Federal Aviation Administration

Initial En Route Qualification Training

Instructor
Lesson 14
Holding Procedures

Course 50148001

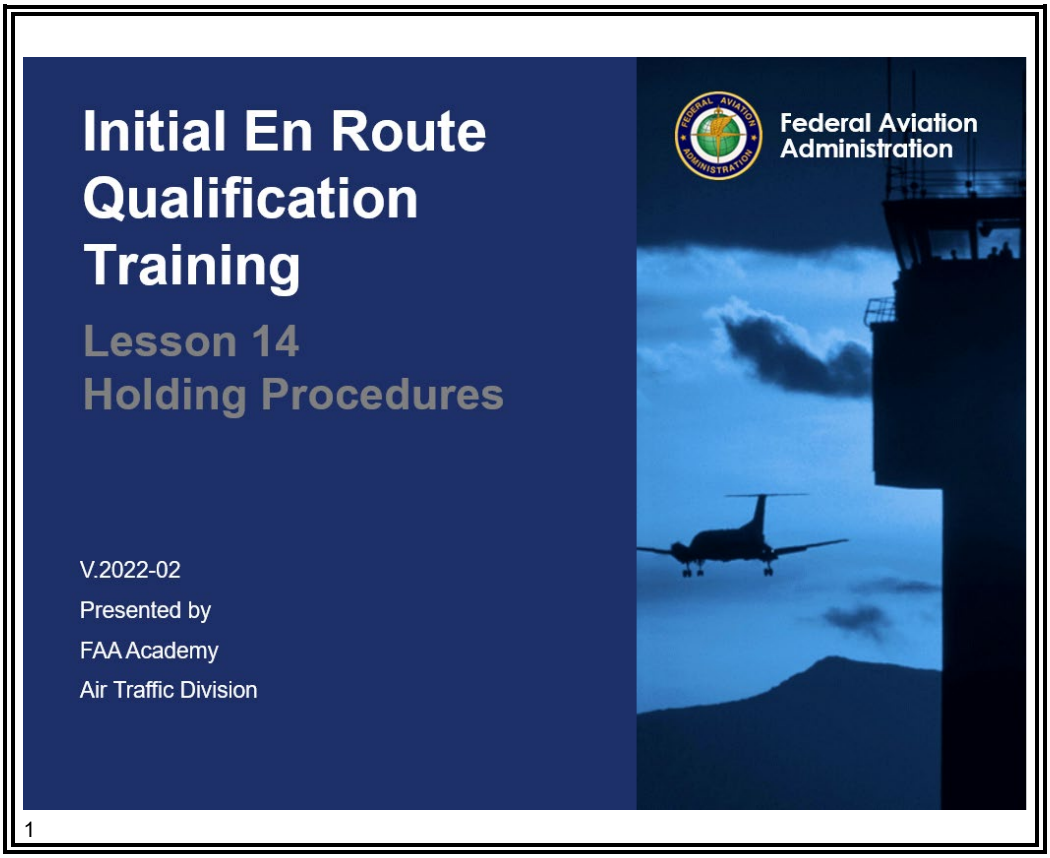
LESSON PLAN DATA SHEET

COURSE NAME:	INITIAL EN ROUTE QUALIFICATION TRAINING
COURSE NUMBER:	50148001
LESSON TITLE:	HOLDING PROCEDURES
DURATION:	7+00 HOURS
DATE REVISED:	2022-02
VERSION:	V.2022-02
REFERENCE(S):	FAA ORDER JO 7110.65, AIR TRAFFIC CONTROL; FAA ORDER JO 8260.3, HOLDING PATTERN CRITERIA; AERONAUTICAL INFORMATION MANUAL (AIM)
HANDOUT(S):	hold.f2k - HOLDING EXERCISE STRIPS
EXERCISE(S)/ ACTIVITY(S):	EXERCISE: PRACTICING WITH HOLDING STRIPS
END-OF-LESSON TEST:	YES *(REFER TO ELT14.PDF)*
PERFORMANCE TEST:	NONE
MATERIALS:	NONE
OTHER PERTINENT INFORMATION:	

☞ ***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

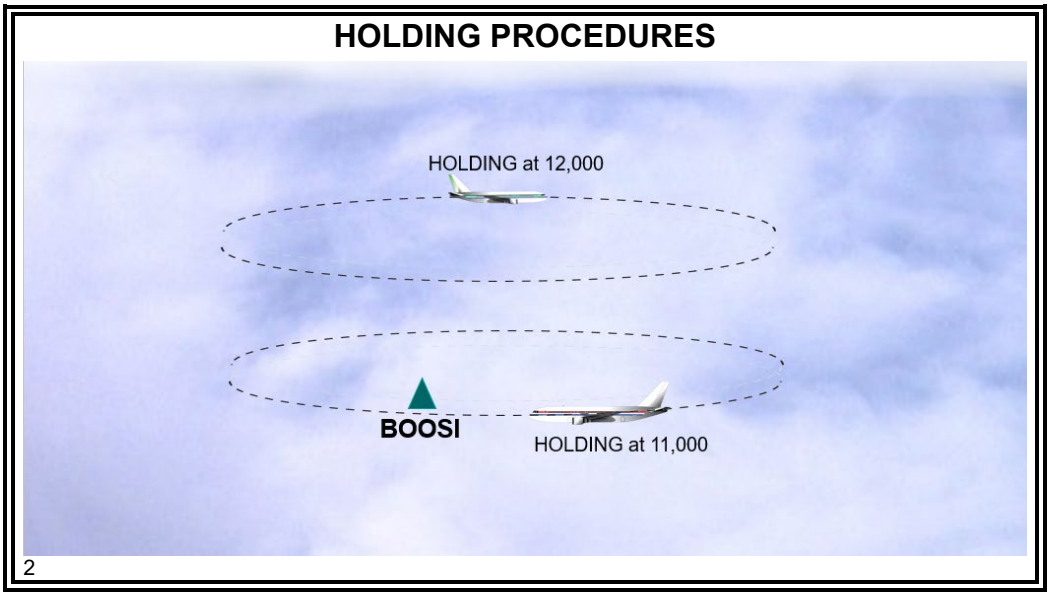
Gain Attention



You have learned procedures for issuing departure clearances, and making altitude and route assignments. However, there are times, such as for weather and traffic saturation, when holding aircraft is required to promote safe and efficient traffic flow. You will now learn the procedures for issuing holding instructions.

INTRODUCTION *(Continued)*

Opening Scenario



Holding is one of the tools used by controllers to effectively separate delayed aircraft, sequence traffic for terminal arrivals, and maintain a safe and orderly sector. Holding is most commonly used for weather delays, in-trail spacing, and managing sector volume.

Purpose

In this lesson we will discuss when and how to issue holding instructions. We will cover phraseology and stripmarking procedures used in various holding situations. In addition, we will discuss time requirements for issuing holding instructions and clearance beyond a clearance limit.

INTRODUCTION *(Continued)*

Lesson Objectives

LESSON OBJECTIVES

- On an End-of-Lesson Test and in accordance with FAA Orders JO 7110.65 and 8260.3, you will identify rules, procedures, and phraseology for holding aircraft.

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☞ ***NOTE:*** *Teach from graphic.*

HOLDING

Applications

- ⊙ Separation
  - En route
  - Arrivals/departures
- ⊙ Sequencing
- ⊙ Weather/meteorological conditions
- ⊙ Traffic Management
  - **Traffic management initiatives** are measures designed to adjust the flow of traffic into a given airspace, along a given route, or bound for a given airport to ensure the most effective utilization of the airspace.
  - Function of Traffic Management Unit (TMU)

☞ ***NOTE:*** *TMU will be covered in more detail in a later lesson.*

Terms and Definitions
JO 7110.65, Pilot/Controller Glossary

📖 A **hold procedure** is a predetermined maneuver, which keeps aircraft within a specified airspace while awaiting further clearance from air traffic control.

📖 A **holding fix** is a specified fix identifiable to a pilot by NAVAIDs or visual reference to the ground used as a reference point in establishing and maintaining the position of an aircraft while holding.

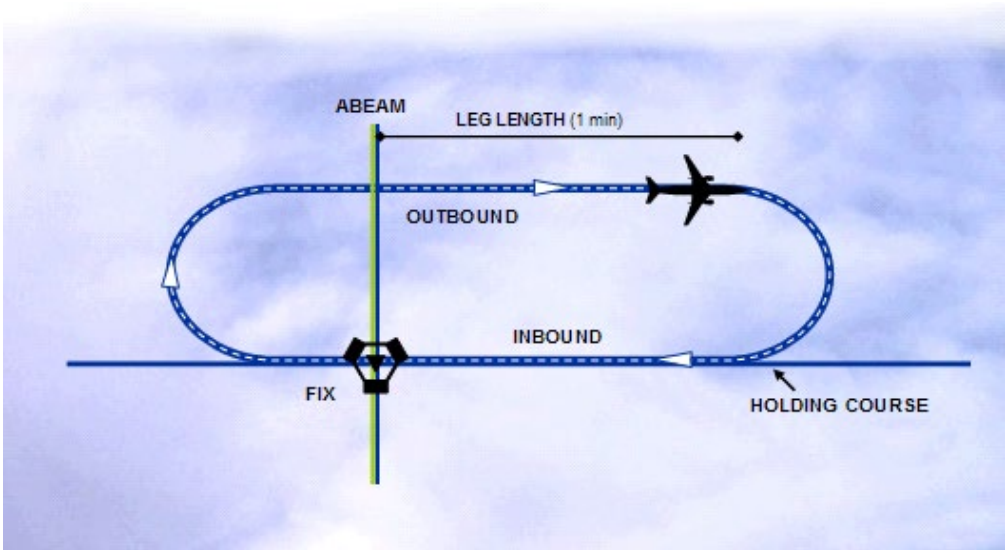
📖 **Expect Further Clearance (EFC) (time)** is the time a pilot can expect to receive clearance beyond a clearance limit.

☞ ***NOTE:*** *Inform the students that they **must** update EFC time before it runs out when an additional delay is expected.*

HOLDING PATTERNS

Standard Procedures
AIM, par. 5-3-8;
JO 7110.65,
Pilot/Controller Glossary

STANDARD PROCEDURES



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- ⊙ Turns
  - Standard pattern
    - – Right turns
  - Nonstandard pattern
    - – Left turns
- ⊙ Leg length
  - At or below 14,000 feet MSL
    - – 1 minute
  - Above 14,000 feet MSL
    - – 1 ½ minutes

☞ ***NOTE:*** *Leg length may be increased if pilot requests and controller deems appropriate.*

HOLDING PATTERNS *(Continued)*

Templates
JO 8260.3

- How much airspace is protected for an aircraft in holding is determined by:
  - Aircraft speed – the faster the speed the more airspace needed
    - Civil aircraft hold between 200 Knot Indicated Airspeed (KIAS) and 265 KIAS
    - Military aircraft hold at 230 KIAS with exceptions for certain aircraft
    - All aircraft may be held at lower airspeeds if issued by controller or published with a speed restriction
  - Aircraft altitude – the higher the altitude the more airspace needed
  - Distance of Holding Fix from NAVAID – the further the distance the more airspace needed
- Holding pattern templates have been developed to aid controllers and airspace specialist to more easily determine the dimensions of protected airspace for each holding situation.
  - There are 31 holding pattern templates that vary in size based the aircraft configuration

NOTE: At Aero Center, holding pattern templates are used at KJAN, KGWO, KMLU, and KVKS to determine the amount of airspace to protect for aircraft in holding. The templates will be provided to you in the Lateral Separation lesson.

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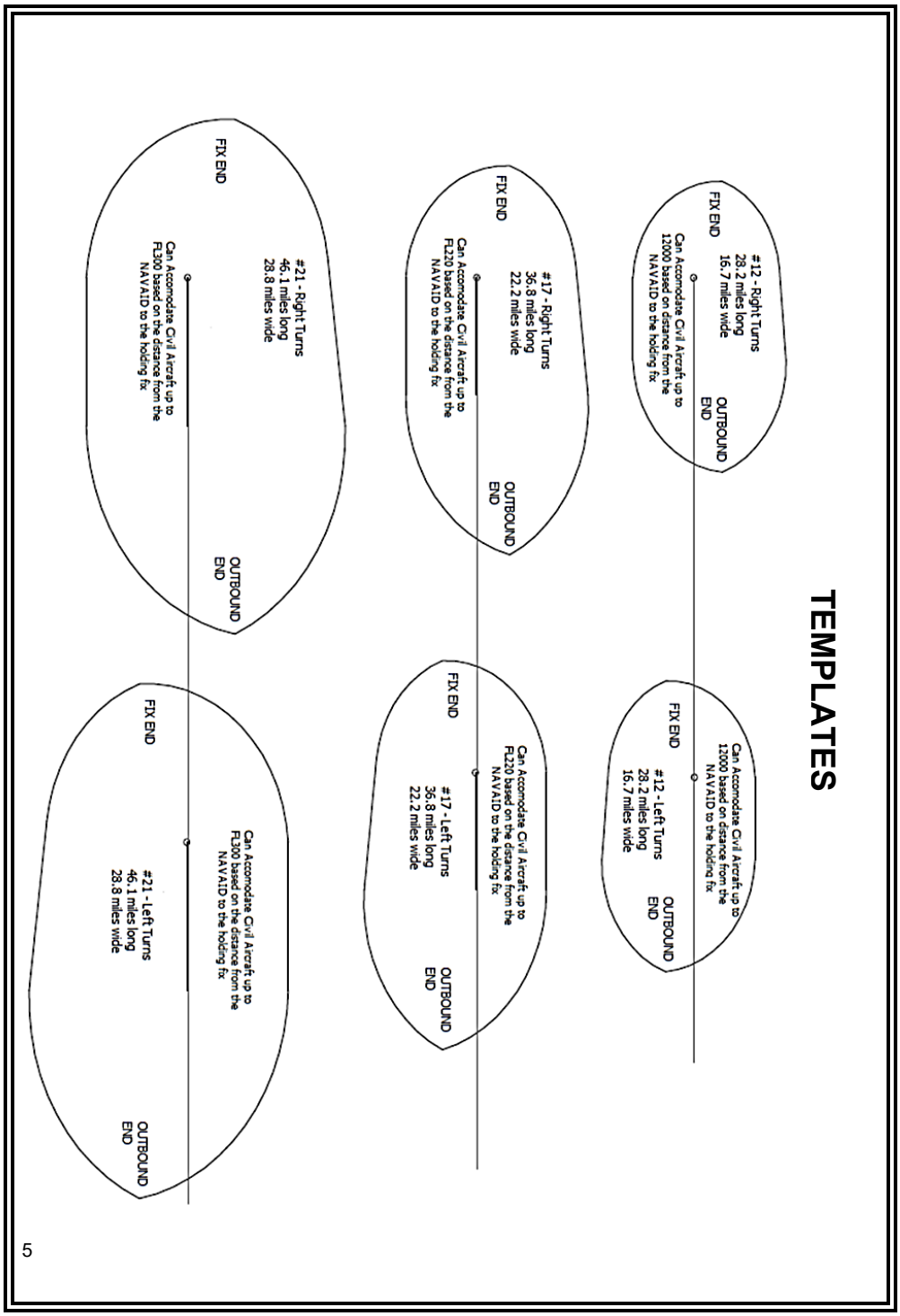
HOLDING PATTERNS *(Continued)*

Templates (Cont'd)

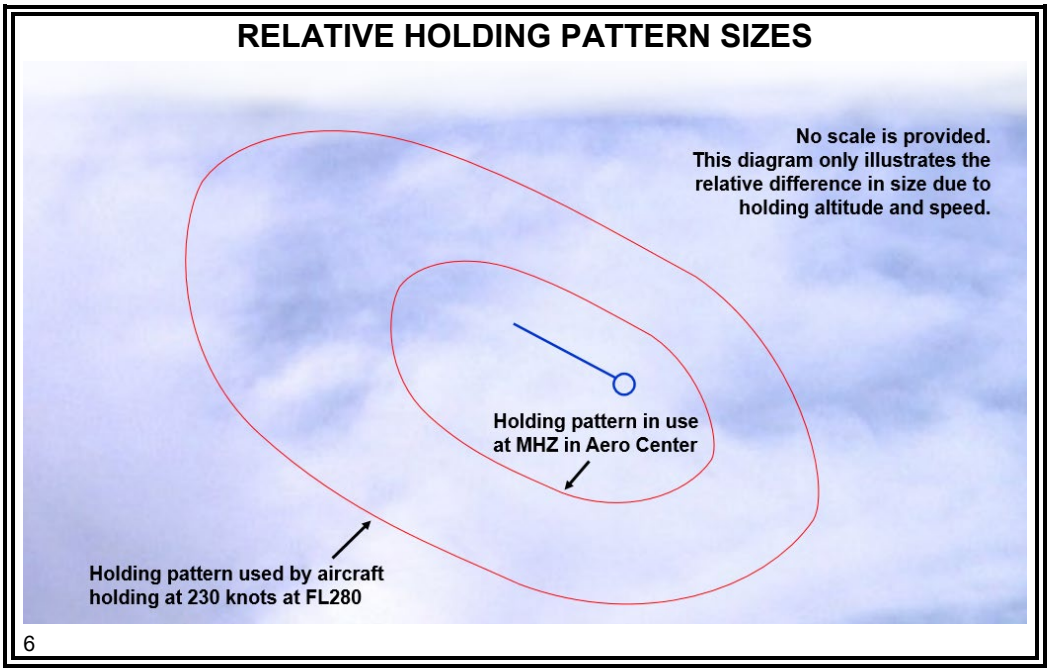
JO 8260.3



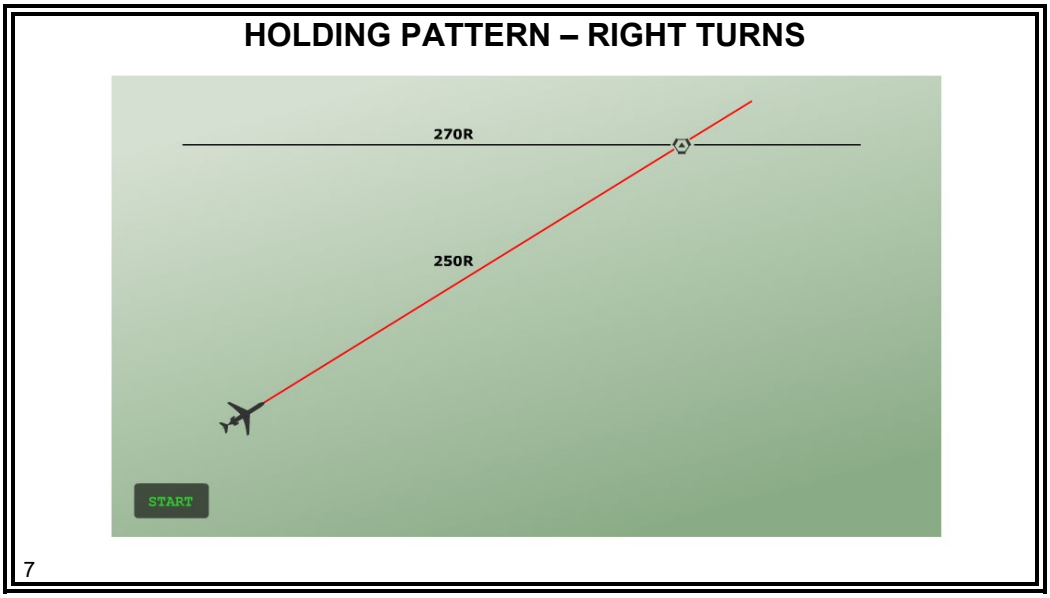
- This slide shows several examples of holding pattern templates and how much airspace they encompass.

HOLDING PATTERNS *(Continued)*

Example



Right Turns



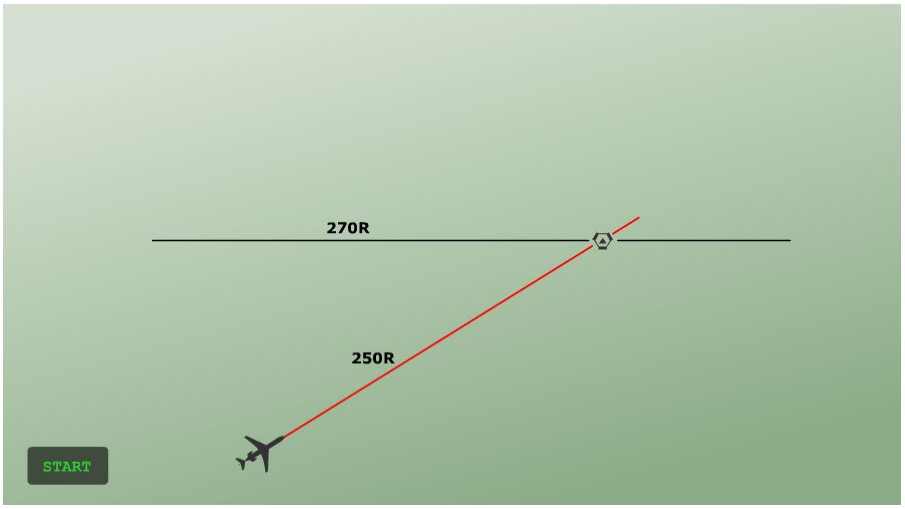
☞ ***NOTE:*** *Introduce topic and then click* ***START*** *to play animation. Click the* ***REPLAY*** *button to play the animation again.*

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

HOLDING PATTERNS *(Continued)*

Left Turns

HOLDING PATTERN – LEFT TURNS



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☞ ***NOTE:*** *Introduce topic and then click* ***START*** *to play animation. Click the* ***REPLAY*** *button to play the animation again.*

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

HOLDING PATTERNS *(Continued)*

Noncharted Pattern
JO 7110.65, par. 4-6-4

HOLDING INSTRUCTIONS

Clearance Limit Issued with Holding Instructions

N148BY BE10/A T240 66 04	IGB 1059	21 11 21 SQS	60✓	KGWO 1126	KMGM IGB V278 SQS KGWO/1126 67↓60	VR H SW 256 LT 1136

Phraseology Example

"November One Four Eight Bravo Yankee, cleared to Sidon VORTAC, hold southwest on the two five six radial, left turns. Expect further clearance one one three six."

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☞ ***NOTE:*** *Click 5 times to build slide.*

NOTE: The holding pattern airspace (HPAS) at Sidon VORTAC overlaps D67. The protected airspace of holding patterns will be taught in Lateral Separation.

⊙ When issuing holding instructions, specify:

- Holding fix/waypoint
  - → May be omitted if included at the beginning of the transmission as the clearance limit
- Direction of holding from fix/waypoint using eight compass points
- Radial, course, bearing, track, azimuth, and airway or route on which aircraft is to hold

Phraseology

"HOLD (direction) OF (fix/waypoint) ON (specified radial, course, bearing, track, airway, azimuth(s), or route)"

Continued on next page

HOLDING PATTERNS *(Continued)*

Noncharted Pattern (Cont'd)

HOLDING INSTRUCTIONS

Leg Length is Specified

N56Q BE65A T165 G165 66 **004** 01	MLU 0017	48 00 48 MHZ	90✓	KJAN	KSHV./.MLU V18 MHZ KJAN	1445 H 10 HEDUD SW V18 0108

"November Five Six Quebec, cleared to HEDUD intersection, hold southwest on Victor Eighteen, one zero mile leg. Expect further clearance zero one zero eight."

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Phraseology Example

☞ ***NOTE:*** *Click 5 times to build slide.*

- Leg length
  - → In miles if DME or RNAV is to be used
  - → In minutes if pilot requests, or controller considers it necessary

If leg length is specified:

"(Number of minutes/miles) MINUTE/MILE LEG."

Phraseology

Continued on next page

HOLDING PATTERNS *(Continued)*

Noncharted Pattern (Cont'd)
JO 7110.65, pars. 4-6-1, 4-6-4

LEFT TURNS

N989GH MU2/A T220 66 01	MLU 1118	31 11 31 DORTS	110✓	VKS 1136	KDTN MLU V417 DORTS VKS KVKS/1136	H VKS SW 195 LT 1146

✈ Phraseology Example

"November Niner Eight Niner Golf Hotel, cleared to Vicksburg Radio Beacon, hold southwest on the one niner five bearing from the Vicksburg Radio Beacon, left turns. Expect further clearance one one four six."

11

☞ ***NOTE:*** *Click 5 times to build slide.*

- Direction of turns if:
  - → Left turns are to be made
  - → Pilot requests
  - → Controller deems it necessary

If direction of turn is specified:

✈ Phraseology

"LEFT/RIGHT TURNS."

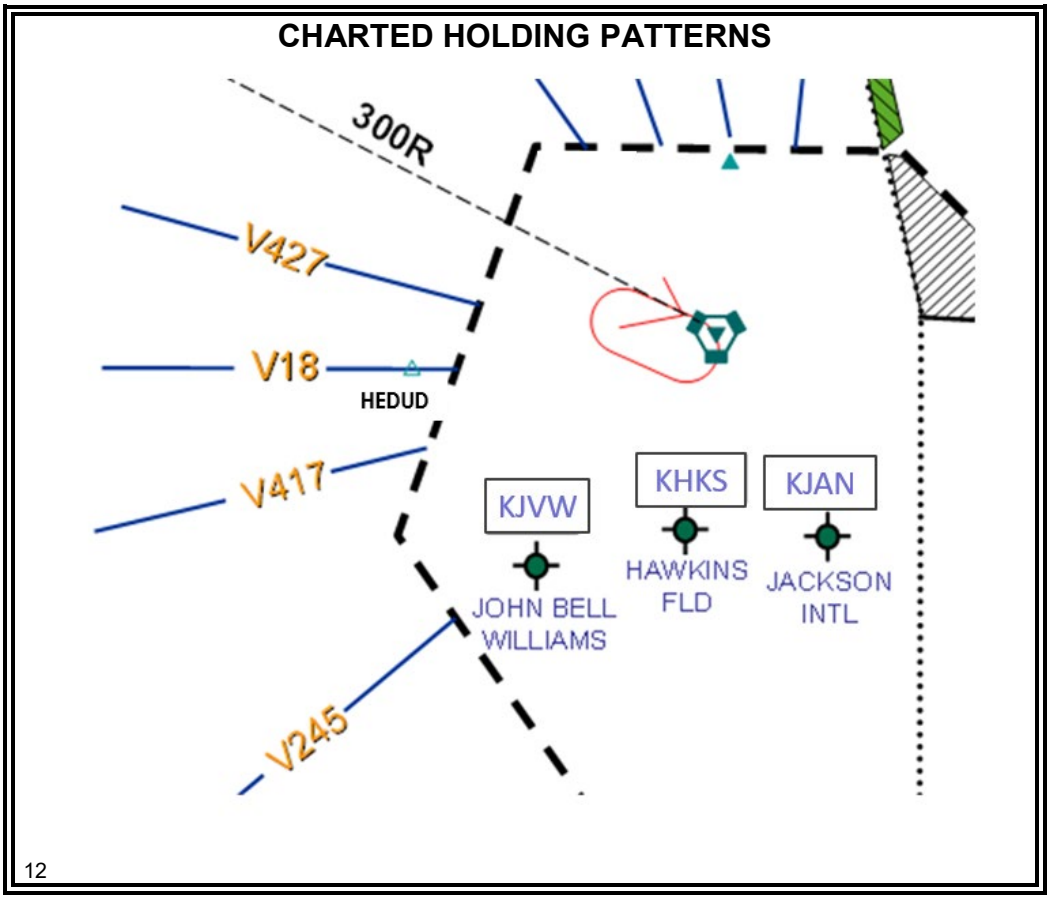
- Expect Further Clearance (EFC)

✈ Phraseology

"EXPECT FURTHER CLEARANCE (time)."

HOLDING PATTERNS *(Continued)*

Charted Pattern
JO 7110.65, par. 4-6-1



- Omit all holding instructions except charted direction and statement “as published.”

Phraseology

“CLEARED TO (fix), HOLD (direction) AS PUBLISHED.”

- **Always** issue complete holding instructions when the pilot requests them

NOTE: Most generally used holding patterns are published on low/high altitude en route charts, area charts, and STAR charts.

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HOLDING PATTERNS *(Continued)*

Charted Pattern (Cont'd)
JO 7110.65, par. 4-6-1

HOLDING INSTRUCTIONS

Charted Pattern

BTA3567 E120/A T280 66 01	HEZ 1113	29 11 29 MHZ	150✓ ↓60	KJAN	KIAH./.HEZ V245 MHZ KJAN BTA- JETLINK	H NW 1139 26 SW

Phraseology Example

"Jet Link Thirty-Five Sixty-Seven, cleared to Magnolia VORTAC, hold northwest as published. Expect further clearance one one three niner."

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- When a holding pattern is charted, issue Expect Further Clearance (EFC) time if delay is expected.

Phraseology

"CLEARED TO (fix), HOLD (direction), AS PUBLISHED, EXPECT FURTHER CLEARANCE (time)."

HOLDING PATTERNS *(Continued)*

Knowledge Check

KNOWLEDGE CHECK

QUESTION: When issuing holding instructions, you should always specify _____.

A. direction of turns and holding fix

B. direction of turns, if left turns are to be made

C. leg length in minutes or miles

14

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

ANSWER: *B*

KNOWLEDGE CHECK

QUESTION: When issuing holding instructions, what is the first item specified after the clearance limit?

A. Radial, airway, or route on which to hold

B. Leg length

C. Direction of holding from fix

15

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

ANSWER: *C*

Continued on next page

HOLDING PATTERNS *(Continued)*

Knowledge Check (Cont'd)

KNOWLEDGE CHECK

QUESTION: When would you specify direction of turns in a holding pattern?

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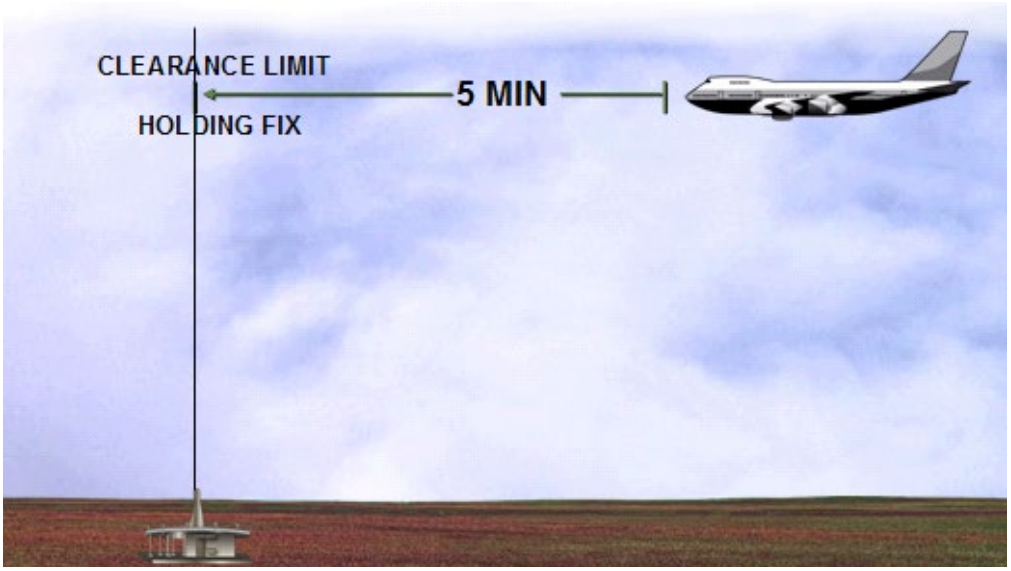
☞ ***NOTE:*** *Click once to show answer.*

ANSWER: *When left turns are to be made, when the pilot requests, and when the controller deems necessary*

CLEARANCE TO HOLDING FIX

Anticipated Delay
JO 7110.65, par. 4-6-1

ANTICIPATED DELAY



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- ⊙ When delay is expected, issue holding instructions at least 5 minutes before aircraft estimate to reach clearance limit.
  - Provides pilot time to start speed reduction
  - Compensates for small differences in pilot/center ETAs at the holding fix
- ⊙ Issue the following items (as applicable):
  - Clearance limit
    - – If any part of route beyond a clearance limit differs from the last routing cleared, issue the route the pilot can expect beyond the clearance limit

✈ **Phraseology**

"EXPECT FURTHER CLEARANCE VIA (routing)."

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CLEARANCE TO HOLDING FIX *(Continued)*

Anticipated Delay (Cont'd)
JO 7110.65, par. 4-6-1

- Holding instructions
  - May be eliminated when you inform the pilot that **no** delay is expected

✈ **Phraseology**

"CLEARED TO (fix), NO DELAY EXPECTED."

- Expect Further Clearance (EFC)
  - Do **not** issue if **no** delay is expected
  - If delay is longer than anticipated, issue new EFC prior to expiration of current EFC

✈ **Phraseology**

"EXPECT FURTHER CLEARANCE (time)."

Knowledge Check

KNOWLEDGE CHECK

QUESTION: United Two Ten is estimating Magnolia VORTAC at 1623. What is the latest time holding instructions should be issued?

A. 1613

B. 1618

C. 1620

18

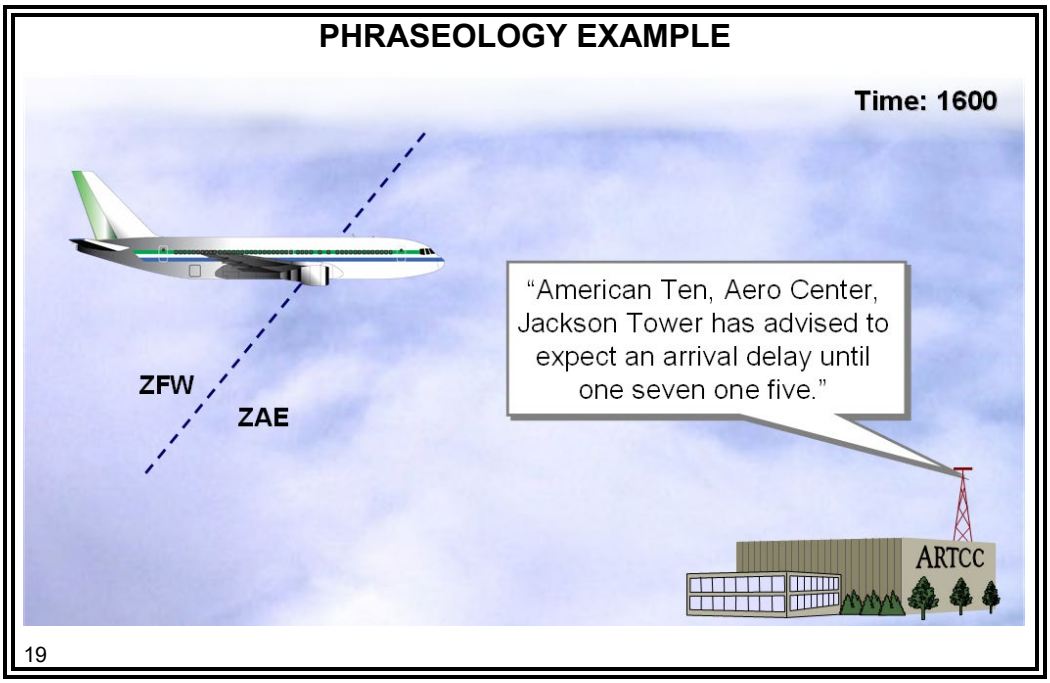
☞ ***NOTE:*** *Click once to show answer.*

ANSWER: *B*

DELAYS

Delays
JO 7110.65,
par. 4-6-3

Phraseology Example



- Advise Front Line Manager or TMU coordinator when:
  - Aircraft are delayed
  - Delays are expected
- When arrival delays reach or are expected to reach 30 minutes:
  - Issue total delay information as soon as possible after the aircraft enters the center's area
    - Issued by first controller to communicate with aircraft
    - May omit when available via ATIS, unless pilot requests

DELAYS *(Continued)*

Delay Indefinite
JO 7110.65, par. 4-6-1

Phraseology Example

DELAY INDEFINITE

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- Advise pilot "delay indefinite" and reason, if known.

☞ ***NOTE:*** *Discuss causes of delays such as weather below minimums, disabled aircraft on runway, terminal saturation, snow removal, etc.*

- Issue EFC time.
  - After determining the reason for the delay, advise the pilot as soon as possible
- Make every effort to provide pilot with best possible estimate of delay and reason.

Phraseology

"DELAY INDEFINITE (reason, if known), EXPECT FURTHER CLEARANCE (time)."

DELAYS *(Continued)*

Knowledge Check

KNOWLEDGE CHECK

QUESTION: When a delay is anticipated and the holding pattern is charted, you should issue the direction the aircraft will hold and _____.

A. leg length

B. turns

C. EFC

21

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

ANSWER: *C*

KNOWLEDGE CHECK

QUESTION: When you delay or expect to delay aircraft, you should advise _____.

A. the sector or approach control that will be affected

B. your Front Line Manager or the Traffic Management Coordinator

C. Air Traffic Control System Command Center

22

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

ANSWER: *B*

Continued on next page

DELAYS *(Continued)*

Knowledge Check (Cont'd)

KNOWLEDGE CHECK

QUESTION: The phraseology for issuing an EFC for a lengthy delay is _____.

A. "DELAY INDEFINITE, (reason, if known), STAND BY"

B. "EXPECT FURTHER CLEARANCE IN ONE HOUR"

C. "DELAY INDEFINITE, (reason, if known), EXPECT FURTHER CLEARANCE (time)"

23

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

ANSWER: *C*

CLEARANCE BEYOND FIX

Clearance Items to Issue
JO 7110.65, par. 4-6-2

Phraseology Example

CLEARANCE BEYOND FIX

UAL412 B731/L T410 66 03	GLH 1113	19 11 19 SQS	170✓	IGB	KLIT GLH V278 IGB KATL	H/

"United Four Twelve, cleared to Atlanta Airport via Victor Two Seventy-Eight Bigbee direct."

N426A BE20/G T260 66 03	GLH 1254	05 13 05 SQS	150✓	IGB	KLIT GLH V278 IGB KUBS	H/

"King Air Four Two Six Alpha, cleared to Columbus Airport via last routing cleared."

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☞ ***NOTE:*** *Teach stripmarking from graphic.*

⊙ Issue clearance beyond clearance limit

- As soon as possible, or
- At least five minutes prior to aircraft reaching fix

⊙ Clearance items to issue

- Clearance limit or approach clearance
- Route of flight, specifying one of the following:
  - Complete details of route
  - Phrase: "VIA LAST ROUTING CLEARED"
    - → **Only** when the most recently issued routing is valid
    - → When verbiage is reduced
- Assigned altitude, if different from present altitude

CLEARANCE BEYOND FIX *(Continued)*

No Clearance Beyond Fix Issued
AIM, par. 5-3-8

- Pilot is expected to hold as depicted on charts (low/high altitude en route, area, STAR).
- If **no** charted pattern and **no** holding instructions have been issued, pilot should request instructions prior to reaching fix.
  - If unable to obtain holding instructions, pilot should:
    - Hold in standard pattern on course approaching fix
    - Request further clearance as soon as possible

Knowledge Check

KNOWLEDGE CHECK

QUESTION: When should you issue clearance beyond the clearance limit?

A. Five minutes prior to the clearance limit

B. When the pilot requests

C. Further clearance is not required

25

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

ANSWER: *A*

Continued on next page

CLEARANCE BEYOND FIX *(Continued)*

Knowledge Check (Cont'd)

KNOWLEDGE CHECK

QUESTION: The phraseology for specifying the route of flight when clearing an aircraft beyond a clearance limit is _____.

A. "VIA LAST ROUTING CLEARED"

B. "VIA FLIGHT PLAN ROUTE"

C. "CLEARED AS FILED"

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

ANSWER: *A*

KNOWLEDGE CHECK

QUESTION: A delay is anticipated and holding is necessary. The holding clearance should always specify the _____.

A. leg length

B. EFC

C. direction of turns

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

ANSWER: *B*

EXERCISE: PRACTICING WITH HOLDING STRIPS

Exercise 1

PRACTICING WITH HOLDING STRIPS EXERCISE

Purpose: to practice marking flight progress strips

Directions: complete the strips based on information provided by instructor

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Directions

In this exercise, you will practice marking strips and issuing holding instructions.

Your instructor will provide a set of flight progress strips. Students will be called to the board one at a time to issue a clearance for each aircraft while marking the corresponding strip appropriately.

☞ ***NOTE:*** *This exercise requires one set of holding strips for every student.*

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

Use the board to display the strips a few at a time. Call the students to the board one at a time to issue holding instructions (no altitude restrictions) for each aircraft while they mark the corresponding strip appropriately.

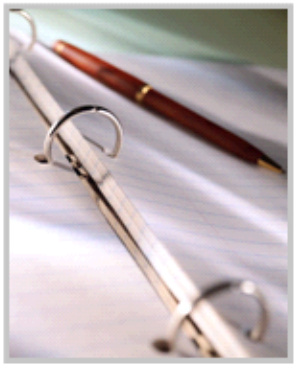
IN CONCLUSION

Lesson Review

LESSON REVIEW

The following topics were covered in this lesson:

- Holding
- Holding patterns
- Clearance to holding fix
- Delays
- Clearance beyond a fix



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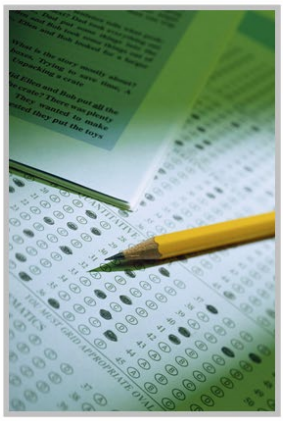
☞ ***NOTE:*** *Teach from graphic. Review and elaborate briefly on the topics covered in this lesson.*

End-of-Lesson Test

END-OF-LESSON TEST

Holding Procedures



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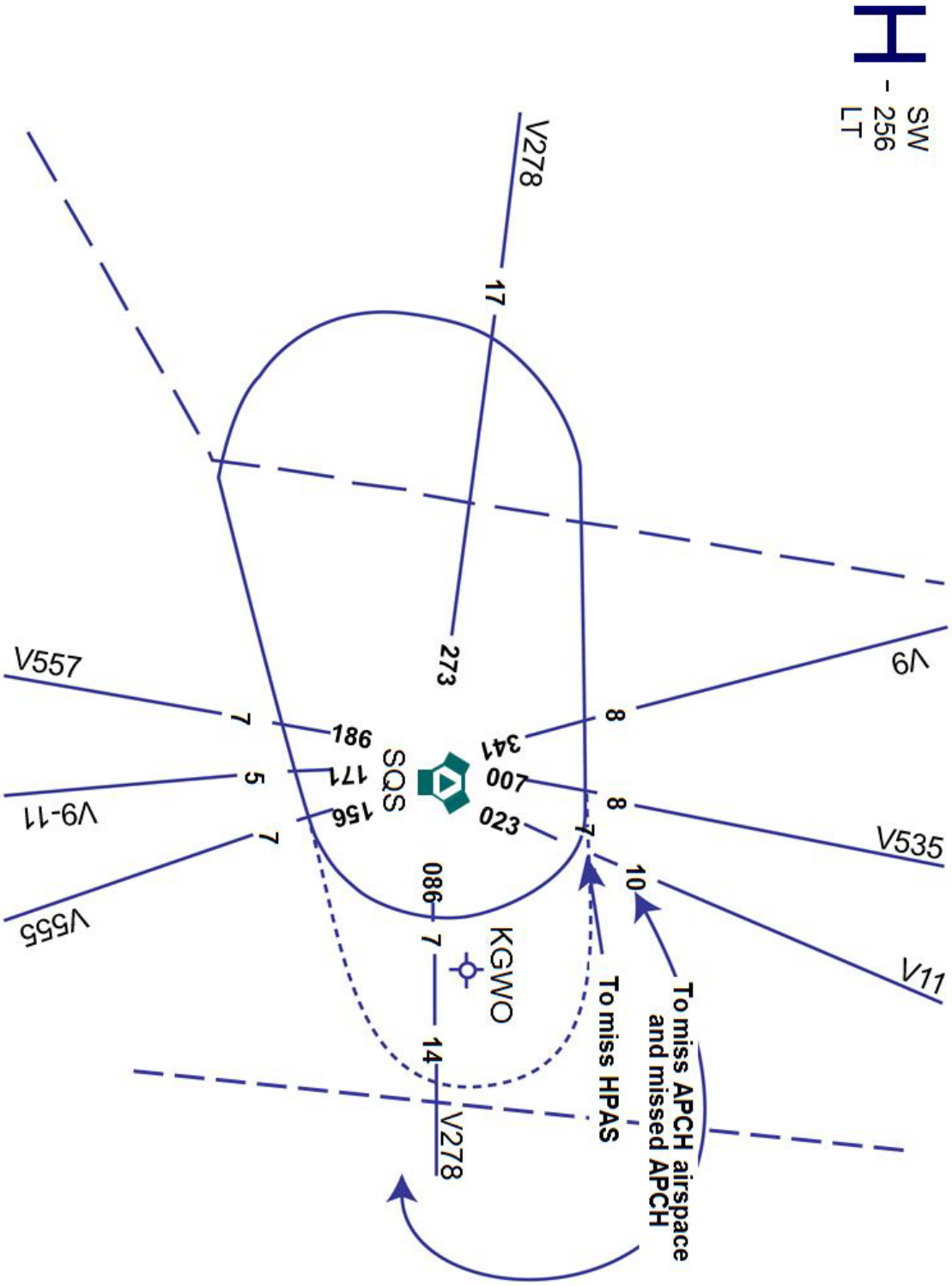
APPENDIX A: ZAE HOLDING PATTERNS



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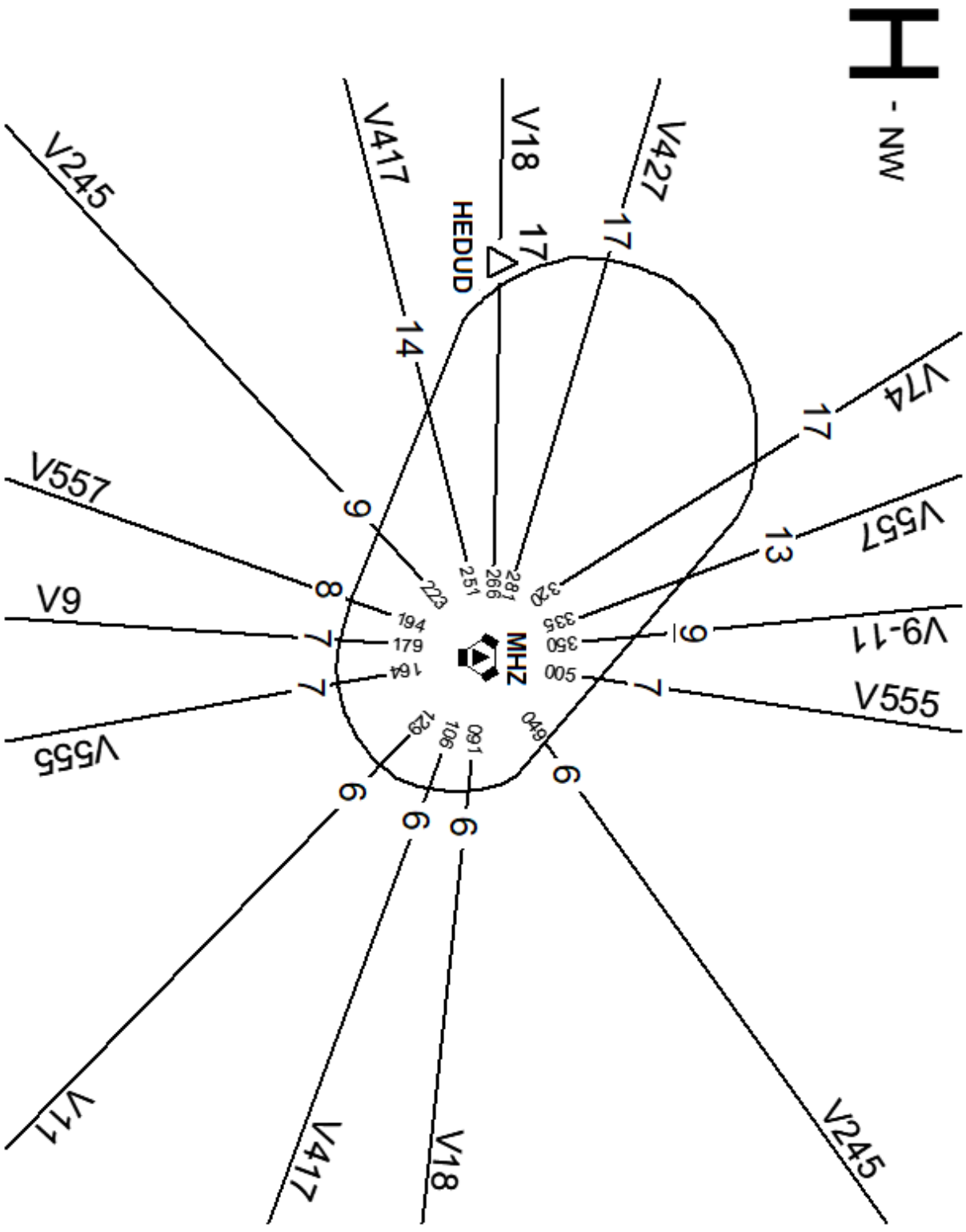
APPENDIX A: ZAE HOLDING PATTERNS *(Continued)*



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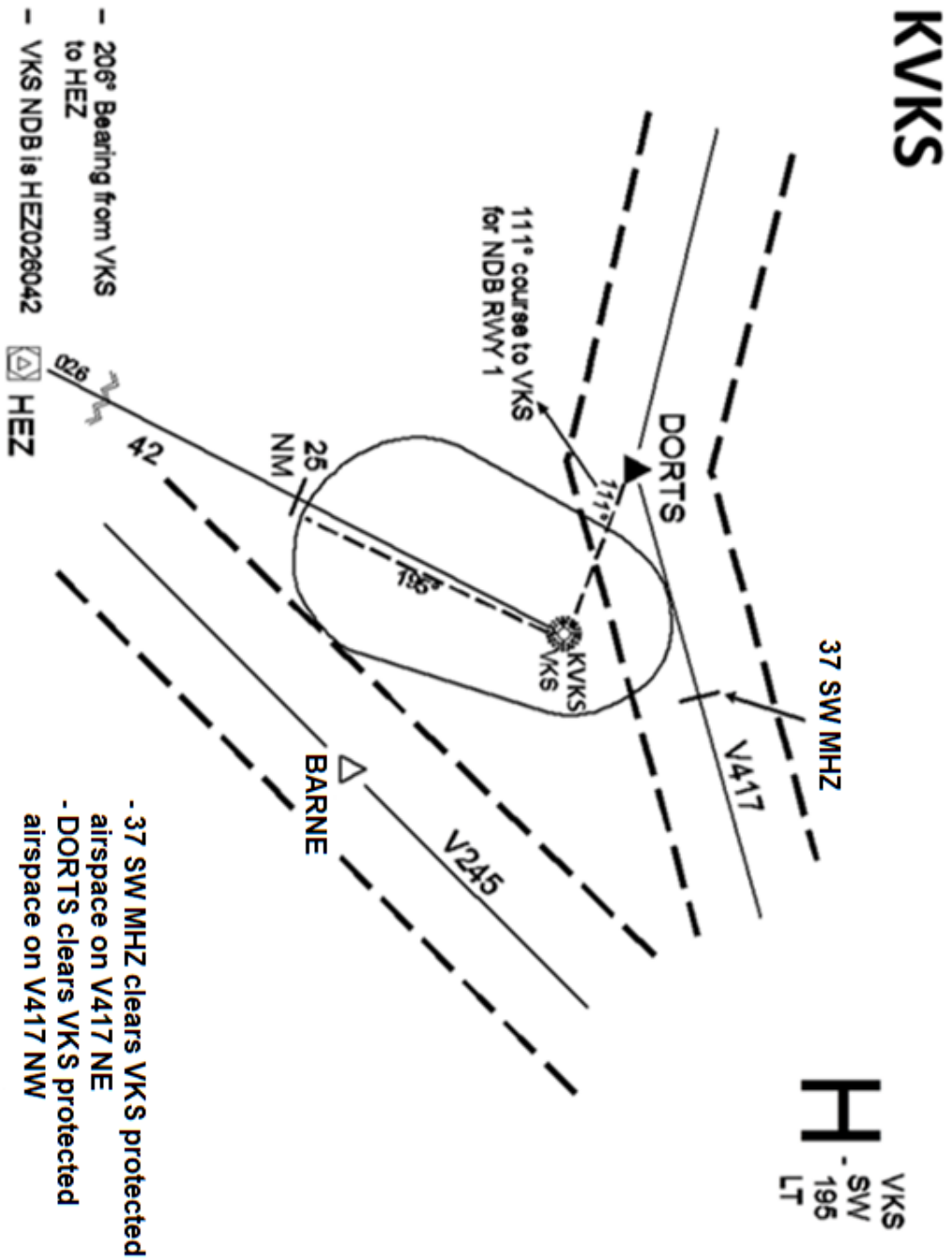
APPENDIX A: ZAE HOLDING PATTERNS *(Continued)*



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APPENDIX A: ZAE HOLDING PATTERNS *(Continued)*