

SUBCOURSE

AV0905

EDITION

A

U.S. ARMY AVIATION CENTER



RADAR IDENTIFICATION PROCEDURES

THIS SUBCOURSE HAS BEEN REVIEWED FOR
OPERATIONS SECURITY CONSIDERATIONS.

THE ARMY INSTITUTE FOR PROFESSIONAL DEVELOPMENT
ARMY CORRESPONDENCE COURSE PROGRAM



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RADAR IDENTIFICATION PROCEDURES

Subcourse Number AV0905*

EDITION A

REVISION

US Army Aviation Center
Fort Rucker, Alabama 36362-5324

Credit Hours: 3

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SUBCOURSE OVERVIEW

We designed this subcourse to provide instruction in radar identification, vectoring, and handoff procedures used by radar controllers, MOS 93C.

No prerequisites exist for this subcourse.

This subcourse reflects current doctrine when the subcourse was prepared. In your own work, always refer to the latest publications.

The words "he," "him," "his," and "men," when used in this publication, represent the masculine and feminine genders unless otherwise stated.

TERMINAL LEARNING OBJECTIVE

- TASKS:** You will control instrument flight rule arrival or departure aircraft, provide radar approach information, and identify aircraft using radar procedures.
- CONDITION:** You are assigned to the arrival or feeder control position at an air traffic control radar (ground controlled approach) facility.

*Supersedes Aviation Subcourse 0905, Edition 7.

STANDARDS: You will properly identify aircraft and vector to final approach according to the Federal Aviation Administration Handbook 7110.65 and soldier training publication 1-93C1-SM.

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LESSON

IDENTIFICATION AND CONTROL OF INSTRUMENT FLIGHT RULE (IFR) AIRCRAFT

Tasks: 011-143-1037
011-143-1038
011-143-1044

OVERVIEW

TASK DESCRIPTION

In this lesson you will learn to control aircraft in a radar environment.

LEARNING OBJECTIVE

- TASKS:** You will effectively control IFR arrival and departure aircraft, provide radar approach information, and identify-aircraft using radar procedures.
- CONDITION:** You are manning the arrival (feeder) control position at an air traffic control (ATC) radar ground controlled approach (GCA) facility.
- STANDARD:** You will properly identify aircraft and vector to final approach according to standards set forth in the Federal Aviation Administration (FAA) Handbook 7110.65E.
- REFERENCES:** The material in this lesson was derived from the following publications:
- FAA Handbook 7110.65E.
STP 1-93C1-SM.

INTRODUCTION

The ability to properly identify aircraft in a radar environment is very important. This procedure must be mastered in order to perform the arrival or feeder controller duties necessary to ensure safe and orderly traffic flow within.

NOTE: The nature of the subject matter requires using abbreviations and terms only applicable to air traffic controllers.

Part A. EQUIPMENT

1. PRESENTATION AND EQUIPMENT PERFORMANCE

Provide radar service only if you are personally satisfied that radar presentation and equipment performance are adequate for the service being provided.

a. Alignment Check. As soon as possible after assuming responsibility for a control position, check the operating equipment for alignment accuracy and display acceptability. Recheck periodically throughout the watch. Check the alignment of the radar video display by assuring that the video map or overlay is properly aligned with a permanent target of known range and azimuth on the radar display. Where possible, check one permanent target per quadrant.

b. Code Monitor. Continuously monitor the Mode 3/A radar beacon codes assigned for use by aircraft operating within your area of responsibility. This includes the appropriate IFR code actually assigned and codes 1200 and 1277, as appropriate, unless your area of responsibility includes only positive controlled airspace. During periods when ring-around or excessive visual flight rule (VFR) target presentations derogate the separation of IFR traffic, monitoring VFP codes 1200 and 1277 may be temporarily discontinued.

2. SERVICE LIMITATIONS

When radar mapping is not available, limit radar service to separating radar-identified aircraft targets and vectoring aircraft to intercept a precision approach radar (PAR) final approach course. Provide limited radar service in areas that ensure no conflict with terrain, traffic on airways, airport control zones, restricted or prohibited areas, or other ATC areas of jurisdiction. Also provide limited radar service in areas that ensure no conflict with terrain, traffic on airways, restricted or prohibited areas, other ATC areas of jurisdiction, or other control zones.

3. ELECTRONIC CURSOR

An electronic cursor may be used to aid in identifying and vectoring an aircraft and to give finer delineation to a video map. Do NOT use it as a substitute for a video map or map overlay, such as to form intersections, airway boundaries, and final approach courses. Fixed electronic cursors may be used to form

the final approach course for surveillance approaches conducted by military-operated mobile radar facilities.

Part B. CONTROL

4. RADAR IDENTIFICATION

a. Identification Status. Before you provide radar service, establish and maintain radar identification of the aircraft involved. Inform the pilot of radar contact after you establish initial identification within the ATC system and after you reestablish identification subsequent to losing radar contact with the aircraft or terminating radar service to it. Also inform the pilot when radar contact is lost.

b. Service Termination. Inform the pilot when radar service is terminated. Radar service is automatically terminated and the pilot need not be advised of termination when--

(1) An aircraft cancels its IFR flight plan, except within a terminal control area (TCA), airport radar service area (ARSA), terminal radar service area (TRSA), or where Stage II service is provided.

(2) An aircraft conducting an instrument, visual, or contact approach has landed or has been instructed to change to advisory frequency.

(3) Terminal.

(a) An arriving VFR aircraft receiving radar service to a tower-controlled airport within a TCA, TRSA, ARSA, or where Stage II service is provided has landed, or to all other airports, is instructed to change to tower or advisory frequency.

(b) An aircraft completes a radar approach.

c. Primary Radar Identification Methods. Identify a primary or radar beacon target by using one of the following methods:

(1) Observe a departing aircraft target within 1 mile of the takeoff runway end (Figure 1).

(2) Observe a target whose position, with respect to a fix or a visual reporting point, corresponds with a direct position report received from an aircraft and the observed track is consistent with the reported heading or flight route. A fix is displayed on the video map, scribed on the map overlay, or displayed as a permanent echo. A visual reporting point is one whose range and azimuth from the radar antenna have been

accurately determined and made available to the controller. If a tactical air navigation aid (TACAN) or VHF omnidirectional range and TACAN (VORTAC) is located within 6,000 feet of the radar antenna, the TACAN or VORTAC may be used as a reference fix or radar identification without being displayed on the video map overlay.

NOTE: Visual reporting points used for radar identification are limited to those most used by pilots and whose range and azimuth have been determined by supervisory personnel.

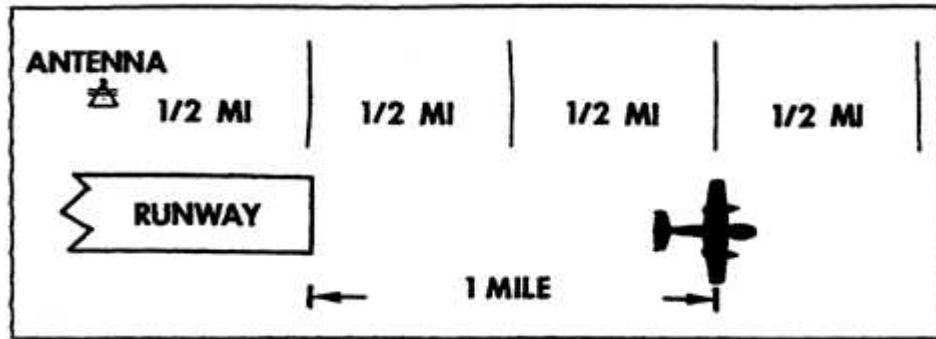


Figure 1. Departing Aircraft.

(3) Observe a target making an identifying turn or turns of 30 degrees or more, provided the following conditions exist:

NOTE: Using identifying turns or headings that would cause the aircraft to follow normal IFR routes or known VFR flight paths might result in misidentification. When these circumstances cannot be avoided, additional identification methods might be necessary.

(a) Except in the case of a lost aircraft, when you received a pilot position report, it assures you that the aircraft is within radar coverage and within the area being displayed.

(b) Only one aircraft is observed making these turns.

(c) For aircraft operating according to an IFR clearance, you do one of two things. You issue a heading away from an area that requires an increased minimum IFR altitude, or

you have the aircraft climb to the highest minimum altitude in your area of jurisdiction before you issue a heading.

d. Beacon Identification Methods. When using only a Mode 3/A radar beacon to identify a target, use one of the following:

(1) Request the pilot to activate the identification (IDENT) feature of the transponder and then observe the identification display.

PHRASEOLOGY: IDENT (if aircraft is on your assigned code.)

or

SQUAWK (code) AND IDENT.

(2) Request the pilot to change to a specific code, and then observe the target display change. If a code change is required according to an altitude change or other operational requirement, use the code specified therein.

(3) Request the pilot to change the transponder to STANDBY. After you observe sufficient scans to assure that a target loss resulted, request the pilot to return the transponder to normal operation and then observe the reappearance of the target.

PHRASEOLOGY: SQUAWK STANDBY (after target disappears.)

then

SQUAWK (code).

e. Questionable Identification. Use more than one method of identification when proximity of targets, duplication of observed action, or any other circumstance causes doubt as to target identification. If for any reason identification is questionable, take immediate action to reidentify the aircraft or terminate radar service.

f. Position Information. Inform the pilot of the aircraft's position when radar identification is established by means of identifying turns or radar beacon procedure. Position information need not be given when identification is established by position correlation or when a departing aircraft is identified within 1 mile of the takeoff runway end.

5. RADAR HANDOFF

Inter- or intrafacility radar handoffs shall be accomplished in all areas of radar surveillance except where it is not operationally feasible. The transferring controller shall complete a radar handoff or obtain the receiving controller's approval before the flight enters the receiving controller's airspace.

a. Handoff Methods.

(1) Transfer the identification of an aircraft target by physically pointing out the target on the receiving controller's scope or using landline voice communications. When using either method, relay information to the receiving controller in the following order:

(a) The position of the target relative to a fix, map symbol, or radar target known and displayed by the receiving and transferring controller.

(b) Aircraft identification.

(c) Assigned altitude, appropriate restrictions, and information that the aircraft is climbing or descending, if applicable. The exception is when inter- or intrafacility directives ensure that the altitude information will be known by the receiving controller.

(d) Advise the receiving controller of pertinent information not contained in the data block or flight progress strip unless covered in a letter of agreement or facility directive. Pertinent information includes assigned heading, airspeed restrictions, and issued altitude information. Other information includes observed track or deviation from the last route clearance and the beacon code if different from that normally used or previously coordinated. Include any other pertinent information.

(2) Consider that the target being transferred is identified on the receiving controller's display when any of the following conditions are met:

(a) The transferring controller has physically pointed out the target on his display and the receiving controller acknowledges receipt.

(b) The target location corresponds with the information provided by the transferring controller.

(c) The receiving controller shall state the aircraft identification and inform the transferring controller of radar contact.

(d) Should any doubt exist concerning positive identification, do not hesitate to require additional information or to use additional methods.

b. Communication Transfer. Transfer communication before an aircraft enters the receiving controller's area unless previously coordinated. If possible, initiate the transfer at the time of handoff.

c. Control Transfer. Assume control of an aircraft only after it is in your area of jurisdiction unless specifically coordinated at the time of handoff. When you transfer control of an aircraft while it is within your area of jurisdiction, issue any restrictions to the receiving controller that may be necessary to provide separation with other aircraft within your area.

In order to separate traffic within your area of jurisdiction, coordinate with the transferring controller any change in the heading or altitude of an aircraft within the transferring controller's area of jurisdiction.

d. Confirmation. After you accept a handoff from another facility--

(1) Confirm the identity of a nonbeacon target by advising the pilot of the aircraft's position (in relation to the handoff point).

(2) Confirm the identity of a beacon target by observing a code change, an IDENT reply, or a STANDBY squawk (unless one of these methods was used in affecting the handoff). These procedures do not apply at those towers or GCAs that have been delegated the responsibility for providing radar separation within designated areas by the parent approach control facility and the aircraft identification is assured by sequencing or positioning before the handoff.

NOTE: If any doubt as to target identification exists, apply the provisions of questionable identification stated in paragraph 4e.

6. VECTORING

a. Application.

(1) Vector aircraft in controlled airspace for safety, separation, noise abatement, operational advantage, or when the pilot requests it.

(2) Vector aircraft in noncontrolled airspace only on pilot request as an additional service.

(3) Vector an aircraft at or above minimum vectoring altitudes or the minimum IFR altitude except as authorized for missed approaches, radar approaches, departures, special VFR (SVFR), and VFR operations.

NOTE: VFR aircraft not at an altitude assigned by ATC may be vectored at any altitude. It is the responsibility of the pilot to comply with the applicable federal aviation regulations.

(4) Vector aircraft in airspace for which you have control jurisdiction, unless otherwise coordinated.

(5) Vector an aircraft to permit it to resume its own navigation within radar coverage.

(6) Vector aircraft operating under SVFR only within control zones.

(7) Vector VFR aircraft at those locations where a special program is established, when a pilot requests it, or when you suggest the vector and the pilot concurs.

b. Vector Methods.

(1) Specify the direction of turn, if appropriate, and the magnetic heading to be flown after completing the turn.

PHRASEOLOGY: TURN LEFT (or RIGHT) HEADING (degrees).

(2) Specify a no-gyro vector as follows:

(a) Before issuing any vectors, inform the pilot of the type of vector.

PHRASEOLOGY: THIS WILL BE A NO-GYRO VECTOR.

(b) When issuing each turn instruction, specify the direction of the turn and when to stop the turn.

PHRASEOLOGY: TURN LEFT (or RIGHT). STOP TURN.

(3) Specify, in group form, the number of degrees to turn and the direction of the turn when the heading of the aircraft is unknown and time does not permit obtaining it.

PHRASEOLOGY: TURN (number) **DEGREES LEFT** (or **RIGHT**).

If required,

(purpose).

(4) Specify the magnetic heading.

PHRASEOLOGY: FLY HEADING (degrees).

(5) Specify that the present heading be flown.

PHRASEOLOGY: FLY PRESENT HEADING.

(6) Specify the heading to depart a fix.

PHRASEOLOGY: DEPART (fix), **HEADING** (degrees).

(7) With the initial vector, advise the pilot of the purpose.

PHRASEOLOGY: FOR VECTOR TO (fix or airway).

or

INTERCEPT (name of navigational aid [NAVAID]), specified) **RADIAL** (COURSE).

or if the pilot has prior knowledge of the type of approach to be made,

FINAL APPROACH COURSE.

or when the pilot does not have prior knowledge of the type of approach to be made,

(approach NAVAID) **FINAL APPROACH COURSE.**

or

RUNWAY (number) **TRAFFIC PATTERN.**

or

(other point or purpose).

(8) Issue with the vector an altitude to maintain and all appropriate altitude restrictions when the-

(a) Vector will take the aircraft off the assigned procedures containing altitude instructions, such as instrument approaches or nonradar standard instrument departures (SIDs).

(b) Previously issued clearance included crossing restrictions.

(9) If appropriate, advise the pilot what to expect when the vector is complete.

PHRASEOLOGY: EXPECT TO RESUME (route, SID, or standard terminal arrival route [STAR]).

NOTE: You must ensure that the pilot is made aware if he is expected to resume a previously issued route or procedure.

(10) Provide radar navigational guidance until the--

(a) Aircraft is established within the airspace to be protected for the nonradar route to be flown.

(b) Aircraft is on a heading that will, within a reasonable distance, intercept the nonradar route to be flown.

(c) Pilot is informed of the aircraft's position unless the aircraft is equipped with area navigation or distance measuring equipment (DME) and being vectored toward a VORTAC, TACAN, or way point and within the service volume of the NAVAID.

PHRASEOLOGY: (position with respect to the course or fix along the route) **RESUME OWN NAVIGATION**

or

FLY HEADING (degrees) **UNTIL RECEIVING** (name of NAVAID or way point). **THEN PROCEED DIRECT.**

or

RESUME (name-number SID, transition, STAR, or procedure).

(11) Inform a pilot when a vector will take the aircraft across a previously assigned nonradar route.

PHRASEOLOGY: EXPECT VECTOR ACROSS (NAVAID or radial)(airway or route) **FOR** (purpose).

7. RADAR SEPARATION MINIMA

a. Application. Separate radar-identified aircraft by 3 miles if less than 40 miles from the antenna, or by 5 miles if 40 miles or more from the antenna.

b. Passing or Diverging. Vertical separation between aircraft may be discontinued when--

(1) You observe that they have passed each other or that one has crossed the projected course of another.

(2) Their tracks are monitored to assure that their primary targets or beacon control slashes will not touch.

(3) Their courses diverge by at least 15 degrees.

c. Departure and Arrival. Separate a departing aircraft from an arriving aircraft on final approach by a minimum of 2 miles if separation will increase to a minimum of 3 miles (5 miles if 40 miles or more from the antenna) within one minute after takeoff.

d. Adjacent Airspace.

(1) If the coordination between the controllers concerned has not been affected, separate radar-controlled aircraft from the boundary of adjacent airspace in which radar separation is also being used. This separation should be 1½ miles when less than 40 miles from the antenna or 2½ miles when 40 miles or more from the antenna.

(2) Separate radar-controlled aircraft from the boundary of airspace in which nonradar separation is being used. This separation should be a minimum of 3 miles when less than 40 miles from antenna or 5 miles when 40 miles or more from the antenna.

e. Edge of Scope. Separate a radar-controlled aircraft climbing or descending through the altitude of an aircraft that has been tracked to the edge of the scope or display. The minimum separation should be 3 miles (5 miles when 40 miles or more from the antenna) from the edge of the scope until nonradar separation has been established.

NOTE: Sequence arriving aircraft that are conducting radar approaches to ensure a minimum of 3 miles separation or a predetermined distance to accommodate the acceptance rate of the runway or final control.

f. Beacon Target Displacement. When using a radar display with a previously specified beacon target displacement to

separate a beacon target from terrain, obstructions, a primary target, or adjacent airspace, add a 1-mile correction factor to the applicable minima.

8. RADAR APPROACHES

a. Pattern. The **downwind leg** (parallel but in opposite direction to final approach course) is normally offset 3 to 5 miles. It can be a left pattern, right pattern, or both depending on restrictions. The base leg (a 90-degree angle to the downwind leg) can also be a left or right pattern, as appropriate. The final leg is normally two turns from base to final. The first turn is generally an intercept heading of 30 degrees to the final approach course (Figure 2). The second turn is the final approach course heading. This procedure is standard but not required.

DISTANCE FROM INTERCEPTION POINT TO APPROACH GATE	MAXIMUM INTERCEPTION ANGLE
LESS THAN 2 MILES	20 DEGREES
2 MILES OR MORE	30 DEGREES (45 DEGREES FOR HELICOPTERS)

Figure 2. Approach Course Interception Angle.

b. Application. Provide radar approaches according to standard or special instrument approach procedures. A radar approach may be given to any aircraft on request and may be offered to aircraft in distress regardless of weather conditions or to expedite traffic.

c. Approach Information.

(1) Issue the following information to an aircraft that will conduct a radar approach. Current approach information contained in the automatic service (ATIS) broadcast may be omitted if the pilot states the appropriate ATIS broadcast code. All items listed below except (c) may be omitted after the first approach is made and no change has occurred. Transmission with aircraft in this approach phase should be approximately every minute.

(a) Altimeter setting.

(b) Ceiling and visibility if the ceiling at the airport of intended landing is reported below 1,000 feet or below the highest circling minimum, whichever is greater, or if the visibility is less than 3 miles.

(c) Any known changes classified as special weather observations as soon as possible. Special weather observations need not be issued after they are included in the ATIS broadcast and the pilot states the appropriate ATIS broadcast code.

(d) Pertinent information on known airport conditions if they are considered necessary to the safe operation of the aircraft concerned.

(e) Lost communication procedure as specified in d below.

(2) Before starting final approach--

NOTE: The transmissions in (a) and (b) below are given together and usually with the initial vector.

(a) Inform the aircraft of the approach type, runway, airport, heliport, or other point, as appropriate, to which the approach will be made. Specify the airport name when the approach will be to a secondary airport.

PHRASEOLOGY: THIS WILL BE A P-A-R (or SURVEILLANCE) APPROACH TO RUNWAY (number)

or

(name) **AIRPORT, RUNWAY (number)**

or

(name) **AIRPORT (or HELIPORT).**

(b) For surveillance approaches, specify the location of the missed approach point (MAP) in relation to the runway, airport, or heliport.

PHRASEOLOGY: MISSED APPROACH POINT IS (distance)

MILES FROM RUNWAY (or AIRPORT or HELIPORT)

or for a point-in-space approach

A MISSED APPROACH POINT (distance) MILES

(direction from landing area) **OF (name) AIRPORT (or HELIPORT).**

(3) Provide recommended altitudes on final approach if the pilot requests them. If recommended altitudes are requested, inform the pilot that recommended altitudes at or above the published minimum descent altitude will be given for each mile on final.

PHRASEOLOGY: RECOMMENDED ALTITUDES WILL BE FURNISHED EACH MILE ON FINAL APPROACH.

(4) Inform the pilot making an approach to an airport not served by a tower that no traffic or landing runway information is available for the airport.

PHRASEOLOGY: NO TRAFFIC OR LANDING RUNWAY INFORMATION AVAILABLE FOR THE AIRPORT.

d. Lost Communications. When weather reports indicate that an aircraft will likely encounter IFR weather conditions during the approach, take the following actions as soon as possible after establishing radar identification and radio communications. (These actions may be omitted after the first approach when successive approaches are made and the instructions remain the same.)

NOTE: The ATC facilities at US Army and USAF installations are not required to transmit lost communications instructions to military aircraft. All military facilities will issue specific lost communications instructions to civil aircraft when required.

(1) If lost communication instructions will require the pilot to fly an unpublished route, issue an appropriate altitude to the pilot. If lost communication instructions are the same for the pattern and final, the pattern or vector controller shall issue both.

(2) If radio communication is lost for a specified time interval (not more than one minute) on vector to final approach, 15 seconds on a surveillance final approach, or 5 seconds on a PAR final approach, advise the pilot to--

(a) Attempt contact on a secondary or tower frequency.

(b) Proceed according to VFR, if possible.

(c) Proceed with an approved nonradar approach or execute the specific lost communication procedure for the radar approach being used.

PHRASEOLOGY: IF NO TRANSMISSIONS ARE RECEIVED FOR (time interval) **IN THE PATTERN OR FIVE** (or FIFTEEN) **SECONDS ON FINAL APPROACH, ATTEMPT CONTACT ON** frequency) **AND**

if possibility exists,

PROCEED VFR; IF UNABLE,

If approved,

PROCEED WITH (nonradar approach) **MAINTAIN** (altitude) **UNTIL ESTABLISHED ON** (or OVER) **FIX** (or NAVAID or APPROACH PROCEDURE)

or

(alternate instructions).

(3) If the pilot states that he cannot accept a lost communication procedure because of weather conditions or other reason, request the pilot's intention.

NOTE: The pilot is responsible for determining the adequacy of lost communication procedure with respect to the aircraft's performance, equipment capability, or reported weather.

e. Position Report. Inform the pilot of the aircraft's position at least once before starting final approach.

PHRASEOLOGY: (number) MILES (direction) OF AIRPORT.

or

DOWNWIND (or BASE LEG) (number) **MILES (direction) OF AIRPORT.**

f. Landing Check. Advise the pilot to perform a landing check while the aircraft is on the downwind leg and in time to complete it before turning onto the base leg. If an incomplete pattern is used, issue the landing check before handoff to the final controller for a PAR approach or before starting descent on final approach for a surveillance approach.

PHRASEOLOGY: PERFORM LANDING CHECK.

g. Low Approach and Touch and Go. Before an aircraft that plans to execute a low approach or a touch-and-go begins final

descent, issue the appropriate departure instructions to be followed on completion of the approach. Climb-out instructions must include a specific heading and altitude except when the aircraft will maintain VFR and contact the tower.

PHRASEOLOGY: AFTER COMPLETING LOW APPROACH (or **TOUCH AND GO**), **CLIMB AND MAINTAIN** (altitude). **TURN RIGHT** (or **LEFT**) **HEADING** (degrees); **FLY RUNWAY HEADING**.

or

MAINTAIN V-F-R, CONTACT TOWER.

or

(other instructions as appropriate)

h. Final Controller Changeover. When instructing the aircraft to change frequencies for final approach guidance, include the name of the facility.

PHRASEOLOGY: CONTACT (facility name) **FINAL CONTROLLER ON** (frequency).

9. ADDITIONAL SERVICES

a. Application. Provide additional services to the extent contingent on your capability to fit the services into the performance of higher priority duties. You may do this based on the following:

(1) Factors (workload, traffic, volume, radar, limitations, and frequency congestion) should be considered by the controller.

(2) You have complete discretion for determining if you are able to provide, or to continue to provide, a service in a particular case.

(3) Your reason not to provide, or to continue to provide, a service in a particular case is not subject to question by the pilot and need not be made known to him.

b. Traffic Information. Issue radar traffic information to all radar-identified aircraft unless omission is requested by the pilot, or the aircraft is operating within positive controlled airspace. Issue traffic information to the aircraft pilots on your frequency when, in your judgement, their proximity may diminish to less than the applicable separation minima.

(1) To radar-identified aircraft.

- (a) Azimuth from the aircraft in terms of the 12-hour clock.
- (b) Distance from the aircraft in miles.
- (c) Direction in which traffic is proceeding and/or relative traffic movement.
- (d) If known, the type of aircraft and altitude.

PHRASEOLOGY: **TRAFFIC**, (number) **O'CLOCK** (number) **MILES**, (direction) **BOUND**
(relative movement and, if known, type of aircraft and altitude--if altitude is unknown, so state.)

(2) To non radar-identified aircraft.

- (a) Distance and direction from fix.
- (b) Direction in which traffic is proceeding.
- (c) If known, the type of aircraft and altitude.
- (d) Estimated arrival time over the fix the aircraft is approaching, if appropriate.

PHRASEOLOGY: **TRAFFIC**, (number) **MILES** (or MINUTES) **OF** (airport or fix), (direction)
BOUND (if known, type or aircraft and altitude) **ESTIMATED** (fix and time).

(3) To radar-identified aircraft requesting avoidance vectors. When requested by the pilot, issue radar vectors to assist in avoiding the traffic, provided the aircraft to be vectored is within your jurisdiction area or coordination has been affected with the sector of facility in whose area the aircraft is operating.

(4) To traffic not in sight. If the pilot informs you that he does not see the traffic you have issued, inform him when the traffic is no longer a factor.

PHRASEOLOGY: **TRAFFIC NO LONGER A FACTOR.**

or

(number) **O'CLOCK TRAFFIC NO LONGER A FACTOR.**

c. Merging Target Procedure.

(1) Except while aircraft are established in a holding pattern, apply merging target procedure to all radar-identified aircraft at 10,000 feet and above and turbojet or Presidential aircraft regardless of altitude. Issue traffic information to all aircraft whose targets appear likely to merge, unless the aircraft are separated by more than the appropriate vertical separation minima.

(2) If the pilot requests, vector his aircraft to avoid merging with (so it will not touch) the target of previously issued traffic. If you are unable to provide vector service, inform the pilot.

LESSON

PRACTICE EXERCISE

The following items will test your grasp of the lesson material. Each item has only one correct answer. When you complete the exercise, check your answers with the answer key that follows. If you answer any item incorrectly, restudy that part of the lesson.

1. When checking scope alignment by correlating a permanent target of known range and azimuth with the radar display, the controller should check
 - A. only one target.
 - B. one target per quadrant, where possible.
 - C. two targets, one on each side of the scope.
 - D. a target bearing 360 degrees at 10-mile increments.
2. More than one method of aircraft identification should be used when the
 - A. aircraft is lost.
 - B. target proximity causes doubt as to target identification.
 - C. aircraft is in an area where the minimum IFR altitude changes.
 - D. aircraft is in an area immediately adjacent to your area of jurisdiction.
3. An aircraft is considered properly identified when the
 - A. pilot reports he is departing and the target is observed.
 - B. tower has relayed the departure time and the aircraft target is observed climbing out.
 - C. primary or secondary target of a departing aircraft is observed within 1 mile of the takeoff runway end.
 - D. primary or secondary target of a departing aircraft is observed within 1 1/2 miles of the takeoff runway end.

4. How do you confirm the identity of a beacon-equipped target?
- A. You don't--identity is not necessary.
 - B. Have the aircraft make a turn of 30 degrees or more.
 - C. Advise the aircraft to IDENT or change to a specific code.
 - D. Give the aircraft its position in relation to the handoff point.
5. What are the lost communication time intervals for a vector to final approach and for a surveillance final approach?
- A. 1 minute, 15 seconds
 - B. 15 seconds, 1 minute
 - C. 5 seconds, 15 seconds
 - D. 15 seconds, 5 seconds
6. A pilot need not be advised of radar service termination when
- A. he misses the approach.
 - B. conducting a radar approach.
 - C. vectored to the final approach course.
 - D. conducting a visual or contact approach and is advised to contact the tower.
7. An aircraft can be considered identified if the position and heading of the target correspond with that given by the pilot, providing the position
- A. is given as a DME fix.
 - B. is given with respect to an airway intersection.
 - C. if the target is within 1 1/2 miles of that stated by the pilot.
 - D. is given in respect to a TACAN or VORTAC fix located within 6,000 feet of the radar antenna.
8. When will the appropriate climb-out instructions be issued to an aircraft planning to execute a low approach or a touch and go?
- A. before a MAP is issued
 - B. before the aircraft begins final descent
 - C. while the aircraft is on the downwind leg
 - D. as soon as possible after the pilot requests a low approach or touch-and-go

9. How do you confirm the identity of a nonbeacon target after handoff?
- A. Advise the aircraft to IDENT.
 - B. Have the aircraft squawk STANDBY.
 - C. Direct the aircraft to make a 30-degree turn.
 - D. Give the aircraft's position in relation to the handoff point.
10. When will the pilot of an aircraft be informed of the runway, airport, or heliport to which the approach will be made?
- A. on initial radar contact
 - B. before the aircraft turns on final
 - C. before handoff to the terminal facility
 - D. before the aircraft starts final approach
11. In what direction is the normal GCA traffic pattern downwind leg?
- A. straight-in
 - B. a 90-degree angle to the base leg
 - C. 30 degrees to the final approach course
 - D. left pattern, right pattern, or both depending on restrictions
12. What is the primary prerequisite for providing radar approaches?
- A. The pilot is IFR-qualified.
 - B. Aircraft are instrument-equipped.
 - C. The ceiling must be at least 500 feet and the visibility 1 1/2 miles.
 - D. Approaches are according to standard or special instrument approach procedure.
13. Additional services are provided to an aircraft
- A. anytime.
 - B. after the pilot requests specific services.
 - C. contingent on workload and higher priorities.
 - D. only when the aircraft is outside positive controlled airspace.

14. When is the lost communication procedure required to be issued to civilian aircraft?
- A. before all radar approaches
 - B. before each approach if repeated approaches are made
 - C. after the pilot requests an alternate frequency procedure
 - D. when aircraft are likely to encounter IFR weather conditions during the approach
15. Merging target procedures are applied to
- A. scheduled air carriers.
 - B. radar-controlled, air-carrier aircraft.
 - C. radar-controlled, scheduled, air-carrier aircraft except while in positive controlled airspace.
 - D. all radar-identified aircraft at or above 10,000 feet or turbojet and presidential aircraft, regardless of altitude, except while aircraft are established in a holding pattern.

LESSON
PRACTICE EXERCISE
ANSWER KEY AND FEEDBACK

<u>Item</u>	<u>Correct Answer and Feedback</u>
1.	B. one target per quadrant, where possible. You need to check the complete radar scan area. (page 2, para 1)
2.	B. target proximity causes doubt as to target identification. When more than one aircraft is observed making identifying actions or their locations are too close, an attempt to reidentify is confusing. (page 5, para 4e)
3.	C. primary or secondary target of a departing aircraft is observed within 1 mile of the takeoff runway end. A departing aircraft must be seen within 1 mile of the end of the departure runway. [page 3, para 4c(1)]
4.	C. advise the aircraft to IDENT or change to a specific code. Aircraft squawking your code will IDENT, and an aircraft on a different code will change to your code. [page 7, para 5d(2)]
5.	A. 1 minute, 15 seconds. Transmissions must be made for at least one minute while in the pattern and each 15 seconds or less while on airport surveillance radar final. [page 15, para 8d(1)]
6.	D. conducting a visual or contact approach and is advised to contact the tower. When the pilot of an aircraft is told to contact tower radar, the service is terminated when a frequency change is made. [page 3, para 4b(2)]

7. D. is given in respect to a TACAN or VORTAC fix located within 6,000 feet of the radar antenna.

Using a VORTAC or TACAN located within 6,000 feet of the radar antenna does not need to be displayed and can be used as a video fix. If the reported position and heading corresponds with the observed track over a fix, it is identified. [page 3, para 4c(2)]

8. B. before the aircraft begins final descent.

Before the pilot begins final descent, he must have instructions to be followed on completion of his approach. (page 16, para 8g)

9. D. give the aircraft's position in relation to the handoff point.

When informed of his position in relation to the handoff point and the pilot concurs, identity is confirmed. [page 7, para 5d(1)]

10. D. before the aircraft starts final approach.

The pilot must be told to what area the approach is being made. [page 13, para 8c(2)(a)]

11. D. left pattern, right pattern, or both depending on restrictions.

The downwind leg is always parallel but in opposite direction to the final approach course. (page 12, para 8a)

12. D. approaches are according to standard or special instrument approach procedures.

A radar approach is an instrument procedure, so it will follow published regulations. (page 12, para 8b)

13. C. contingent or workload and higher priorities.

Provide additional services when there is time. Do NOT delay information to controlled aircraft. (page 17, para 9a)

14. D. when aircraft are likely to encounter IFR weather conditions during the approach.

Civil aircraft need to be issued lost communications for military airfields. (page 14, para 8d NOTE)

15. D. all radar-identified aircraft at or above 10,000 feet or turbojet and presidential aircraft regardless of altitude, except while aircraft are established in a holding pattern.

Inform controlled aircraft when targets are converging with uncontrolled aircraft. [page 18, para 9c(1)]

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