Federal Aviation Administration

Initial En Route Qualification Training

Instructor
Lesson 33
Radar Identification

Course 50148001

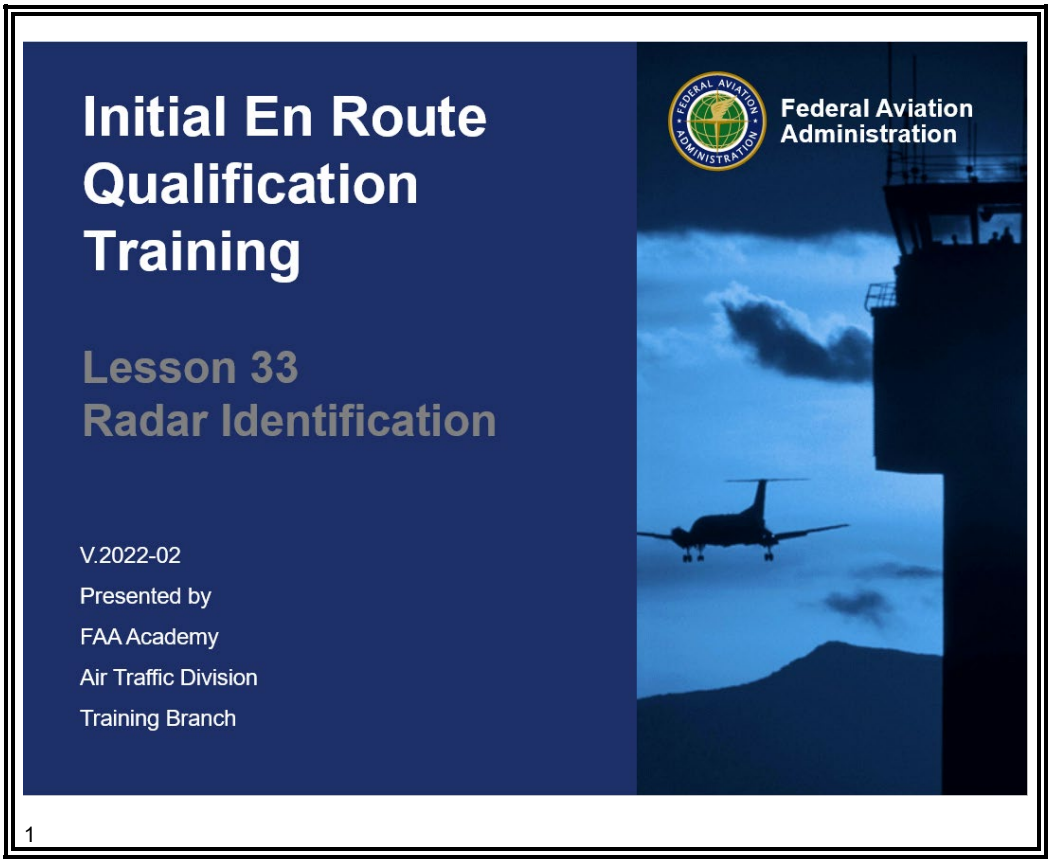
LESSON PLAN DATA SHEET

COURSE NAME:	INITIAL EN ROUTE QUALIFICATION TRAINING
COURSE NUMBER:	50148001
LESSON TITLE:	RADAR IDENTIFICATION
DURATION:	3+00 HOURS
DATE REVISED:	2022-02
VERSION:	V.2022-02
REFERENCE(S):	FAA ORDERS JO 7110.65, AIR TRAFFIC CONTROL; FAA ORDER JO 7110.311A, PROCEDURAL GUIDANCE FOR FAA ORDER JO 7110.65 FOLLOWING EN ROUTE AUTOMATION MODERNIZATION (ERAM) IMPLEMENTATON; TI 6110.100, ERAM USER MANUAL
HANDOUT(S):	NONE
EXERCISE(S)/ ACTIVITY(S):	EXERCISE: APPLYING RADAR IDENTIFICATION PROCEDURES
END-OF-LESSON TEST:	YES *(REFER TO ELT33.PDF)*
PERFORMANCE TEST:	NONE
MATERIALS:	NONE
OTHER PERTINENT INFORMATION:	NONE

☞ ***NOTE:*** *As you prepare for this lesson, recall and be prepared to talk about examples and personal experiences that illustrate or explain the teaching points in the lesson.*

INTRODUCTION

Gain Attention



Without radar identification of aircraft, it would be difficult to provide air traffic control service in today's complex system. Discrete beacon codes enable computers to establish and maintain unquestionable radar identification in this system.

INTRODUCTION *(Continued)*

Opening Scenario

RADAR IDENTIFICATION

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It is essential that you have a thorough knowledge of the procedures for establishing radar identification, regardless of whether the aircraft has an operating transponder. As part of the Radar team, you need to be aware of the procedures used by radar controllers to establish and maintain radar contact.

Purpose

This lesson covers the criteria for establishing and maintaining radar identification of aircraft.

INTRODUCTION *(Continued)*

Lesson Objectives

LESSON OBJECTIVES

- On an End-of-Lesson Test and in accordance with FAA Orders JO 7110.65 and JO 7110.311, and TI 6110.100, you will identify:
  - Primary and beacon identification methods
  - Causes of questionable identification
  - Target marker requirements
  - Computer tracking procedures and symbols
  - Controller requirements for radar termination

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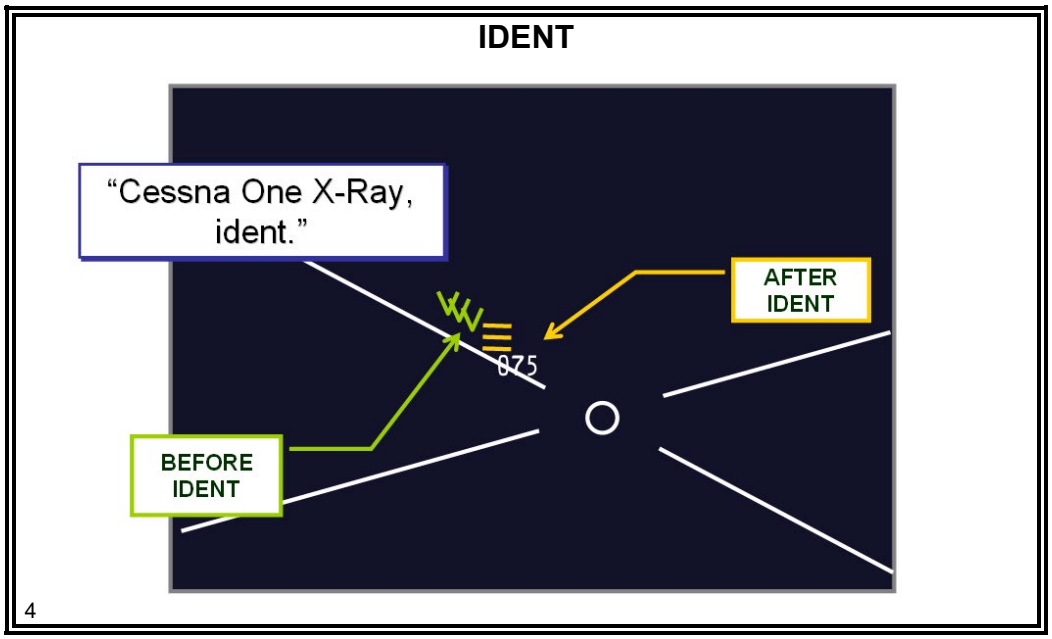
☞ ***NOTE:*** *Teach from graphic.*

RADAR IDENTIFICATION METHODS

Application
JO 7110.65,
par. 5-3-1

⊙ Before you provide radar service, establish and maintain radar identification.

Beacon Methods
JO 7110.65,
par. 5-3-3



⊙ When using only Mode 3/A radar beacon to identify a target, use one of the following methods:

- Request aircraft to ident and observe the display
- Request the pilot to change to a specific discrete or nondiscrete code, as appropriate, and then observe the target or code display change.
- Request the pilot to change their transponder/ ADS−B to "standby." After you observe the target disappear for sufficient scans to assure that loss of target resulted from placing the transponder/ADS−B in "standby" position, request the pilot to return the transponder to normal operation and then observe the reappearance of the target.

NOTE: *Paired LDBs in ERAM do not display a beacon code.*

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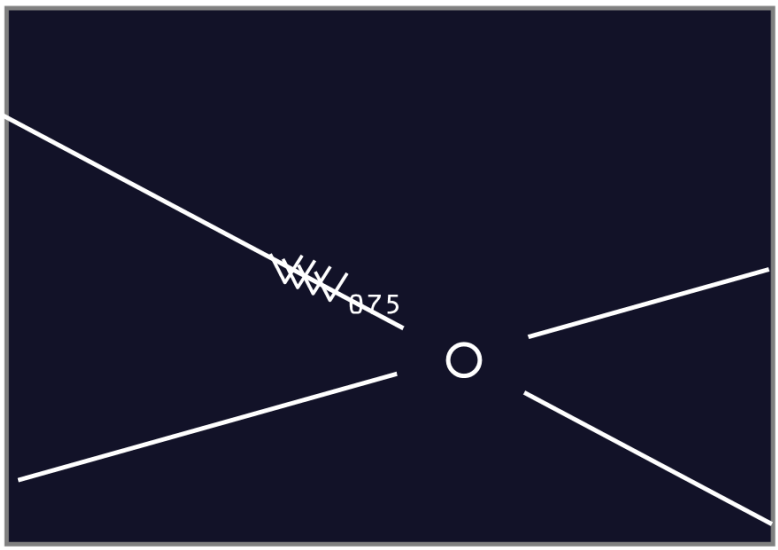
RADAR IDENTIFICATION METHODS *(Continued)*

Beacon Methods (Cont'd)
JO 7110.65, par. 5-3-3

BEFORE CODE CHANGE



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☞ ***NOTE:*** *Teach from graphic.*

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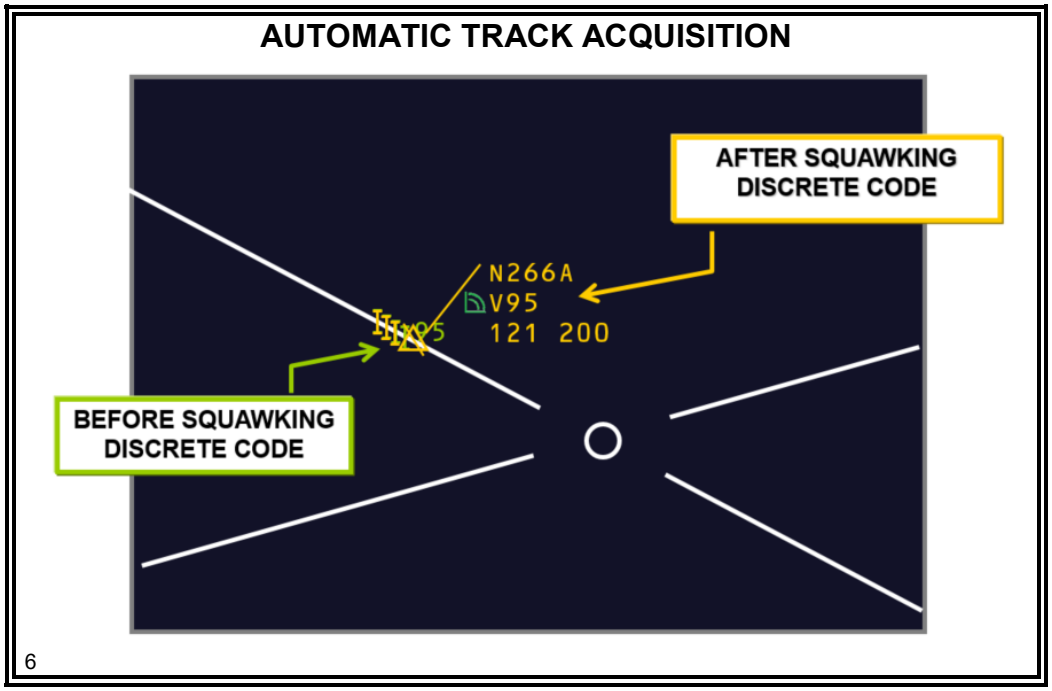
RADAR IDENTIFICATION METHODS *(Continued)*

Beacon Methods (Cont'd)
JO 7110.65, par. 5-3-3

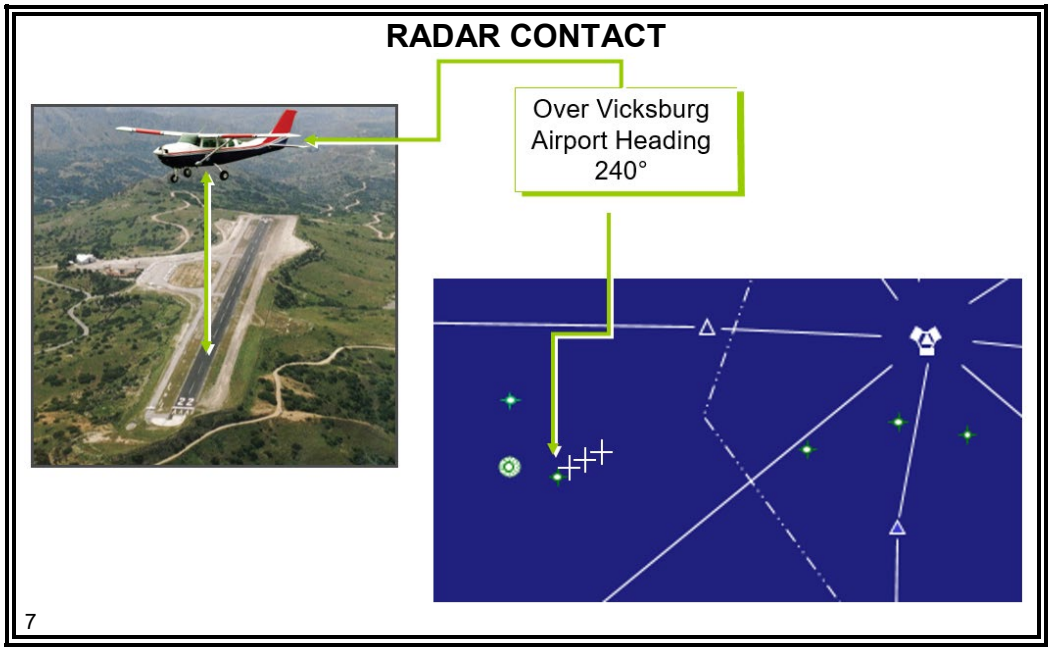


☞ ***NOTE:*** *Click once to build graphic.*

- The full data block is automatically associated with the target symbol of an aircraft that is squawking a discrete code assigned by the computer.

RADAR IDENTIFICATION METHODS *(Continued)*

Primary Methods
JO 7110.65, par. 5-3-2



- Identify a primary target by one of the following methods:
  - Observing a target whose position with respect to a fix or a visual representation corresponds with a direct position report from the aircraft
    - Fix **must** be displayed on the map overlay
    - The observed track is consistent with the reported heading or route of flight
  - Observing a target making an identifying turn of 30 degrees or more, provided that the aircraft is:
    - In your airspace
    - Above the MIA in your area before issuing the heading

RADAR IDENTIFICATION METHODS *(Continued)*

Knowledge Check

KNOWLEDGE CHECK

QUESTION: What is the minimum number of degrees required for each turn when using turns to radar identify an aircraft?

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☞ ***NOTE:*** *Click once to show answer.*

ANSWER: *30*

KNOWLEDGE CHECK

QUESTION: Careful consideration must be given to MIA when identifying an aircraft by _____.

A. position correlation

B. turns

C. code changes

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☞ ***NOTE:*** *Click once to show answer.*

ANSWER: *B*

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RADAR IDENTIFICATION METHODS *(Continued)*

Knowledge Check (Cont'd)

KNOWLEDGE CHECK

QUESTION: A Full Data Block that appears automatically when an aircraft squawks a beacon code assigned by the computer is positive identification.

A. True

B. False

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☞ ***NOTE:*** *Click once to show answer.*

ANSWER: *A*

EXERCISE: APPLYING RADAR IDENTIFICATION PROCEDURES

Exercise

APPLYING RADAR IDENTIFICATION PROCEDURES EXERCISE

Purpose: to review auto-acquisition

Directions: answer the questions

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Directions

Your instructor will walk you through this exercise describing auto-acquisition.

Questions

N612K calls and states the aircraft's position as 15 miles west of Vicksburg at 7,500 feet proceeding direct Tulsa and requesting an IFR clearance. N612K has been instructed to squawk 3223, which the computer has assigned.

1. What will be the result when N612K squawks 3223?

ANSWER: *Code 3223 will appear in the Limited Data Block (LDB). An FDB then appears with the associated target.*

2. In the above situation, is the aircraft considered radar identified?

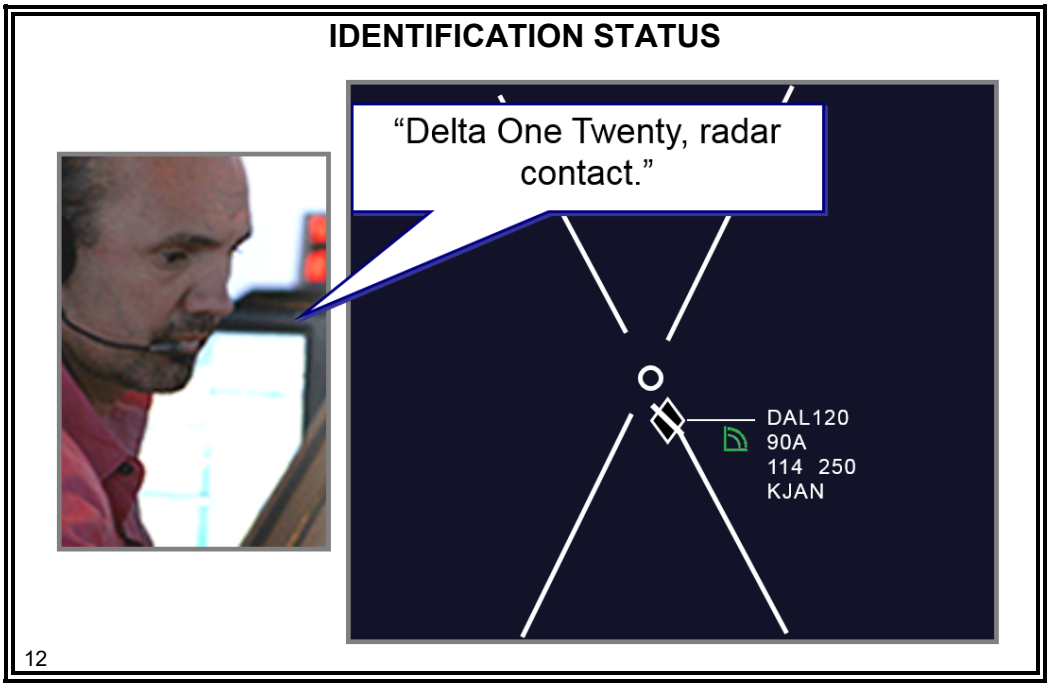
ANSWER: *Yes.*

3. What will be the result if N612K inadvertently squawks 3224?

ANSWER: *Code 3224 will appear in the LDB.*

IDENTIFICATION STATUS

Radar Contact
JO 7110.65,
par. 5-3-7



⊙ Inform an aircraft that it is in radar contact when:

- Initial radar identification in the ATC system is established
- Radar contact is re-established

✈ **Phraseology**

"RADAR CONTACT (position, if required)."

⊙ Inform an aircraft when radar contact is lost.

NOTE: Use when identification is still desired but lost due to some uncontrollable situation, e.g., radar failure, no target return.

Questionable Identification
JO 7110.65,
par. 5-3-5

⊙ If identification is questionable for any reason:

- Take immediate action to re-identify the aircraft, or
- Terminate radar service

NOTE: Re-identification of an aircraft is preferred to terminating radar service.

⊙ Ensure all primary targets are displayed when radar identification is lost or questionable.

POSITION INFORMATION

Informing Aircraft
JO 7110.65, par. 5-3-6

⊙ Inform aircraft of its position when identified by:

- Beacon methods (pg. 4)
- Turns

⊙ Position information need **not** be given when aircraft is identified by:

- Position correlation

Knowledge Check

KNOWLEDGE CHECK

QUESTION: The phraseology to inform UAL11 of radar contact when position is **not** required is "United Eleven, _____."

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☞ ***NOTE:*** *Click once to show answer.*

ANSWER: *radar contact*

KNOWLEDGE CHECK

QUESTION: If radar identification is questionable for any reason, you should _____.

A. re-establish radar contact using last known position

B. change the aircraft's altitude

C. take immediate action to re-identify the aircraft

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☞ ***NOTE:*** *Click once to show answer.*

ANSWER: *C*

RADAR SERVICE TERMINATION

Informing Aircraft
JO 7110.65, par. 5-1-13

⊙ Inform an aircraft when radar service is terminated because:

- Identification is no longer necessary
- Aircraft proceeds into nonradar coverage area

⊙ Radar service is automatically terminated and the aircraft need **not** be advised of termination when:

- An aircraft cancels its IFR flight plan, except:
  - Within Class B airspace
  - Within Class C airspace
  - Where basic radar service is provided
- An aircraft conducting an instrument, visual, or contact approach has either:
  - Landed, or
  - Been instructed to change to advisory frequency

⊙ An arriving aircraft **shall** be informed when radar service is terminated at tower-controlled airports where radar coverage does **not** exist to within ½ mile of the end of the runway.

Knowledge Check

KNOWLEDGE CHECK

QUESTION: Radar service must be terminated when an aircraft _____.

A. cancels IFR

B. conducts a visual approach

C. proceeds into a nonradar coverage area

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☞ ***NOTE:*** *Click once to show answer.*

ANSWER: *C*

POSITION REPORTING

Reporting
JO 7110.65,
par. 5-1-12

⊙ An aircraft will discontinue reporting over compulsory reporting points once it has been radar-identified by ATC.

- The aircraft resumes normal position reporting when ATC advises:
  - Radar contact is lost, or
  - Radar service is terminated

Knowledge Check

KNOWLEDGE CHECK

QUESTION: A23456 has been identified solely by observing a code change. The radar controller advised A23456 "RADAR CONTACT." Is that a sufficient response from the controller? Explain.

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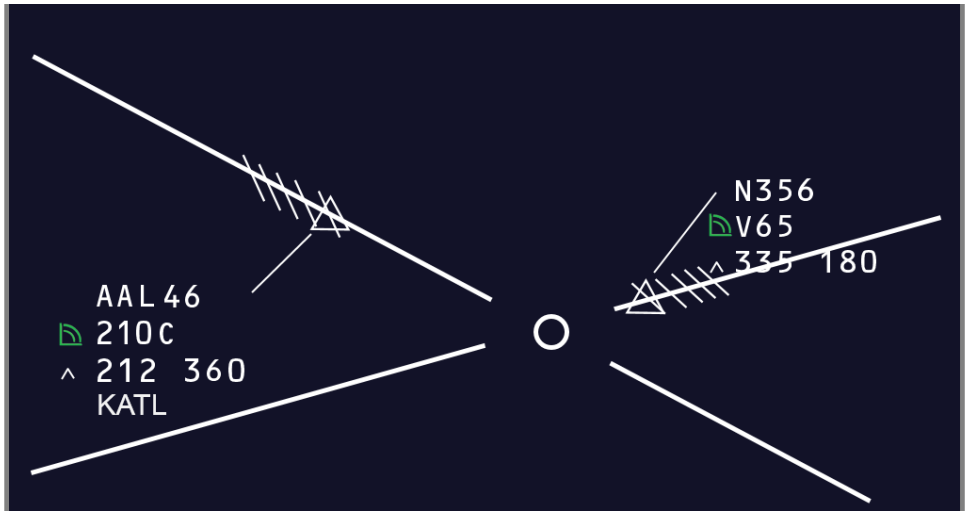
☞ ***NOTE:*** *Click once to show answer.*

ANSWER: *No. The aircraft position **must** also be given to the pilot. Position information is required when using beacon methods and identifying turns. Position information is **not** required when using position correlation.*

TARGET MARKERS

Automated Systems
JO 7110.65, par. 5-3-8;
JO 7110.311C, par. 5-3-8

FDB ASSISTS IN MAINTAINING IDENTITY



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- To provide continuous identity, use data blocks that are associated with the appropriate target symbol.

- Retain the data block until:

  - Aircraft has exited the sector or delegated airspace, and
  - All potential conflicts have been resolved

NOTE: This includes point-out aircraft, which are covered in the next lesson.

- Required items to be displayed in the Full Data Block (FDB) include:

  - Aircraft Identification
  - Interim or assigned altitude or reported altitude

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TARGET MARKERS *(Continued)*

Automated Systems (Cont'd)
JO 7110.65, par. 5-3-8;
JO 7110.311C, par. 5-3-8

⊙ When you have separation responsibility for an aircraft and a paired track exists, display:

- A full data block (FDB)

⊙ Other items available for display:

- Computer Identification (CID)
- Beacon code
- Leader line
- Vector line
- Position symbol

COMPUTER TRACKING

Automatic Track Initiation on Discrete Code Targets

⊙ A flight **must** satisfy the following conditions before it is eligible for automatic track initiation:

- **Must** have a stored flight plan
- Last two numbers of the assigned beacon code must **not** be “00”

⊙ Cases of automatic track initiation:

- Flights from an adjacent NAS center
- Departures from adapted airports
- Flights with holds manually canceled
- En route flight plan acquiring a discrete beacon code
- Flights with tentative flight plan storage

☞ ***NOTE:*** *Other situations that are **not** discussed may also cause automatic track initiation.*

Identity Maintained by Computer Tracking

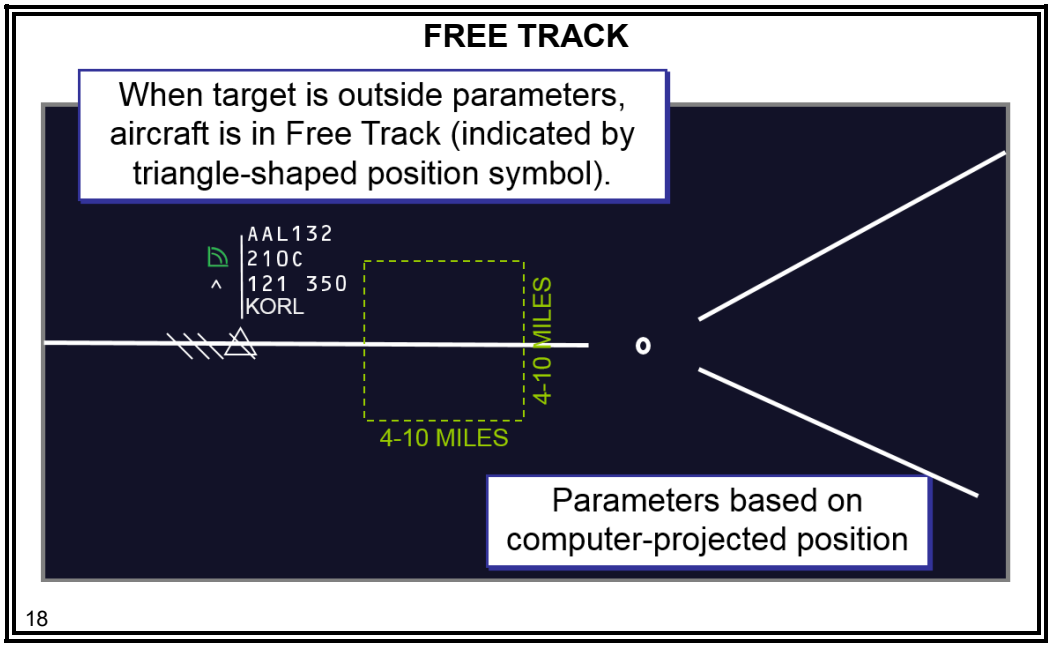
⊙ Type of track is determined by computer, unless controller specifies type.

⊙ The three types of track are:

- Free Track
- Flight Plan Aided Tracking (FLAT) Track
- Coast Track

COMPUTER TRACKING *(Continued)*

Free Track

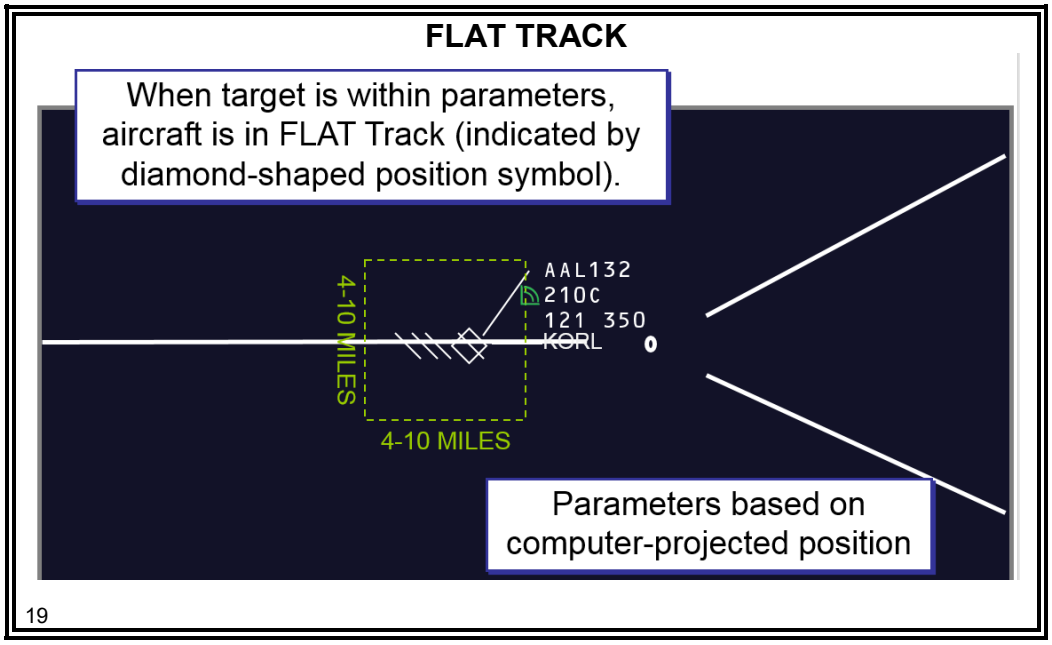


⊙ Free Track

- Position symbol - Δ
- Utilizes latest ground speed and heading information
- Displayed with data block on display
- Oriented relative to initial direction of track based on radar data

COMPUTER TRACKING *(Continued)*

FLAT Track



⊙ Flight Plan Aided Tracking (FLAT) Track

- Position symbol - ◊
- Utilizes Free Track process plus information from the flight plan
- Based on:
  - Airway or route heading in the flight plan
  - Speed
    - → Filed True Airspeed (TAS) determines ground speed prediction
    - → Forecast upper winds are taken into consideration
  - Planned maneuvers
    - → Prediction is based on planned route changes

COMPUTER TRACKING *(Continued)*

FLAT Track Parameters

⊙ FLAT Track is preferred.

- Lateral and longitudinal tolerances are adaptable locally
- If aircraft is in lateral tolerance but out of longitudinal tolerance, the computer:
  - Calculates new flight plan position
  - Issues updated times
  - Remains in FLAT Track
- If aircraft is out of lateral tolerance, it will change to Free Track until it returns to within lateral tolerance
  - No longer eligible for automatic updates
- For vectors, weather deviations, and other changes in route of flight:
  - The controller **must** enter amended route for aircraft to remain in FLAT Track

Advantages of FLAT Track Over Free Track

⊙ Include:

- Auto handoffs
- Auto position time updates
- Coast tracking using flight plan data
- More accurate track prediction
- Forced FDB if handoff is **not** made

COMPUTER TRACKING *(Continued)*

Sequence

⊙ Typical sequence of events:

- Track is started (FLAT)
- Track exceeds parameter limits (Free)
- Route is amended (FLAT)
- Track deviates from route due to weather or exceeding parameters (Free)
- Track returns to route (FLAT)

Knowledge Check

KNOWLEDGE CHECK

QUESTION: When a position symbol changes from FLAT Track to Free Track, what does that signify? Explain.

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☞ ***NOTE:*** *Click once to show answer.*

ANSWER: *The target is outside FLAT Track tolerance and is no longer within the confines of the route stored in the computer. Because of this, the flight is no longer eligible for automatic updates.*

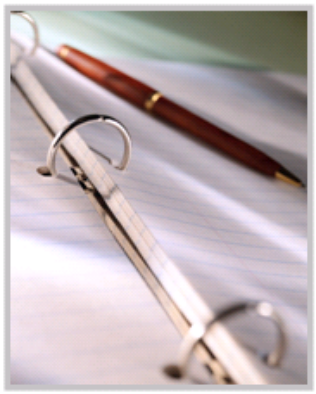
IN CONCLUSION

Lesson Review

LESSON REVIEW

The following topics were covered in this lesson:

- Radar identification methods
- Identification status
- Position information
- Radar service termination
- Position reporting
- Target markers
- Computer tracking



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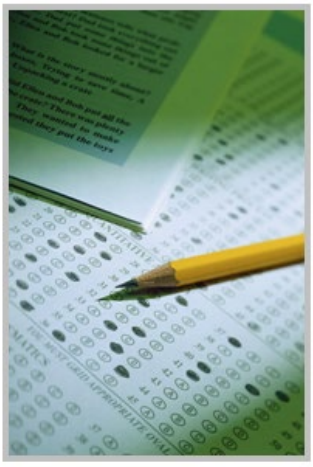
☞ ***NOTE:*** *Teach from graphic. Review and elaborate briefly on the topics covered in this lesson.*

End-of-Lesson Test

END-OF-LESSON TEST

Radar Identification



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