Federal Aviation Administration

Initial En Route Qualification Training

Instructor
Lesson 18
Lateral Separation

Course 50148001

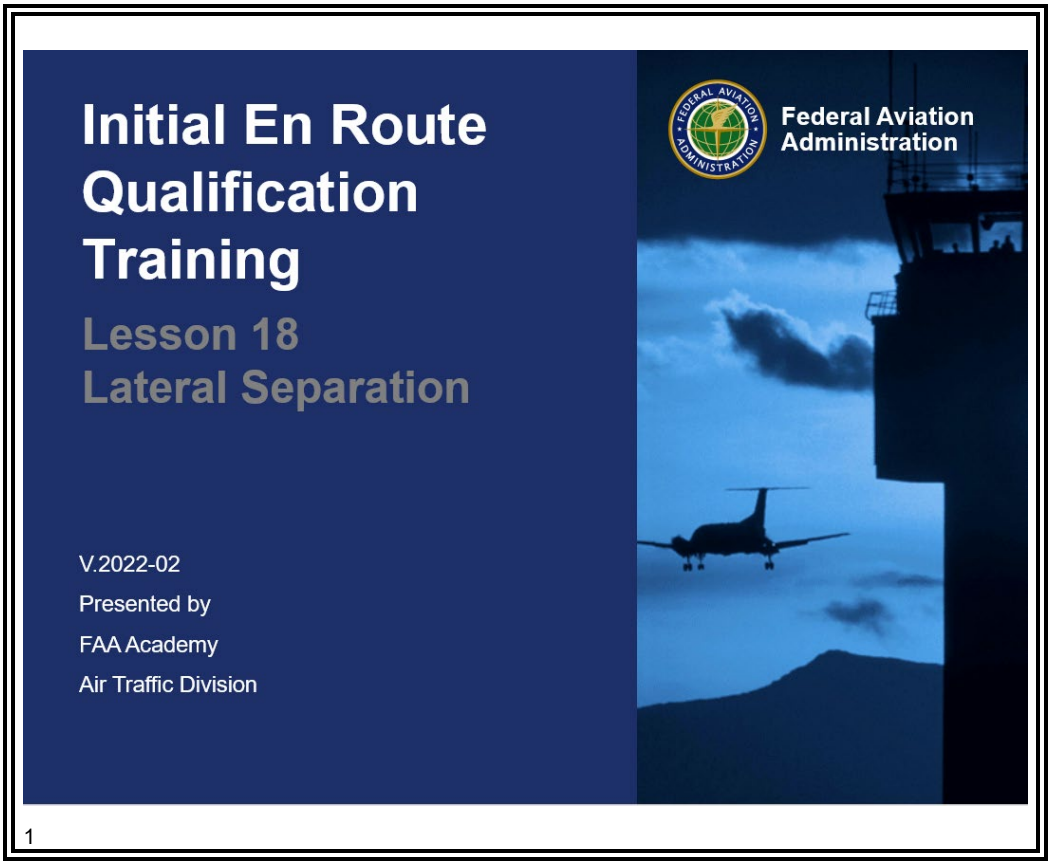
LESSON PLAN DATA SHEET

COURSE NAME:	INITIAL EN ROUTE QUALIFICATION TRAINING
COURSE NUMBER:	50148001
LESSON TITLE:	LATERAL SEPARATION
DURATION:	12+00 HOURS
DATE REVISED:	2022-02
VERSION:	V.2022-02
REFERENCE(S):	FAA ORDER JO 7110.65, AIR TRAFFIC CONTROL; AERO CENTER MAP; FAA ORDER 8260.3 UNITED STATES STANDARD FOR TERMINAL INSTRUMENT PROCEDURES (TERPS)
HANDOUT(S):	lat1.f2k, lat2.f2k, lat3.f2k, lat4.f2k, lat5.f2k, latptask.f2k - LATERAL SEPARATION PART-TASK STRIPS
EXERCISE(S)/ ACTIVITY(S):	EXERCISE 1: APPLYING LATERAL SEPARATION EXERCISE 2: DEMONSTRATING LATERAL SEPARATION BEST PRACTICES ACTIVITY: ENSURING SEPARATION
END-OF-LESSON TEST:	YES *(REFER TO ELT18.PDF)*
PERFORMANCE TEST:	NONE
MATERIALS:	NONE
OTHER PERTINENT INFORMATION:	APPENDIX A: ZAE HOLDING PATTERNS *APPENDIX B: INSTRUCTOR KEY FOR ELEARNING ACTIVITY*

☞ ***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

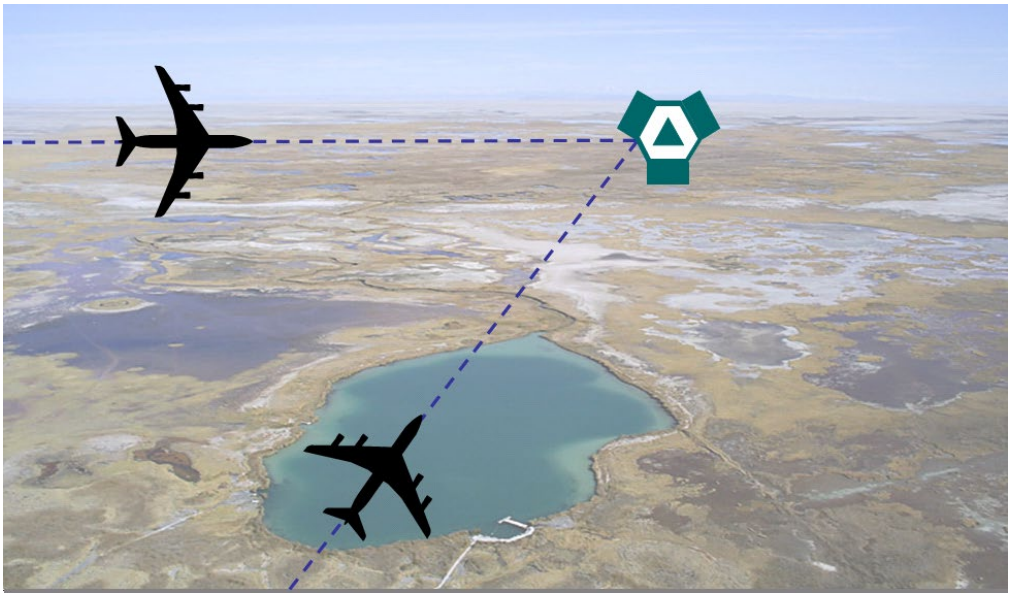


In the previous lesson, you were introduced to longitudinal separation. However, you will **not** be able to apply vertical separation in all situations. Air Traffic Controllers generally use a combination of separation rules to achieve a safe operation. A combination of lateral and vertical separation will allow you to separate aircraft more efficiently.

INTRODUCTION *(Continued)*

Opening Scenario

LATERAL SEPARATION



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Your ability to apply lateral separation in conjunction with vertical separation will help resolve traffic situations as they become more complex throughout your training.

Purpose

This lesson will cover lateral separation and its application in air traffic control situations.

Lesson Objectives

LESSON OBJECTIVES

- On an End-of-Lesson Test, and in accordance with FAA Order JO 7110.65, you will identify:
  - Airspace to be protected along airways/routes, and holding patterns
  - Minima and procedures for applying lateral separation

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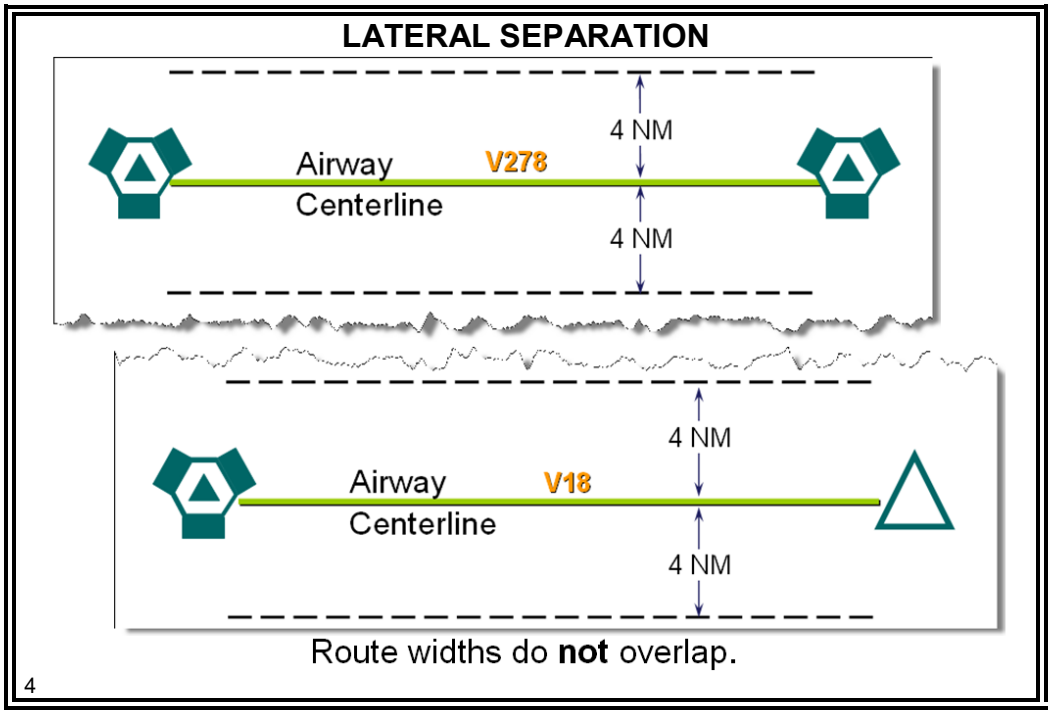
☞ **NOTE:** Teach from graphic.

LATERAL SEPARATION METHODS

Methods
JO 7110.65,
par. 6-5-1



⊙ Clear aircraft on different airways or routes whose widths or protected airspace **must not** overlap.

NOTE: Protected airspace can touch, but it **cannot** overlap.

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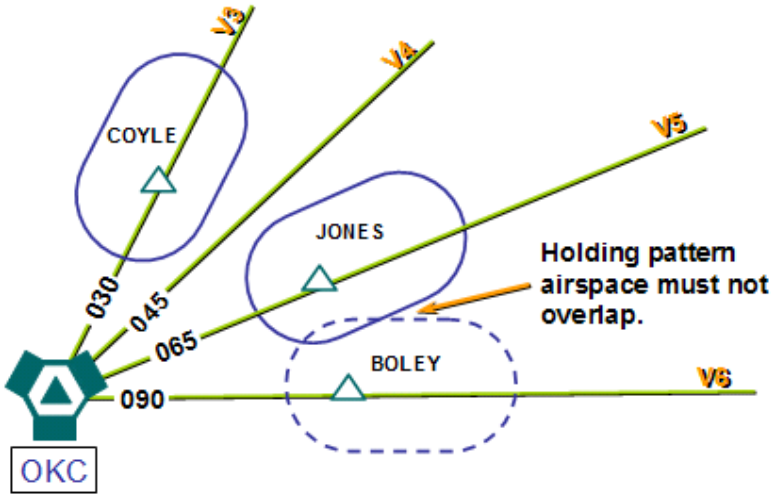
LATERAL SEPARATION METHODS *(Continued)*

Methods (Cont'd)
JO 7110.65, par. 6-5-1

SEPARATION IN HOLDING PATTERNS



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Clear aircraft to hold over different fixes whose holding patterns **must not** overlap.

- If holding patterns overlap, do **not** hold aircraft at the same altitude

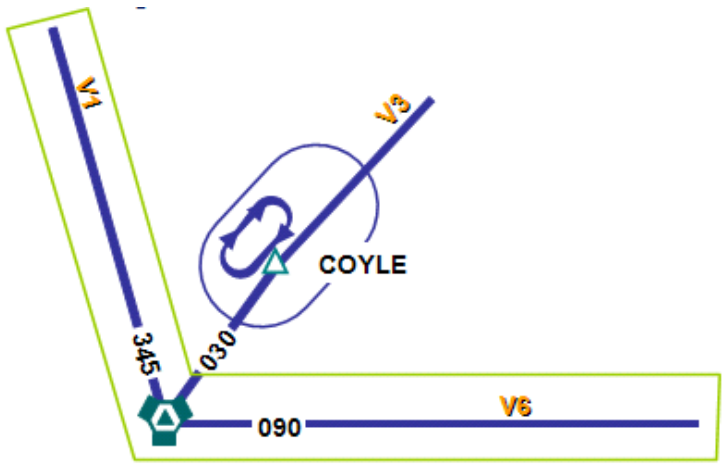
☞ ***NOTE:*** *Protected airspace can touch but **cannot** overlap.*

Continued on next page

LATERAL SEPARATION METHODS *(Continued)*

Methods (Cont'd)
JO 7110.65, par. 6-5-1

SEPARATION BETWEEN HOLDING PATTERNS AND AIRWAYS/ROUTES



Protected airspaces may **not** overlap.

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- Clear aircraft to hold over different fixes whose holding patterns **must not** overlap other protected airspace.

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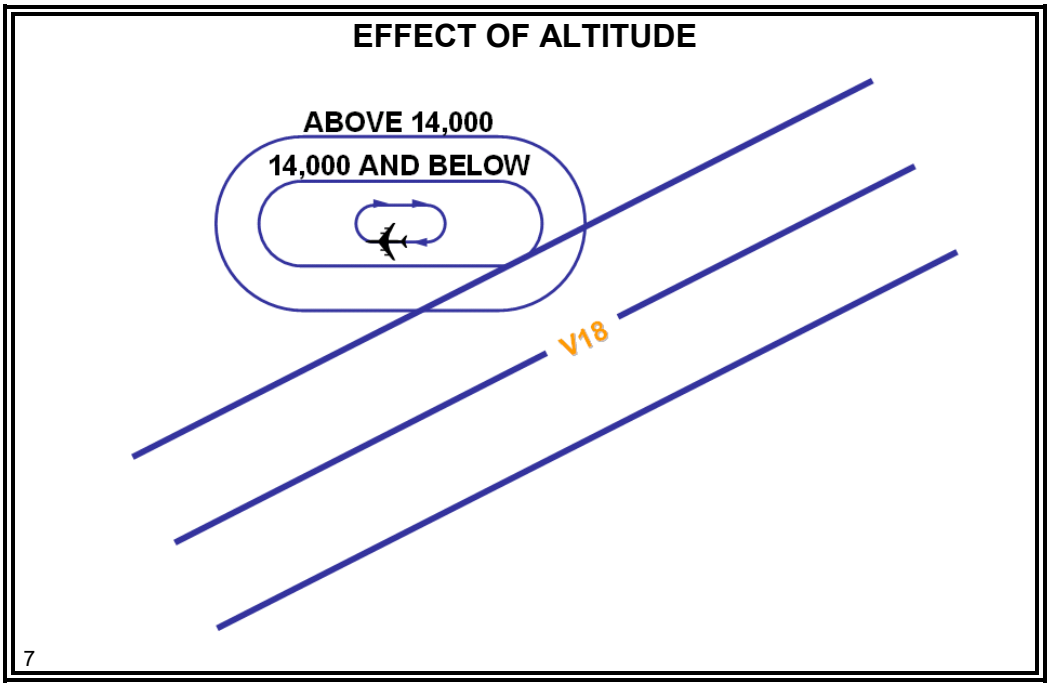
LATERAL SEPARATION METHODS *(Continued)*

Methods (Cont'd)
JO 7110.65, par. 6-5-1



- Holding pattern protected airspace area increases with an increase in an aircraft's altitude and/or speed.

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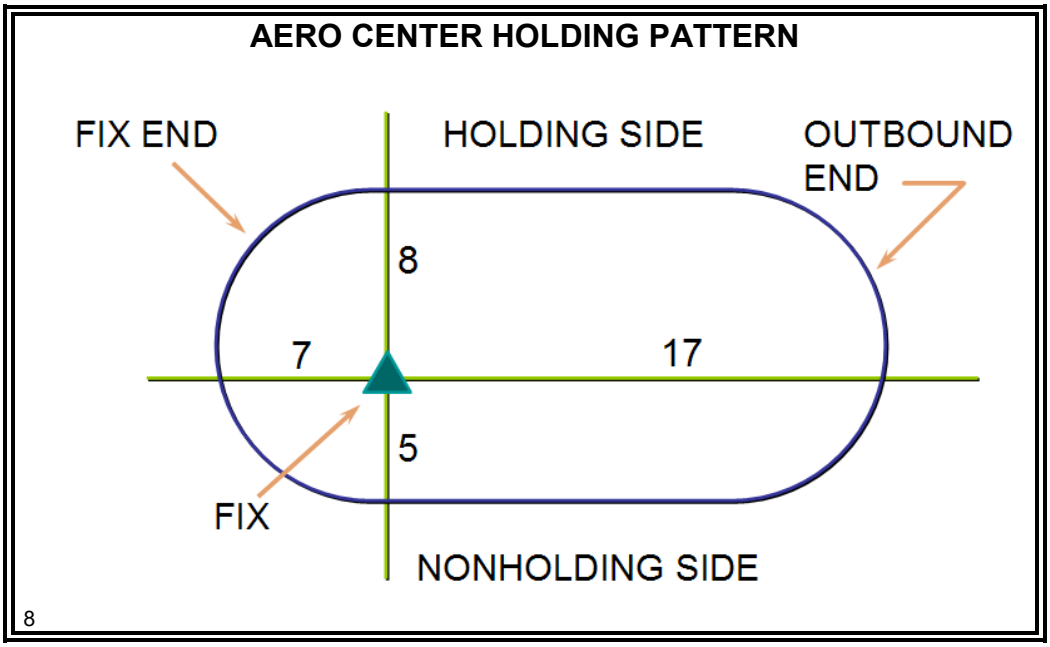
LATERAL SEPARATION METHODS *(Continued)*

Methods (Cont'd)
JO 7110.65, par. 6-5-1



- The above holding pattern was used in Aero Center to determine the protected airspace used in nonradar maps, scenarios, and procedures

NOTE: Other templates are available for other altitudes and types of aircraft.

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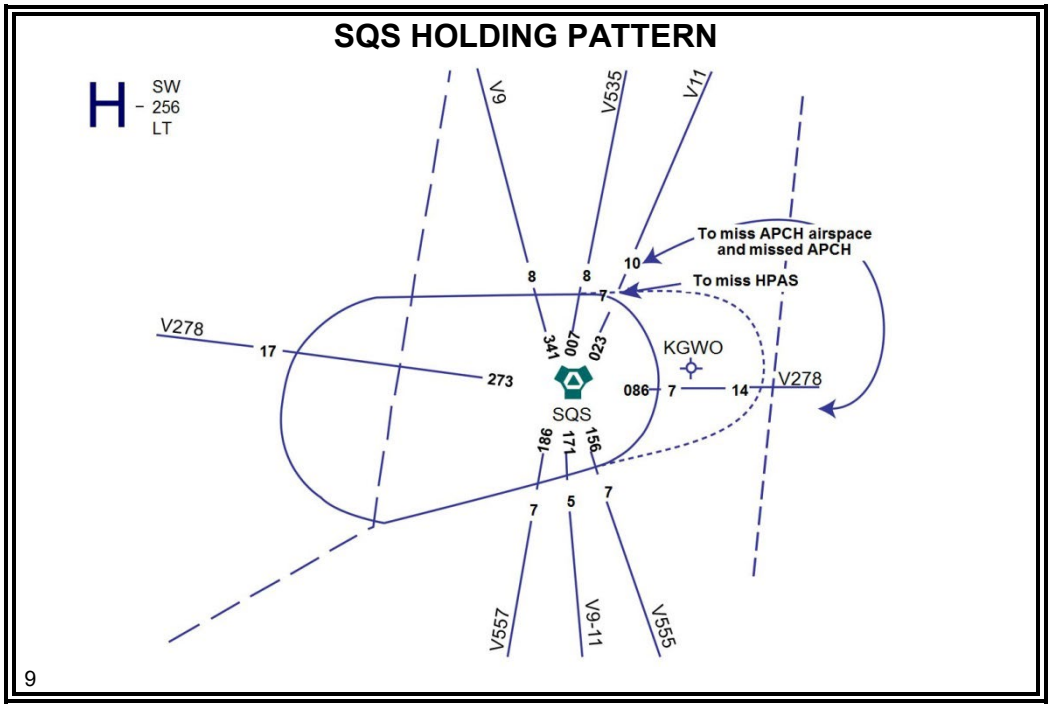
LATERAL SEPARATION METHODS *(Continued)*

Methods (Cont'd)
JO 7110.65, par. 6-5-1



NOTE: SQS holding pattern overlaps Sector 67 airspace and requires coordination before and after use. The dotted line at the airport end depicts additional protected airspace for the actual approach to the airport including the missed approach. Other Aero Center holding patterns are in Appendix A of this lesson.

NOTE: KGWO departures which require a crossing restriction or report on V11, V278 or V535 of 10 miles NE SQS or less must include "ON/established on" an airway.
Example: "Cross one zero miles NE SQS VORTAC ON/Established ON V11 at or below 6000"….

LATERAL SEPARATION METHODS *(Continued)*

Knowledge Check

KNOWLEDGE CHECK

QUESTION: The protected airspace of a holding pattern must **not** _____ of an airway.

A. overlap the protected airspace

B. overlap the centerline

C. touch the protected airspace

10

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

ANSWER: *A*

KNOWLEDGE CHECK

QUESTION: The size of the protected airspace of a holding pattern varies according to _____ and _____.

A. speed; direction of holding

B. altitude; wind speed

C. speed; altitude

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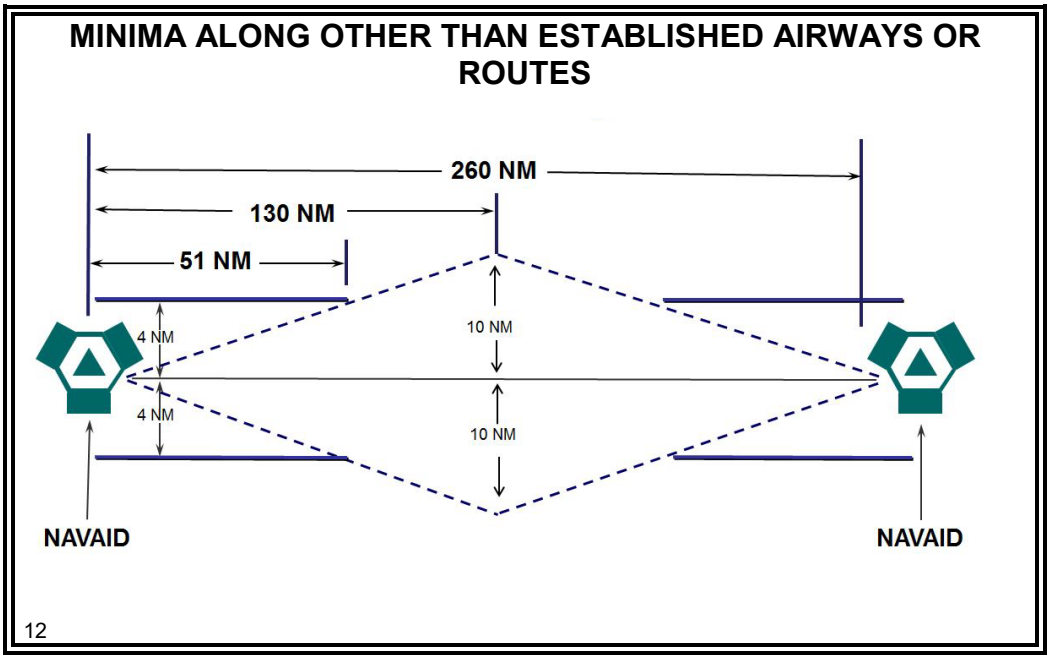
☞ **NOTE:** Click once to show answer.

ANSWER: *C*

PROTECTED AIRSPACE

Minima Along Other Than Established Airways/ Routes
JO 7110.65, par. 6-5-4



Protect airspace along other than established airways or routes as follows:

⊙ Direct courses and course changes of 15 degrees or less:

- Via NAVAIDs or radials FL 600 and below− 4 miles on each side of the route to a point 51 miles from the NAVAID, then increasing in width on a 4 1/2 degree angle to a width of 10 miles on each side of the route at a distance of 130 miles from the NAVAID.

PROTECTED AIRSPACE *(Continued)*

Protected Airspace

PROTECTED AIRSPACE

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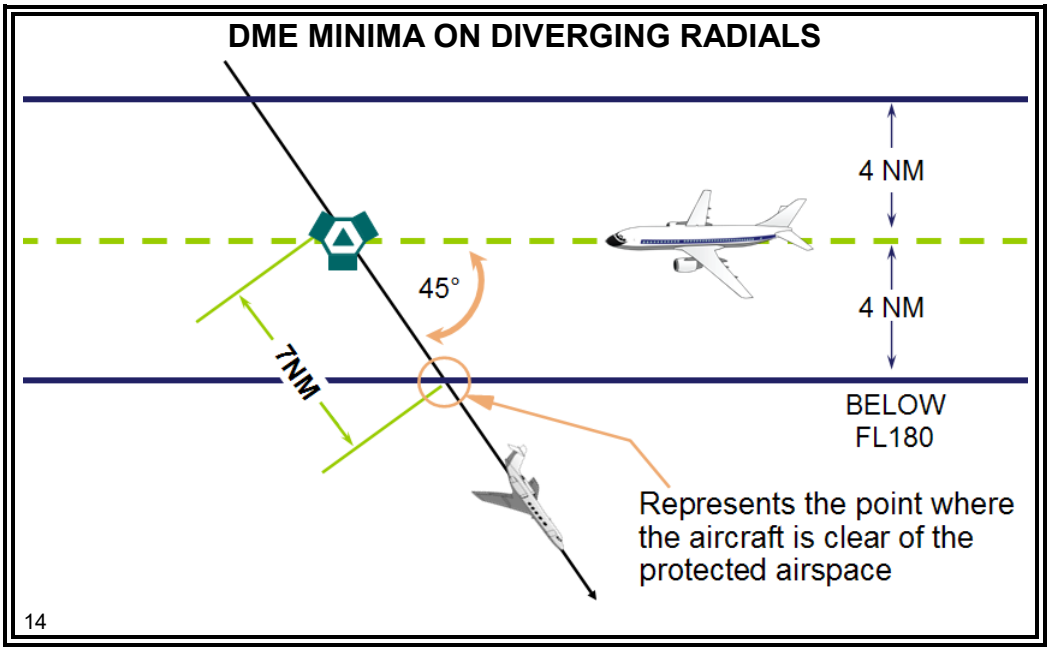
☞ ***NOTE:*** *Introduce topic and then click image to play animation. At any point, click image to pause or resume play. Once the animation is complete, click once on image to restart.*

☞ ***NOTE:*** *Click outside the animation to advance to the next slide.*

NOTE: This animation is intended to illustrate the concept of lateral and longitudinal protected airspace.

MINIMA ON DIVERGING RADIALS

Separation Criteria
JO 7110.65, par. 6-5-2, table 6-5-2



- Consider separation to exist between aircraft:
  - Established on diverging radials of the same NAVAID
    - At least 15 degrees divergence when either aircraft is clear of the airspace to be protected for the other aircraft

MINIMA ON DIVERGING RADIALS *(Continued)*

DME Divergence Distance Minima
JO 7110.65, par. 6-5-2, table 6-5-2

DME DIVERGENCE DISTANCE MINIMA

Divergence (Degrees)	Distance (NM) (below FL180)
15	17
20	13
25	11
30	9
35	8
45	7
55	6
90	5

15

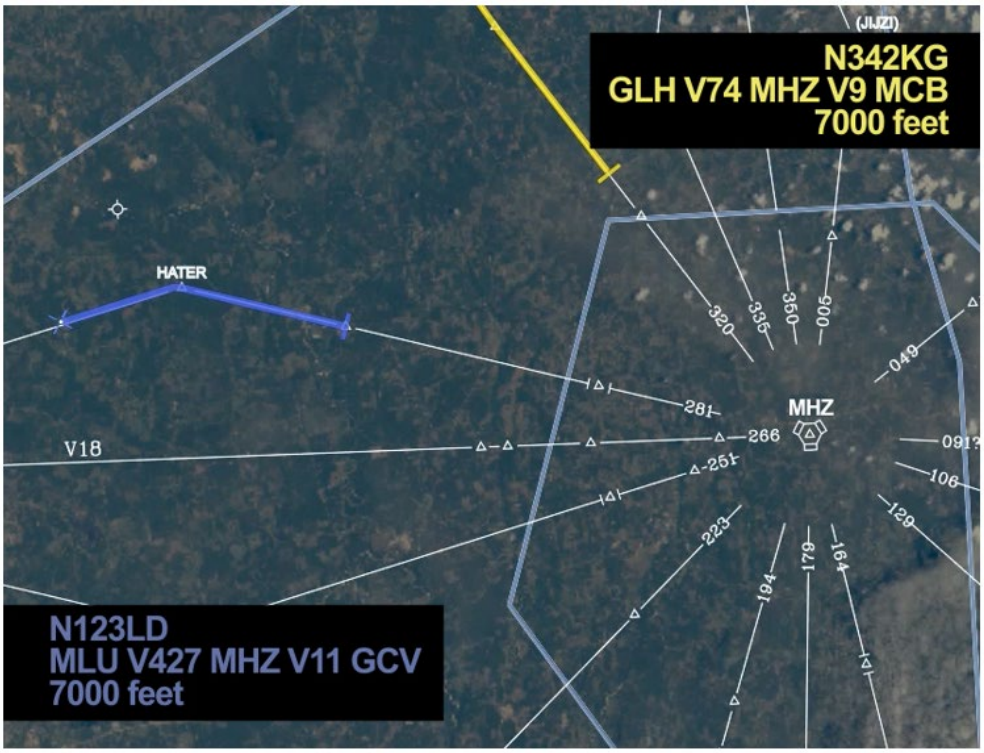
- DME Application Table
  - Used to determine the distance required for angles of divergence to clear protected airspace
    - If the divergence falls between two values, use the greater distance minima
  - Compensates for DME slant-range error
    - Slant-range is the line-of-sight distance between the aircraft and NAVAID

NOTE: Students must memorize DME Divergence Table. It will **not** be available during tests.

MINIMA ON DIVERGING RADIALS *(Continued)*

Loss of Longitudinal Separation

LOSS OF LONGITUDINAL SEPARATION



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☞ ***NOTE:*** *Introduce topic and then click image to play animation. At any point, click image to pause or resume play. Once the animation is complete, click once on image to restart.*

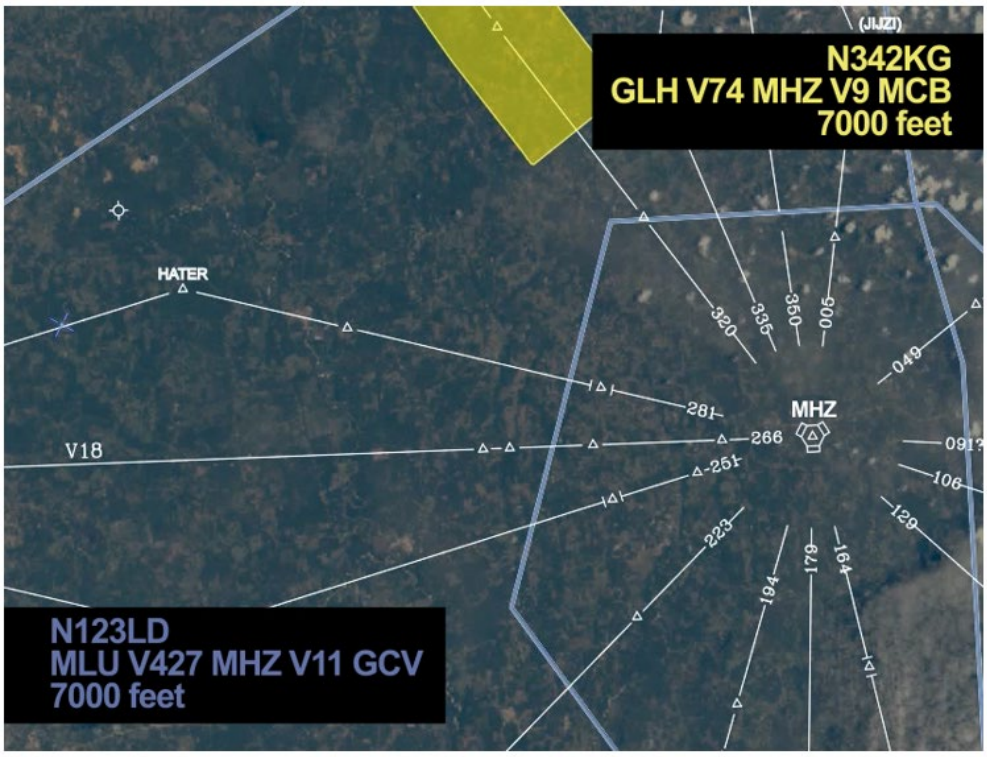
☞ ***NOTE:*** *Click outside the animation to advance to the next slide.*

NOTE: This animation is intended to illustrate loss of longitudinal separation and the requirement to issue a clearance establishing some other form of separation prior to loss of longitudinal.

MINIMA ON DIVERGING RADIALS *(Continued)*

Loss of Lateral Separation

LOSS OF LATERAL SEPARATION



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☞ ***NOTE:*** *Introduce topic and then click image to play animation. At any point, click image to pause or resume play. Once the animation is complete, click once on image to restart.*

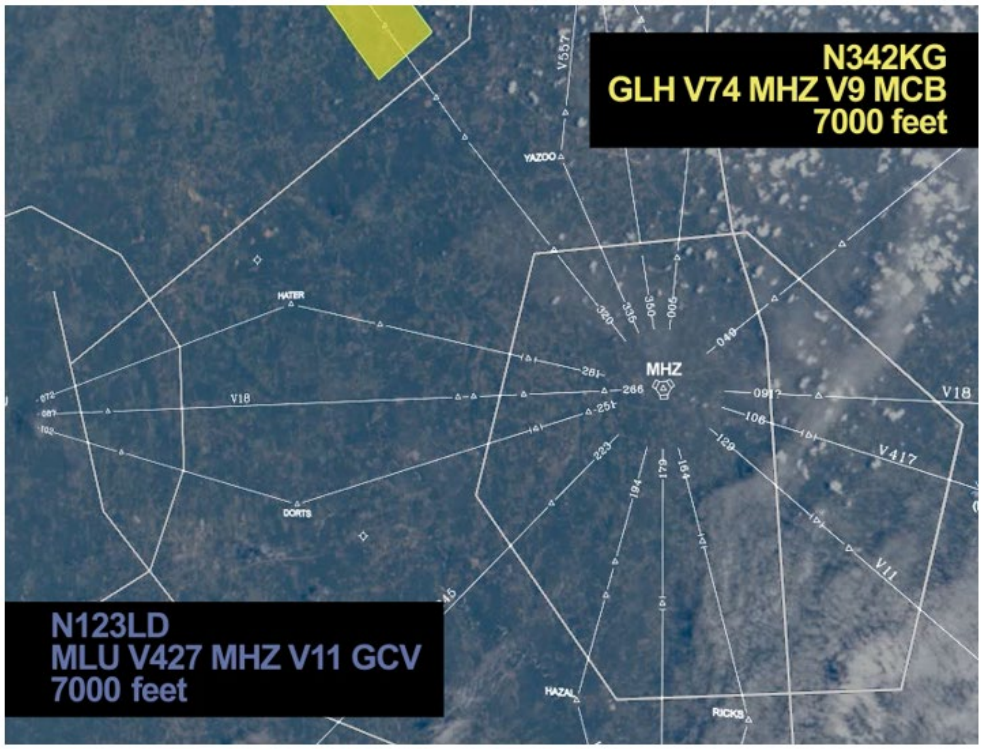
☞ ***NOTE:*** *Click outside the animation to advance to the next slide.*

NOTE: This animation is intended to illustrate loss of lateral separation.

MINIMA ON DIVERGING RADIALS *(Continued)*

Establishing Vertical Separation

ESTABLISHING VERTICAL SEPARATION WITH A CROSSING RESTRICTION



"N123LD cross 8 miles northwest Magnolia VORTAC at or above eight thousand. Climb and maintain niner thousand."

18

☞ ***NOTE:*** *Introduce topic and then click image to play animation. At any point, click image to pause or resume play. Once the animation is complete, click once on image to restart.*

☞ ***NOTE:*** *Click outside the animation to advance to the next slide.*

☞ ***NOTE:*** *Mention that this scenario assumes sector 66 has control of N123LD.*

NOTE: This animation is intended to illustrate the establishment of vertical separation at the same point where lateral separation is lost.

MINIMA ON DIVERGING RADIALS *(Continued)*

Knowledge Check

KNOWLEDGE CHECK

QUESTION: To determine a distance for lateral separation when the degrees divergence falls between two values listed in the divergence table, _____.

A. take the average of the two distances

B. use the greater distance

C. use the lesser distance

19

NOTE: Click once to show answer.

ANSWER: *B*

KNOWLEDGE CHECK

QUESTION: The width of V18, 40 miles east of MLU VORTAC, is _____ miles.

A. 4

B. 8

C. 10

20

NOTE: Click once to show answer.

ANSWER: *B*

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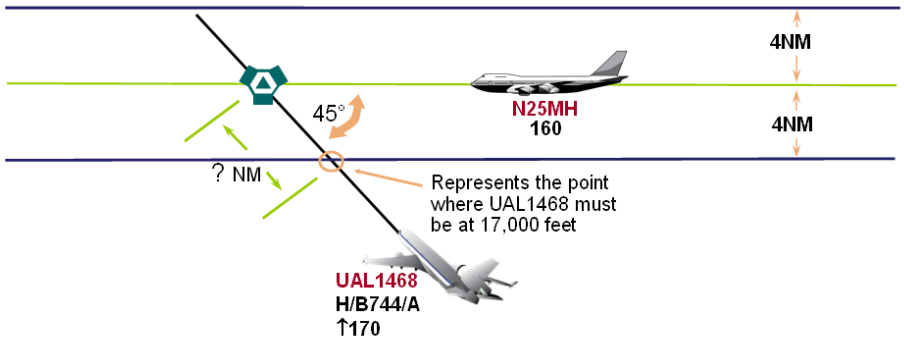
MINIMA ON DIVERGING RADIALS *(Continued)*

Knowledge Check (Cont'd)

KNOWLEDGE CHECK



QUESTION: How many miles southeast of the VORTAC must UAL1468 (DME aircraft) be at 17,000 feet to provide minimum lateral separation from N25MH?

21

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

ANSWER: *7*

EXERCISE 1: APPLYING LATERAL SEPARATION

Exercise 1

APPLYING LATERAL SEPARATION EXERCISE

Purpose: to practice applying lateral separation rules

Directions: use lateral separation rules and provided aides to answer questions

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Directions

Use your Aero Center Map to answer questions 1 through 10 in this exercise.

☞ ***NOTE:*** *Allow the students 5 minutes to write down the answers and then review the answers with the class, answering any questions they may have.*

Questions

QUESTION 1: What is the required mileage for the following diverging angles? (Use the DME Application Table on p. 13)

DIVERGING ANGLES	BELOW FL180
15 degrees	***ANSWER:*** *17*
45 degrees	***ANSWER:*** *7*

QUESTION 2: AAL42 is 40 miles west of Magnolia VORTAC on V427 at one six thousand. At this position, what airspace **must** be protected on either side of the route?

ANSWER: 4 miles

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Continued on next page

EXERCISE 1: APPLYING LATERAL SEPARATION
(Continued)

Questions (Cont'd)

QUESTION 3: Under what condition may aircraft be cleared to hold over different fixes at the same altitude?

ANSWER: *The holding pattern airspace does not overlap.*

QUESTION 4: When are aircraft established on radials of the same NAVAID that diverge by at least 15 degrees considered to be laterally separated?

ANSWER: *When either aircraft is beyond the protected airspace for the other.*

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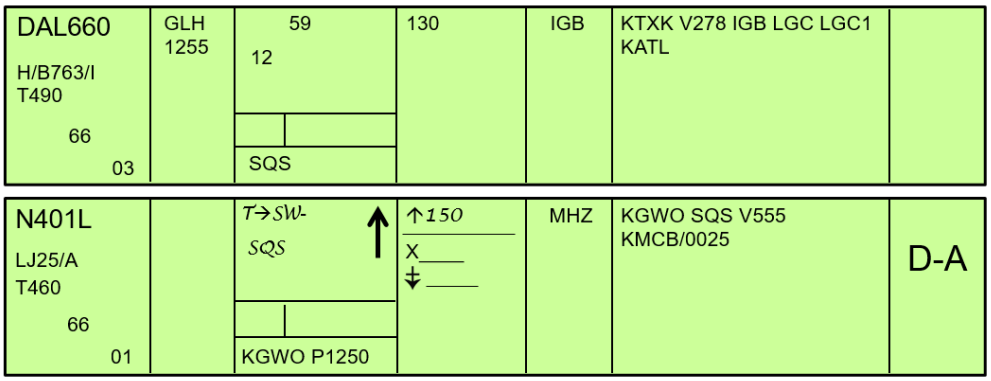
Use the following flight progress strip on DAL660 to answer questions 5 through 10.

Question 5 Progress Strips



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QUESTION 5: TIME: 1250 RUNWAY: 23

To provide separation from DAL660, N401L **must** have a crossing restriction of _____ miles southeast of SQS VORTAC at or below _____ feet.

ANSWER: *6 miles; 12,000 feet*

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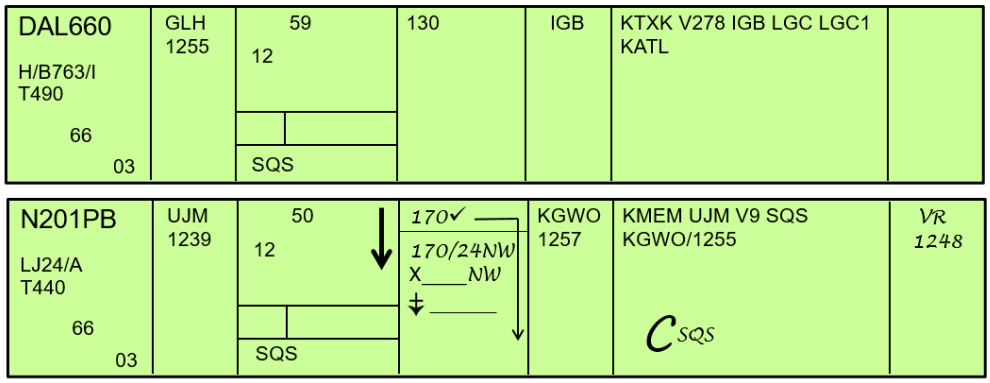
EXERCISE 1: APPLYING LATERAL SEPARATION
(Continued)

Questions (Cont'd)

Question 6 Progress Strips



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QUESTION 6: TIME: 1248

To provide separation from below DAL660, N201PB **must** have a crossing restriction of _____ miles northwest of SQS VORTAC at or below _____ feet.

ANSWER: *6 miles; 12,000 feet*

Continued on next page

EXERCISE 1: APPLYING LATERAL SEPARATION
(Continued)

Questions (Cont'd)

Question 7 Progress Strips

DAL660 H/B763/I T490 66 03	GLH 1255	59 12 SQS	130	IGB	KTXK V278 IGB LGC LGC1 KATL	
N401L LJ25/A T460 66 01		T→SW- SQS ↑ KGWO P1250	↑150 X____ ↡____	MHZ	KGWO SQS V555 KMCB/0025	D-A

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QUESTION 7: To provide lateral separation from DAL660, N401L **must** have a crossing restriction of _____ miles southeast of SQS VORTAC at or below _____ feet.

ANSWER: *6 miles; 12,000 feet*

Question 8 Progress Strips

DAL660 H/B763/I T490 66 03	GLH 1255	59 12 SQS	130	IGB	KTXK V278 IGB LGC LGC1 KATL	
N751L LJ55/A T465 66 02	MHZ 1249	57 12 SQS	130✓	HLI	KMCB V555 SQS V11 HLI M41/1312	

28

QUESTION 8: When will separation cease to exist between N751L and DAL660?

ANSWER: *1249*

☞ ***NOTE:*** *Discuss the two options that will provide lateral separation:*

1. *If DAL660 is moved, the restriction would be to cross 5 miles NW SQS (at or above 140 or at or below 120)*
2. *If N751L is moved, the restriction would be to cross 6 miles SE SQS (at or above 140 or at or below 120)*

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EXERCISE 1: APPLYING LATERAL SEPARATION
(Continued)

Questions (Cont'd)

Question 9 Progress Strips

DAL660 H/B763/I T490 66 03	GLH 1255	59 12 SQS	130	IGB	KTXK V278 IGB LGC LGC1 KATL	
N50JC GLF3/A T450 66 02	MHZ 1249	57 12 SQS	↑160 X____ ↟ ____	UJM	KJAN MHZ V9 UJM KMEM/1312	

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QUESTION 9: TIME: 1255 RUNWAY: 18

To provide lateral separation from DAL660, N50JC **must** have a crossing restriction of _____ miles southeast of SQS VORTAC at or above _____ feet.

ANSWER: *6 miles; 14,000 feet*

Question 10 Progress Strips

A25817 BE55/B T230 66 02	STUEE 0040	57 12 58 MHZ	90↓60	KJAN	KMLU V18 MHZ KJAN	H NW
N256B BE65/A T160 66 01		 KJAN P0100	↑90 X____ ↡ ____	KHEZ	KJAN MHZ V245 KHEZ/0030	

30

QUESTION 10: TIME: 0050

To provide separation from A25817's holding pattern at MHZ, N256B **must** be restricted to cross _____ miles southwest of MHZ VORTAC at or below _____ feet.

ANSWER: *9 miles; 5,000 feet*

LATERAL SEPARATION FROM SPECIAL USE AIRSPACE

Conflict with MOA

CONFLICT WITH MOA

"N342KG Cleared to Texarkana airport via direct Sidon Victor 278. Climb and maintain one zero thousand.
B-G."

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☞ ***NOTE:*** *Introduce topic and then click image to play animation. At any point, click image to pause or resume play. Once the animation is complete, click once on image to restart.*

☞ ***NOTE:*** *Click outside the animation to advance to the next slide.*

NOTE: This animation is intended to illustrate loss of separation between GWO departure and the CBM MOA.

LATERAL SEPARATION FROM SPECIAL USE AIRSPACE *(Continued)*

Crossing Restriction to Miss MOA

CROSSING RESTRICTION TO MISS MOA

"N342KG cleared to Texarkana Airport via direct Sidon Victor 278. Cross eight miles northeast Sidon VORTAC at or below seven thousand. Climb and maintain one zero thousand. B-G."

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☞ ***NOTE:*** *Introduce topic and then click image to play animation. At any point, click image to pause or resume play. Once the animation is complete, click once on image to restart.*

☞ ***NOTE:*** *Click outside the animation to advance to the next slide.*

☞ ***NOTE:*** *Discuss types of airspace that controllers need to tell aircraft to avoid (i.e., restricted airspace, holding patterns, etc.).*

NOTE: This animation is intended to illustrate the crossing restriction required to separate a GWO departure from the CBM MOA.

EXERCISE 2: DEMONSTRATING LATERAL SEPARATION BEST PRACTICES

Exercise 2

DEMONSTRATING LATERAL SEPARATION BEST PRACTICES EXERCISE

Purpose: to practice applying lateral separation rules

Directions: complete the flight strips based on the information provided by your instructor

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Directions

In this exercise, you will practice stripmarking and phraseology to ensure lateral separation.

Your instructor will provide five separate sets of flight progress strips and lead the class through a discussion to determine the correct solution, phraseology, and stripmarking for each scenario.

☞ ***NOTE:*** *This exercise requires five separate sets of lateral separation strips (LAT1 through LAT5) for every student.*

☞ ***NOTE:*** *Tell students they can use Appendix A, ZAE Holding Patterns, or their Aero Center map to complete this exercise.*

Conduct this exercise using one set of strips at a time. Use the board to display the strips a few at a time. Lead the class through a discussion to determine the correct solution, phraseology, and stripmarking for each scenario. Ensure the students have the correct stripmarking prior to moving to the next scenario.

EXERCISE 2: DEMONSTRATING LATERAL SEPARATION BEST PRACTICES SCENARIOS 1-5

34-43

EXERCISE 2: DEMONSTRATING LATERAL SEPARATION BEST PRACTICES *(Continued)*

Recommend-ed Solutions

SCENARIO 1:

VKS

MUSIC41 C130/A T300 66 01	MLU 1624	34 16 HATER	130	MHZ	KBAD./.MLU V427 MHZ V18 KMEI	
N721P C441/A T250 66 01	MLU 1620	25 16 25 STUEE	150	MHZ	KDTN./.MLU V18 MHZ KHKS/1647	

MHZ

N721P C441/A T250 66 02	STUEE 1625	44 16 ↓ MHZ	150	HKS	KDTN./.MLU V18 MHZ KHKS /1647	
MUSIC41 C130/A T300 66 02	HATER 1634	44 16 MHZ	130	MEI	KBAD./.MLU V427 MHZ V18 KMEI	

RECOMMENDED SOLUTION: *N721P is a KJAN arrival on V18 at 150 and **must** be cleared to 60. MUSIC41 is on V427 at 130 and estimating MHZ VORTAC at the same time as N721P. Degrees divergence between V18 and V427 is 15 degrees. N721P should cross 17 miles SW MHZ VORTAC at or below 120 descending to 60 to meet lateral and vertical separation requirements at MHZ. At MLU, N721P should maintain 150 until 17 miles NE MLU VORTAC to meet vertical and lateral separation requirements. A restriction to X31 NE MLU VORTAC at or above 70 is also necessary to miss MLU APCH airspace.*

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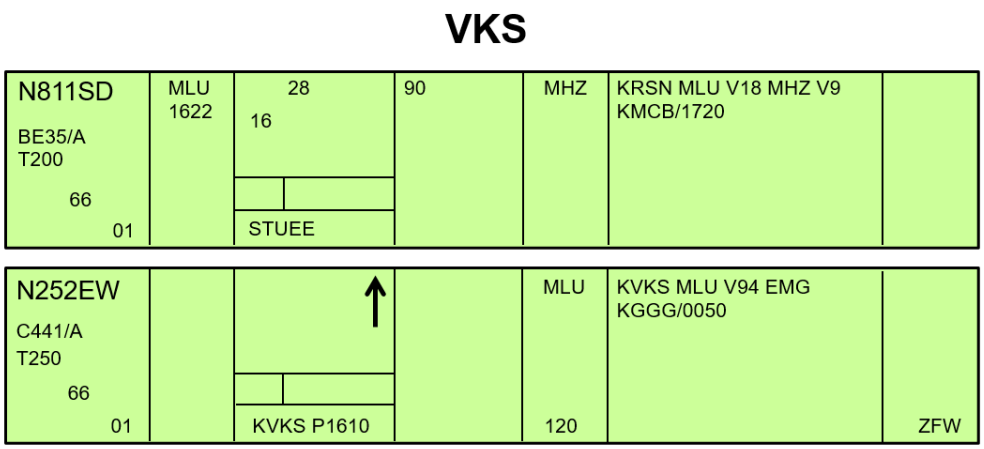
EXERCISE 2: DEMONSTRATING LATERAL SEPARATION BEST PRACTICES *(Continued)*

Recommend-ed Solutions (Cont'd)

SCENARIO 2:



RECOMMENDED SOLUTION: *N252EW should be given a heading to join V417 (solicit) and a crossing restriction to miss MLU APCH (x 31SE MLU VORTAC at or above 70) and N811SD at MLU (x 17 SE MLU VORTAC at or above 100). Coordinate climbing to 120 and V417 with MLU LO.*

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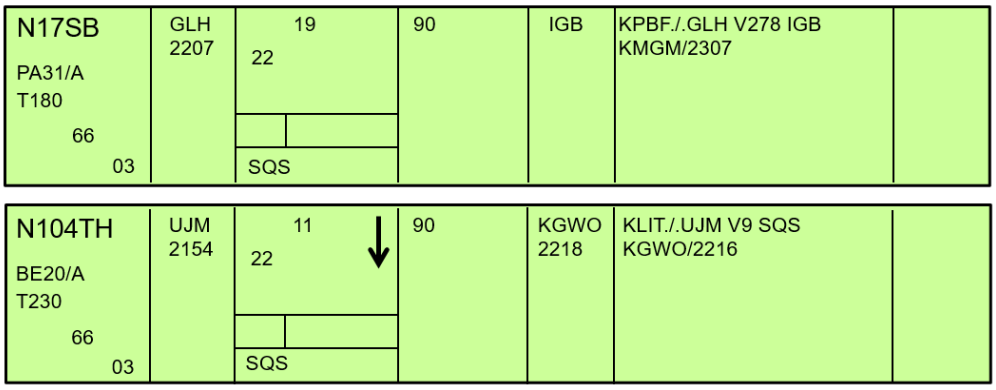
EXERCISE 2: DEMONSTRATING LATERAL SEPARATION BEST PRACTICES *(Continued)*

Recommend-ed Solutions (Cont'd)

SCENARIO 3A:



RECOMMENDED SOLUTION: *Since both aircraft are at the same altitude and have less than 10 minutes separation at SQS VORTAC, red Ws are required on the strips. N104TH lands at KGWO and should be descended and N17SB is the conflicting aircraft whose protected vertical and lateral airspace **must** be missed. The separation needs to be established before 2209 (or loss of longitudinal separation occurs) and NW of SQS VORTAC for N104TH. The restriction would be for N104TH to cross 6 miles NW SQS VORTAC at or below 80 to miss N17SB and x SQS VORTAC at or below 70 to miss the CMB3 MOA then cleared for APCH. Coordination with D67 and GWO Tower is required before issuing clearance. Ensure N104TH is in 66 airspace before issuing clearance.*

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EXERCISE 2: DEMONSTRATING LATERAL SEPARATION BEST PRACTICES *(Continued)*

Recommend-ed Solutions (Cont'd)

SCENARIO 3B:

SQS

N17SB PA31/A T180 66 03	GLH 2207	19 22 SQS	70	IGB	KPBF./.GLH V278 IGB KUBS/2250	
N104TH BE20/A T230 66 03	UJM 2154	11 22 SQS	90	KGWO 2218	KLIT./.UJM V9 SQS KGWO/2216	

RECOMMENDED SOLUTION: *Since the aircraft are at two different altitudes,* ***no*** *red Ws are required. N104TH lands at KGWO and* ***must*** *be descended below 60 to miss N17SB and then cleared for APCH. The crossing restriction to x 6NW SQS VORTAC at or below 60 also misses the CBM3 MOA. Coordination with D67 and GWO Tower is required before issuing clearance. Ensure N104TH is in 66 airspace before issuing clearance.*

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Continued on next page

EXERCISE 2: DEMONSTRATING LATERAL SEPARATION BEST PRACTICES *(Continued)*

Recommend-ed Solutions (Cont'd)

SCENARIO 3C:

SQS

N17SB PA31/A T180 66 03	GLH 2207	19 22 SQS	90	HLI	KPBF./.GLH V278 SQS V535 M41/2252	
N104TH BE20/A T230 66 03	UJM 2154	11 ↓ 22 SQS	90	KGWO 2218	KLIT./.UJM V9 SQS KGWO/2216	

RECOMMENDED SOLUTION: *Since both aircraft are at the same altitude and have less than 10 minutes separation at SQS VORTAC, red Ws are required on strips. N104TH lands at KGWO and should be descended and N17SB is the conflicting aircraft whose protected vertical and lateral airspace **must** be missed. The separation needs to be established before 2209 (or loss of longitudinal separation occurs) and NW of SQS VORTAC for N104TH. The lateral separation necessary would be 11 miles NW SQS VORTAC - N104TH is on the SQS341R and N17SB is on SQS273R but owns the SQS007R as well. The 11 mile restriction is from the divergence of the 341R and the 007R. In addition to this restriction, N104TH **must** be issued a restriction to cross SQS VORTAC at or below 70 to miss the CBM3. Coordination with D67 and GWO Tower is required before issuing clearance. Ensure N104TH is in 66 airspace before issuing clearance.*

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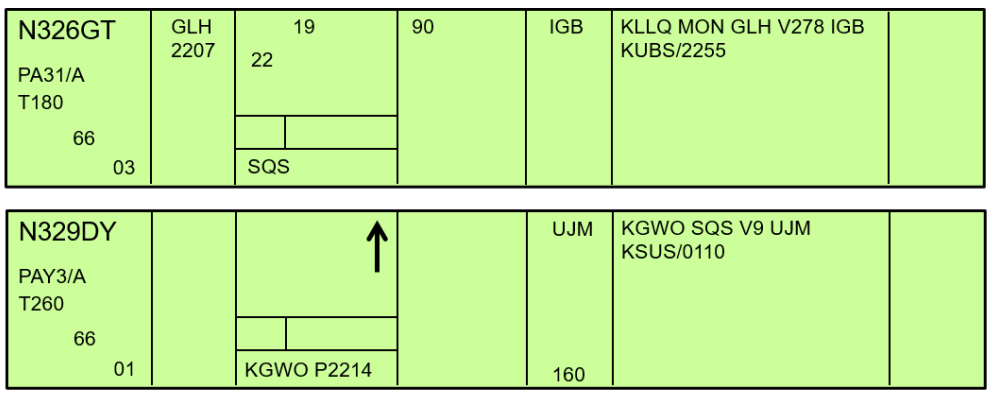
EXERCISE 2: DEMONSTRATING LATERAL SEPARATION BEST PRACTICES *(Continued)*

Recommend-ed Solutions (Cont'd)

SCENARIO 4A:



RECOMMENDED SOLUTION: *N329DY is a KGWO departure requesting 160. N326GT is in the way at 90 over SQS VORTAC. N329DY is the aircraft being moved and N326GT is the conflicting aircraft whose protected vertical and lateral airspace **must** be missed. N329DY needs to be at or below 80 NW of SQS VORTAC to satisfy vertical separation. The lateral separation necessary would be 6 miles NW SQS VORTAC – N329DY is on the SQS341R and N326GT is on SQS273R but owns the SQS086R as well. The 6 mile restriction is from the divergence of the 273R and the 341R. In addition to this restriction, N329DY **must** first be issued a restriction to cross 8 miles NE of SQS VORTAC at or below 70 to miss the CBM3 MOA.*

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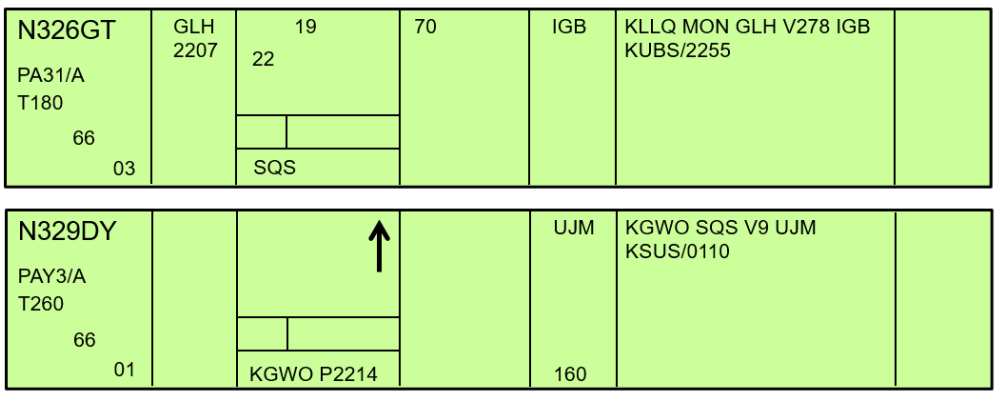
EXERCISE 2: DEMONSTRATING LATERAL SEPARATION BEST PRACTICES *(Continued)*

Recommend-ed Solutions (Cont'd)

SCENARIO 4B:



RECOMMENDED SOLUTION: *N329DY is a KGWO departure requesting 160. N326GT is in the way at 70 over SQS VORTAC. N329DY is the aircraft being moved and N326GT is the conflicting aircraft whose protected vertical and lateral airspace **must** be missed. N329DY needs to be at or below 60 NW of SQS VORTAC to satisfy vertical separation. The lateral separation necessary would be 6 miles NW SQS VORTAC – N329DY is on the SQS 341R and N326GT is on SQS273R but owns the SQS086R as well. The 6 mile restriction is from the divergence of the 273R and the 341R. This restriction also provides separation from the CBM3 MOA.*

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EXERCISE 2: DEMONSTRATING LATERAL SEPARATION BEST PRACTICES *(Continued)*

Recommend-ed Solutions (Cont'd)

SCENARIO 5A:

MHZ

MES2230 E120/A T280 66 03	GLH 0000	15 00 MHZ	110	MCB	KLIT./.GLH V74 MHZ V555 MCB KMSY	
ENY240 SF34/A T270 66 01	HEZ 2348	05 00 MHZ	130	KJAN	KHOU./.HEZ V245 MHZ KJAN	

RECOMMENDED SOLUTION: *Since aircraft are at 2 different altitudes,* ***no*** *red Ws are required. ENY240 lands at KJAN and* ***must*** *be descended to 60 through the altitude of MES2230. Although there are 10 minutes at MHZ VORTAC, the separation is decreasing because the first aircraft at MHZ VORTAC is the arrival (ENY240). ENY240 is the aircraft being moved and MES2230 is the conflicting aircraft whose protected vertical and lateral airspace* ***must*** *be missed. ENY240 needs to be at or below 100 by MHZ VORTAC to provide minimum separation. Ensure ENY240 is in 66 airspace before issuing restriction.*

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EXERCISE 2: DEMONSTRATING LATERAL SEPARATION BEST PRACTICES *(Continued)*

Recommend-ed Solutions (Cont'd)

SCENARIO 5B:

MHZ

MES2230 E120/A T280 66 03	GLH 0000	15 00 MHZ	110	MCB	KLIT./.GLH V74 MHZ V555 MCB KMSY	ZHU
ENY240 SF34/A T270 66 01	HEZ 2348	06 00 MHZ	110	ZAMMA	KHOU./.HEZ V245 IGB KGTR	

ASSUME NOW: *ENY240 is an overflight at 110 with a MHZ time of 0006.*

RECOMMENDED SOLUTION: *Since both aircraft are at the same altitude and have less than 10 minutes separation at MHZ VORTAC, red Ws are required on strips. MES2230 will be IAFDOF after MHZ VORTAC, so the best solution would be to either climb MES2230 to 120 or descend to 100. Because MES2230 is the aircraft being moved, that makes ENY240 the conflicting aircraft whose protected vertical and lateral airspace* ***must*** *be missed. The separation needs to be established before 0005 (or when loss of longitudinal separation occurs) and NW of MHZ VORTAC for MES2230. The restriction would be for MES2230 to cross 6 miles NW MHZ VORTAC @ ___ (100 or 120). Degrees divergence of 6 miles is derived from MES2230 on V74 (320R) and ENY240 on V245 NE of MHZ VORTAC (049R). ENY240 also owns V245 SW of MHZ VORTAC (223R), but that divergence mileage is 5 miles, so the other radial (049R) would be used since the mileage is greater.*

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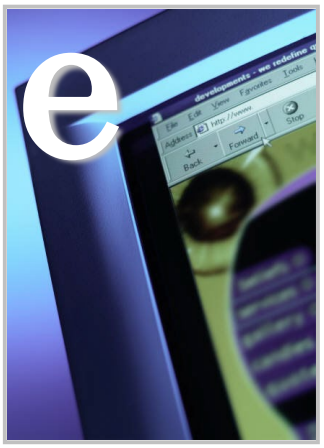
ACTIVITY: ENSURING SEPARATION

Activity

ENSURING SEPARATION ACTIVITY



Purpose: to identify and resolve conflictions by applying lateral separation rules

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☞ **NOTE:** Have the students access the IET eLearning menu and select the activity for Lesson 18

Description

In this activity, you will review flight scenarios with conflictions and then select the appropriate solutions to ensure lateral separation.

Directions

Access the IET eLearning menu. Select **Lesson 18 – Lateral Separation**. Click on the title to launch the **Ensuring Separation** activity.

Time Allotted

45 minutes

☞ **NOTE:** Refer to Appendix B for the Instructor Key for this eLearning activity.

☞ ***NOTE:*** *Remember to disable the eLearning capability after students complete the eLearning.*

IN CONCLUSION

Lesson Review

LESSON REVIEW

The following topics were covered in this lesson:

- Lateral separation methods
- Protected airspace
- Minima on diverging radials

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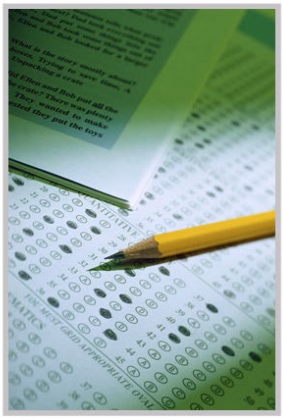
☞ **NOTE:** Teach from graphic. Review and elaborate briefly on the topics covered in this lesson.

End-of-Lesson Test

END-OF-LESSON TEST

Lateral Separation



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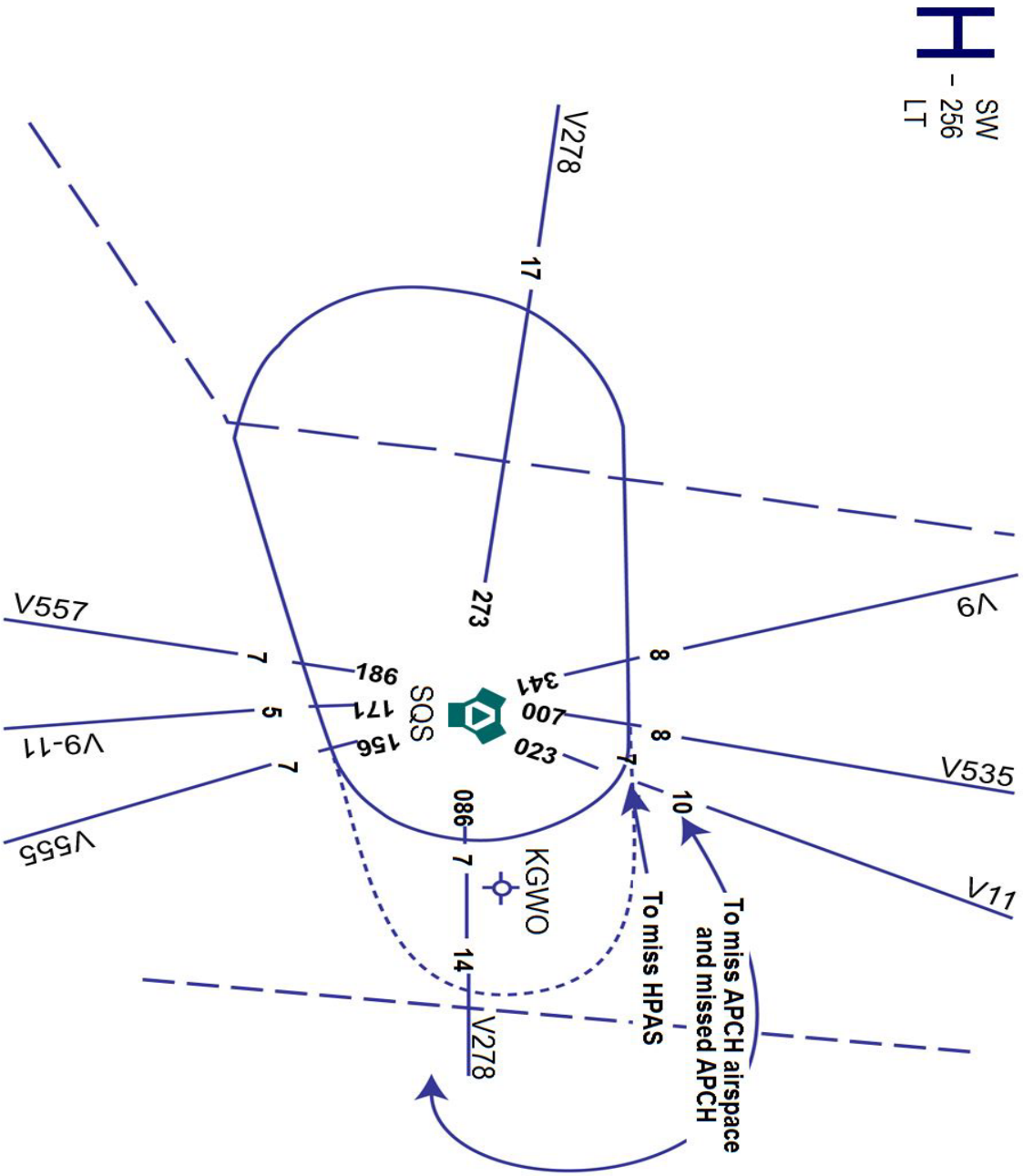
Part-Task Lab

You will now complete the Lateral Separation part-task lab using LATPtask strips.

APPENDIX A: ZAE HOLDING PATTERNS



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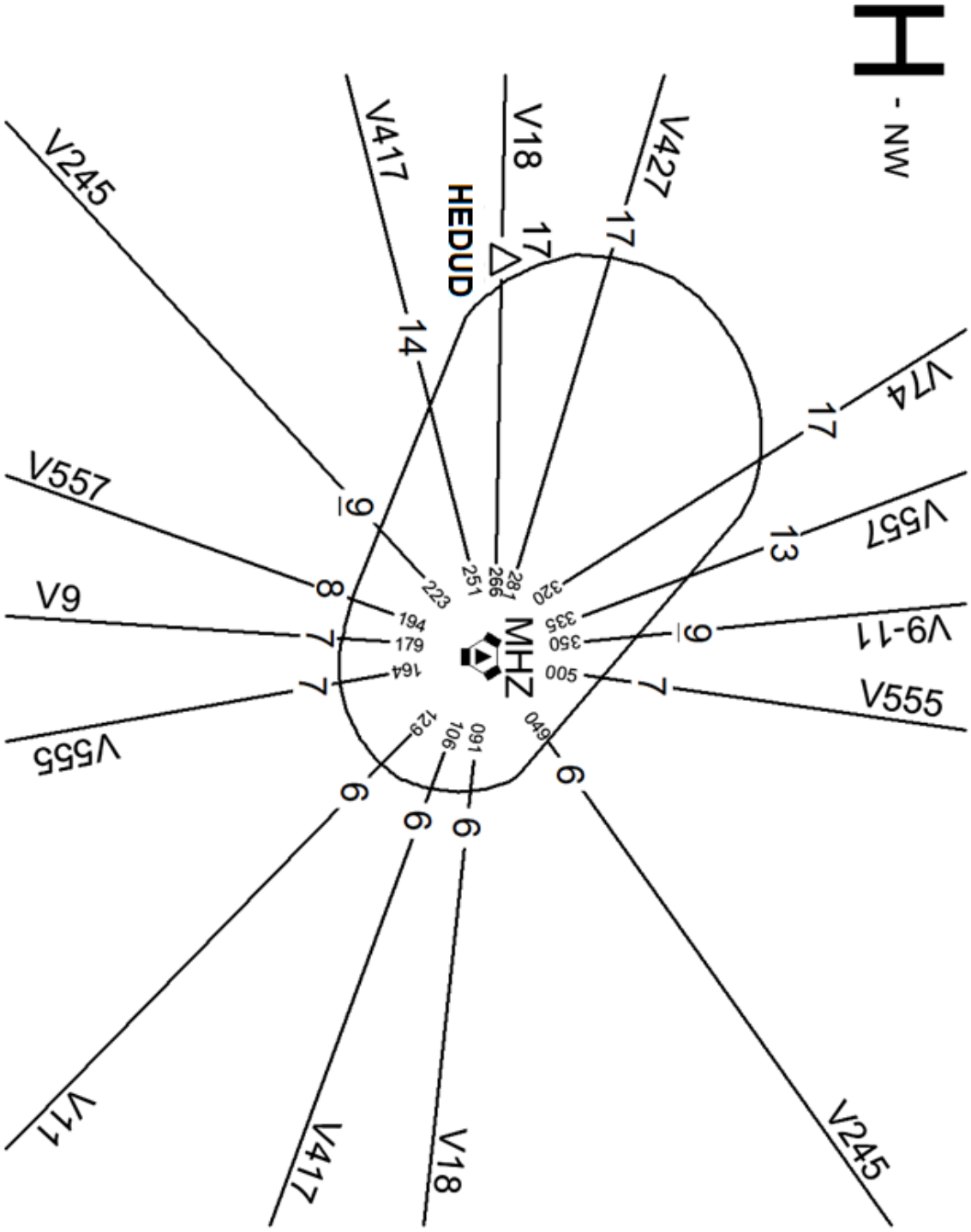
APPENDIX A: ZAE HOLDING PATTERNS *(Continued)*



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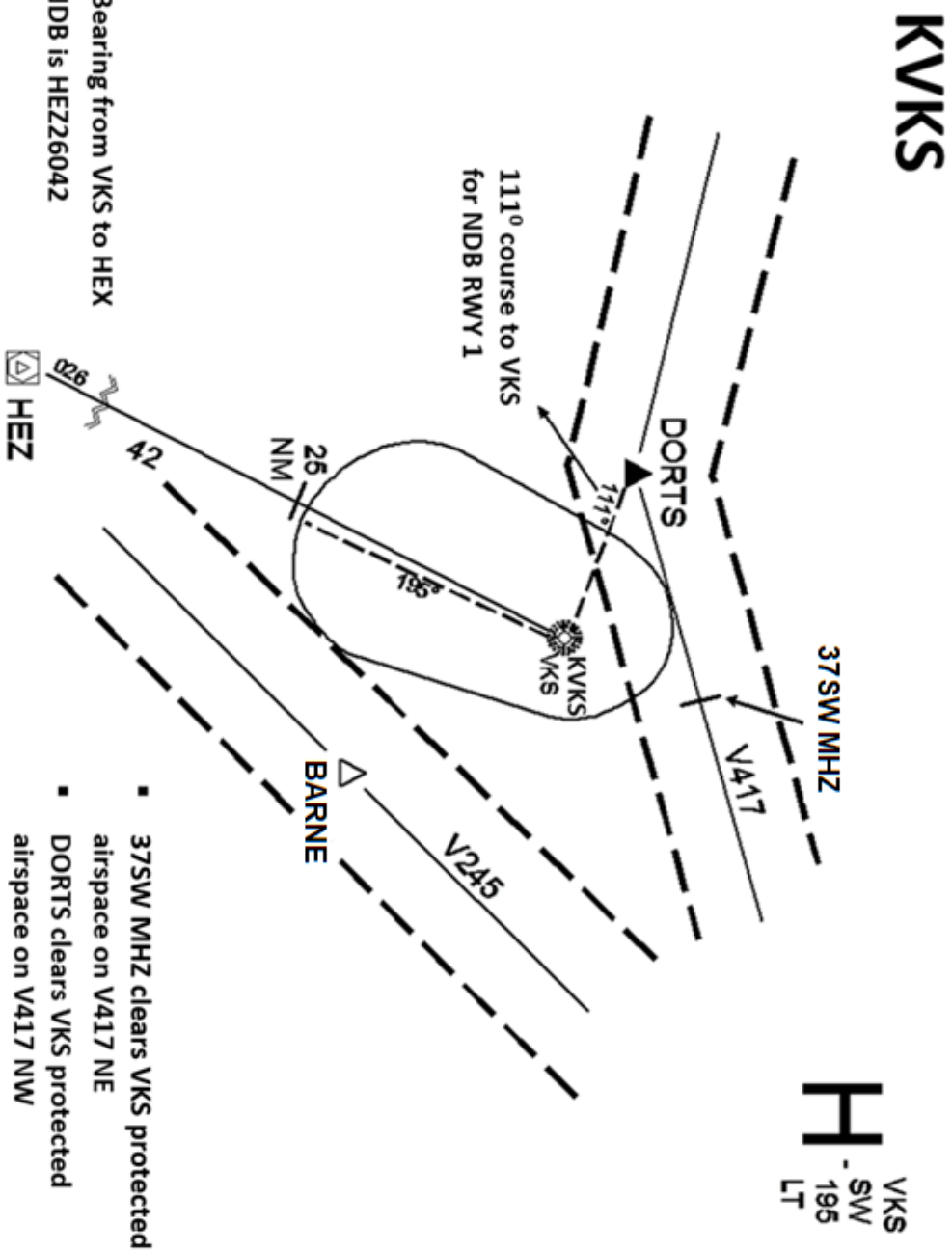
APPENDIX A: ZAE HOLDING PATTERNS *(Continued)*



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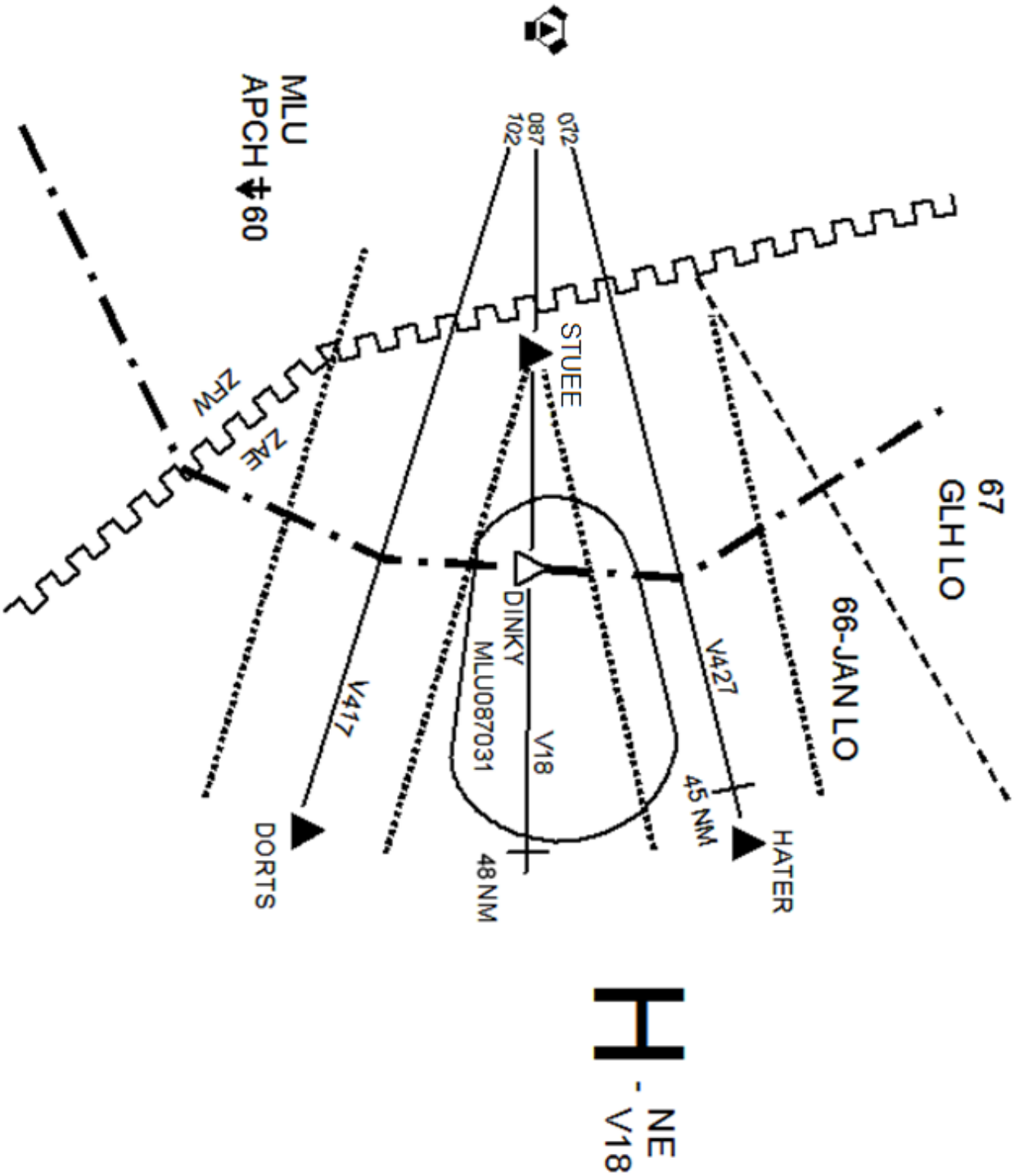
APPENDIX A: ZAE HOLDING PATTERNS *(Continued)*



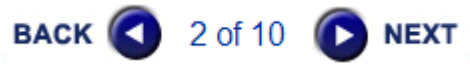
APPENDIX B: INSTRUCTOR KEY FOR ELEARNING ACTIVITY

Purpose

This document serves as a guide for facilitating the eLearning activities of the Initial En Route Training course and provides an overview of the objectives and content of the eLearning activities within this lesson.

Navigation

- To navigate within the eLearning activities, a Navigation Bar is positioned at the top right of the page and contains the following options:
  - MAIN MENU: Allows students to access a main menu listing all of the eLearning activities
  - RESOURCES: Allows students to access additional resources, including:
    - A **Glossary** link
    - A **References** link
    - A **Help** link
  - EXIT: Allows students to exit from the eLearning activity at any time



- To navigate within an activity, a navigation tab is also positioned near the top right of the screen, just below the navigation bar.
  - The navigation tab contains the following buttons:
    - BACK: When active, returns students to the previous page
    - NEXT: When active, allows students to advance to the next page

NOTE: Inactive BACK and NEXT buttons indicate students are at the beginning or at the end of a lesson.

Navigation Tips

- To refresh a page or reset an activity, press **F5**.
- You can advance to a specific page in the activity without completing the activity. Click the **NEXT** or **BACK** buttons until the page is displayed.

APPENDIX B: INSTRUCTOR KEY FOR ELEARNING ACTIVITY (*Continued)*

Lesson Title Lesson 18 Lateral Separation

eLearning Objective The objective of the eLearning activity is to reinforce minima requirements for lateral separation and to issue clearances that ensure all required separation.

eLearning Activity

⊙ Lesson 18 contains the following eLearning activity:

- Ensuring Separation

Activity: Ensuring Separation

Activity Description In the first part of this activity, students are presented with flight scenarios and **must** answer multiple choice questions regarding the time the instructions **must** be issued to ensure longitudinal separation. They then choose from the displayed flight strips which crossing restriction will ensure separation. The correct instructions are illustrated using 3-D animations.

In the second part, students are presented with flight scenarios and **must** select the mileage, direction, and fix from drop-down lists to ensure separation of the aircraft in conflict. A graphic illustration of the crossing restriction is displayed to support the visualization of the correct response.

In the final part, students are presented with flight scenarios and possible solutions to ensure lateral separation. Students **must** answer either yes or **no** as to whether the possible solution ensures separation. A written explanation of the correct answer is provided.

Continued on next page

APPENDIX B: INSTRUCTOR KEY FOR ELEARNING ACTIVITY (*Continued)*

Activity Content

- Page 1 contains an activity introduction.
- Pages 2-5 contain multiple choice questions regarding loss of separation and multiple choice questions regarding ensuring separation.
- Pages 6-10 contain a series of drop-down menus in which students **must** select the appropriate crossing restrictions.
- Pages 11-22 contain a series of flight progress strips in which students **must** determine the appropriate crossing restriction by answering either yes or **no**.

Activity Specifics

- Multiple choice questions and 3-D animations
  - On pages 2-5, students have one attempt to answer a question regarding loss of lateral separation and then they have two attempts to choose the appropriate answer that will ensure separation. Students will be shown a 3-D animation illustrating the correct answer. Additionally, students will have the ability to click the tabs for the incorrect answers for explanations as to why that answer is incorrect.
  - Students have access to the DME chart and ZAE map.
- Drop-down menu questions
  - On pages 6-10, students have two attempts to select the appropriate solution for crossing restrictions before they are given the correct answer. The correct answer includes a graphic illustration.
  - Students have access to the DME chart and ZAE map.
- Yes/**No** questions
  - On pages 11-22, students have one attempt to select the appropriate solution for crossing restrictions before they are given the correct answer.