfer of communications.
- ARTS/STARS functions may be used, provided that a Letter of Agreement or facility directive specifies control and communications transfer points.

✈ **Phraseology**

"(Call sign) (control instructions as required) CLEARED VISUAL APPROACH RUNWAY (number)."

or

"(Call sign) (control instructions as required) CLEARED VISUAL APPROACH TO (airport name); (if appropriate) WEATHER NOT AVAILABLE."

or

"VERIFY THAT YOU HAVE THE (airport) WEATHER."

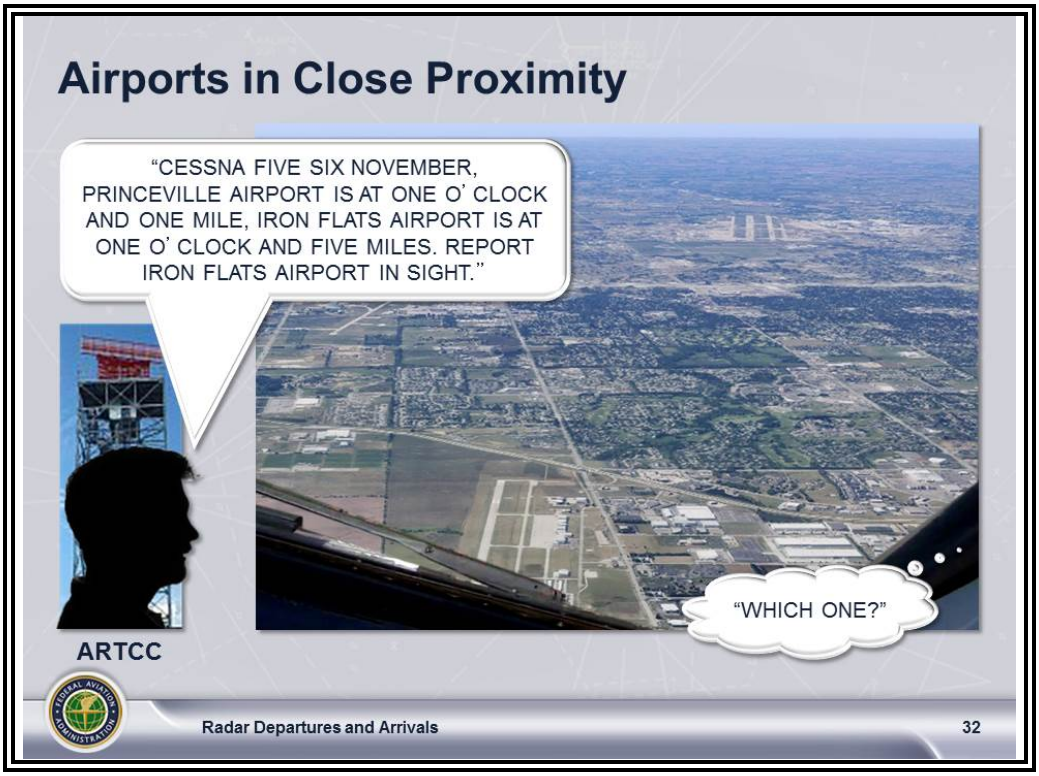
or

"(upon pilot request) AWOS/ASOS WEATHER AVAILABLE ON FREQUENCY (frequency) MHZ."

⊙ Ensure that the location of the airport is provided when the pilot is asked to report the destination airport in sight.

VISUAL APPROACHES *(Continued)*

Airports in Close Proximity
JO 7110.65, par. 7-4-3



- When airports are located in close proximity, provide the location of the airport that may cause confusion.

✈ **Phraseology Example**

"CESSNA FIVE SIX NOVEMBER, PRINCEVILLE AIRPORT IS AT ONE O'CLOCK AND ONE MILE, IRON FLATS AIRPORT IS AT ONE O'CLOCK AND FIVE MILES. REPORT IRON FLATS AIRPORT IN SIGHT."

CONCLUSION

Summary

☞ ***NOTE:*** *Review and elaborate briefly on the following:*

- ⊙ Departure routes
- ⊙ Departure vectors
- ⊙ Arrival instructions
- ⊙ Vectors for approach
- ⊙ Approaches

☞ ***NOTE:*** *Ask students if there are any questions*

End-of-Lesson Test

- ⊙ Your instructor will now administer the End-of-Lesson Test.

☞ ***NOTE:*** *Distribute and administer the End-of-Lesson Test located in 55055-ELT10.*