BASICS FOR AIR TRAFFIC CONTROL – SIDs AND STARs

MODULE OVERVIEW

Purpose: The purpose of this module is to introduce you to Standard Instrument Departure (SID) and Standard Terminal Arrival (STAR) procedural charts, which are used by pilots when flying on an Instrument Flight Rules (IFR) flight plan.

MODULE OUTLINE

Lesson: Standard Instrument Departure (SID) Charts

Purpose: The purpose of this lesson is to describe how Standard Instrument Departure (SID) procedures are used and to identify the types of information displayed on these charts.

Objectives:

- Identify types of departure procedures
- Identify types of SIDs
- Identify components of SIDs
- Identify “No SID” procedures

Topics:

- Standard Instrument Departures (SIDs)
- Performance-Based Navigation (PBN)
- Instrument Departure Procedures (DPs)
  - Obstacle Departure Procedures (ODPs)
  - Standard Instrument Departure (SID) Procedures
- Standard Instrument Departure (SID) Charts
- Types of SIDs
  - Pilot Navigational SID
  - Vector SID
- SID Layout
  - Margin Information
  - Planview
  - Textual Description
- “No SID”
- Knowledge Check
- Review/Summary

Exercise: Using a SID

Question and Answer Session – *Parking Lot*

Lesson: Standard Terminal Arrival (STAR) Charts

Purpose: The purpose of this lesson is to describe how Standard Terminal Arrival (STAR) Charts are used and to identify the types of information displayed on these charts.

Objectives:

- Identify the purpose of STARs
- Identify layout/components of STARs
- Identify how to interpret a STAR
- Identify “No STAR” procedures

Topics:

- Performance-Based Navigation (PBN)
- Standard Terminal Arrival (STAR) Charts
- STAR Layout
- U.S. Terminal Procedures Chart – STARs
- Interpreting a STAR
  - Common NAVAID/Fix
  - Transitions
- “No STAR”
- Knowledge Check
- Review/Summary

Exercise: Using a STAR

Question and Answer Session – *Parking Lot*

Game – Terminal Determination

Question and Answer Session – *Parking Lot*

End-of-Module (EOM) Test

INTRODUCTION

LESSONS	■ Standard Instrument Departure (SID) Charts ■ Standard Terminal Arrival (STAR) Charts
TOTAL ESTIMATED RUN TIME	3 hrs. 12 mins.
MODULE CONTENT	■ Module Overview ■ Lesson: Standard Instrument Departure (SID) Charts ■ Exercise – Using a SID ■ Q&A Session – Parking Lot ■ Lesson: Standard Terminal Arrival (STAR) Charts ■ Exercise – Using a STAR ■ Q&A Session – Parking Lot ■ Game – Terminal Determination ■ Q&A Session – Parking Lot ■ End-of-Module Test

FACILITATOR INSTRUCTIONS	DELIVERY METHOD
■ Instruct students to select ***SIDs and STARs*** module link within Blackboard ■ Instruct students to read the module introduction and then wait quietly for additional instructions	Blackboard
	EST. RUN TIME
	2 mins.

Air traffic in the vicinity of airports naturally becomes congested. Much like for automobile traffic, specialized procedures have been developed to organize and expedite the flow of aircraft into and out of terminal areas. These complicated and intricate procedures have been encoded on:

- Standard Instrument Departure (SID) charts
- Standard Terminal Arrival (STAR) charts

The purpose of this module is to introduce you to SID and STAR procedural charts, which are used by pilots when flying on an Instrument Flight Rules (IFR) flight plan.

General Disclaimer: *All graphics in this lesson are for illustration/training purposes only and may not reflect current procedures.*

FACILITATOR INSTRUCTIONS	DELIVERY METHOD
■ **ENABLE *Standard Instrument Departure (SID) Charts*** lesson in Blackboard ■ Instruct students to navigate to the ***Standard Instrument Departure (SID) Charts*** lesson in Blackboard ■ Instruct students to work individually through the lesson content ■ Upon completion of the lesson, students should review previously introduced content or wait quietly until other students have completed	Blackboard **EST. RUN TIME** 20 mins.

STANDARD INSTRUMENT DEPARTURE (SID) CHARTS

Purpose: The purpose of this lesson is to describe how Standard Instrument Departure (SID) procedures are used and to identify the types of information displayed on these charts.

Objectives:

- Identify types of departure procedures
- Identify types of SIDs
- Identify components of SIDs
- Identify “No SID” procedures

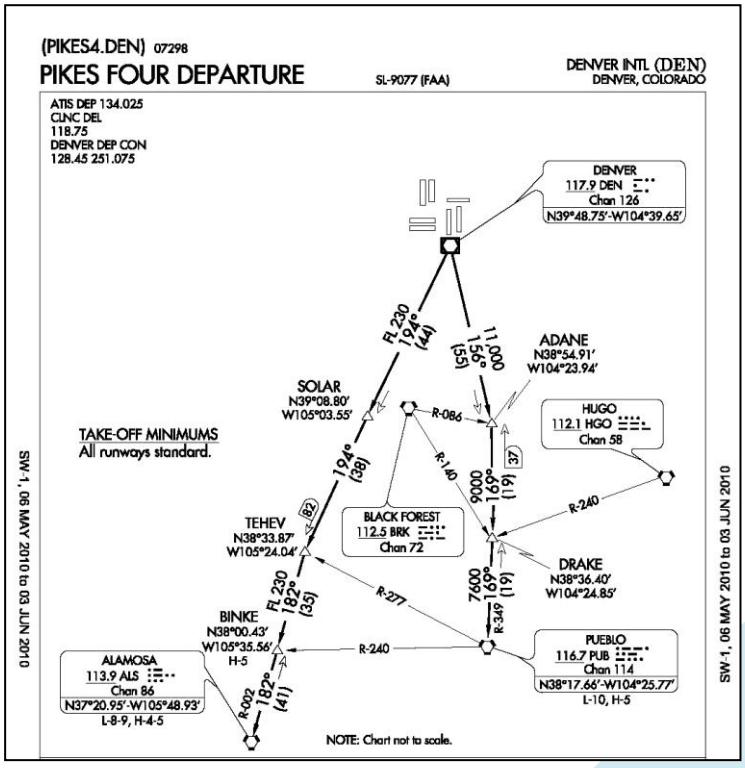
References for this lesson are as follows:

- FAA Order JO 7110.65, Air Traffic Control
- FAA-H-8083-16, Instrument Procedures Handbook
- U.S. Terminal Procedures Chart SW, Vol. 1
- Aeronautical Information Manual (AIM)

Standard Instrument Departures (SIDs)

A SID is a departure procedure used by the pilot/controller to provide obstacle clearance and a transition from the terminal area to the appropriate en route structure.

They are provided to pilots in graphical and textual form within US Terminal Procedures Publications.

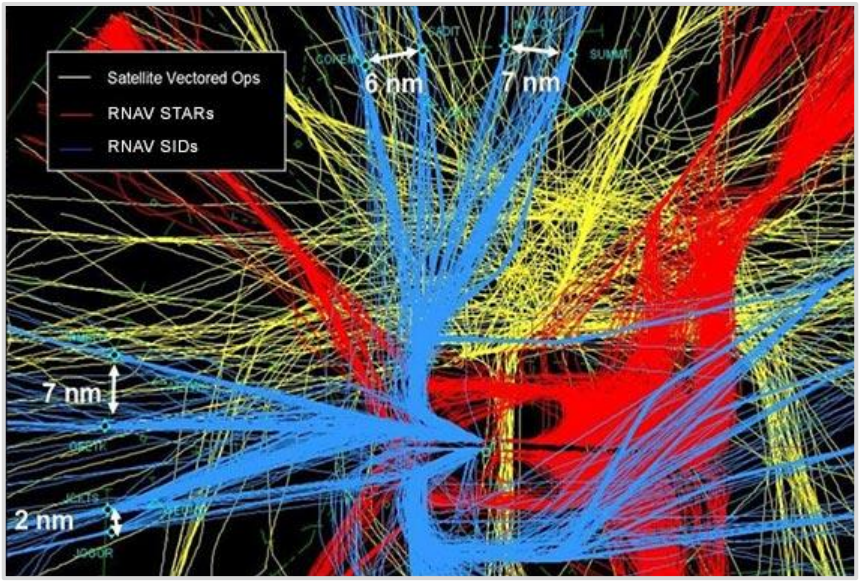


Performance-Based Navigation (PBN)

Performance-Based Navigation (PBN) is a satellite navigation tool that creates precise 3D flight paths. PBN helps lower aircraft fuel consumption and emissions and saves time. It incorporates satellites with our ground-based navigational systems.

PBN impacts departures:

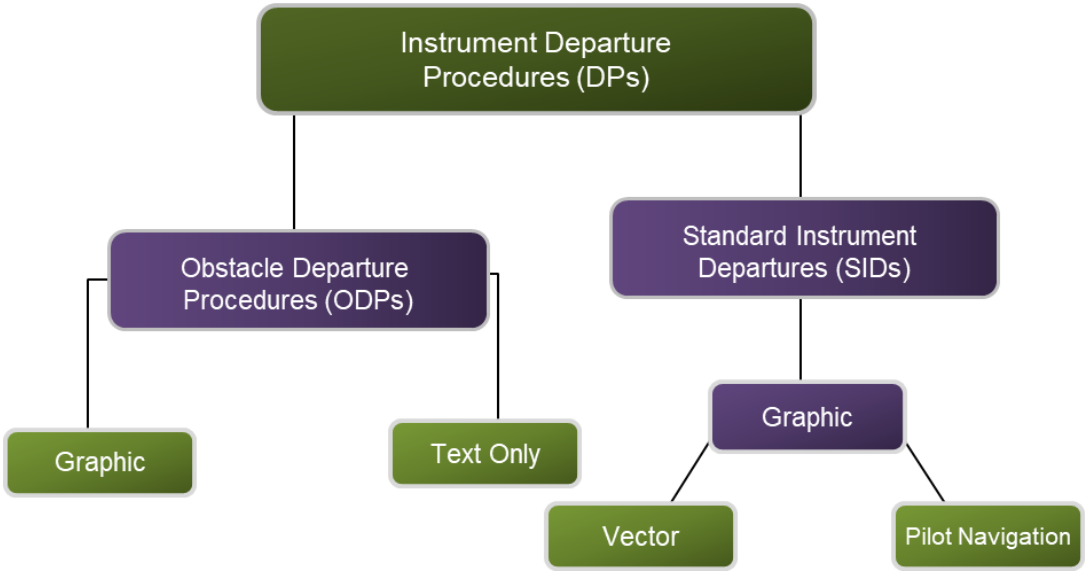
- Reduces controller workload
- Provides for more departures per hour while using reduced departure procedures
- Reduces dependence on existing navigational aids



Instrument Departure Procedures (DPs)

Instrument Departure Procedures (DPs) are a preplanned instrument flight rule (IFR) departure procedure published for pilot use, in graphic or textual format, that provides obstruction clearance from the terminal area to the appropriate en route structure.

There are two types of DPs: Obstacle Departure Procedure (ODP) and Standard Instrument Departure (SID).

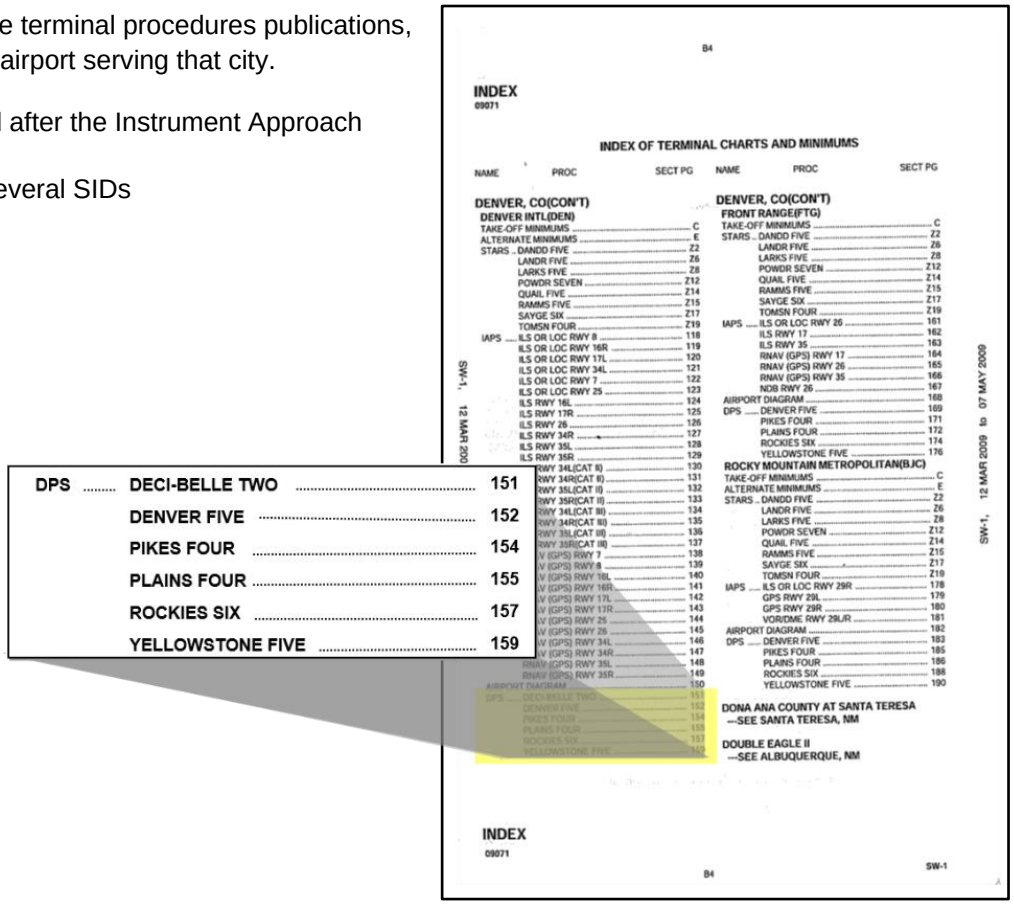


Obstacle Departure Procedures (ODPs)	Standard Instrument Departure (SIDs) Procedures
Obstacle Departure Procedures (ODPs) are preplanned IFR departure procedures printed for pilot use in textual or graphic form to provide obstruction clearance via the least onerous route from the terminal area to the appropriate en route structure. ■ ***ODPs are recommended for*** obstruction clearance and may be flown without ATC clearance unless an alternate departure procedure (SID or radar vector) has been specifically assigned by ATC ■ ***ODPs are recommended when*** no SID or radar vector is assigned because they provide obstruction clearance via the least difficult route	**Standard Instrument Departures (SIDs) Procedures** are preplanned IFR ATC departure procedures printed for pilot/controller use in graphic form to provide obstacle clearance and a transition from the terminal area to the appropriate en route structure. ■ ***SIDs are primarily designed for*** system enhancement to expedite traffic flow and to reduce pilot/controller workload ■ ***ATC clearance must always*** be received prior to flying a SID ***Note:*** *This lesson will cover SIDs, which are the most common type of DPs used by ATC. Not all airports have an Instrument DP.*

Standard Instrument Departure (SID) Charts

To find a particular SID in the terminal procedures publications, locate the city first, then the airport serving that city.

- SIDs are always located after the Instrument Approach Procedures (IAPs)
- One airport may have several SIDs



Types of SIDs

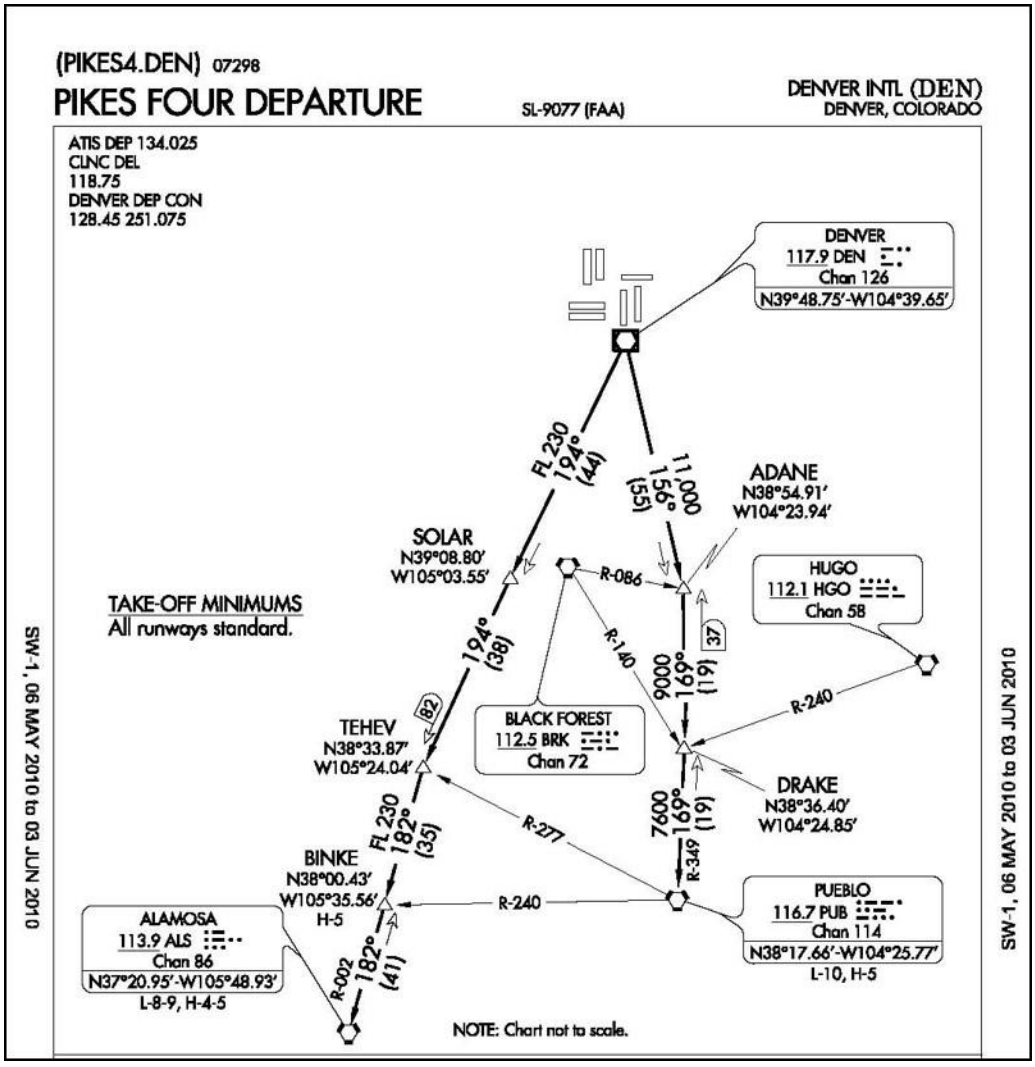
There are two basic types of SIDs:

Pilot Navigation SID	Vector SID
Pilot navigation SIDs are designed to allow pilots to provide their own navigation with minimal radio communication. ■ May include an initial segment requiring radar vectors to help the flight join the procedure	Vector SIDs require ATC to provide radar vectors from just after takeoff until reaching the assigned route or a fix depicted on the SID chart. ■ Does not include departure routes or transition routes because independent pilot navigation is not involved

Pilot Navigational SID

Pilot Navigation SIDs use precise radials from a Very High Frequency Omnidirectional Range (VOR) that have been flight checked by FAA pilots to ensure accuracy.

A pilot navigation SID may include an initial segment requiring radar vectors to help the flight join the procedure.



Vector SID

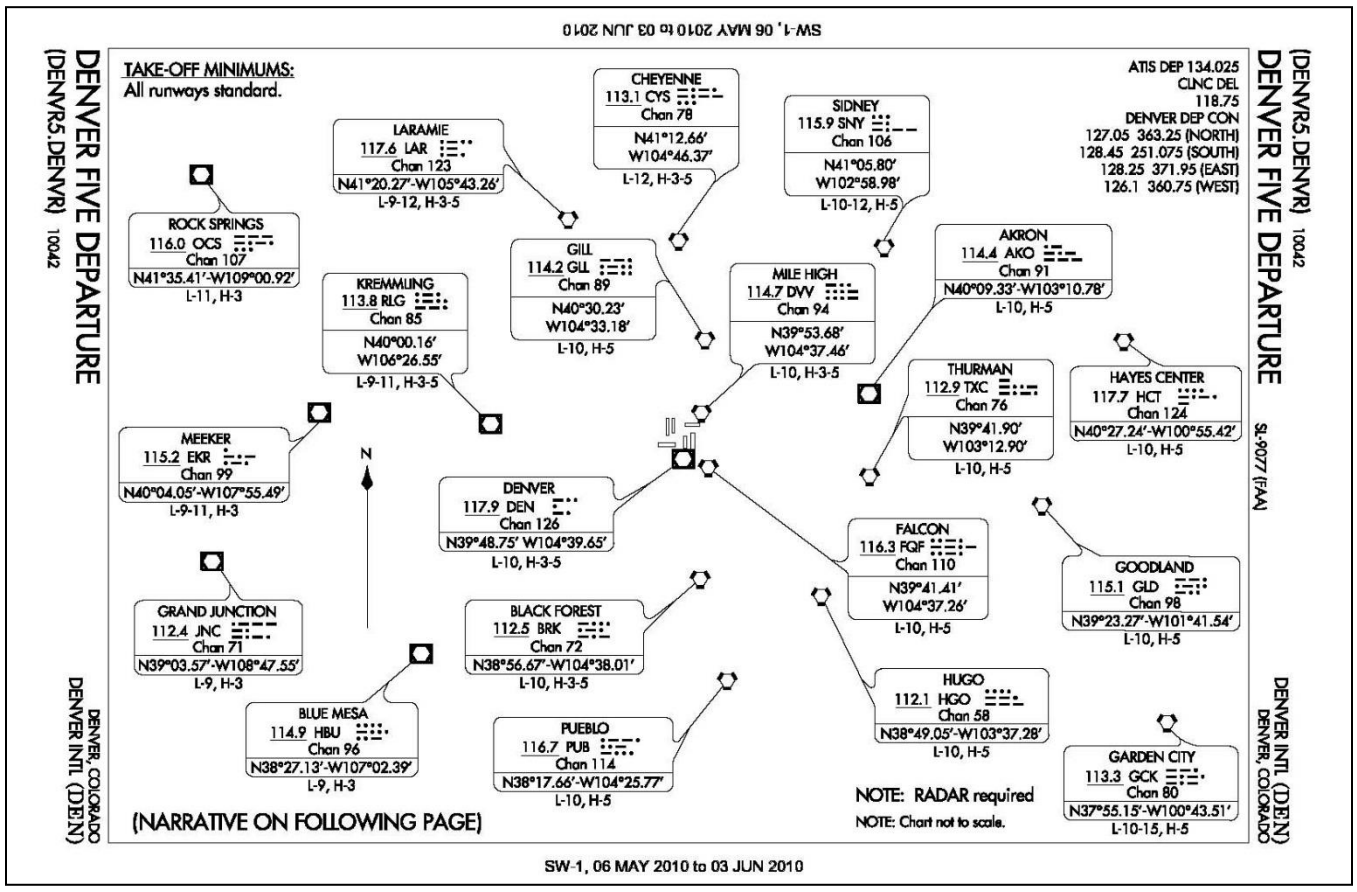
Vector SIDs do not include departure routes or transition routes because independent pilot navigation is not involved.

The procedure sets forth an initial set of departure instructions that typically include an initial heading and altitude.

ATC must have radar contact with the aircraft to be able to provide vectors.

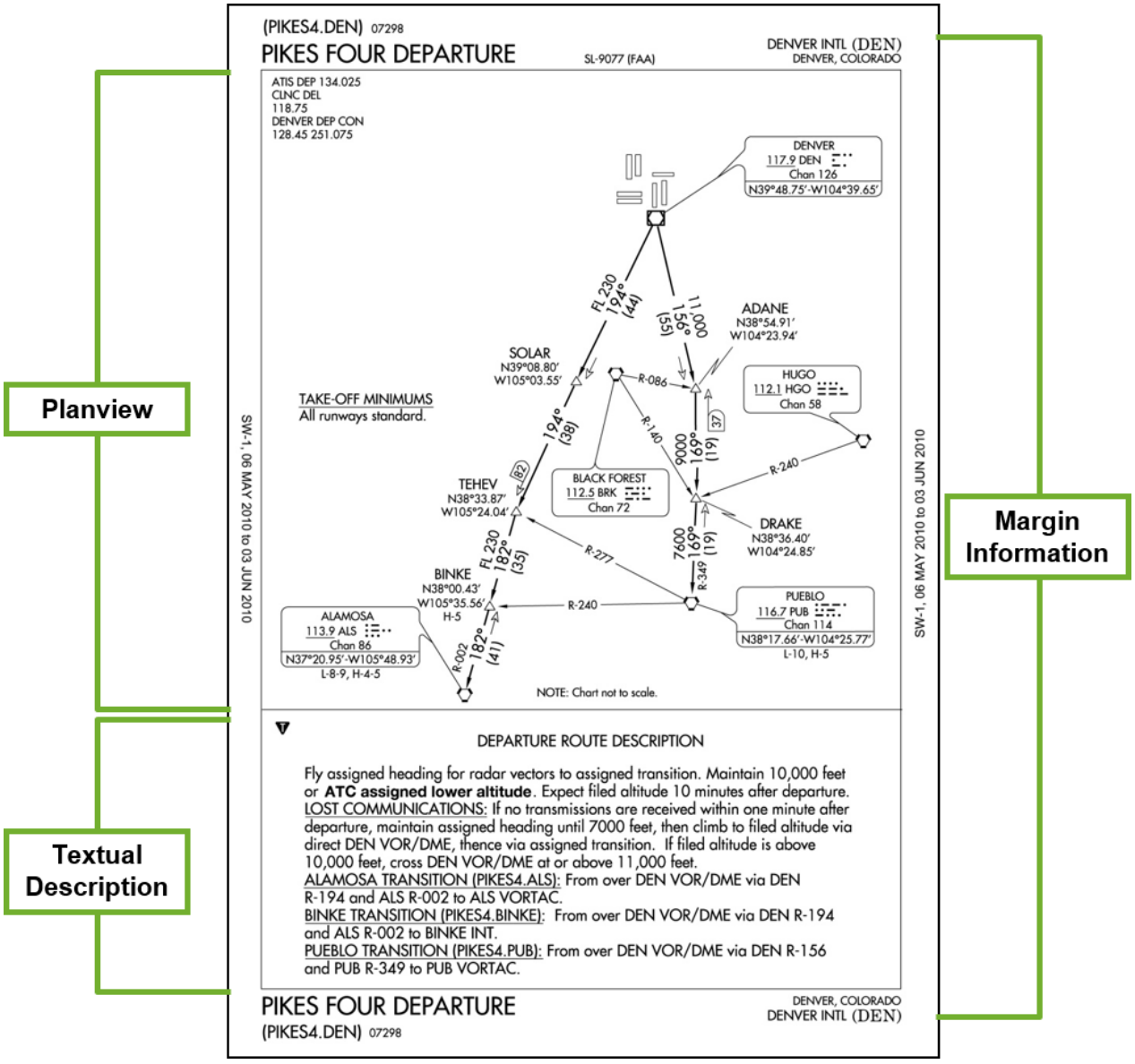
The pilot is expected to immediately comply with a radar vector and to notify ATC if they are unable to comply.

The pilot is also expected to make contact immediately if an instruction will cause them to compromise safety due to obstructions or traffic.

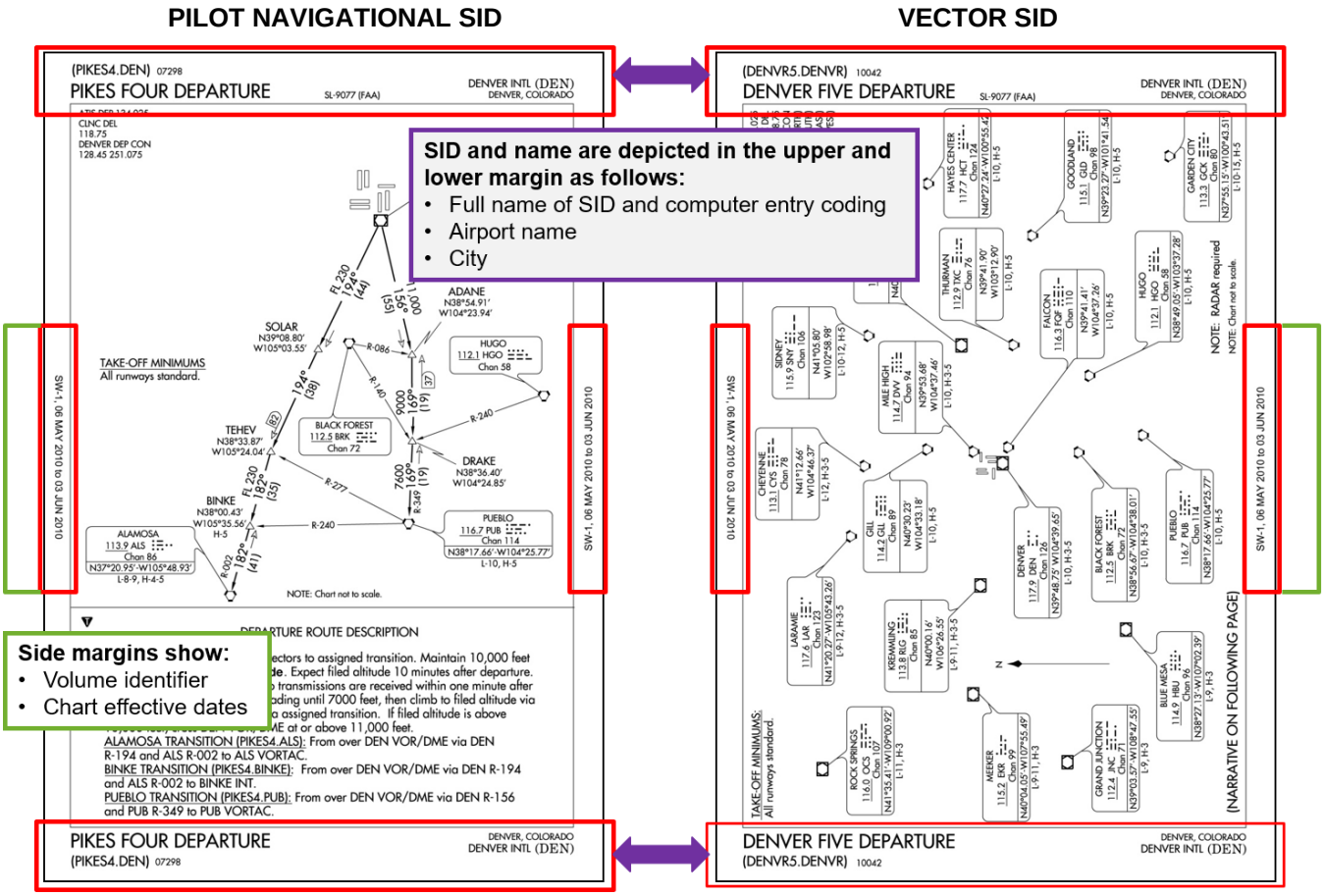


SID Layout

The three sections of a SID are:



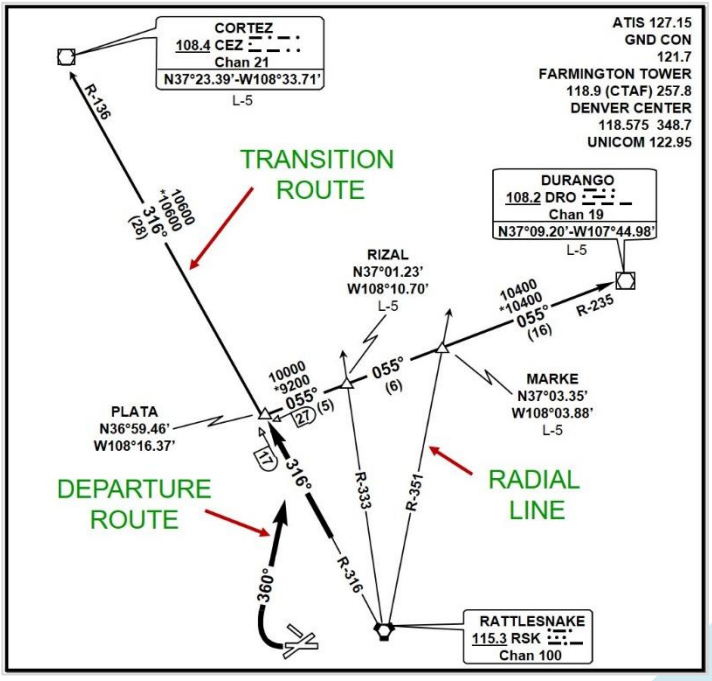
Margin Information



Planview

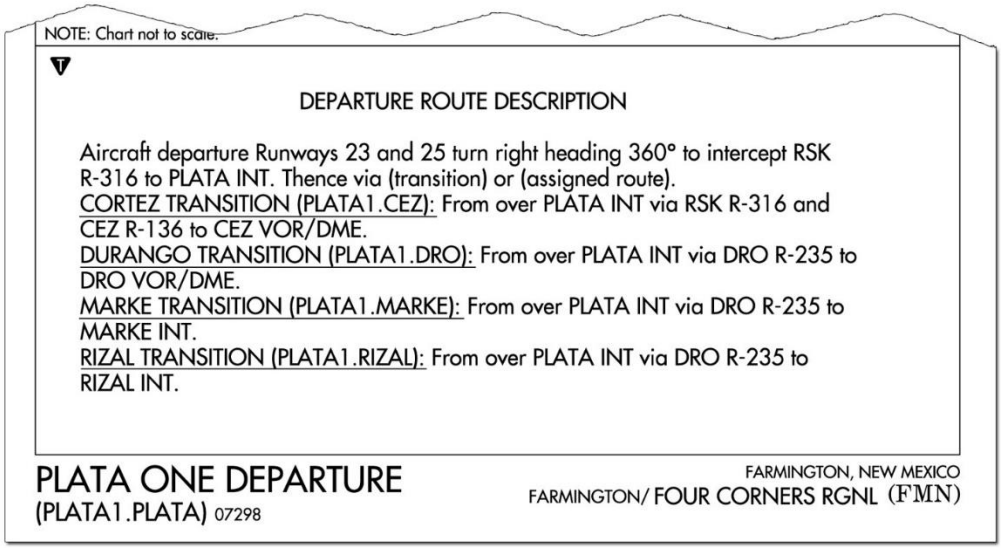
The Planview (graphic) contains many symbols which have already been studied, including:

- Airport runways
- NAVAIDs such as VORs, VORTACs, and intersections
- Primary NAVAID boxes
- Communication frequency section
- Departure routes
- Transition route
- Radials of departure routes
- Distance between fixes
- Minimum en route altitude (MEA)



Textual Description

The Textual Description is a narrative that correlates with the Planview. The pilot is required to have the appropriate chart of the SID at the time of departure.



NOTE: Chart not to scale.

DEPARTURE ROUTE DESCRIPTION

Aircraft departure Runways 23 and 25 turn right heading 360° to intercept RSK R-316 to PLATA INT. Thence via (transition) or (assigned route).
CORTEZ TRANSITION (PLATA1.CEZ): From over PLATA INT via RSK R-316 and CEZ R-136 to CEZ VOR/DME.
DURANGO TRANSITION (PLATA1.DRO): From over PLATA INT via DRO R-235 to DRO VOR/DME.
MARKE TRANSITION (PLATA1.MARKE): From over PLATA INT via DRO R-235 to MARKE INT.
RIZAL TRANSITION (PLATA1.RIZAL): From over PLATA INT via DRO R-235 to RIZAL INT.

PLATA ONE DEPARTURE
(PLATA1.PLATA) 07298

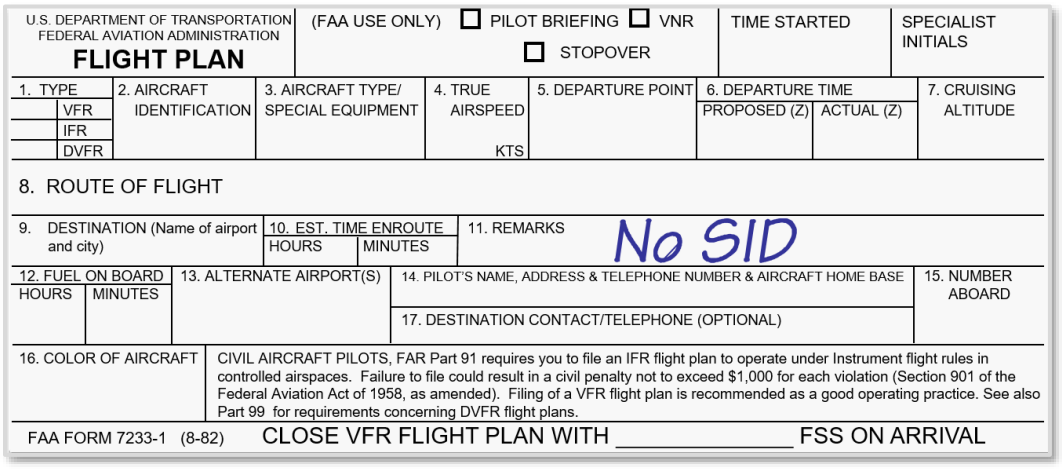
FARMINGTON, NEW MEXICO
FARMINGTON/ FOUR CORNERS RGNL (FMN)

"No SID"

A pilot is expected to advise ATC if they:

- Cannot comply with a SID
- Do not possess SID charts
- Simply do not wish to fly a SID

Although it is not required, pilots are **encouraged** to include the phrase, "No SID," in the remarks portion of their flight plan. The flight progress strip will reflect this decision.



U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
FLIGHT PLAN

(FAA USE ONLY) ☐ PILOT BRIEFING ☐ VNR ☐ STOPOVER | TIME STARTED | SPECIALIST INITIALS

1. TYPE	2. AIRCRAFT IDENTIFICATION	3. AIRCRAFT TYPE/ SPECIAL EQUIPMENT	4. TRUE AIRSPEED KTS	5. DEPARTURE POINT	6. DEPARTURE TIME PROPOSED (Z)	6. DEPARTURE TIME ACTUAL (Z)	7. CRUISING ALTITUDE
VFR / IFR / DVFR							

8. ROUTE OF FLIGHT

9. DESTINATION (Name of airport and city)	10. EST. TIME ENROUTE HOURS	10. EST. TIME ENROUTE MINUTES	11. REMARKS
			No SID

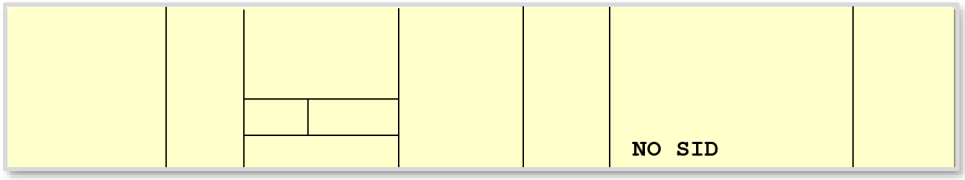
12. FUEL ON BOARD HOURS	12. FUEL ON BOARD MINUTES	13. ALTERNATE AIRPORT(S)	14. PILOT'S NAME, ADDRESS & TELEPHONE NUMBER & AIRCRAFT HOME BASE / 17. DESTINATION CONTACT/TELEPHONE (OPTIONAL)	15. NUMBER ABOARD

16. COLOR OF AIRCRAFT

CIVIL AIRCRAFT PILOTS, FAR Part 91 requires you to file an IFR flight plan to operate under Instrument flight rules in controlled airspaces. Failure to file could result in a civil penalty not to exceed $1,000 for each violation (Section 901 of the Federal Aviation Act of 1958, as amended). Filing of a VFR flight plan is recommended as a good operating practice. See also Part 99 for requirements concerning DVFR flight plans.

FAA FORM 7233-1 (8-82) CLOSE VFR FLIGHT PLAN WITH _____ FSS ON ARRIVAL

Flight Progress Strip



When a pilot indicates they will not accept a SID, the controller should clear the aircraft via the filed route to the extent possible, or via a preferential departure route.

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

Example
The underlined segments depict the difference between the example clearances.

A clearance **without using a SID** may sound like:	The same clearance **using a SID** would sound like:
"United Six Fifty Five, cleared to Burbank airport, after departure turn right heading 360, intercept Rattlesnake 316 radial direct Plata intersection, then via Durango 235 radial direct Durango, then as filed. Climb and maintain flight level 210 departure frequency 119.1 squawk 0454."	"United Six Fifty Five, cleared to Burbank airport, Plata 1 departure, Durango transition, then as filed. Climb and maintain flight level 210 departure frequency 119.1 squawk 0454."

Knowledge Check A

REVIEW what you have learned so far about SID charts. ANSWER the questions listed below.

1. Which procedures are preplanned IFR procedures that provide obstruction clearance and facilitate transition from the terminal environment to the en route environment? *(Select the correct answer.)*
   - ❑ Standard Instrument Departures
   - ❑ Obstacle Departure Procedures
   - ❑ **Instrument Departure Procedures**

2. Which of the following should be located first in the Terminal Procedures Publications when searching for a particular SID? *(Select the correct answer.)*
   - ❑ Airport
   - ❑ **City**
   - ❑ State

3. What should the controller do when a pilot indicates that they will **NOT** accept a SID? *(Select the correct answer.)*
   - ❑ **Clear the aircraft via the filed route, if possible**
   - ❑ Instruct the pilot to hold until able to comply
   - ❑ Lecture the pilot for slowing down traffic

4. What are the two types of departure procedures? *(Select the correct answer.)*
   - ❑ STARs and SIDs
   - ❑ Vector and Pilot Navigational
   - ❑ **ODPs and SIDs**

Standard Instrument Departure (SID) Charts Summary

Standard Instrument Departures are primarily designed for system enhancement to expedite traffic flow and to reduce pilot/controller workload and frequency congestion.

FACILITATOR INSTRUCTIONS	DELIVERY METHOD
■ Instruct students to locate student exercise ***Using a SID*** in the printed ***Student Guide*** ■ Instruct students to locate ***Using a SID*** in the ***Student Guide and References*** folder ■ Inform students to use the reference to answer questions ■ The exercise will be performed in small teams ■ Instruct students to read scenario then answer each question ■ At the end of the exercise, the exercise will be evaluated during a whole class discussion ■ Randomly select students to represent teams and provide answers orally ■ Instruct other students to assess their answers when provided ■ Encourage student discussion with this exercise and resolve any questions	Exercise **EST. RUN TIME** 20 mins.

EXERCISE – USING A SID

Purpose
This exercise will give you practice in using a Standard Instrument Departure (SID) chart.

Detailed Facilitator Instructions: *The reference required to complete this exercise is located in the* ***Student Guide and References*** *folder. Ensure students have located the reference before beginning the exercise.*

Reference: *Using a SID*

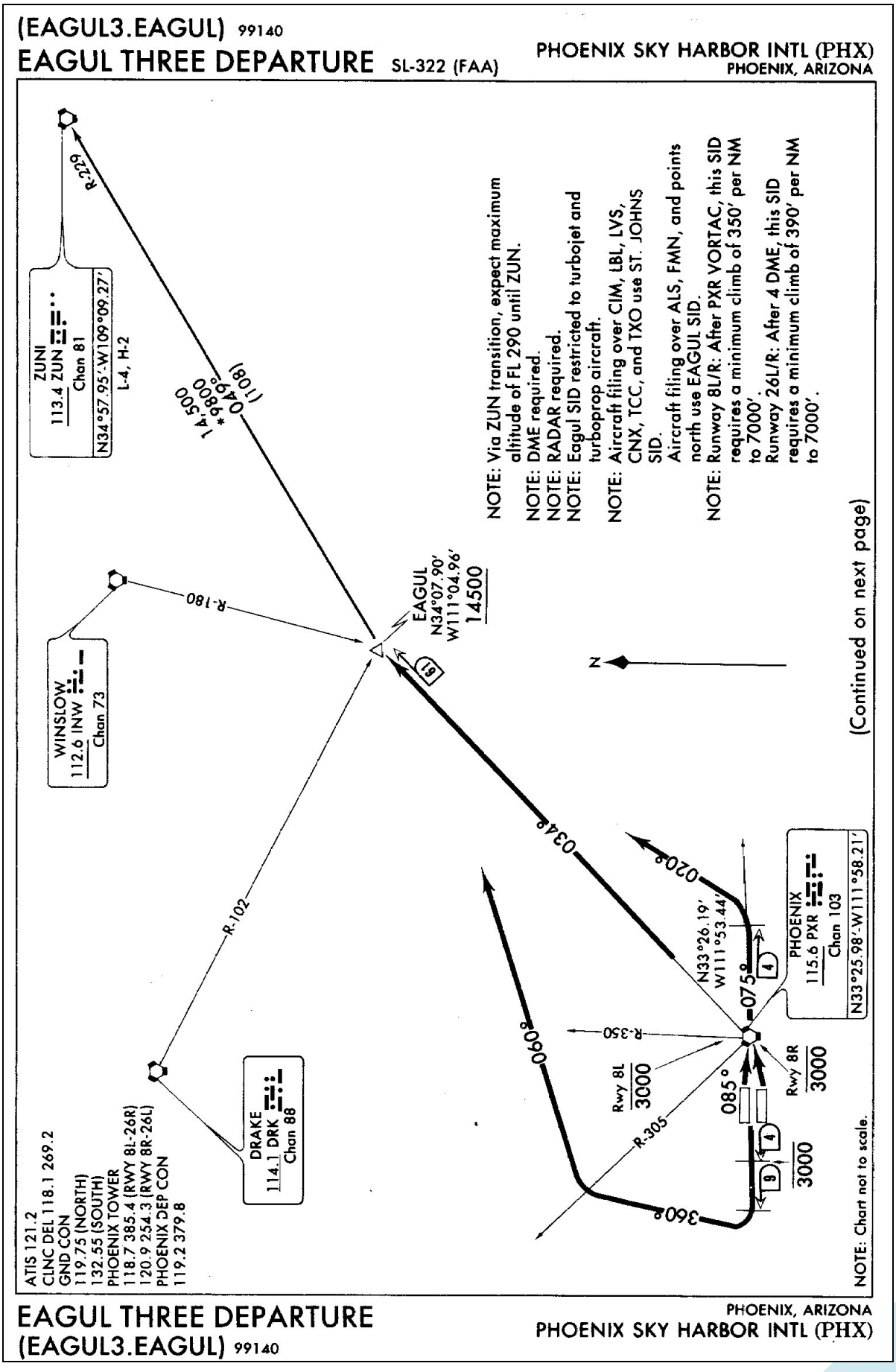
Divide classes into small teams. Instruct students to locate ***"Using a SID"*** *worksheet in the* ***Student Guide****. Using the reference, locate the answers and record answers on the worksheet. After completion, select students to report their assessments and justify the answers. Encourage student discussion with this exercise and clarify any misunderstandings.*

Directions
Working in teams, read the scenario, then use the sample SID to locate the answers to the questions. After completion, select a spokesman for your team to provide and justify your answers.

Reference – Using a SID

Scenario
The pilot of N100WN, a GLF3, is preparing to depart Phoenix Sky Harbor Airport for Chicago O'Hare. ATIS has advised N100WN that Runway 26R is active. The clearance delivery controller has cleared N100WN "...via the EAGUL THREE departure, Zuni transition."

Question	Answer
1. What type of SID is the EAGUL THREE departure?	**Pilot navigational SID**
2. Can a Cessna 172 aircraft fly the EAGUL THREE departure? Explain.	**The fourth note restricts use of EAGUL THREE to turbojet and turboprop aircraft because the mountains require an "at or above 14,500" restriction at EAGUL intersection.**
3. How many VORTACs are displayed on the EAGUL THREE departure?	**Four**
4. What navigational frequency will the pilot of N100WN have selected as the aircraft is taking off from Sky Harbor Airport?	**115.6 – the frequency for PXR VORTAC**
5. Must an aircraft have DME to execute the EAGUL THREE departure? Explain.	**Yes, because of the 4-DME-mile altitude restriction and the 9-DME-mile clearance to turn right heading 360 degrees. These are found in the Notes.**
6. What is the three-letter designator for Sky Harbor Airport?	**PHX**
7. On what frequency will a SID be issued?	**Clearance delivery – 118.1/269.2**
8. Where does the EAGUL THREE departure route terminate?	**EAGUL Intersection**
9. What is the altitude restriction at EAGUL Intersection? Is this AGL or MSL?	**At or above 14,500 – MSL**
10. What is the minimum climb rate for this scenario?	**390 ft/NM to 7,000 ft.**
11. Who is primarily responsible for navigation on this SID?	**The pilot**


(EAGUL3.EAGUL) 99140
EAGUL THREE DEPARTURE SL-322 (FAA)
PHOENIX SKY HARBOR INTL (PHX)
PHOENIX, ARIZONA
ZUNI
113.4 ZUN
Chan 81
N34°57.95'-W109°09.27'
L-4, H-2
R-229
WINSLOW
112.6 INW
Chan 73
R-180
DRAKE
114.1 DRK
Chan 88
R-102
EAGUL
N34°07.90'
W111°04.96'
14500
NOTE: Via ZUN transition, expect maximum altitude of FL 290 until ZUN.
NOTE: DME required.
NOTE: RADAR required.
NOTE: Eagul SID restricted to turbojet and turboprop aircraft.
NOTE: Aircraft filing over CIM, LBL, LVS, CNX, TCC, and TXO use ST. JOHNS SID.
Aircraft filing over ALS, FMN, and points north use EAGUL SID.
NOTE: Runway 8L/R: After PXR VORTAC, this SID requires a minimum climb of 350' per NM to 7000'.
Runway 26L/R: After 4 DME, this SID requires a minimum climb of 390' per NM to 7000'.
(Continued on next page)
N
034°
020°
075°
090°
085°
360°
R-350
R-305
N33°26.19'
W111°53.44'
PHOENIX
115.6 PXR
Chan 103
N33°25.98'-W111°58.21'
Rwy 8L
3000
Rwy 8R
3000
3000
ATIS 121.2
CLNC DEL 118.1 269.2
GND CON
119.75 (NORTH)
132.55 (SOUTH)
PHOENIX TOWER
118.7 385.4 (RWY 8L-26R)
120.9 254.3 (RWY 8R-26L)
PHOENIX DEP CON
119.2 379.8
NOTE: Chart not to scale.
EAGUL THREE DEPARTURE
(EAGUL3.EAGUL) 99140
PHOENIX, ARIZONA
PHOENIX SKY HARBOR INTL (PHX)

FACILITATOR INSTRUCTIONS	DELIVERY METHOD
■ Review content presented in ***Standard Instrument Departure (SID) Charts*** lesson and ***Using a SID*** exercise ■ Review answers orally and have students evaluate their answers for ***Using a SID*** exercise ■ Navigate to the ***Parking Lot*** link within Blackboard and review any student questions ■ Address ***Parking Lot*** questions and facilitate a brief discussion of the lesson content	Facilitated Discussion **EST. RUN TIME** 15 mins.

FACILITATOR INSTRUCTIONS	DELIVERY METHOD
■ **ENABLE *Standard Terminal Arrival (STAR) Charts*** lesson in Blackboard ■ Instruct students to navigate to the ***Standard Terminal Arrival (STAR) Charts*** lesson in Blackboard ■ Instruct students to work individually through the lesson content ■ Upon completion of the lesson, students should review previously introduced content or wait quietly until other students have completed	Blackboard **EST. RUN TIME** 15 mins.

STANDARD TERMINAL ARRIVAL (STAR) CHARTS

Purpose: The purpose of this lesson is to describe how Standard Terminal Arrival (STAR) charts are used and to identify the types of information displayed on these charts.

Objectives:

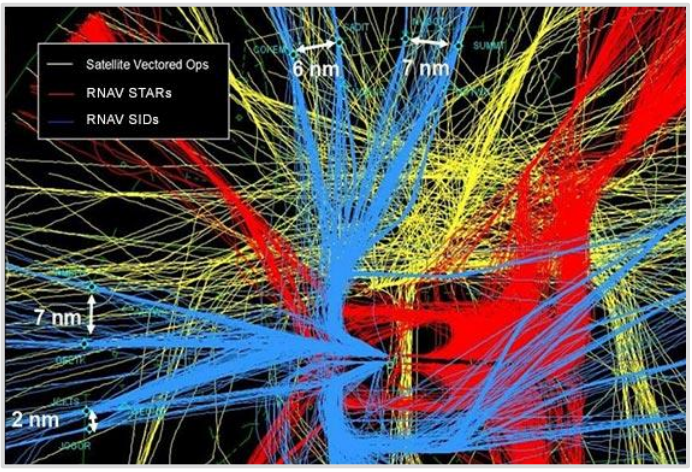
- Identify the purpose of STARs
- Identify layout/components of STARs
- Identify how to interpret a STAR
- Identify “No STAR” procedures

References for this lesson are as follows:

- FAA Order JO 7110.65, Air Traffic Control
- FAA-H-8083-16, Instrument Procedures Handbook
- U.S. Terminal Procedures Chart SW, Vol. 1

Performance-Based Navigation (PBN)

Like the Standard Instrument Departure (SID), the STAR uses Performance-Based Navigation (PBN). PBN provides transitions to a safer and more efficient design of National Airspace System (NAS).

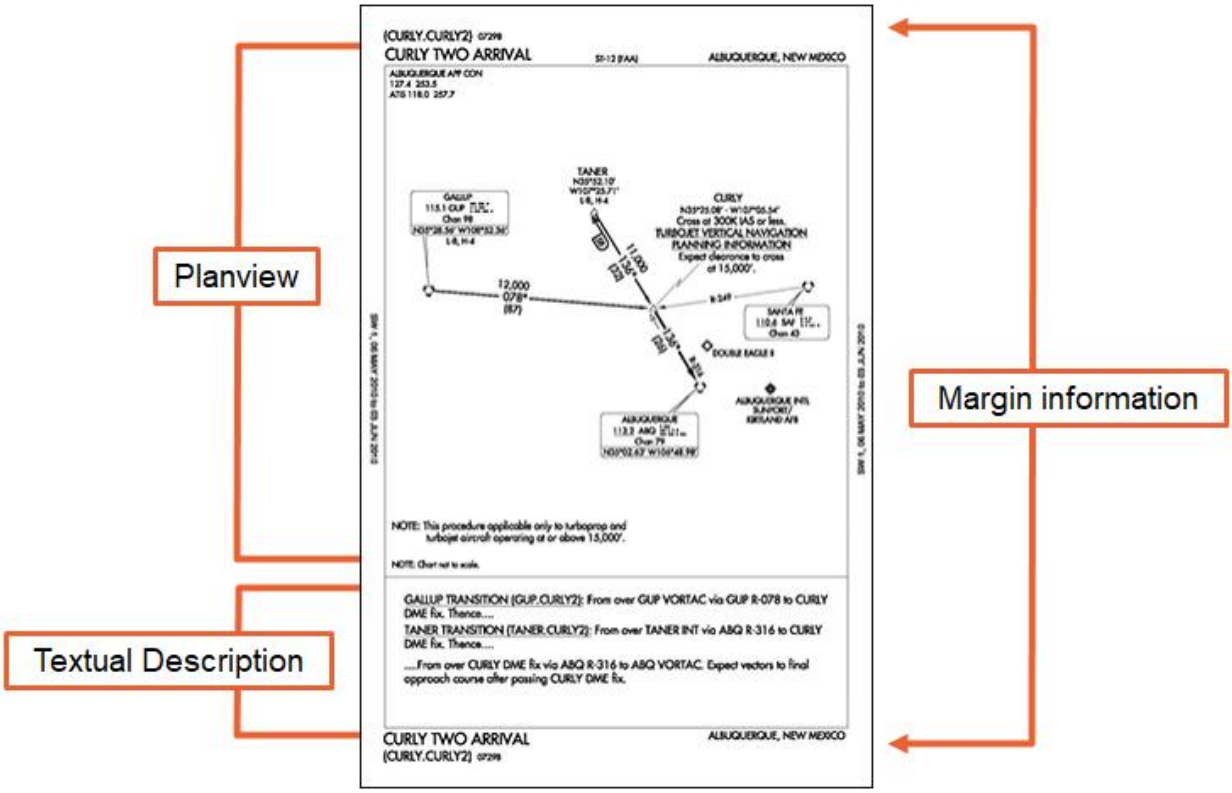


PBN impacts arrivals:

- Reduces arrival delay times at the destination airports
- Improves traffic flow management
- Improves access to more airports during poor weather conditions

Standard Terminal Arrival (STAR) Charts

Like the SID, the STAR has three sections on a chart.

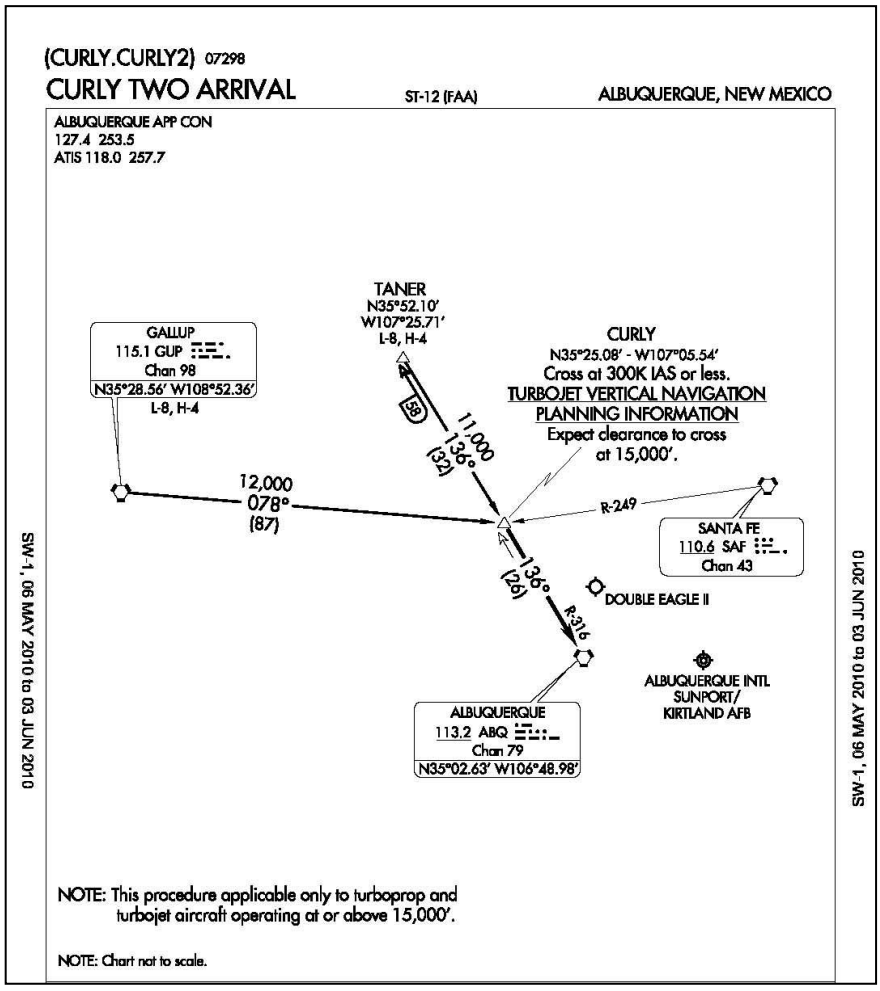


STARs are long-range planning tools that funnel arrival traffic into one-way corridors. They are designed to expedite arrival procedures and to facilitate transition between en route and instrument approach operations.

- They depict preplanned IFR arrival procedures in graphic and textual form
- Each STAR procedure is presented as a separate chart and may serve either a single airport or more than one airport in a given geographic area
- Use of a STAR requires pilot possession of the approved chart

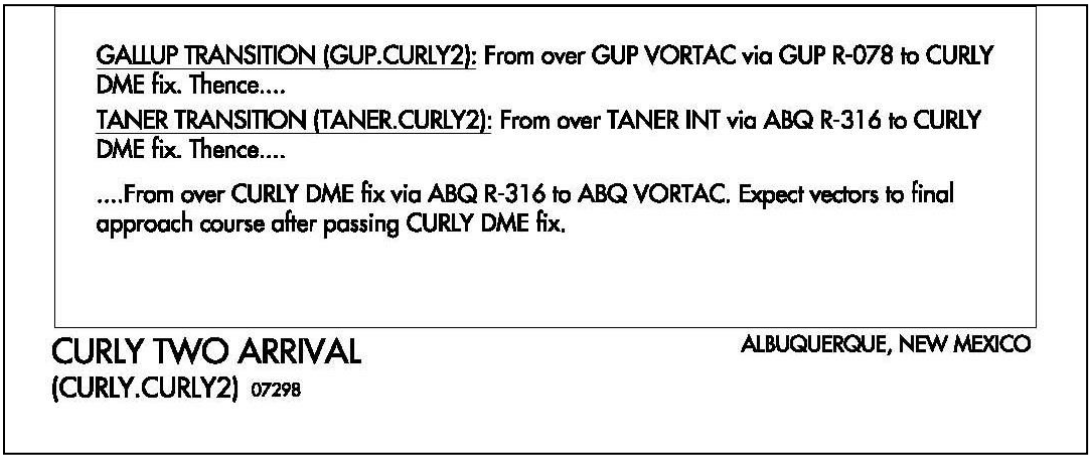
Procedure:

- The transition routes begin at GUP VORTAC or TANER DME fix
- Transition routes (medium black lines) provide navigation to the common fix, CURLY (for which the procedure is named)
- The arrival route (thick black line) begins at CURLY and ends at ABQ VORTAC
- Frequencies: Navigation and Communication



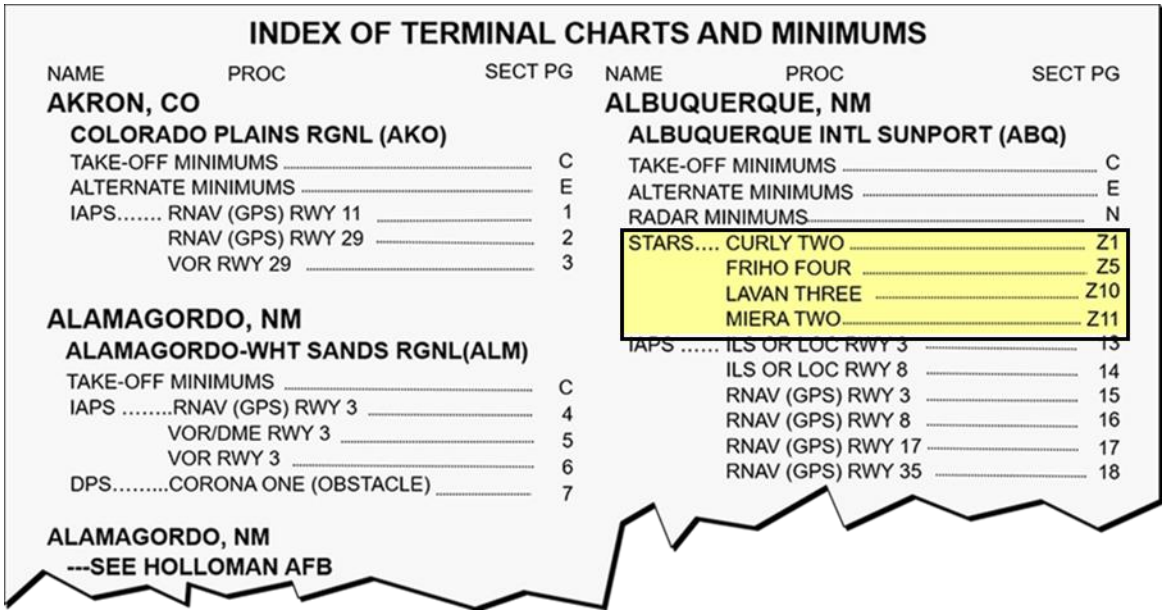
Standard Information:

- The communication frequencies for the procedure are listed at the top left of the STAR; the navigation frequencies are listed in the individual navigational aid information box
- Turbojet Vertical Navigation Planning Information
  - These are "expect" clearances and not to be executed until the controller issues clearance
- Textual Description
- Procedure Notes



U.S. Terminal Procedures Chart – STARS

Unlike SIDs, which are located with the Instrument Approach Procedures (IAPs) and the Airport Diagram, STARs have their own separate section in the front of the book.



INDEX OF TERMINAL CHARTS AND MINIMUMS

NAME PROC SECT PG

AKRON, CO

COLORADO PLAINS RGNL (AKO)

TAKE-OFF MINIMUMS C
ALTERNATE MINIMUMS ..... E
IAPS..... RNAV (GPS) RWY 11 1
RNAV (GPS) RWY 29 2
VOR RWY 29 3

ALAMAGORDO, NM

ALAMAGORDO-WHT SANDS RGNL(ALM)

TAKE-OFF MINIMUMS C
IAPS .....RNAV (GPS) RWY 3 4
VOR/DME RWY 3 5
VOR RWY 3 6
DPS.....CORONA ONE (OBSTACLE) 7

ALAMAGORDO, NM

---SEE HOLLOMAN AFB

NAME PROC SECT PG

ALBUQUERQUE, NM

ALBUQUERQUE INTL SUNPORT (ABQ)

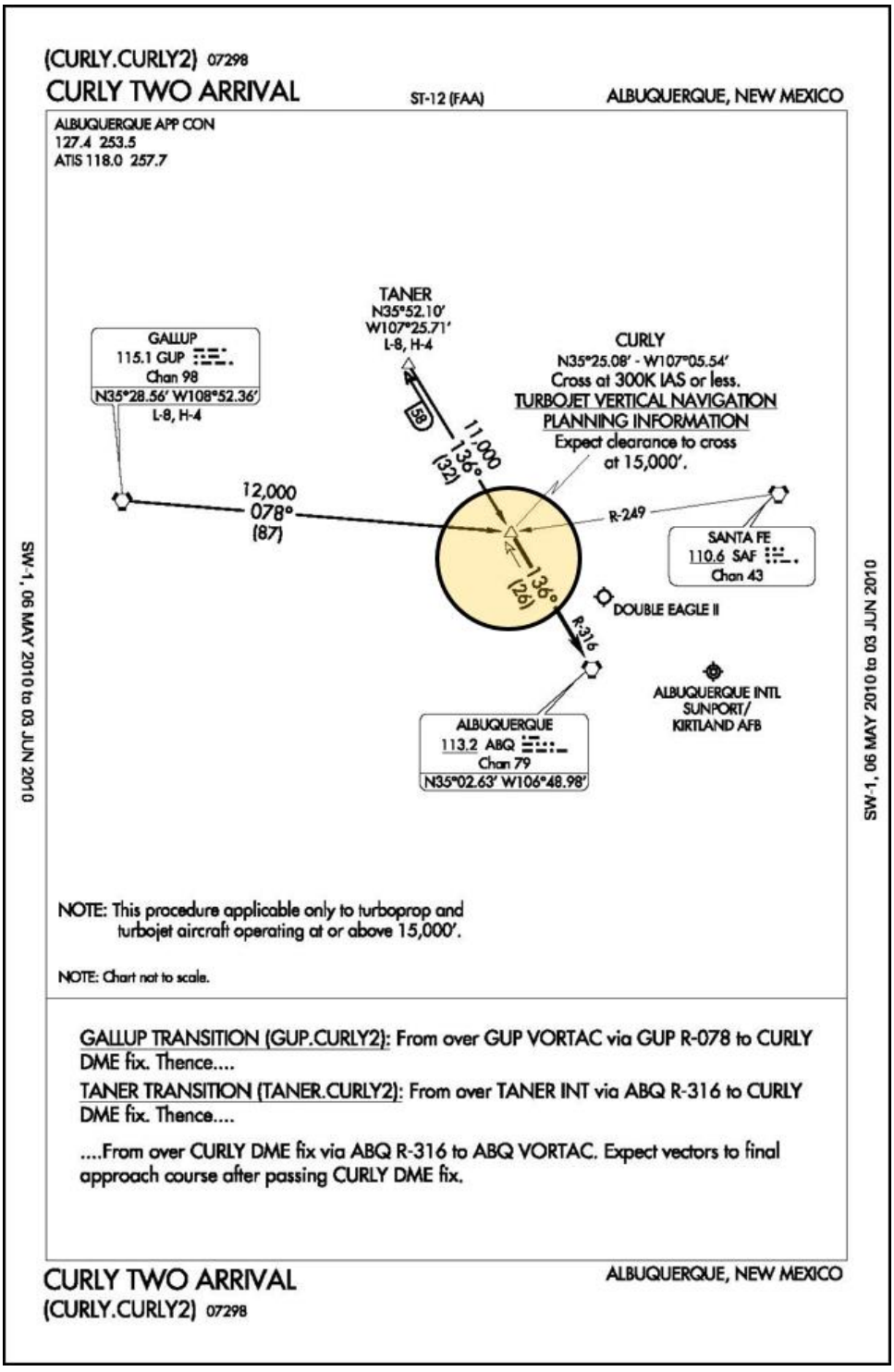
TAKE-OFF MINIMUMS C
ALTERNATE MINIMUMS ..... E
RADAR MINIMUMS ..... N
STARS.... CURLY TWO Z1
FRIHO FOUR Z5
LAVAN THREE Z10
MIERA TWO Z11
IAPS ..... ILS OR LOC RWY 3 13
ILS OR LOC RWY 8 14
RNAV (GPS) RWY 3 15
RNAV (GPS) RWY 8 16
RNAV (GPS) RWY 17 17
RNAV (GPS) RWY 35 18

Interpreting a STAR

STARs use much of the same symbology as departure and approach charts.

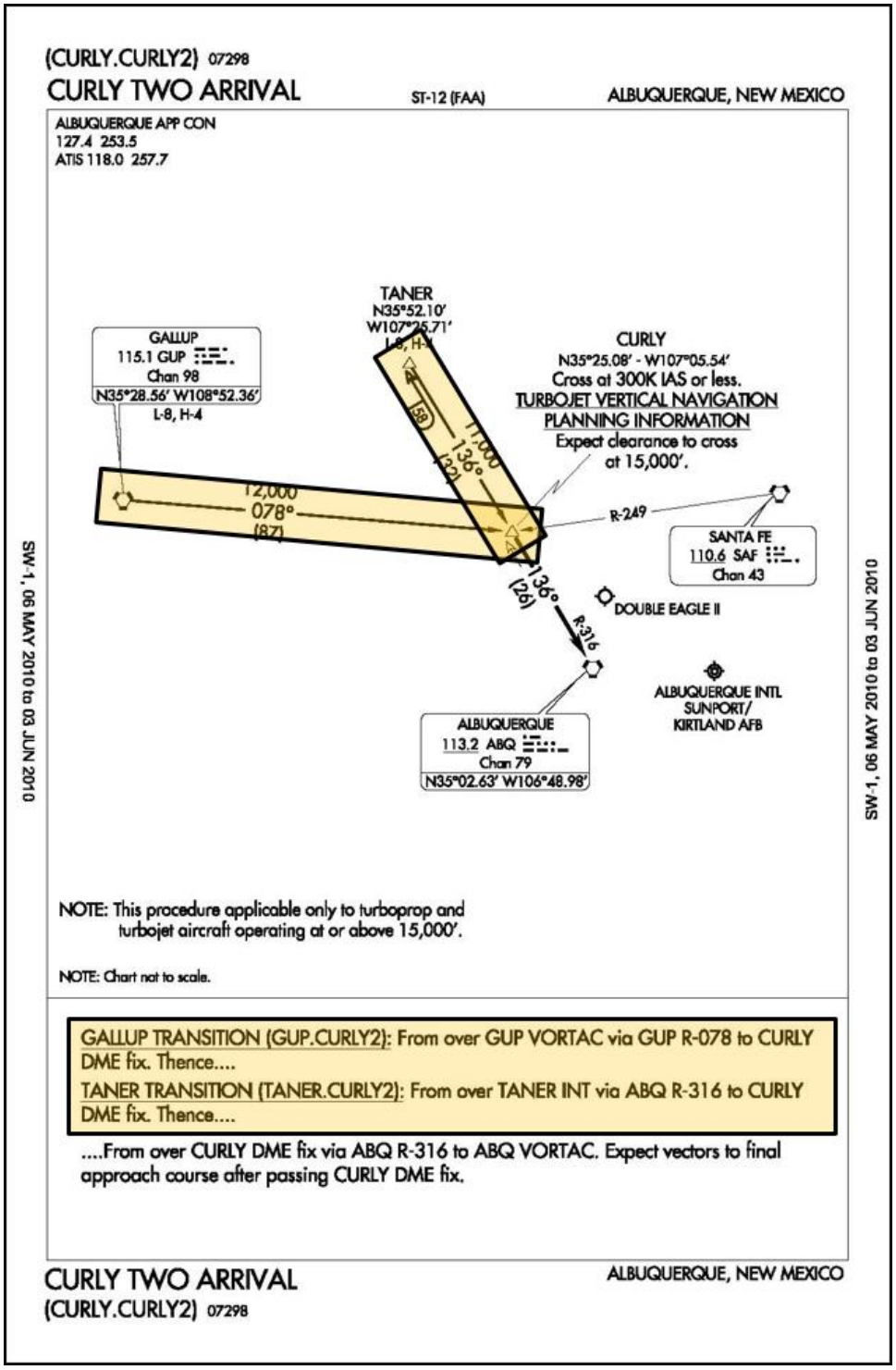
Common NAVAID/Fix

The arrival route officially begins at the common NAVAID, intersection, or fix where all the various transitions come together.



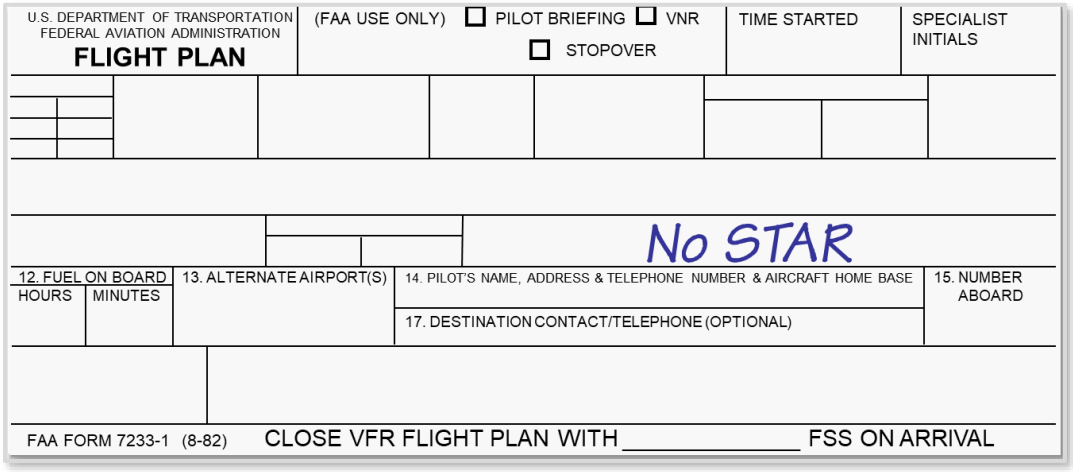
Transitions

- A transition is a published segment used to connect one or more en route airways, jet routes, or area navigation (RNAV) routes to the common NAVAID/fix
- Several transitions from various directions can be accommodated on the same chart, and traffic flow is routed appropriately within the congested airspace

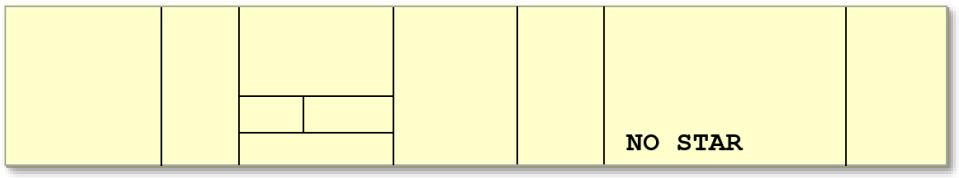


“No STAR”

Although it is **NOT** required, pilots are encouraged to include the phrase “No STAR” on their flight plan if they do not wish to be issued a STAR. The flight progress strip will reflect this decision.



Flight Progress Strip



Example

A clearance **without using a STAR** may read:	The same clearance **using a STAR** would read:
“Learjet 32G, cleared to Seattle/Tacoma International Airport as filed. Maintain 12,000. At the Ephrata VOR, intercept the 221° radial to CHINS Intersection. Intercept the 284° radial of the Yakima VOR to RADDY Intersection. Cross RADDY at 10,000. Continue via the Yakima 284° radial to AUBRN Intersection. Expect radar vectors to the final approach course.”	“Learjet 32G, cleared to Seattle/Tacoma International Airport as filed, then CHINS EIGHT ARRIVAL, Ephrata Transition. Maintain 10,000.” A shorter transmission conveys the same information.

Knowledge Check B

REVIEW what you have learned so far about STAR charts. ANSWER the questions listed below.

1. What are the purposes of a STAR chart? *(Select all correct answers that apply.)*
   - ❑ Expedite ATC departure procedures
   - ❑ Transition from approach to terminal
   - ❑ **Expedite ATC arrival procedures**
   - ❑ **Transition aircraft from en route to approach**

2. What types of information will you find on a STAR? *(Select all correct answers that apply.)*
   - ❑ **Multiple converging transition routes**
   - ❑ **One common fix, intersection, or NAVAID**
   - ❑ **Transitions from en route to approach**
   - ❑ **A description of the Planview information**

3. What are pilots encouraged to include on their flight plan if they do not wish to be issued a STAR? *(Select the correct answer.)*
   - ❑ "STAR exempt"
   - ❑ "**No STAR"**
   - ❑ "STAR not issued"

Standard Terminal Arrival (STAR) Summary

Standard terminal arrivals streamline arrivals by allowing aircraft to merge to a given point from one or more directions and land safely on a runway. Controllers must become familiar with standard terminal arrivals in order to provide successful guidance to arriving aircraft.

FACILITATOR INSTRUCTIONS	DELIVERY METHOD
■ Instruct students to locate student exercise ***Using a STAR*** in the printed ***Student Guide*** ■ Instruct students to locate in the ***Using a STAR*** in the ***Student Guide and References*** folder ■ Inform students to use the reference to answer questions ■ The exercise will be performed in teams ■ Instruct students to read scenario then answer each question ■ At the end of the exercise, the exercise will be evaluated during a whole class discussion ■ Randomly select students to represent teams and provide answers orally ■ Instruct other students to assess their answers when provided ■ Encourage student discussion with this exercise and resolve any questions	Exercise **EST. RUN TIME** 20 mins.

EXERCISE – USING A STAR

Purpose
This exercise will give you practice in using a Standard Terminal Arrival (STAR) chart.

Detailed Facilitator Instructions: *The reference required to complete this exercise is located in the* ***Student Guide and References*** *folder. Ensure students have located the reference before beginning the exercise.*

Reference: *Using a STAR*

*Divide classes into small teams. Instruct students to locate "**Using a STAR"** worksheet in the **Student Guide**. Using the reference, locate the answers and record answers on the worksheet. After completion, select students to report their assessments and justify the answers. Encourage student discussion with this exercise and clarify any misunderstandings.*

Directions
Working in teams read the scenario, then use the sample STAR to locate the answers to the questions. After completion, select a spokesman for your team to provide and justify your answers.

Reference – Using a STAR

Scenario
The pilot of N1GN, a B737, is en route to Las Vegas, Nevada, from New York City. Somewhere over Nebraska at FL 280, the pilot receives a clearance "Direct PGS (Peach Springs) VEEVA TWO ARRIVAL to LAS (Las Vegas)."

Question	Answer
1. Normally, what type of controller cleared N1GN for the VEEVA TWO Arrival?	**En route**
2. When N1GN received the VEEVA TWO Arrival clearance, what type of navigational chart was the pilot using?	**En route High Altitude Chart**
3. What must a pilot possess before accepting a STAR clearance?	**The approved chart for the STAR.**
4. Why isn't the altitude information at VEEVA included in the textual description?	**The altitude information at VEEVA is for planning purposes only.**
5. After receiving the clearance "Direct PGS the VEEVA TWO ARRIVAL to LAS," what frequency would the pilot select to navigate direct PGS?	**112.0**
6. To find out the LAS weather, approach-in-use, and active runway, what frequency would the pilot select?	**ATIS on frequency 132.4**
7. How can a pilot identify VEEVA intersection?	**Crossing the Needles 353 radial; The lat/long (N35°50.05'; W114°16.86'); 30 DME from BLD (38 DME from PGS can NOT be used because the DME fix arrow only points to VEEVA from BLD)**
8. Where does the VEEVA TWO ARRIVAL terminate?	**BLD VORTAC**

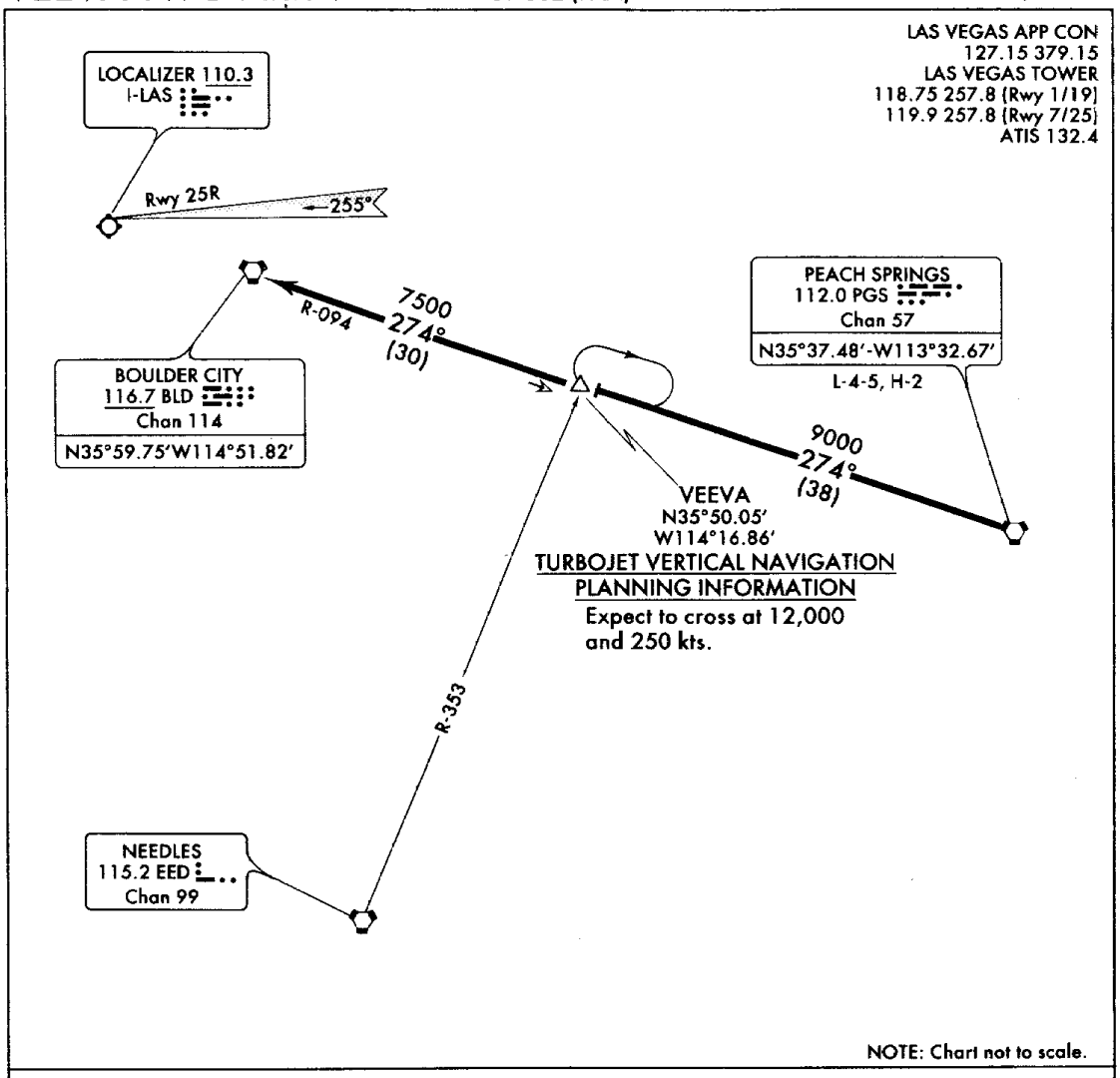
Question	Answer
9. What is the lowest usable altitude that N1GN can be assigned on the VEEVA TWO ARRIVAL? Is this MSL or AGL?	**7,500 feet; MSL**
10. May the Needles transition be used if desired?	**No, there is no Needles transition**
11. What frequency will the last en route controller assign to N1GN?	**Apch Control 127.15**
12. If the active runway at LAS is RWY 19L, what will N1GN do after BLD VORTAC?	**Fly the vector assigned by ATC.**

(PGS.VEEVA2) 98057

VEEVA TWO ARRIVAL

ST-662 (FAA)

McCARRAN INTL
LAS VEGAS, NEVADA



From over PGS VORTAC via PGS R-274 and BLD R-094 to BLD VORTAC. Runways 25L/R expect ILS Approach Procedure. Runways 1L/R, 7L/R, and 19L/R expect vectors to final approach course.

VEEVA TWO ARRIVAL
(PGS.VEEVA2) 98057

LAS VEGAS, NEVADA
McCARRAN INTL

FACILITATOR INSTRUCTIONS	DELIVERY METHOD
■ Review content presented in ***Standard Terminal Arrival (STAR) Charts*** lesson and ***Using a STAR*** exercise ■ Navigate to the ***Parking Lot*** link within Blackboard and review any student questions ■ Address ***Parking Lot*** questions and facilitate a brief discussion of the lesson content	Facilitated Discussion **EST. RUN TIME** 15 mins.

FACILITATOR INSTRUCTIONS	DELIVERY METHOD
■ **ENABLE *Terminal Determination*** game in ***Exercises and Activities*** folder in Blackboard ■ Instruct students to navigate to the ***Exercises and Activities*** folder in Blackboard ■ Instruct students to locate the ***Terminal Determination*** game located in this folder ■ The game will be performed individually ■ Instruct students to answer each question ■ The game will evaluate the students' performance at the end ■ Suggest allowing opportunities to repeat the activity during periods of down time	Game **EST. RUN TIME** 15 mins.

GAME: TERMINAL DETERMINATION (ANSWER KEY)

Note: *The questions in the key and their distractors may appear in a different order than displayed here due to game question randomization.*

Question	Answer
1. N7564, Lear Jet is ready to depart Los Angeles on runway 7L with a heading of 071°. What altitude must the aircraft be at before it starts its right-hand turn?	**2000** 9000 5000 245
2. N7564, Lear Jet is approaching Salt Lake City. What is the name of the common fix used to land at Salt Lake City?	**QWENN** FRNZY KAMMP RRICH
3. N7654, Lear Jet, is ready to depart for Denver. You have assigned N7654 the SALT LAKE FOUR DEPARTURE with the MLD transition. What is the frequency for the MLD VOR?	**117.4** 107 116.8 121

Question	Answer
4. N7654, Lear Jet, is on the final leg of his flight approaching Denver. What frequency would N7654 select to find out the local weather, approach-in-use, and active runway?	**125.6 or 379.9** 120.35 120.35 or 379.3 379.3
5. N1UA, C550, is departing 25R. You assign N1UA the YELLOWSTONE ONE DEPARTURE. Which radial of the GLL VOR/DME should N1UA depart for HANKI?	**GLL R-034** GLL 005° GLL R-005 COPLA
6. N1UA, C550, is now approaching Oklahoma City. You assign N1UA the MURAH THREE ARRIVAL. What type of approach will they expect if they are landing RWY 17R?	**RNAV** Radar Visual ILS
7. N1UA, C550, is ready to depart Oklahoma City. You have assigned N1UA the KRMSN THREE DEPARTURE. What is expected after departure?	**Radar vectors** Pilot navigation PDR Via filed route
8. N1UA, C550, is inbound to Nashville assigned the HEHAW SIX ARRIVAL. What equipment will N1UA need for this approach?	**DME** NDB ILS VOR
9. N1UA, C550, is ready to depart on the final leg of the trip. “No SID” is in the flight strip. What route can the pilot expect?	**Filed route to the extent possible** Pilot navigation Radar vectors Obstacle departure procedure
10. N1UA, C550, is approaching New York! You have assigned N1UA the HAARP THREE ARRIVAL to land at LGA. What altitude is N1UA expected to cross BASYE?	**8,000 feet** 5,000 feet 4,000 feet 3,000 feet

SUMMARY

The purpose of this module was to introduce you to Standard Instrument Departure (SID) and Standard Terminal Arrival (STAR) procedural charts, which are used by pilots when flying on an Instrument Flight Rules (IFR) flight plan.

In accordance with FAA Order JO 7110.65, Air Traffic Control; FAA-H-8083-16 Instrument Procedures Handbook; U.S. Terminal Procedures Chart SW, Vol. 1; and the Aeronautical Information Manual (AIM); you should now be able to:

- Identify types of departure procedures
- Identify types of SIDs
- Identify components of SIDs
- Identify “No SID” procedures
- Identify the purpose of STARs
- Identify layout/components of STARs
- Identify how to interpret a STAR
- Identify “No STAR” procedures

FACILITATOR INSTRUCTIONS	DELIVERY METHOD
■ Navigate to the ***Parking Lot*** link within Blackboard and review any student questions ■ Address ***Parking Lot*** questions and facilitate a brief discussion of the lesson content ■ Instruct students to prepare for the ***End-of-Module*** test by putting away their Student Guides	Facilitated Discussion **EST. RUN TIME** 15 mins.

FACILITATOR INSTRUCTIONS	DELIVERY METHOD
■ **ENABLE *SIDs and STARs End-of-Module Test*** link in Blackboard ■ Instruct students: ○ Clear desks ○ Do not write anything during or after the test ○ Navigate to the ***SIDs and STARs End-of-Module Test*** link in Blackboard ○ Once they are satisfied with their responses, click "Save and Submit;" do not click "OK" to review results until directed to do so ○ Choose "Cancel" if they receive a warning message that the test has unanswered questions; choosing OK will submit the test and not allow them to go back and answer the questions ○ Leave the room after submitting the test and return at the "Be Back" time ■ ***Note:*** *This test is scored but not graded* ■ During test, monitor students to ensure a secure testing environment ■ Identify the most commonly missed questions by reviewing student statistics in Blackboard ■ Instruct students to click "View Results" when ready to review commonly missed questions ■ Review commonly missed questions with students	Blackboard Assessment **EST. RUN TIME** 25 mins.

END-OF-MODULE TEST (ANSWER KEY)

Note: *Test questions in Blackboard are presented to the students in random order. Please be aware the test key question order will not match the student version.*

1. SIDs are air traffic control procedures used at busier airports to do all of the following **EXCEPT** _____. *(Select the correct answer.)*
   - ❑ **Facilitate noise abatement procedures**
   - ❑ Simplify clearance delivery
   - ❑ Expedite traffic flow
   - ❑ Reduce pilot/controller workload

   Reference(s): FAA-H-8083-16, Chap. 1

2. Which SID does **NOT** include departure routes or transition routes? *(Select the correct answer.)*
   - ❑ **Vector**
   - ❑ ODP
   - ❑ Pilot Navigation
   - ❑ DP

   Reference(s): FAA-H-8083-16, Chap. 1

3. What section of a SID or STAR contains the graphic depiction? *(Select the correct answer.)*
   - ❑ **Planview**
   - ❑ Margin
   - ❑ Textual description
   - ❑ Legend

   Reference(s): U.S. Terminal Procedures Chart SW, Vol. 1.

4. What remark are pilots encouraged to include in a flight plan when **NOT** requesting a SID? *(Select the correct answer.)*
   - ❑ **"No SID"**
   - ❑ "No DP"
   - ❑ "No ATC assistance needed"
   - ❑ "No departure assistance required"

   Reference(s): FAA-H-8083-16, Chap. 1

5. Which statement is true regarding a STAR? *(Select the correct answer.)*
   - ❑ **One STAR may serve several airports**
   - ❑ A STAR is designed to provide a transition for departures from the airport into the en route environment
   - ❑ Several STARs may be included on a single chart
   - ❑ STARs are located with the Instrument Approach Procedures in the U.S. Terminal Procedures Publication, while SIDs have their own section in the front of the book

   Reference(s): FAA-H-8083-16, Chap. 3

6. Where does the arrival route begin in a STAR? *(Select the correct answer.)*
   - ❑ **At the common fix**
   - ❑ With transition routes
   - ❑ At CURLY TWO
   - ❑ With frequency navigation and communication

   Reference(s): JO 7110.65, Pilot/Controller Glossary

7. How many transitions can be accommodated on the same STAR chart? *(Select the correct answer.)*
   - ❑ **Several from various directions**
   - ❑ Two
   - ❑ One
   - ❑ Partial arrival from one direction

   Reference(s): FAA-H-8083-16, Chap. 3

8. The following is an example of what type of clearance? *(Select the correct answer.)*
   "Learjet, cleared to the Seattle/Tacoma International Airport as filed. Maintain 12,000. At the Ephrata VOR, intercept the 221° radial to CHINS Intersection. Intercept the 284° radial of the Yakima VOR to RADDY Intersection. Cross RADDY at 10,000. Continue via the Yakima 284° radial to AUBRN Intersection. Expect radar vectors to the final approach course."
   - ❑ **No STAR**
   - ❑ Vector SID
   - ❑ STAR
   - ❑ SID

   Reference(s): JO 7110.65, Chap. 4