Departure Charts/Procedures

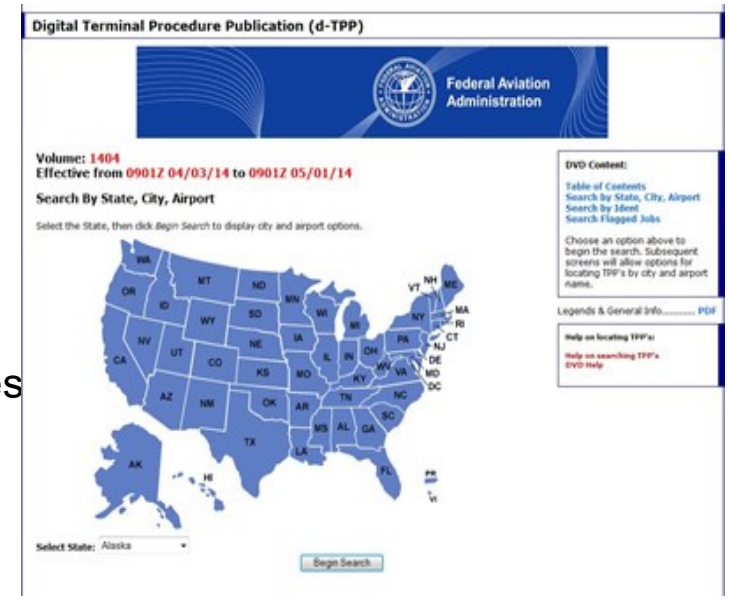
Departure Charts/Procedures

- U.S. Terminal Procedures Familiarization

What are Terminal Procedures? They are for IFR Departures and Arrivals.

U.S. Terminal Procedures Publications are published in 24 loose-leaf or perfect bound volumes covering the conterminous U.S., Puerto Rico, and the Virgin Islands. Included in the Terminal Procedures Publications are:

- **TPP includes**
- Instrument Approach Procedure charts (IAP)
- Departure Procedure charts (DP)
- DoD High Altitude IAPs
- Standard Terminal Arrival Route charts (STAR)
- Airport Diagrams (AD)
- Charted Visual Flight Procedure charts (CVFR)
- Take-Off, Radar, and Alternate Minima textual procedures
- Legend and General Information pages
- d-TPP xml Metafile

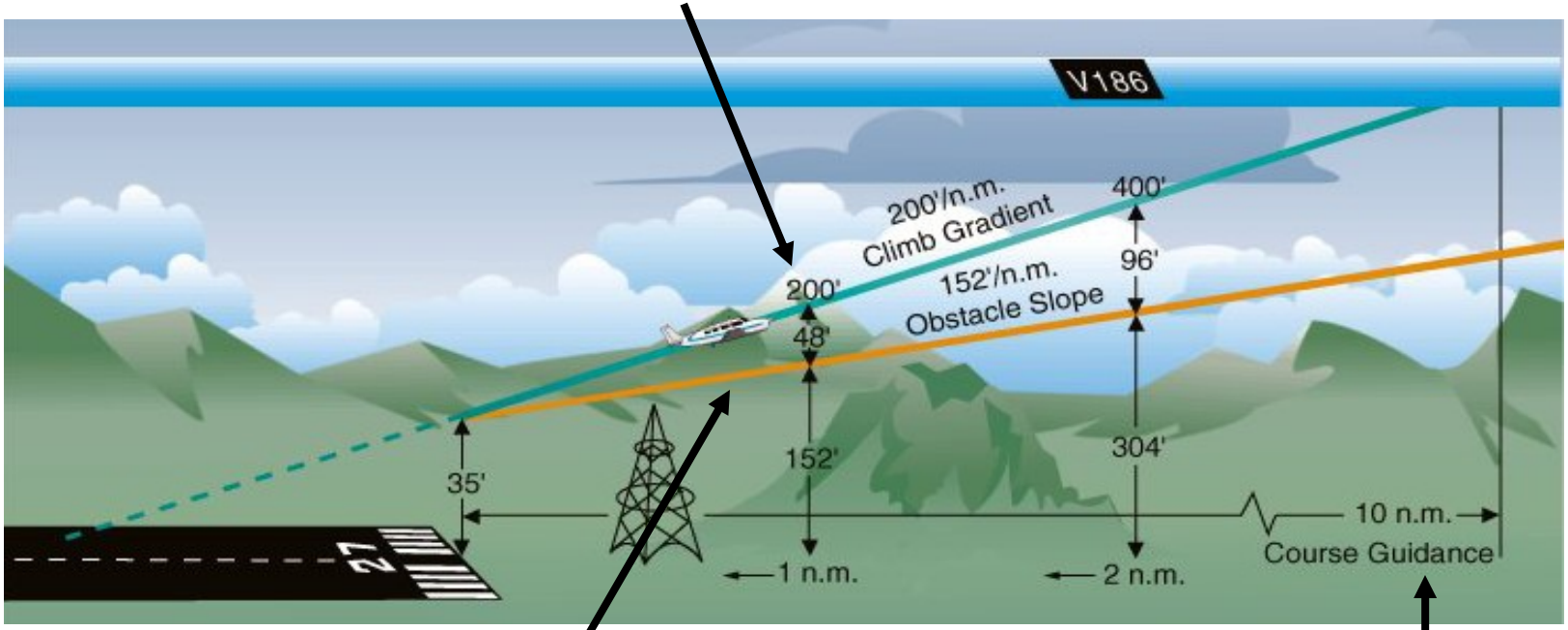


Order *online* at

www.faa.gov/air_traffic/flight_info/aeronav/productcatalog/DigitalProducts/dtpp/

Departure Standards

Provides an obstruction free departure path is based on an aircraft climbing at least 200 feet per nautical mile after it crosses the end of the runway at least 35 ft. AGL.



A slope of 152 feet per nm is assess for obstacles. If none penetrate this slope, the 200 foot per nm climb gradient provides a minimum of 48 ft obstacle clearance for each mile of flight. If obstacles penetrate this slope, special avoidance procedures are specified. (i.e., ceilings, visibility, detailed maneuvers, and/or greater gradients, etc.)

Departure routes based on positive course guidance acquired within 10 nm from the departure end of the runway on straight departures, and 5 nm after completion of turns on departures requiring turns. Surveillance radar may be used for course guidance where available.

To **convert climb gradient (ft/nm) to rate of climb in fpm you divide your groundspeed by 60 and multiply by the gradient**. (ie, 200ft/nm at 90 is (90/60)*200=300 fpm

PILOT and VECTORED DPs

Pilot DP usually contains an initial set of instructions that apply to all aircraft followed by one or more "*transition routes*" that require you to navigate with the appropriate fix within the enroute structure.

Vectored DP – ATC provides radar vectors that start just after take-off and continue until reaching assigned route or one of the fixes shown on the chart.

Departure Procedures (General)

- ATC may assign Departure Procedures (DPs) without a specific request from the pilot
  - If you do not wish to receive the DP, indicate this in the remarks section of your flight plan
  - You may refuse a DP (*strongly* not recommended)
  - Remember: ATC may also issue a visual approach clearance without a pilot request
- *In order to accept a DP,* ***you must at least have a textual description of it***

Departure Procedures (General)

- Minimum climb rates may be specified in DPs
  - Chart method or calculation method
  - It is mandatory that you comply with climb rates, if unable advise ATC or don't accept the DP
- Preferred IFR routes are correlated with DPs
- The departure route description of a DP
  - Explains the DP
  - Explains the route to be used if communication is lost

IFR Departure Procedures

057

TAKE-OFF MINIMUMS AND DEPARTURE PROCEDURES

INSTRUMENT APPROACH PROCEDURE CHARTS

IFR TAKE-OFF MINIMUMS AND DEPARTURE PROCEDURES

Civil Airports and Selected Military Airports

CIVIL USERS: FAR 91 prescribes take-off rules and establishes take-off minimums for certain operators as follows: (1) Aircraft having two engines or less - one statute mile. (2) Aircraft having more than two engines - one-half statute mile. Airports with IFR take-off minimums other than standard are listed below. Departure procedures and/or ceiling visibility minimums are established to assist all pilots conducting IFR flight in avoiding obstacles during climb to the minimum enroute altitude. Take-off minimums and departures apply to all runways unless otherwise specified. Altitudes, unless otherwise indicated, are minimum altitudes in feet MSL.

MILITARY USERS: Special IFR departures not published as Standard Instrument Departure (SIDS) and civil take-off minima are included below and are established to assist pilots in obstacle avoidance. Refer to appropriate service directives for take-off minimums.

SITKA, AK

SITKA ROCKY GUTIERREZ

TAKE-OFF MINIMUMS: **Rwy 11,** Category A and Category B 1500-2 or std. with min. climb of 390' per NM to 1600'. Category C and Category D 2800-2 or std. with min. climb of 550' per NM to 3100.

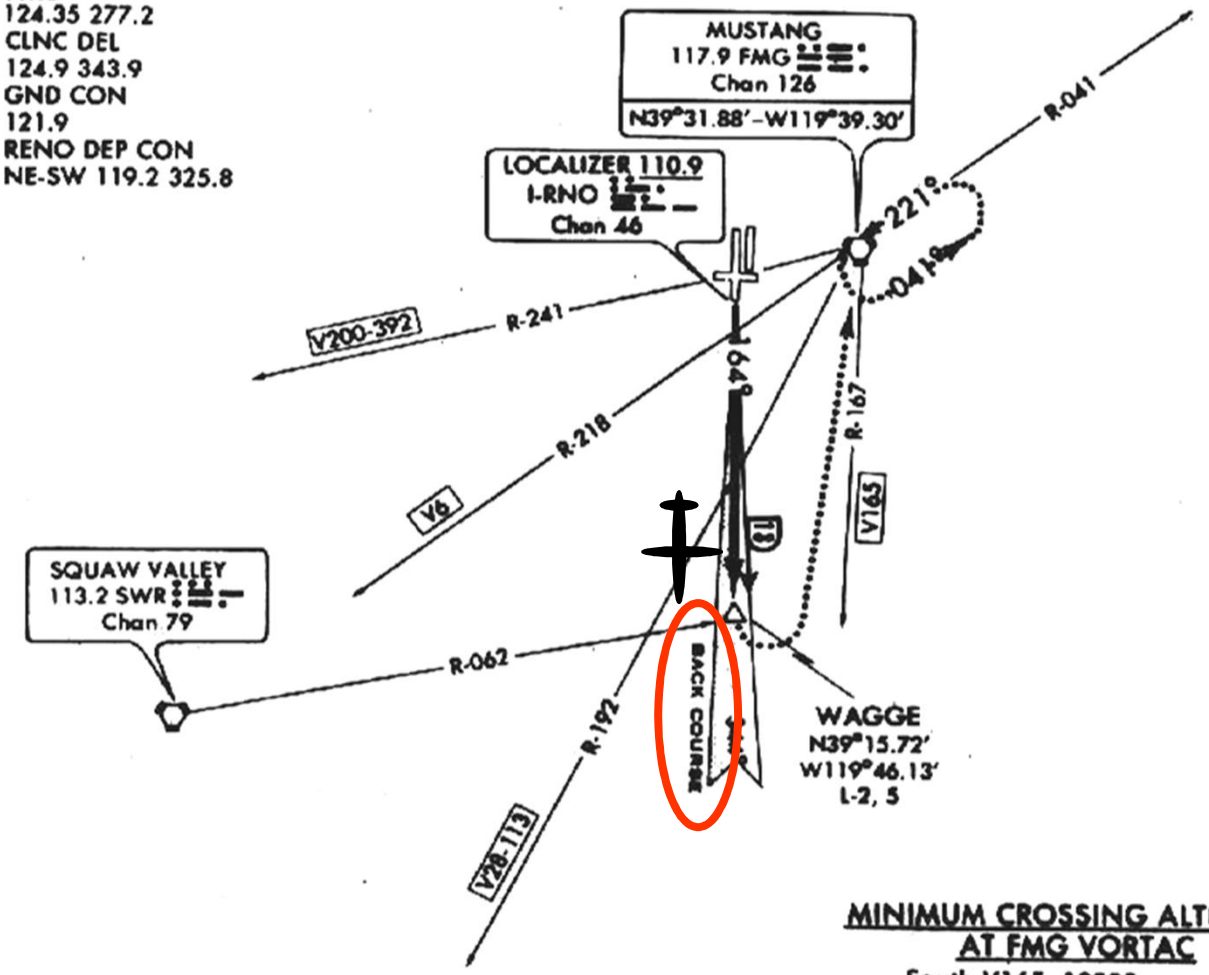
DEPARTURE PROCEDURE: **Rwy 11,** turn right as soon as practical to heading of 215° **Rwy 29,** turn left as soon as practical, intercept the BKA R-350 or SIT 170° bearing to BKA VORTAC or SIT NDB. Continue climb on course.

(VECTOR) (WASH2.WAGGE) 91094

WASHOE TWO DEPARTURE SL-346 (FAA)

RENO CANNON INTL
RENO, NEVADA

ATIS
124.35 277.2
CLNC DEL
124.9 343.9
GND CON
121.9
RENO DEP CON
NE-SW 119.2 325.8



If using the Washoe Two departure and your assigned route is V6, what route would you take...?

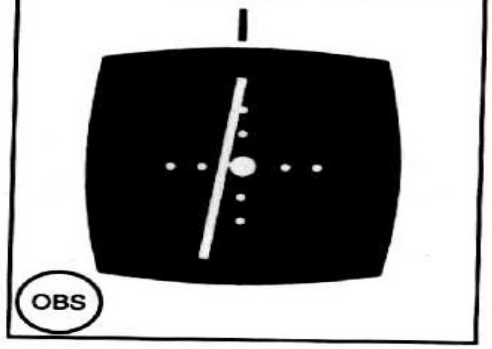
MINIMUM CROSSING ALTITUDES AT FMG VORTAC

South V165, 10000
Southwest V28-113, 10500
Southwest V200-392, 10000
Southwest V6, 12000

NOTE: Minimum climb rate at 400' per NM to 9000' required.

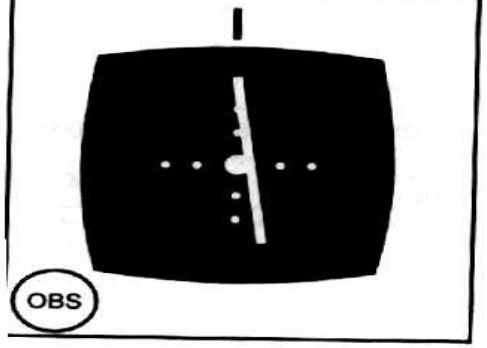
NOTE: Chart not to scale.

FREQ	OBS	
110.9	- -	



2

FREQ	OBS	
113.2	062	FROM



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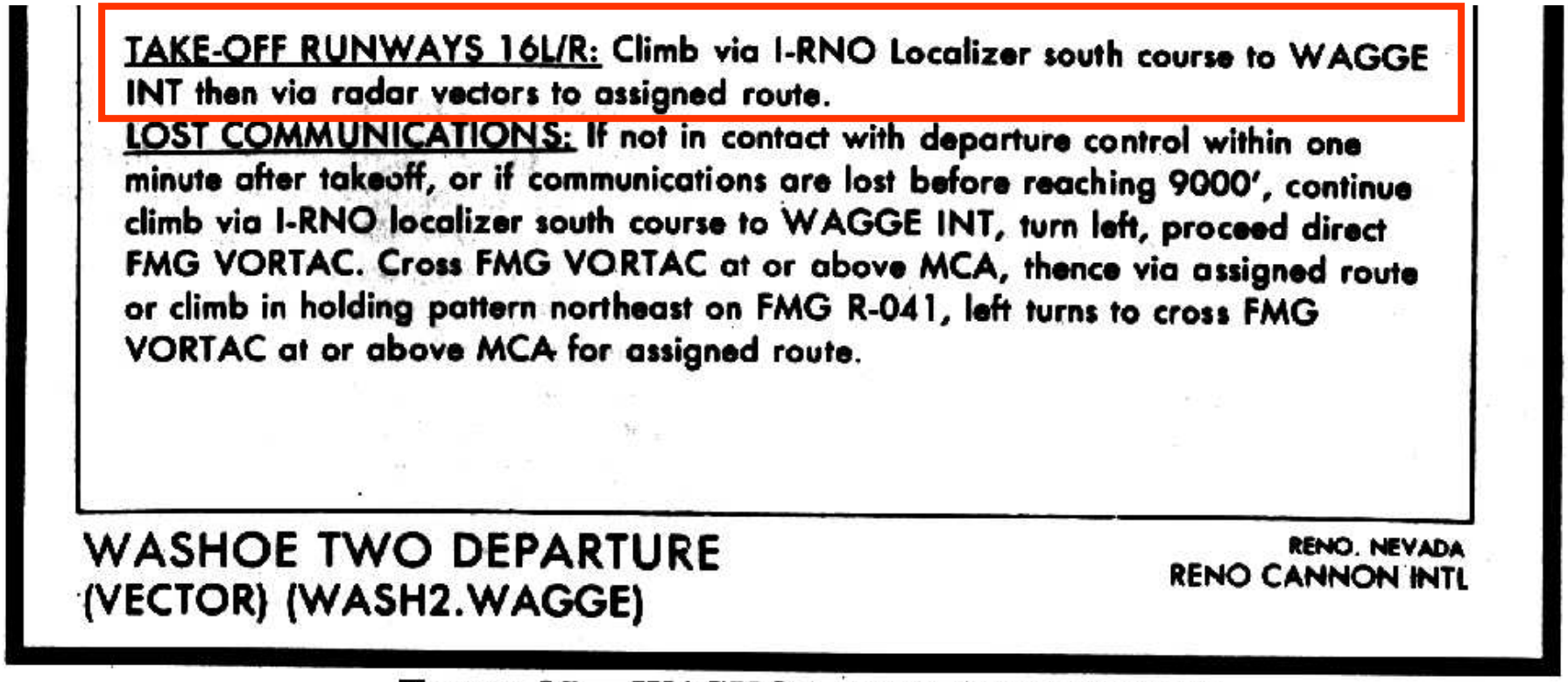
Departure Route Description



TAKE-OFF RUNWAYS 16L/R: Climb via I-RNO Localizer south course to WAGGE INT then via radar vectors to assigned route.

LOST COMMUNICATIONS: If not in contact with departure control within one minute after takeoff, or if communications are lost before reaching 9000', continue climb via I-RNO localizer south course to WAGGE INT, turn left, proceed direct FMG VORTAC. Cross FMG VORTAC at or above MCA, thence via assigned route or climb in holding pattern northeast on FMG R-041, left turns to cross FMG VORTAC at or above MCA for assigned route.

WASHOE TWO DEPARTURE
(VECTOR) (WASH2.WAGGE)

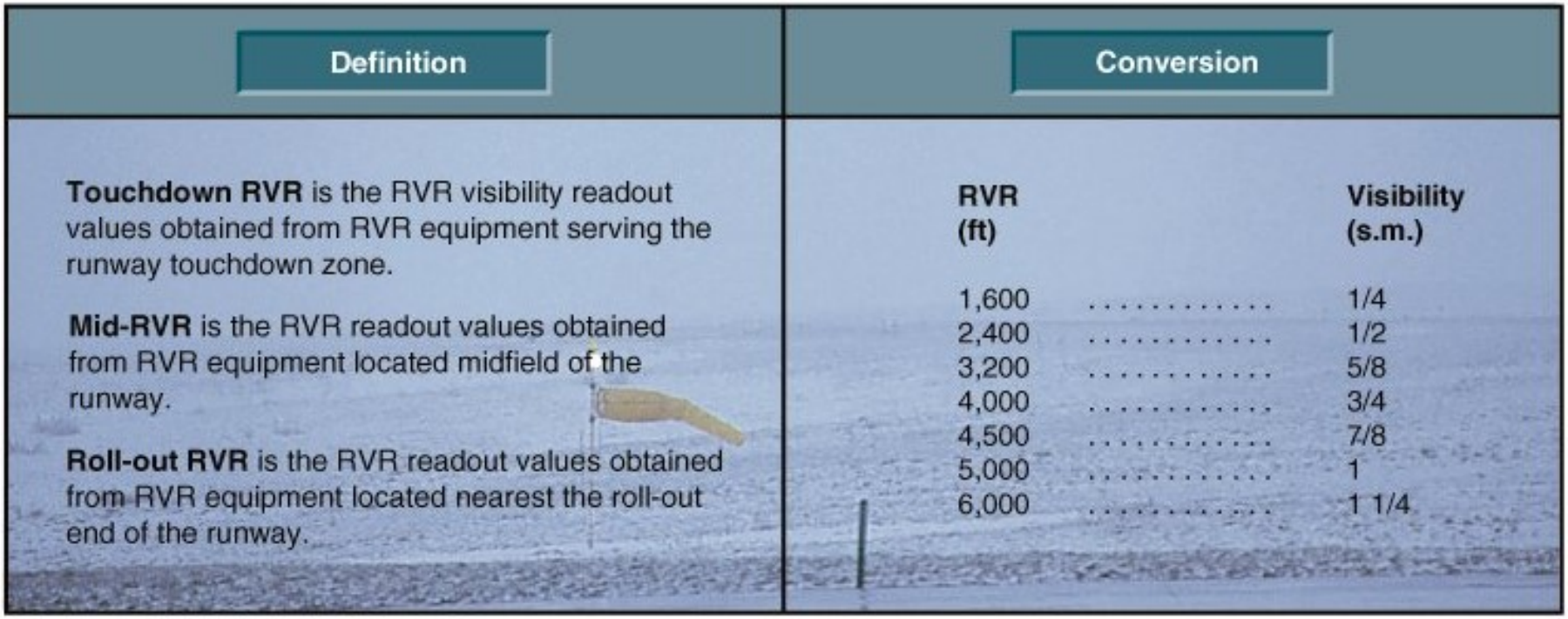
RENO, NEVADA
RENO CANNON INTL

FIGURE 85.—WASHOE TWO DEPARTURE.

Takeoff Minimums

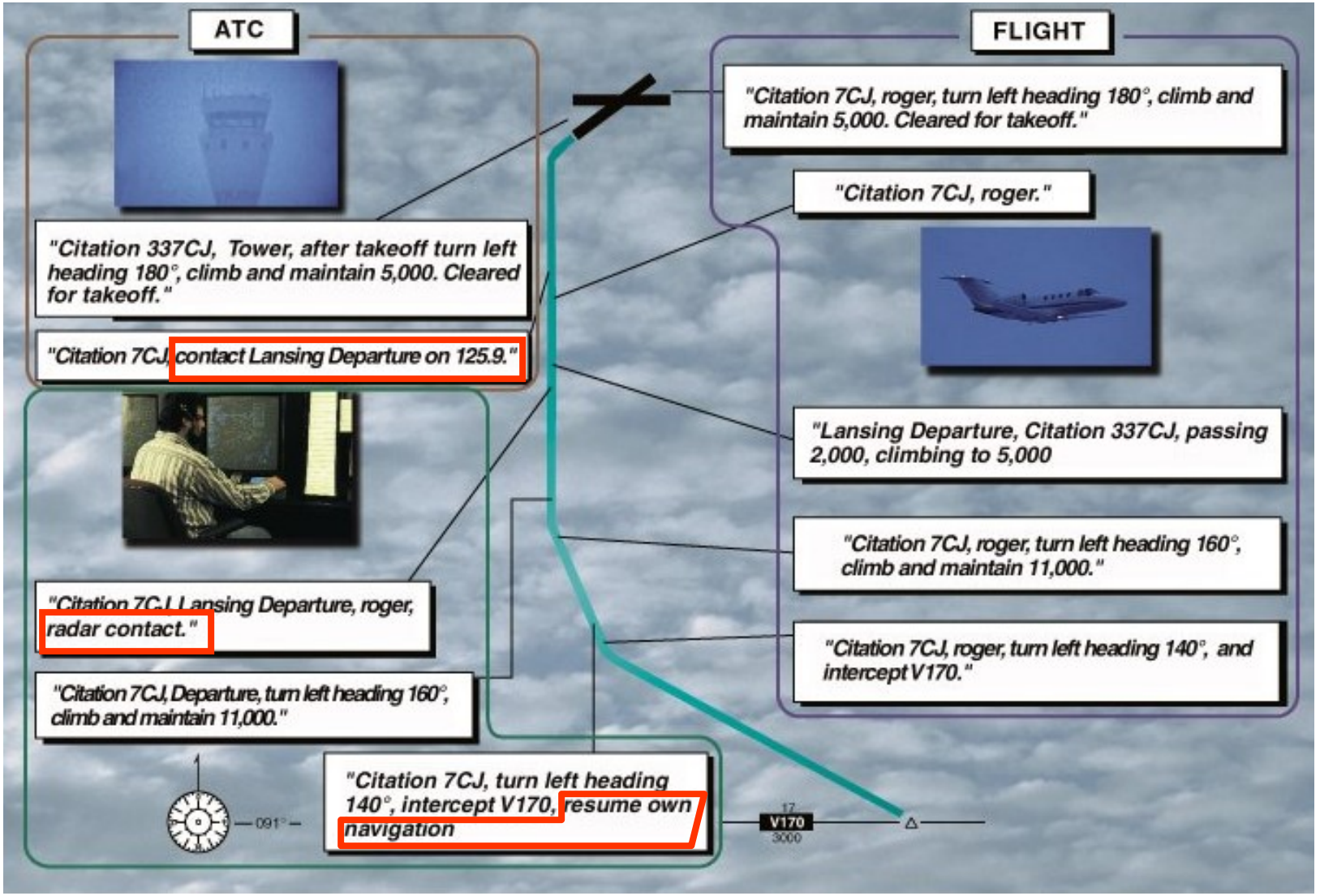
- Standard minimums (no  symbol). That symbol indicates non-standard minimums.
  - Single and twin engine airplanes - 1 SM vsby
  - More than two engines - ½ SM vsby
- Visibility may be based on
  - Prevailing visibility (expressed in SM and fractions thereof)
  - Runway Visibility Value (SM and fractions thereof)
  - Runway Visual Range (expressed in feet)
    - horizontal distance a pilot will see when looking down a *particular* runway

Runway Visual Range Conversions



If RVR is not reported, you can convert the published approach values to miles and fractions of miles.

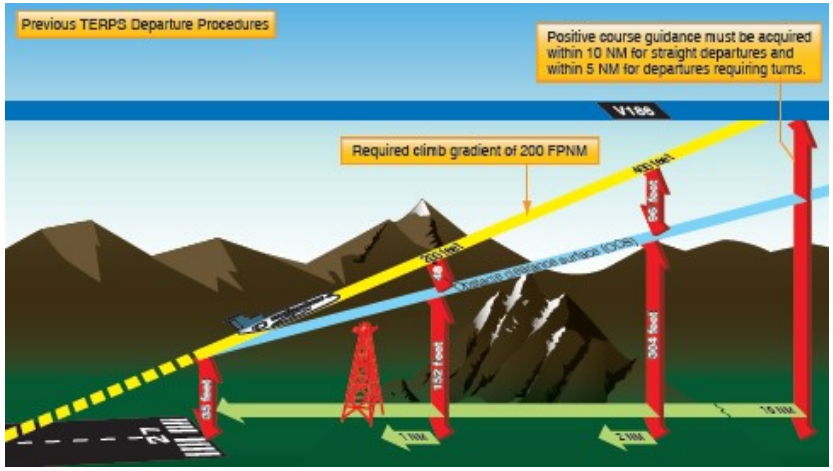
Radar Departures

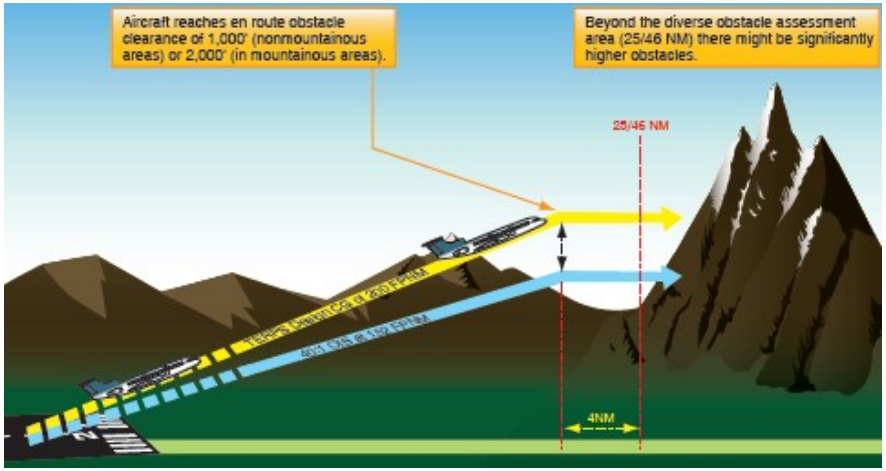


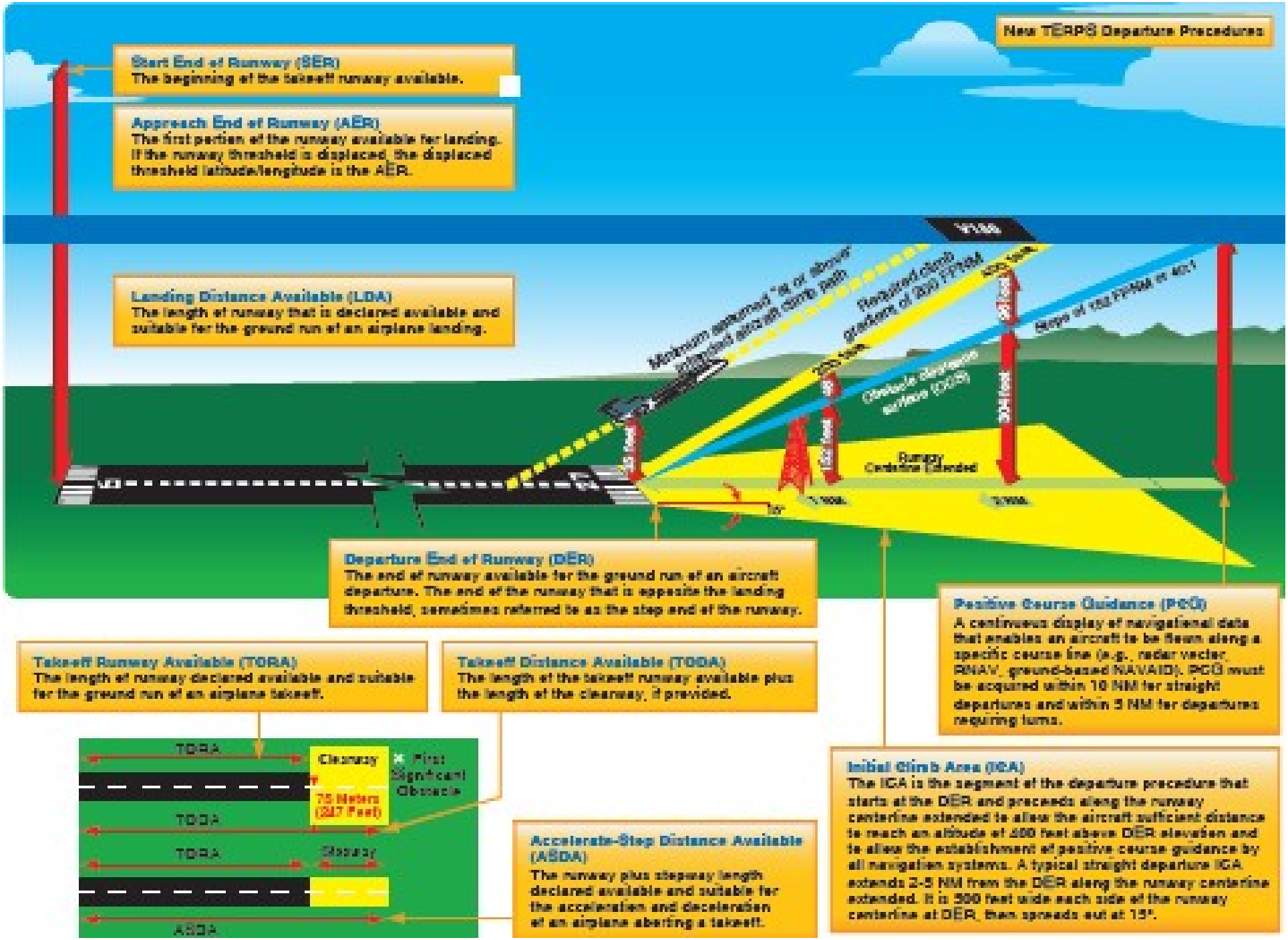
Departure Procedures

Instrument departure procedures are preplanned IFR procedures that provide obstruction clearance from the terminal area to the appropriate en route structure. Primarily, these procedures are designed to provide obstacle protection for departing aircraft. There are two types of Departure Procedures (DPs): **O**bstacle **D**eparture **P**rocedures **(ODPs)** and **S**tandard **I**nstrument **D**epartures **(SIDs)**.

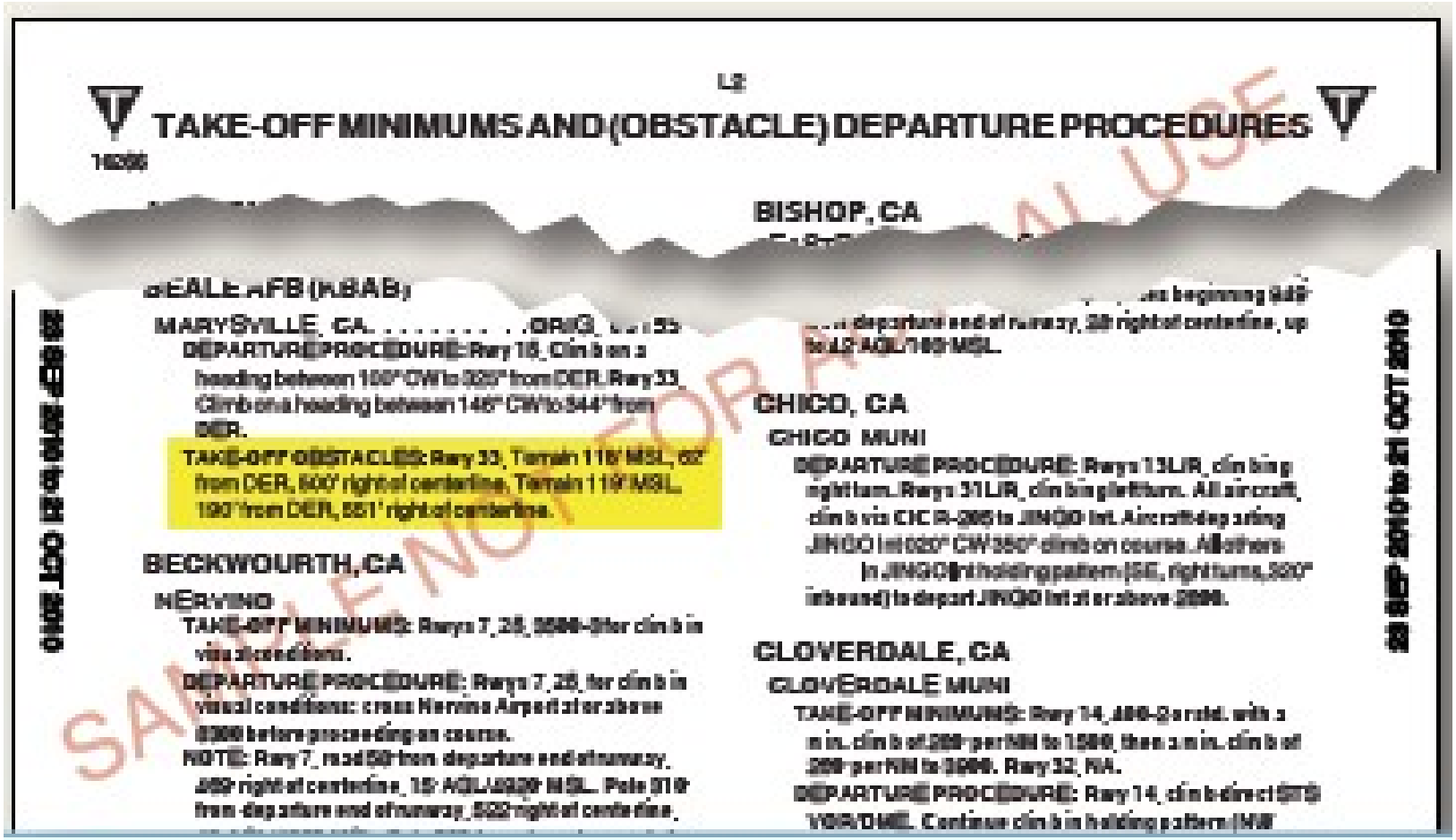
When an instrument approach is initially developed for an airport, the need for an ODP is assessed. If an aircraft may turn in any direction from a runway within the limits of the assessment area and remain clear of obstacles that runway passes what is called a diverse departure assessment, and no ODP is published. A diverse departure assessment ensures that a prescribed, expanding amount of required obstacle clearance (ROC) is achieved during the climb-out until the aircraft can obtain a minimum 1,000 feet ROC in non-mountainous areas or a minimum 2,000 feet ROC in mountainous areas. Unless specified otherwise, required obstacle clearance for all departures, including diverse, is based on the pilot crossing the departure end of the runway (DER) at least 35 feet above the DER elevation, climbing to 400 feet above the DER elevation before making the initial turn, and maintaining a minimum climb gradient of 200 feet per nautical mile (FPNM), unless required to level off by a crossing restriction until the minimum IFR altitude is reached. Following ODP assessment, a SID may still be established for the purposes of ATC flow management, system enhancement, or noise abatement.






New TERPS Departure Procedures
Start End of Runway (SER)
The beginning of the takeoff runway available.
Approach End of Runway (AER)
The first portion of the runway available for landing. If the runway threshold is displaced, the displaced threshold latitude/longitude is the AER.
Landing Distance Available (LDA)
The length of runway that is declared available and suitable for the ground run of an airplane landing.
Runway Centerline Extended
Departure End of Runway (DER)
The end of runway available for the ground run of an aircraft departure. The end of the runway that is opposite the landing threshold, sometimes referred to as the step end of the runway.
Positive Course Guidance (PCG)
A continuous display of navigational data that enables an aircraft to be flown along a specific course line (e.g., radar vector, RNAV, ground-based NAVAID). PCG must be acquired within 10 NM for straight departures and within 5 NM for departures requiring turns.
Takeoff Runway Available (TORA)
The length of runway declared available and suitable for the ground run of an airplane takeoff.
Takeoff Distance Available (TODA)
The length of the takeoff runway available plus the length of the clearway, if provided.
TORA
Clearway
First Significant Obstacle
75 Meters (247 Feet)
TODA
TORA
Stopway
ASDA
Accelerate-Stop Distance Available (ASDA)
The runway plus stopway length declared available and suitable for the acceleration and deceleration of an airplane aborting a takeoff.
Initial Climb Area (ICA)
The ICA is the segment of the departure procedure that starts at the DER and proceeds along the runway centerline extended to allow the aircraft sufficient distance to reach an altitude of 500 feet above DER elevation and to allow the establishment of positive course guidance by all navigation systems. A typical straight departure ICA extends 2-5 NM from the DER along the runway centerline extended. It is 500 feet wide each side of the runway centerline at DER, then spreads out at 15°.

Take Off Minimums



L2

TAKE-OFF MINIMUMS AND (OBSTACLE) DEPARTURE PROCEDURES

BISHOP, CA

departure end of runway, 28 right of centerline, up

CHICO, CA

CHICO MUNI

DEPARTURE PROCEDURE: Rwys 13LIR, climbing right turn. Rwys 31LIR, climbing left turn. All aircraft, climb via CIC R-266 to JINGO Int. Aircraft departing JINGO Int 020° CW 350° climb on course. All others in JINGO holding pattern (SE, right turns, 320° inbound) to depart JINGO Int at or above 2896.

CLOVERDALE, CA

CLOVERDALE MUNI

TAKE-OFF MINIMUMS: Rwy 14, 400-2 or std. with a min. climb of 289' per NM to 1500, then a min. climb of 289' per NM to 3000. Rwy 32, NA.

DEPARTURE PROCEDURE: Rwy 14, climb direct STS VOR/DME. Continue climb in holding pattern (NW

MARYSVILLE, CA

DEPARTURE PROCEDURE: Rwy 15, Climb on a heading between 100° CW to 320° from DER. Rwy 33, Climb on a heading between 146° CW to 344° from DER.

TAKE-OFF OBSTACLES: Rwy 33, Terrain 116' MSL, 62' from DER, 600' right of centerline. Terrain 119' MSL, 190' from DER, 551' right of centerline.

BECKWOURTH, CA

HERVINO

TAKE-OFF MINIMUMS: Rwys 7, 25, 3500-3 for climb in visual conditions.

DEPARTURE PROCEDURE: Rwys 7, 25, for climb in visual conditions: cross Hervino Airport at or above 8300 before proceeding on course.

NOTE: Rwy 7, road 50' from departure end of runway, 469' right of centerline, 15' AGL/4939' MSL. Pole 319° from departure end of runway, 522' right of centerline.

L9

TAKE-OFF MINIMUMS AND (OBSTACLE) DEPARTURE PROCEDURES

10266

PUEBLO, CO
PUEBLO MEMORIAL (PUB)
AMDT 4 09295 (FAA)

TAKE-OFF MINIMUMS: **Rwy 35,** 300-1¾ or standard w/ a min. climb of 254' per NM to 5200.

DEPARTURE PROCEDURE: **Rwy 8L,** climb heading 077° to 5500, then climbing left turn via heading 210° and PUB R-040 to PUB VORTAC, continue climb in PUB VORTAC holding pattern (hold NE, right turns, 244° inbound) to cross PUB VORTAC at or above MEA for route of flight. **Rwy 8R,** climb heading 077° to 5400, then climbing left turn via heading 210° and PUB R-040 to PUB VORTAC, continue climb in PUB VORTAC holding pattern (hold NE, right turns, 244° inbound) to cross PUB VORTAC at or above MEA for route of flight. **Rwy 17,** climb heading 167° to 5800, then climbing left turn via heading 050 and PUB R-180 to PUB VORTAC,

RIFLE, CO
GARFIELD COUNTY RGNL (RIL)
AMDT 8 08157

TAKE-OFF MINIMUMS: **Rwy 8,** std. w/ a min. clim 369' per NM to 12400 or 5400-3 for climb in visual conditions.

DEPARTURE PROCEDURE: **Rwy 8,** DME required. Climb via RIL R-081 to ZOBAK/10 DME, then climbing left turn direct RIL VOR/DME. Climb in RIL VOR/DME holding pattern (Hold E, right turn, 263° inbound) to cross RIL VOR/DME at or above MEA/MCA before proceeding en route, or for climb in visual conditions cross Garfield County Rgnl Airport at or above 10800 before proceeding on course. **Rwy 26,** use SQUAT RNAV DEPARTURE.

NOTE: **Rwy 8,** transmission line towers beginning 1.2 NM from departure end of runway, 437' right of centerline, up

Obstacle departure procedure

Denotes either takeoff minimums or an obstacle departure procedure published in the front of the TPP.

RIFLE, COLORADO AL-6741 (FAA)

ILS RWY 26
RIFLE/GARFIELD COUNTY RGNL (RIL)

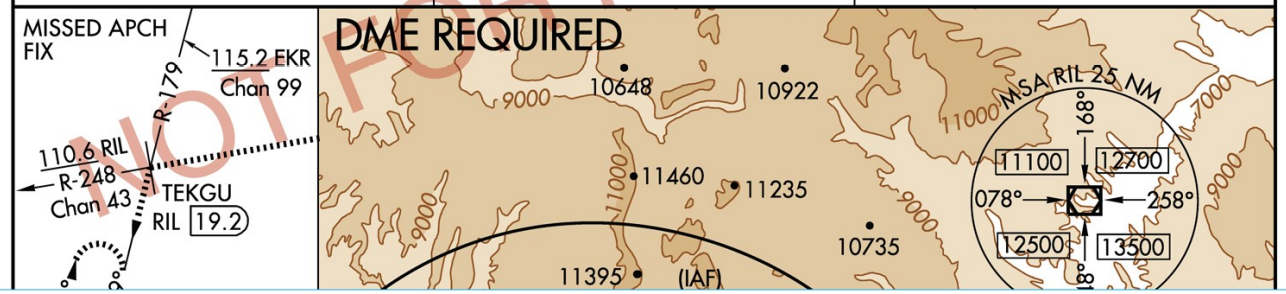
LOC/DME I-RIL	APP CRS	Rwy Idg	7011
110.9	261°	TDZE	5548
Chan 46		Apt Elev	5548

Circling not authorized.
Use I-RIL DME when on localizer course.
Visibility reduction by helicopters NA.

ODALS

MISSED APPROACH: Climb to 13000 via RIL VOR/DME R-248 to TEKGU/RIL 19.2 DME and via EKR VOR/DME R-179 to WOKPA/EKR 44.2 DME and hold.

ASOS	DENVER CENTER	UNICOM
135.275	134.5 327.8	122.8 (CTAF)



23 SEP 2010 to 21 OCT 2010

Departure Minimum Rate of Climb

Minimum climb rates on departure procedures define Minimum rate of climb as “Feet per Nautical Mile”. You must be able to convert that to rate of climb in “Feet per Minute”. How? Either a climb table or hand calculate the FPM

<u>Hand calculation is simple</u>.
(groundspeed / 60) x feet per nautical mile = feet per minute.

Example: 350 ft/NM at GS=120
(120/60)x350=700 Chart reads 701

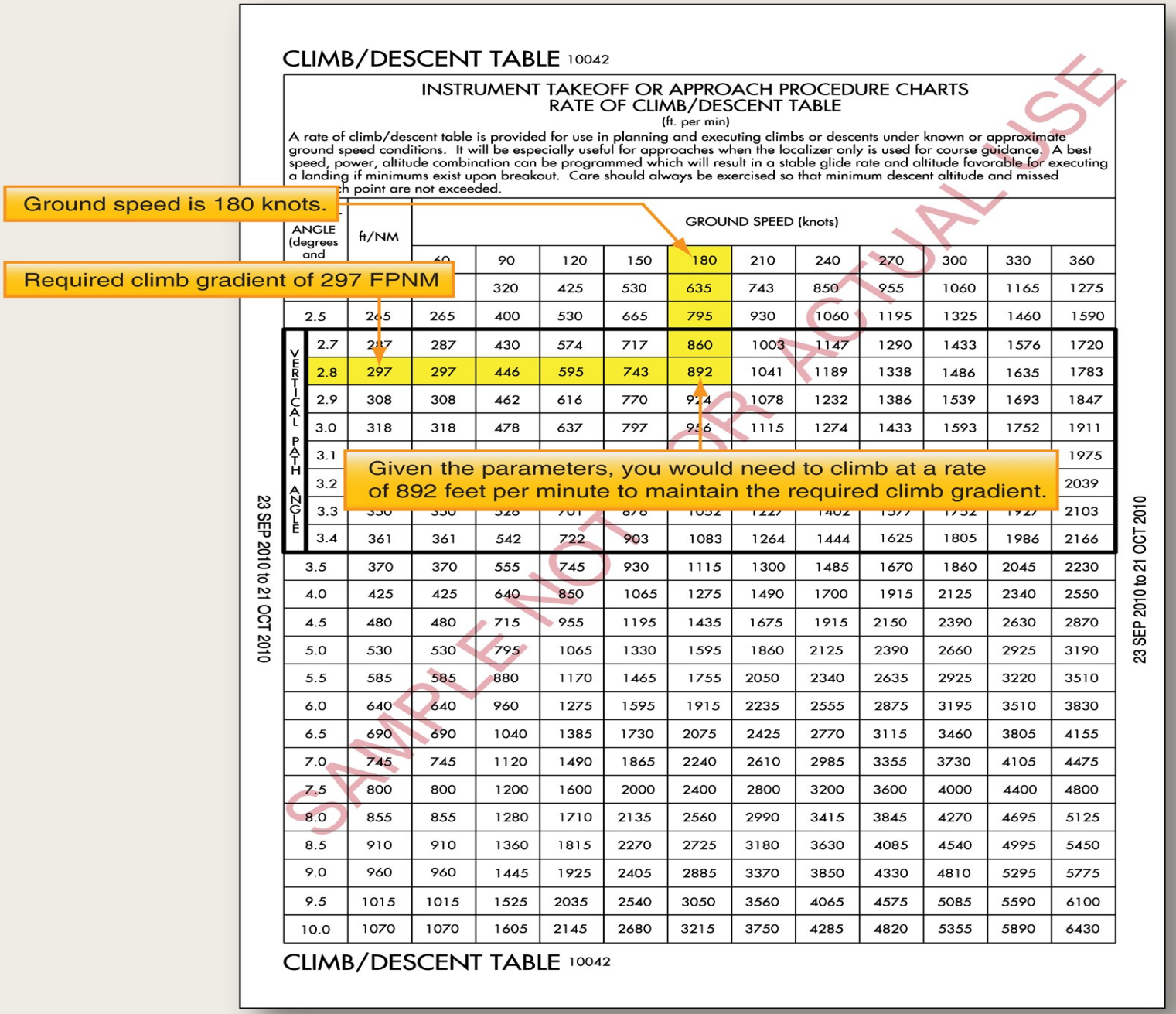
FIGURE3. RATE OF DESCENT TABLE

CLIMB/DESCENT TABLE 10042

INSTRUMENT TAKEOFF OR APPROACH PROCEDURE CHARTS
RATE OF CLIMB/DESCENT TABLE
(ft. per min)

A rate of climb/descent table is provided for use in planning and executing climbs or descents under known or approximate ground speed conditions. It will be especially useful for approaches when the localizer only is used for course guidance. A best speed, power, altitude combination can be programmed which will result in a stable glide rate and altitude favorable for executing a landing if minimums exist upon breakout. Care should always be exercised so that minimum descent altitude and missed approach point are not exceeded.

CLIMB/DESCENT ANGLE (degrees and tenths)	ft/NM	GROUND SPEED (knots)										
		60	90	120	150	180	210	240	270	300	330	360
2.0	210	210	320	425	530	635	743	850	955	1060	1165	1275
2.5	265	265	400	530	665	795	930	1060	1195	1325	1460	1590
VERTICAL PATH ANGLE 2.7	287	287	430	574	717	860	1003	1147	1290	1433	1576	1720
2.8	297	297	446	595	743	892	1041	1189	1338	1486	1635	1783
2.9	308	308	462	616	770	924	1078	1232	1386	1539	1693	1847
3.0	318	318	478	637	797	956	1115	1274	1433	1593	1752	1911
3.1	329	329	494	659	823	988	1152	1317	1481	1646	1810	1975
3.2	340	340	510	680	850	1020	1189	1359	1529	1699	1869	2039
3.3	350	350	526	701	876	1052	1227	1402	1577	1752	1927	2103
3.4	361	361	542	722	903	1083	1264	1444	1625	1805	1986	2166
3.5	370	370	555	745	930	1115	1300	1485	1670	1860	2045	2230
4.0	425	425	640	850	1065	1275	1490	1700	1915	2125	2340	2550
4.5	480	480	715	955	1195	1435	1675	1915	2150	2390	2630	2870
5.0	530	530	795	1065	1330	1595	1860	2125	2390	2660	2925	3190
5.5	585	585	880	1170	1465	1755	2050	2340	2635	2925	3220	3510
6.0	640	640	960	1275	1595	1915	2235	2555	2875	3195	3510	3830
6.5	690	690	1040	1385	1730	2075	2425	2770	3115	3460	3805	4155
7.0	745	745	1120	1490	1865	2240	2610	2985	3355	3730	4105	4475
7.5	800	800	1200	1600	2000	2400	2800	3200	3600	4000	4400	4800
8.0	855	855	1280	1710	2135	2560	2990	3415	3845	4270	4695	5125
8.5	910	910	1360	1815	2270	2725	3180	3630	4085	4540	4995	5450
9.0	960	960	1445	1925	2405	2885	3370	3850	4330	4810	5295	5775
9.5	1015	1015	1525	2035	2540	3050	3560	4065	4575	5085	5590	6100
10.0	1070	1070	1605	2145	2680	3215	3750	4285	4820	5355	5890	6430



CLIMB/DESCENT TABLE 10042

INSTRUMENT TAKEOFF OR APPROACH PROCEDURE CHARTS
RATE OF CLIMB/DESCENT TABLE
(ft. per min)

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Ground speed is 180 knots.

Required climb gradient of 297 FPNM

Given the parameters, you would need to climb at a rate of 892 feet per minute to maintain the required climb gradient.

VERTICAL PATH ANGLE (degrees and	ft/NM	GROUND SPEED (knots)										
		60	90	120	150	180	210	240	270	300	330	360
		213	320	425	530	635	743	850	955	1060	1165	1275
2.5	265	265	400	530	665	795	930	1060	1195	1325	1460	1590
2.7	287	287	430	574	717	860	1003	1147	1290	1433	1576	1720
2.8	297	297	446	595	743	892	1041	1189	1338	1486	1635	1783
2.9	308	308	462	616	770	924	1078	1232	1386	1539	1693	1847
3.0	318	318	478	637	797	956	1115	1274	1433	1593	1752	1911
3.1												1975
3.2												2039
3.3												2103
3.4	361	361	542	722	903	1083	1264	1444	1625	1805	1986	2166
3.5	370	370	555	745	930	1115	1300	1485	1670	1860	2045	2230
4.0	425	425	640	850	1065	1275	1490	1700	1915	2125	2340	2550
4.5	480	480	715	955	1195	1435	1675	1915	2150	2390	2630	2870
5.0	530	530	795	1065	1330	1595	1860	2125	2390	2660	2925	3190
5.5	585	585	880	1170	1465	1755	2050	2340	2635	2925	3220	3510
6.0	640	640	960	1275	1595	1915	2235	2555	2875	3195	3510	3830
6.5	690	690	1040	1385	1730	2075	2425	2770	3115	3460	3805	4155
7.0	745	745	1120	1490	1865	2240	2610	2985	3355	3730	4105	4475
7.5	800	800	1200	1600	2000	2400	2800	3200	3600	4000	4400	4800
8.0	855	855	1280	1710	2135	2560	2990	3415	3845	4270	4695	5125
8.5	910	910	1360	1815	2270	2725	3180	3630	4085	4540	4995	5450
9.0	960	960	1445	1925	2405	2885	3370	3850	4330	4810	5295	5775
9.5	1015	1015	1525	2035	2540	3050	3560	4065	4575	5085	5590	6100
10.0	1070	1070	1605	2145	2680	3215	3750	4285	4820	5355	5890	6430

23 SEP 2010 to 21 OCT 2010

23 SEP 2010 to 21 OCT 2010

CLIMB/DESCENT TABLE 10042

Obstacle Departure Procedures (ODPs)

The term ODP is used to define procedures that simply provide obstacle clearance. ODPs are only used for obstruction clearance and do not include ATC related climb requirements. In fact, the primary emphasis of ODP design is to use the least restrictive route of flight to the en route structure or to facilitate a climb to an altitude that allows random (diverse) IFR flight, while attempting to accommodate typical departure routes.

Only one ODP will be established for a particular runway. This is considered the default IFR departure procedure for a given runway and is intended for pilot awareness and use in the absence of ATC radar vectors or SID assignment.

Due to the complex nature of some procedures, a visual presentation may be necessary for clarification and understanding. If the ODP is charted graphically, the chart itself includes the word “Obstacle” in parentheses in the title. Additionally, all newly-developed RNAV ODPs are issued in graphical form.

Standard Instrument Departures (SIDs)

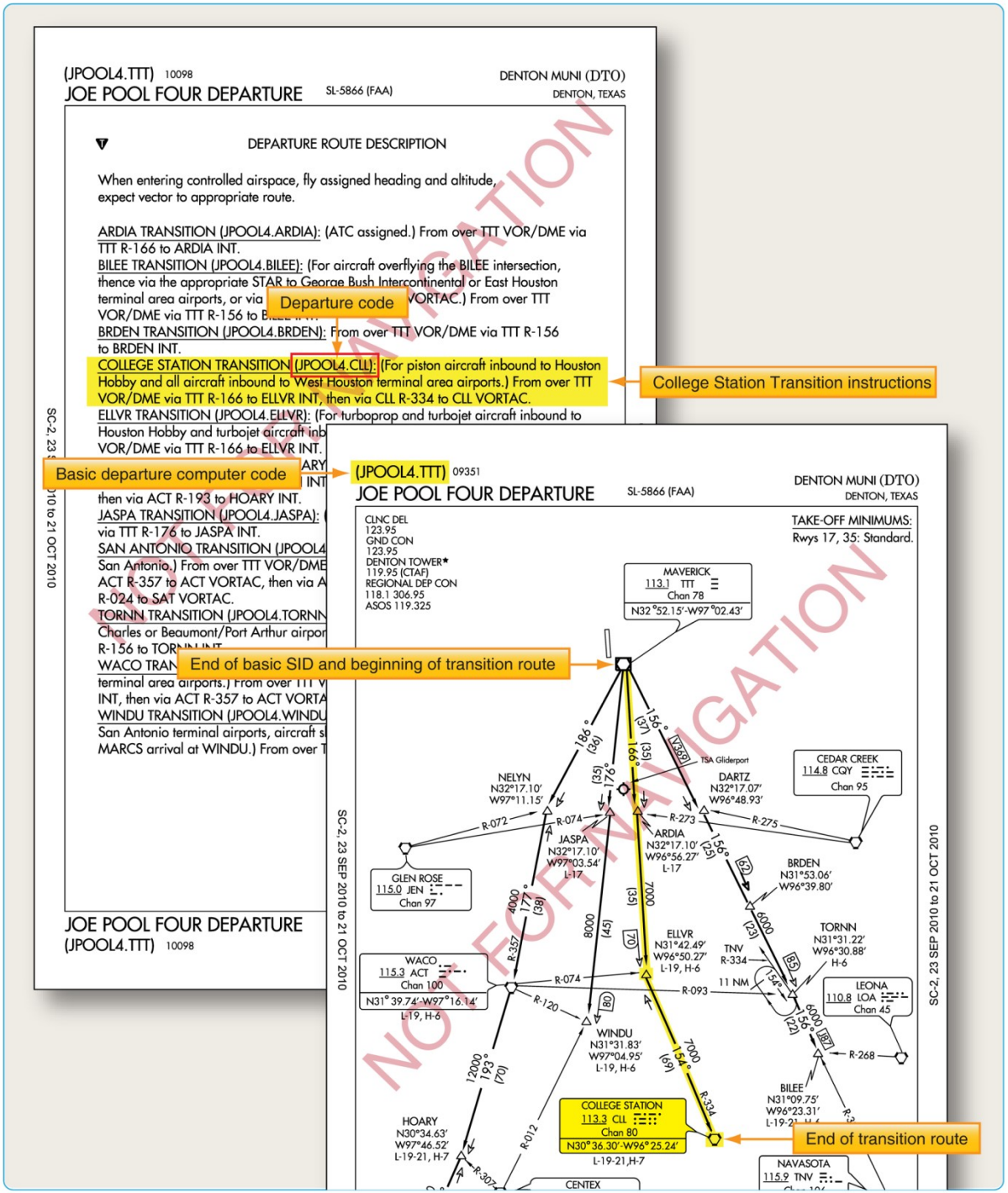
A SID is an ATC-requested and developed departure route, typically used in busy terminal areas. It is designed at the request of ATC in order to increase capacity of terminal airspace, effectively control the flow of traffic with minimal communication, and reduce environmental impact through noise abatement procedures.

While obstacle protection is always considered in SID routing, the primary goal is to reduce ATC/pilot workload while providing seamless transitions to the en route structure. ATC clearance must be received prior to flying a SID. SIDs also provide additional benefits to both the airspace capacity and the airspace users by reducing radio congestion, allowing more efficient airspace use, and simplifying departure clearances. All of the benefits combine to provide effective, efficient terminal operations, thereby increasing the overall capacity of the NAS.

This type of procedure usually contains an initial set of departure instructions followed by one or more transition routes. A SID may include an initial segment requiring radar vectors to help the flight join the procedure, but the majority of the navigation remains the pilot's responsibility.

If you cannot comply with a SID, if you do not possess the charted SID procedure, or if you simply do not wish to use SIDs, include the statement "NO SIDs" in the remarks section of your flight plan.

SIDs are shown in both text and graphic data



SID Flight Planning Considerations

Take into consideration the departure paths included in the SIDs, and determine if you can use a standardized departure procedure. You have the opportunity to choose the SID that best suits your flight plan. During the flight planning phase, you can investigate each departure, and determine which procedure allows you to depart the airport in the direction of your intended flight. Also consider how a climb gradient to a specific altitude affects the climb time and fuel burn portions of the flight plan.

Notes giving procedural requirements are listed on the graphic portion of a departure procedure, and they are mandatory in nature. [next slide]

Mandatory procedural notes may include:

- Aircraft equipment requirements (DME, ADF, etc.)
- ATC equipment in operation (radar)
- Minimum climb requirements
- Restrictions for specific types of aircraft (turbojet only)
- Limited use to certain destinations

SID Altitudes

SID altitudes can be charted in four different ways. The first are mandatory altitudes, the second, minimum altitudes, the third, maximum altitudes and the fourth is a combination of minimum and maximum altitudes or also referred to as block altitudes. Below are examples of how each will be shown on a SID approach plate.

- Mandatory altitudes – 5500
- Minimum altitudes – 2300
- Maximum altitudes – 3300
- Combination of minimum and maximum – 7000 / 4600

Some SIDs may still have “(ATC)” adjacent to a crossing Some SIDs may still have “(ATC)” adjacent to a crossing altitude as shown in Figure 1-33 which implies that the crossing altitude is there to support an ATC requirement.

Crossing Altitudes

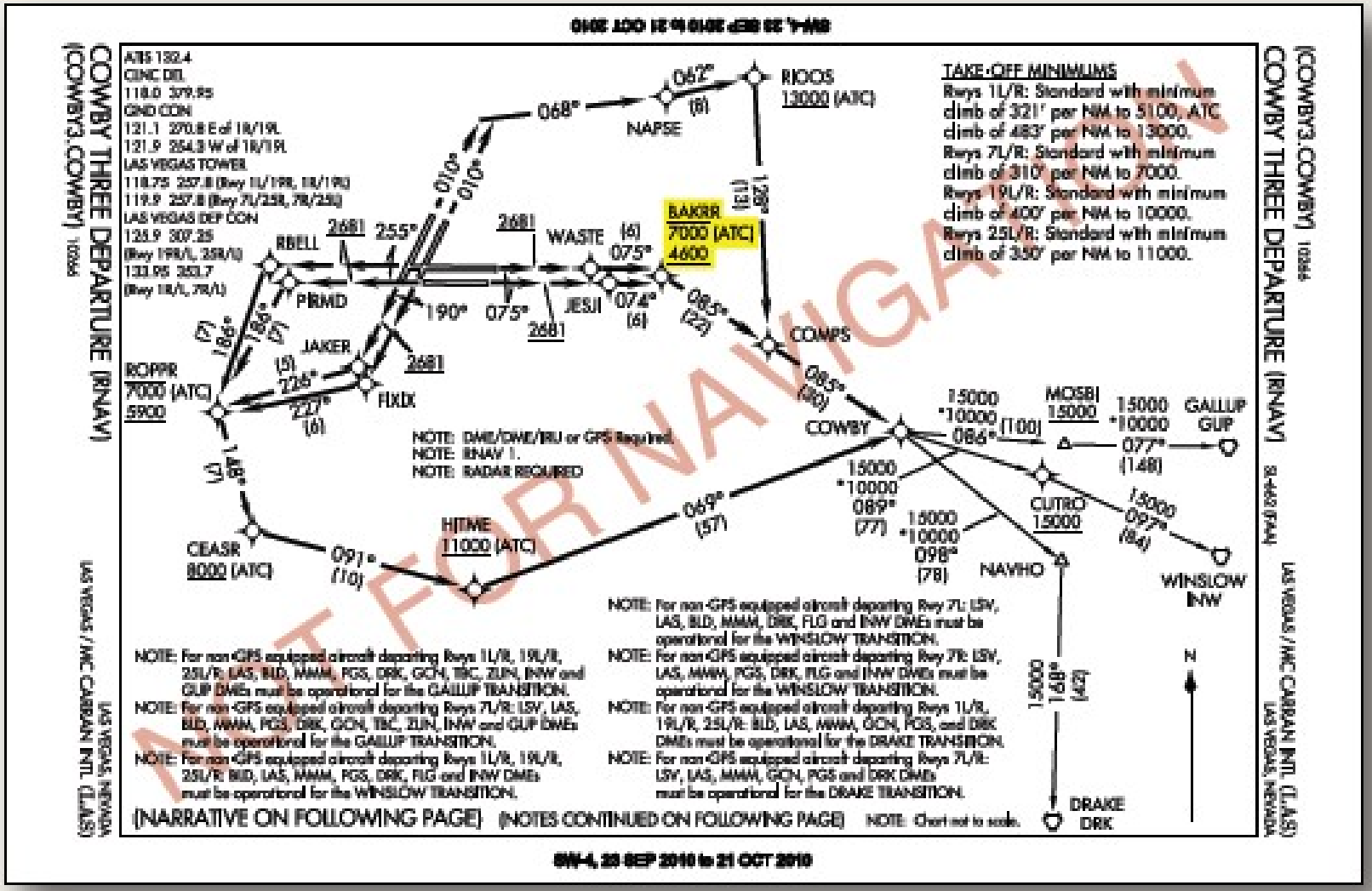
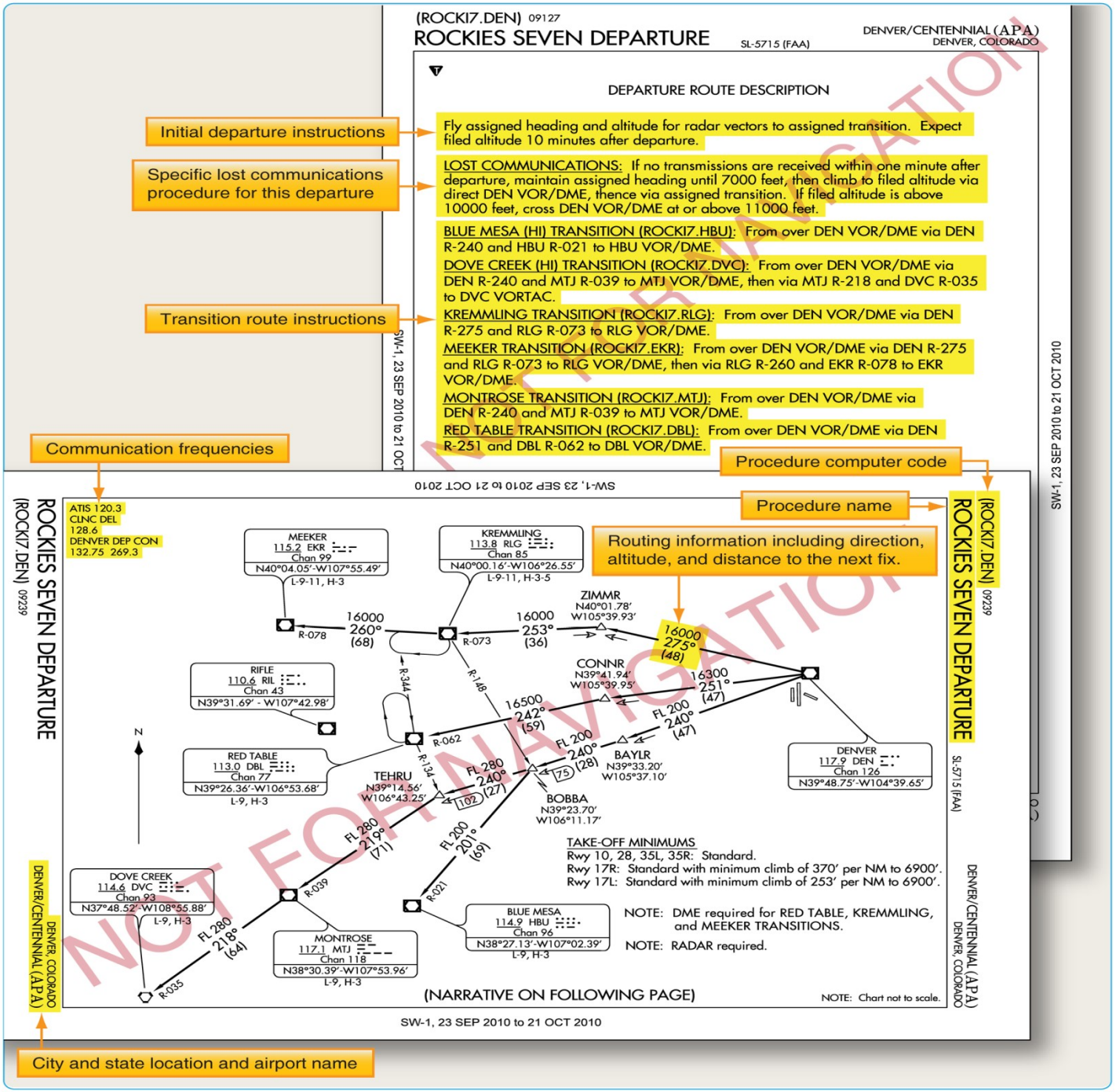
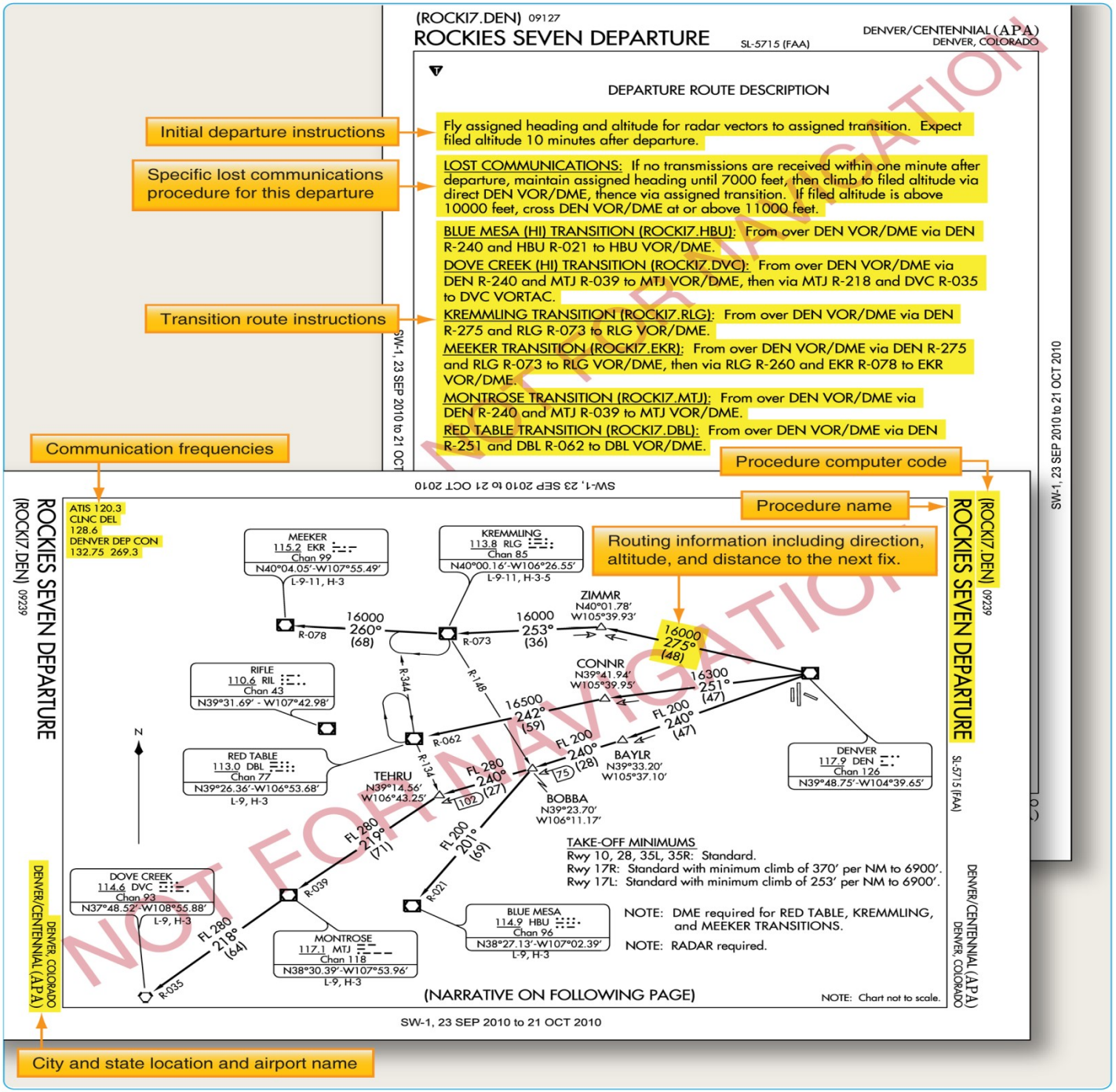


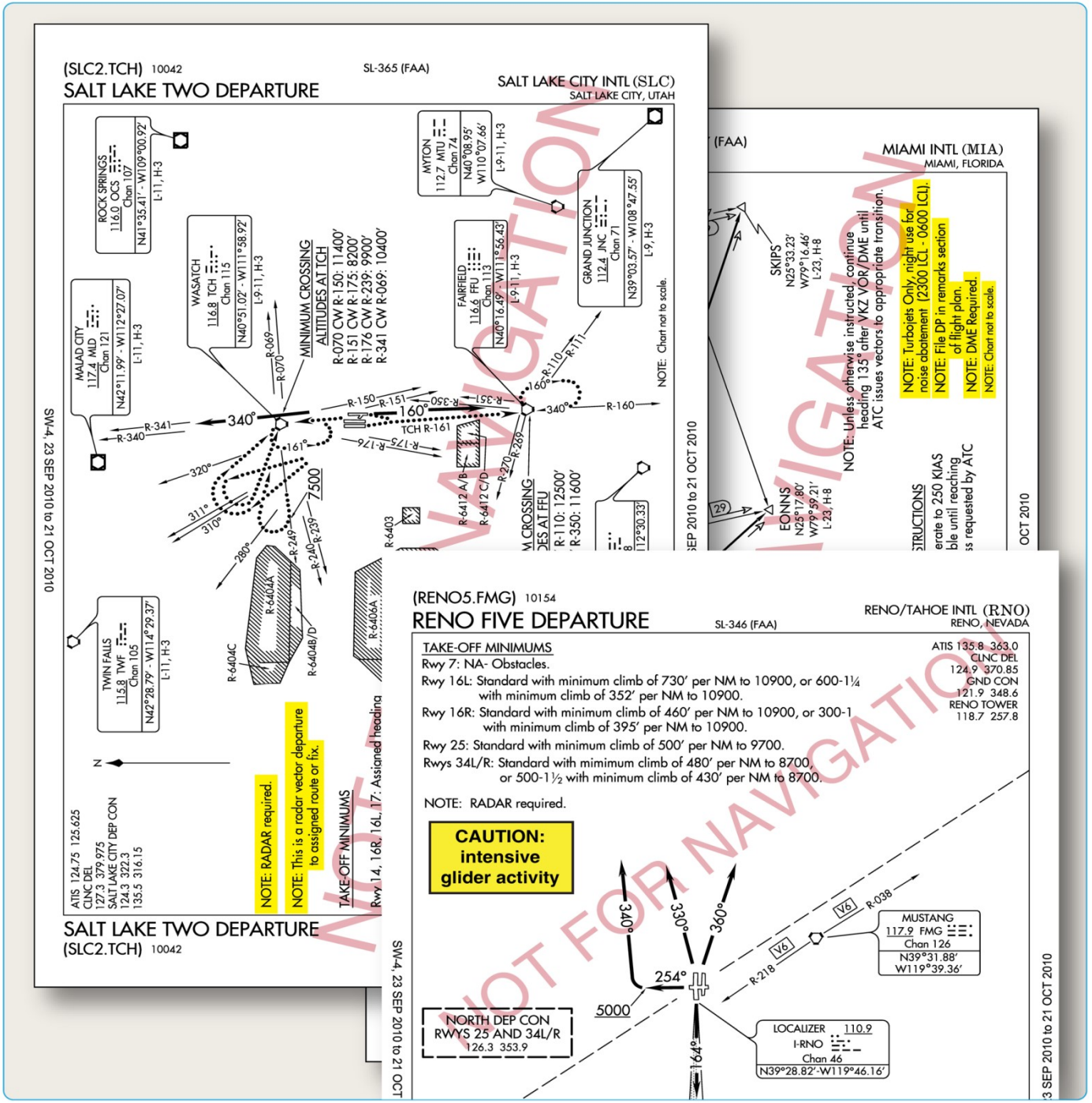
Figure 1-33. Crossing altitude is there to support an ATC requirement.


(ROCKI7.DEN) 09127
ROCKIES SEVEN DEPARTURE
SL-5715 (FAA)
DENVER/CENTENNIAL (APA)
DENVER, COLORADO
DEPARTURE ROUTE DESCRIPTION
Initial departure instructions
Fly assigned heading and altitude for radar vectors to assigned transition. Expect filed altitude 10 minutes after departure.
Specific lost communications procedure for this departure
LOST COMMUNICATIONS: If no transmissions are received within one minute after departure, maintain assigned heading until 7000 feet, then climb to filed altitude via direct DEN VOR/DME, thence via assigned transition. If filed altitude is above 10000 feet, cross DEN VOR/DME at or above 11000 feet.
Transition route instructions
BLUE MESA (HI) TRANSITION (ROCKI7.HBU): From over DEN VOR/DME via DEN R-240 and HBU R-021 to HBU VOR/DME.
DOVE CREEK (HI) TRANSITION (ROCKI7.DVC): From over DEN VOR/DME via DEN R-240 and MTJ R-039 to MTJ VOR/DME, then via MTJ R-218 and DVC R-035 to DVC VORTAC.
KREMMLING TRANSITION (ROCKI7.RLG): From over DEN VOR/DME via DEN R-275 and RLG R-073 to RLG VOR/DME.
MEEKER TRANSITION (ROCKI7.EKR): From over DEN VOR/DME via DEN R-275 and RLG R-073 to RLG VOR/DME, then via RLG R-260 and EKR R-078 to EKR VOR/DME.
MONTROSE TRANSITION (ROCKI7.MTJ): From over DEN VOR/DME via DEN R-240 and MTJ R-039 to MTJ VOR/DME.
RED TABLE TRANSITION (ROCKI7.DBL): From over DEN VOR/DME via DEN R-251 and DBL R-062 to DBL VOR/DME.
SW-1, 23 SEP 2010 to 21 OCT 2010
Communication frequencies
Procedure computer code
Procedure name
Routing information including direction, altitude, and distance to the next fix.
ATIS 120.3
CLNC DEL 128.6
DENVER DEP CON 132.75 269.3
ROCKIES SEVEN DEPARTURE (ROCKI7.DEN) 09239
MEEKER 115.2 EKR Chan 99 N40°04.05'-W107°55.49' L-9-11, H-3
KREMMLING 113.8 RLG Chan 85 N40°00.16'-W106°26.55' L-9-11, H-3-5
ZIMMR N40°01.78' W105°39.93'
CONNR N39°41.94' W105°39.95'
BAYLR N39°33.20' W105°37.10'
BOBBA N39°23.70' W106°11.17'
TEHRU N39°14.56' W106°43.25'
RIFLE 110.6 RIL Chan 43 N39°31.69' - W107°42.98'
RED TABLE 113.0 DBL Chan 77 N39°26.36'-W106°53.68' L-9, H-3
DENVER 117.9 DEN Chan 126 N39°48.75'-W104°39.65'
DOVE CREEK 114.6 DVC Chan 93 N37°48.52'-W108°55.88' L-9, H-3
MONTROSE 117.1 MTJ Chan 118 N38°30.39'-W107°53.96' L-9, H-3
BLUE MESA 114.9 HBU Chan 96 N38°27.13'-W107°02.39' L-9, H-3
TAKE-OFF MINIMUMS
Rwy 10, 28, 35L, 35R: Standard.
Rwy 17R: Standard with minimum climb of 370' per NM to 6900'.
Rwy 17L: Standard with minimum climb of 253' per NM to 6900'.
NOTE: DME required for RED TABLE, KREMMLING, and MEEKER TRANSITIONS.
NOTE: RADAR required.
(NARRATIVE ON FOLLOWING PAGE)
NOTE: Chart not to scale.
SW-1, 23 SEP 2010 to 21 OCT 2010
City and state location and airport name
NOT FOR NAVIGATION


(ROCKI7.DEN) 09127
ROCKIES SEVEN DEPARTURE
SL-5715 (FAA)
DENVER/CENTENNIAL (APA)
DENVER, COLORADO
DEPARTURE ROUTE DESCRIPTION
Initial departure instructions
Fly assigned heading and altitude for radar vectors to assigned transition. Expect filed altitude 10 minutes after departure.
Specific lost communications procedure for this departure
LOST COMMUNICATIONS: If no transmissions are received within one minute after departure, maintain assigned heading until 7000 feet, then climb to filed altitude via direct DEN VOR/DME, thence via assigned transition. If filed altitude is above 10000 feet, cross DEN VOR/DME at or above 11000 feet.
Transition route instructions
BLUE MESA (HI) TRANSITION (ROCKI7.HBU): From over DEN VOR/DME via DEN R-240 and HBU R-021 to HBU VOR/DME.
DOVE CREEK (HI) TRANSITION (ROCKI7.DVC): From over DEN VOR/DME via DEN R-240 and MTJ R-039 to MTJ VOR/DME, then via MTJ R-218 and DVC R-035 to DVC VORTAC.
KREMMLING TRANSITION (ROCKI7.RLG): From over DEN VOR/DME via DEN R-275 and RLG R-073 to RLG VOR/DME.
MEEKER TRANSITION (ROCKI7.EKR): From over DEN VOR/DME via DEN R-275 and RLG R-073 to RLG VOR/DME, then via RLG R-260 and EKR R-078 to EKR VOR/DME.
MONTROSE TRANSITION (ROCKI7.MTJ): From over DEN VOR/DME via DEN R-240 and MTJ R-039 to MTJ VOR/DME.
RED TABLE TRANSITION (ROCKI7.DBL): From over DEN VOR/DME via DEN R-251 and DBL R-062 to DBL VOR/DME.
SW-1, 23 SEP 2010 to 21 OCT 2010
Communication frequencies
Procedure computer code
Procedure name
Routing information including direction, altitude, and distance to the next fix.
ATIS 120.3
CLNC DEL 128.6
DENVER DEP CON 132.75 269.3
ROCKIES SEVEN DEPARTURE (ROCKI7.DEN) 09239
MEEKER 115.2 EKR Chan 99 N40°04.05'-W107°55.49' L-9-11, H-3
KREMMLING 113.8 RLG Chan 85 N40°00.16'-W106°26.55' L-9-11, H-3-5
ZIMMR N40°01.78' W105°39.93'
CONNR N39°41.94' W105°39.95'
BAYLR N39°33.20' W105°37.10'
BOBBA N39°23.70' W106°11.17'
TEHRU N39°14.56' W106°43.25'
RIFLE 110.6 RIL Chan 43 N39°31.69' - W107°42.98'
RED TABLE 113.0 DBL Chan 77 N39°26.36'-W106°53.68' L-9, H-3
DENVER 117.9 DEN Chan 126 N39°48.75'-W104°39.65'
DOVE CREEK 114.6 DVC Chan 93 N37°48.52'-W108°55.88' L-9, H-3
MONTROSE 117.1 MTJ Chan 118 N38°30.39'-W107°53.96' L-9, H-3
BLUE MESA 114.9 HBU Chan 96 N38°27.13'-W107°02.39' L-9, H-3
TAKE-OFF MINIMUMS
Rwy 10, 28, 35L, 35R: Standard.
Rwy 17R: Standard with minimum climb of 370' per NM to 6900'.
Rwy 17L: Standard with minimum climb of 253' per NM to 6900'.
NOTE: DME required for RED TABLE, KREMMLING, and MEEKER TRANSITIONS.
NOTE: RADAR required.
(NARRATIVE ON FOLLOWING PAGE)
NOTE: Chart not to scale.
SW-1, 23 SEP 2010 to 21 OCT 2010
City and state location and airport name
NOT FOR NAVIGATION

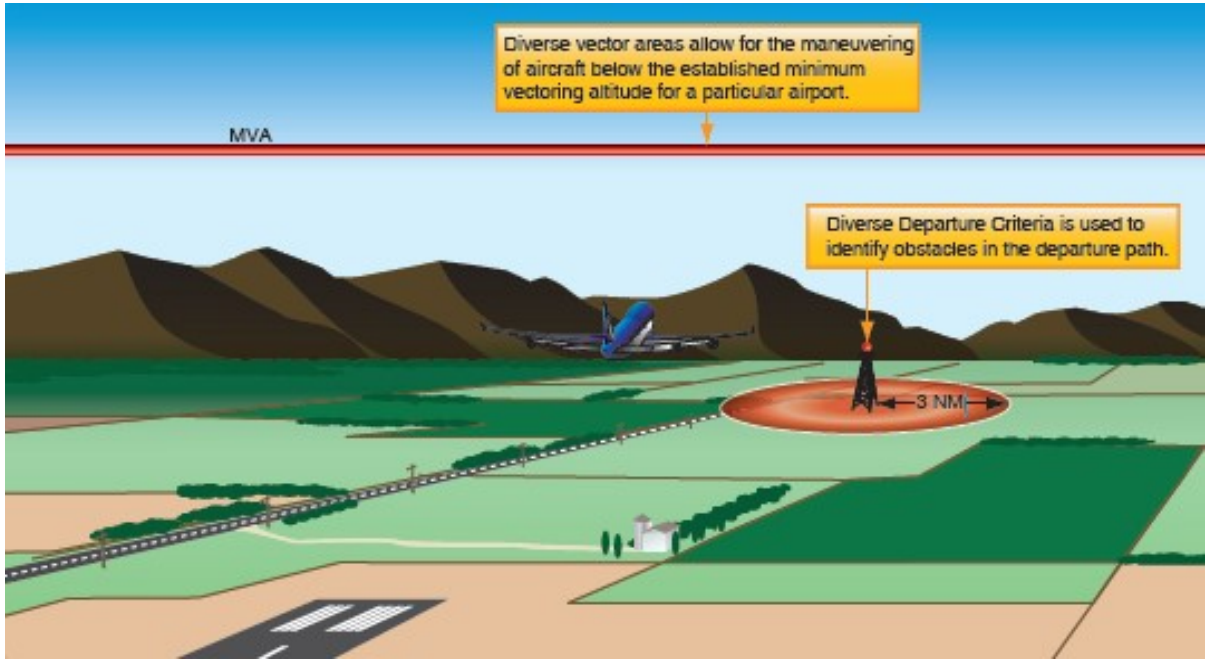
A **radar SID** usually requires ATC to provide radar vectors from just after takeoff (ROC is based on a climb to 400 feet above the DER elevation before making the initial turn) until reaching the assigned route or a fix depicted on the SID chart. Radar SIDs do not include departure routes or transition 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. ATC expects you to immediately comply with radar vectors, and they expect you to notify them if you are unable to fulfill their request. ATC also expects you to make contact immediately if an instruction causes you to compromise safety due to obstructions or traffic.

It is prudent to review radar SID charts prior to use because this type of procedure often includes nonstandard lost communication procedures. If you were to lose radio contact while being vectored by ATC, you would be expected to comply with the lost communication procedure as outlined on the chart, not necessarily those procedures outlined in the AIM.


(SLC2.TCH) 10042
SL-365 (FAA)
SALT LAKE TWO DEPARTURE
SALT LAKE CITY INTL (SLC)
SALT LAKE CITY, UTAH
ROCK SPRINGS 116.0 OCS Chan 107 N41°35.41' - W109°00.92' L-11, H-3
MYTON 112.7 MTU Chan 74 N40°08.95' W110°07.66' L-9-11, H-3
WASATCH 116.8 TCH Chan 115 N40°51.02' - W111°58.92' L-9-11, H-3
FAIRFIELD 116.6 FFU Chan 113 N40°16.49' - W111°56.43' L-9-11, H-3
GRAND JUNCTION 112.4 JNC Chan 71 N39°03.57' - W108°47.55' L-9, H-3
MALAD CITY 117.4 MLD Chan 121 N42°11.99' - W112°27.07' L-11, H-3
MINIMUM CROSSING ALTITUDES AT TCH
R-070 CW R-150: 11400'
R-151 CW R-175: 8200'
R-176 CW R-239: 9900'
R-341 CW R-069: 10400'
NOTE: Chart not to scale.
TCH R-161
7500
TWIN FALLS 115.8 TWF Chan 105 N42°28.79' - W114°29.37' L-11, H-3
ATIS 124.75 125.625
CLNC DEL
127.3 379.975
SALT LAKE CITY DEP CON
124.3 322.3
135.5 316.15
NOTE: RADAR required.
NOTE: This is a radar vector departure to assigned route or fix.
TAKE-OFF MINIMUMS
Rwy 14, 16R, 16L, 17: Assigned heading
SW-4, 23 SEP 2010 to 21 OCT 2010
SALT LAKE TWO DEPARTURE
(SLC2.TCH) 10042
(FAA)
MIAMI INTL (MIA)
MIAMI, FLORIDA
SKIPS N25°33.23' W79°16.46' L-23, H-8
EONNS N25°17.80' W79°59.21' L-23, H-8
NOTE: Unless otherwise instructed, continue heading 135° after VKZ VOR/DME until ATC issues vectors to appropriate transition.
NOTE: Turbojets Only, night use for noise abatement (2300 LCL - 0600 LCL).
NOTE: File DP in remarks section of flight plan.
NOTE: DME Required.
NOTE: Chart not to scale.
(RENO5.FMG) 10154
RENO FIVE DEPARTURE
SL-346 (FAA)
RENO/TAHOE INTL (RNO)
RENO, NEVADA
TAKE-OFF MINIMUMS
Rwy 7: NA- Obstacles.
Rwy 16L: Standard with minimum climb of 730' per NM to 10900, or 600-1¼ with minimum climb of 352' per NM to 10900.
Rwy 16R: Standard with minimum climb of 460' per NM to 10900, or 300-1 with minimum climb of 395' per NM to 10900.
Rwy 25: Standard with minimum climb of 500' per NM to 9700.
Rwys 34L/R: Standard with mimimum climb of 480' per NM to 8700, or 500-1½ with minimum climb of 430' per NM to 8700.
NOTE: RADAR required.
ATIS 135.8 363.0
CLNC DEL
124.9 370.85
GND CON
121.9 348.6
RENO TOWER
118.7 257.8
CAUTION: intensive glider activity
NORTH DEP CON
RWYS 25 AND 34L/R
126.3 353.9
5000
MUSTANG 117.9 FMG Chan 126 N39°31.88' W119°39.36'
LOCALIZER 110.9 I-RNO Chan 46 N39°28.82'-W119°46.16'
NOT FOR NAVIGATION

Diverse Vector Area

ATC may establish a minimum vectoring altitude (MVA) around certain airports. This altitude, based on terrain and obstruction clearance, provides controllers with minimum altitudes to vector aircraft in and around a particular location. However, at times, it may be necessary to vector aircraft below this altitude to assist in the efficient flow of departing traffic. For this reason, an airport may have an established Diverse Vector Area (DVA). This DVA may be established below the MVA or Minimum IFR Altitude (MIA) in a radar environment at the request of Air Traffic. This type of DP meets the TERPs criteria for diverse departures, obstacles and terrain avoidance in which random radar vectors below the MVA/MIA may be issued to departing traffic. The existence of a DVA will be noted in the Takeoff Minimums and Obstacle Departure Procedures section of the U.S. Terminal Procedure Publication (TPP).



DPs are also categorized by equipment requirements as follows:

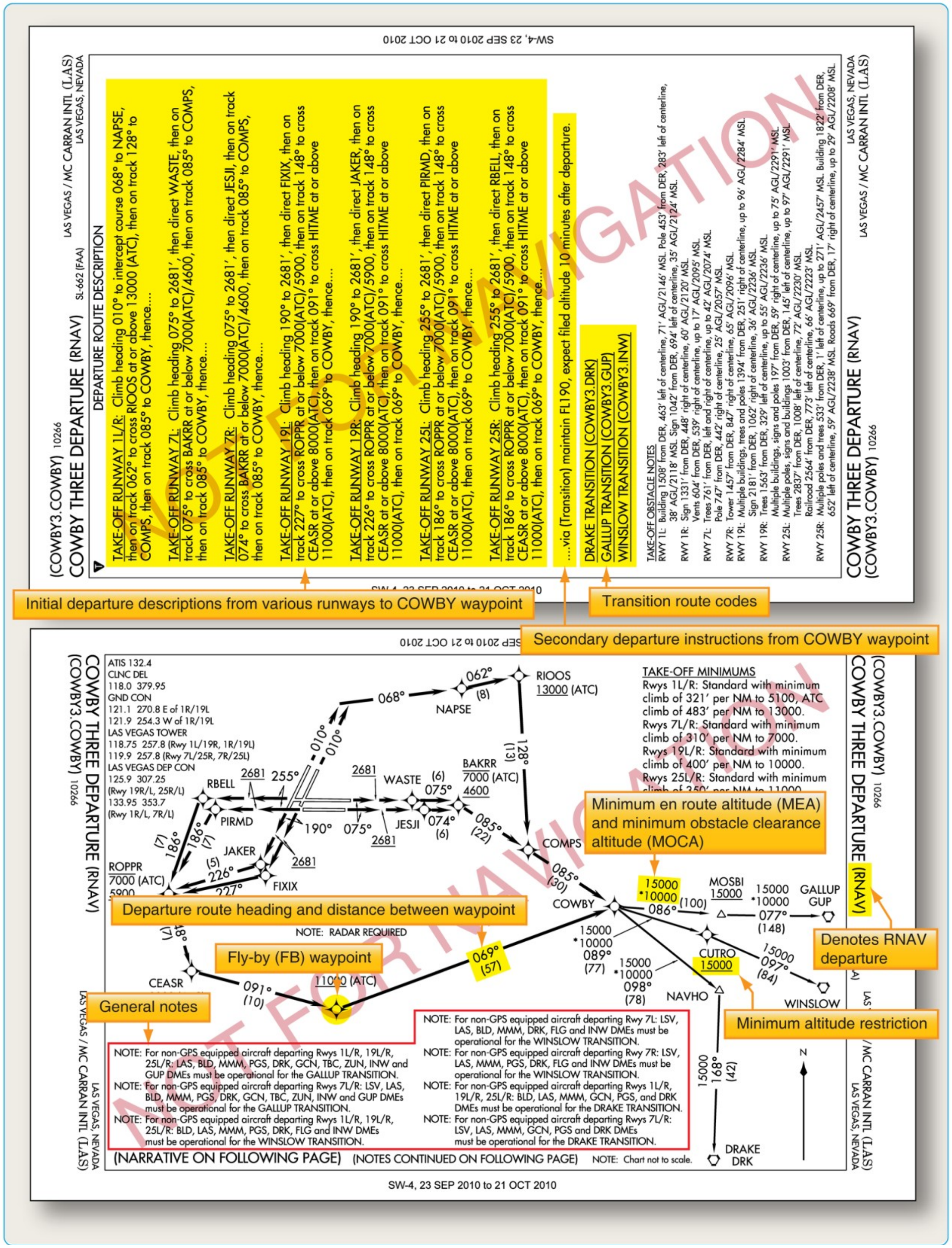
Non-RNAV DP—established for aircraft equipped with conventional avionics using ground-based NAVAIDs. These DPs may also be designed using dead reckoning navigation.

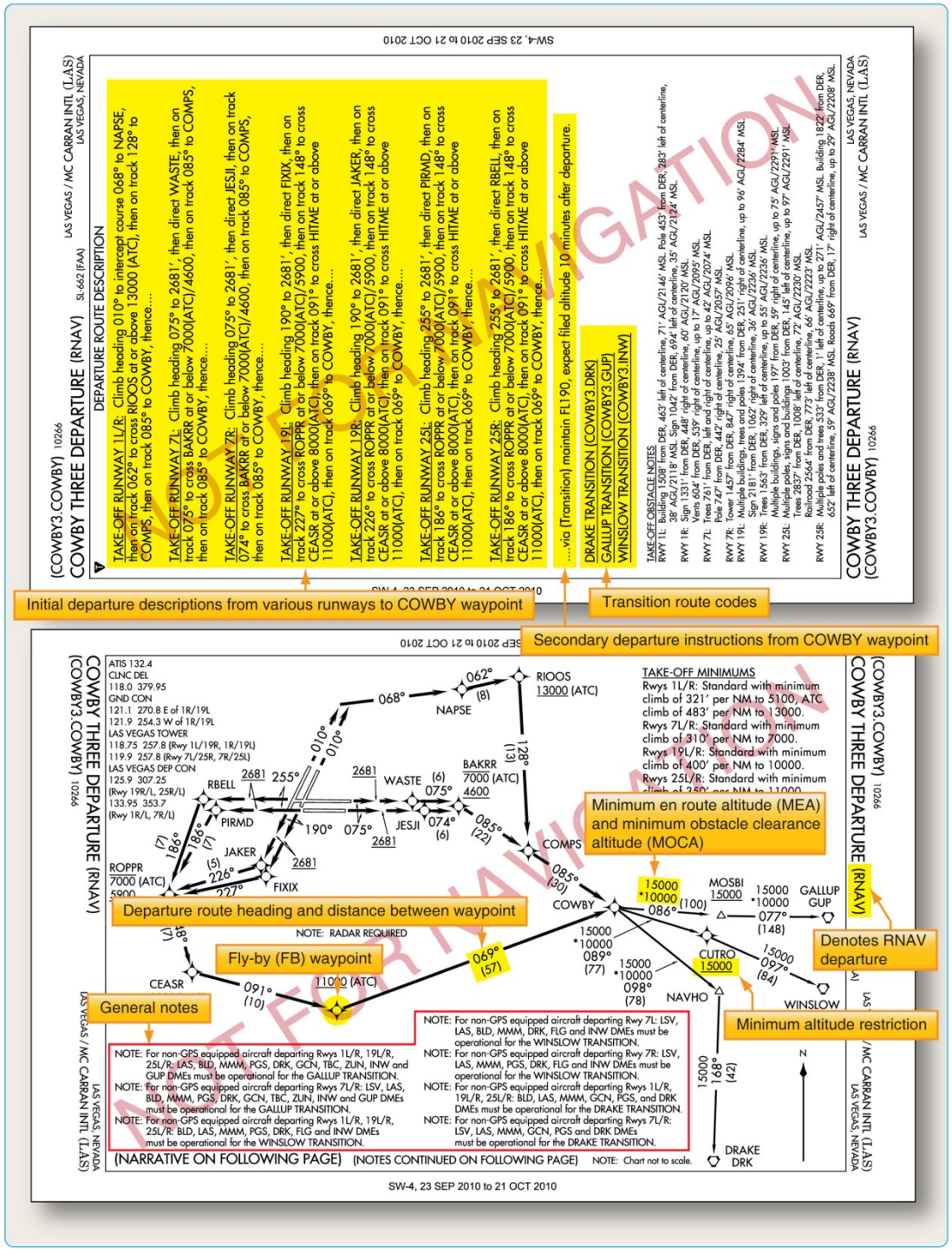
RNAV DP—established for aircraft equipped with RNAV avionics (e.g., GPS, VOR/DME, DME/DME). Automated vertical navigation is not required, and all RNAV procedures not requiring GPS must be annotated with the note: “RADAR REQUIRED.”

Radar DP—radar may be used for navigation guidance for SID design. Radar SIDs are established when ATC has a need to vector aircraft on departure to a particular ATS Route, NAVAID, or fix. A fix may be a ground-based NAVAID, a waypoint, or defined by reference to one or more radio NAVAIDs.

Area Navigation (RNAV) Departures

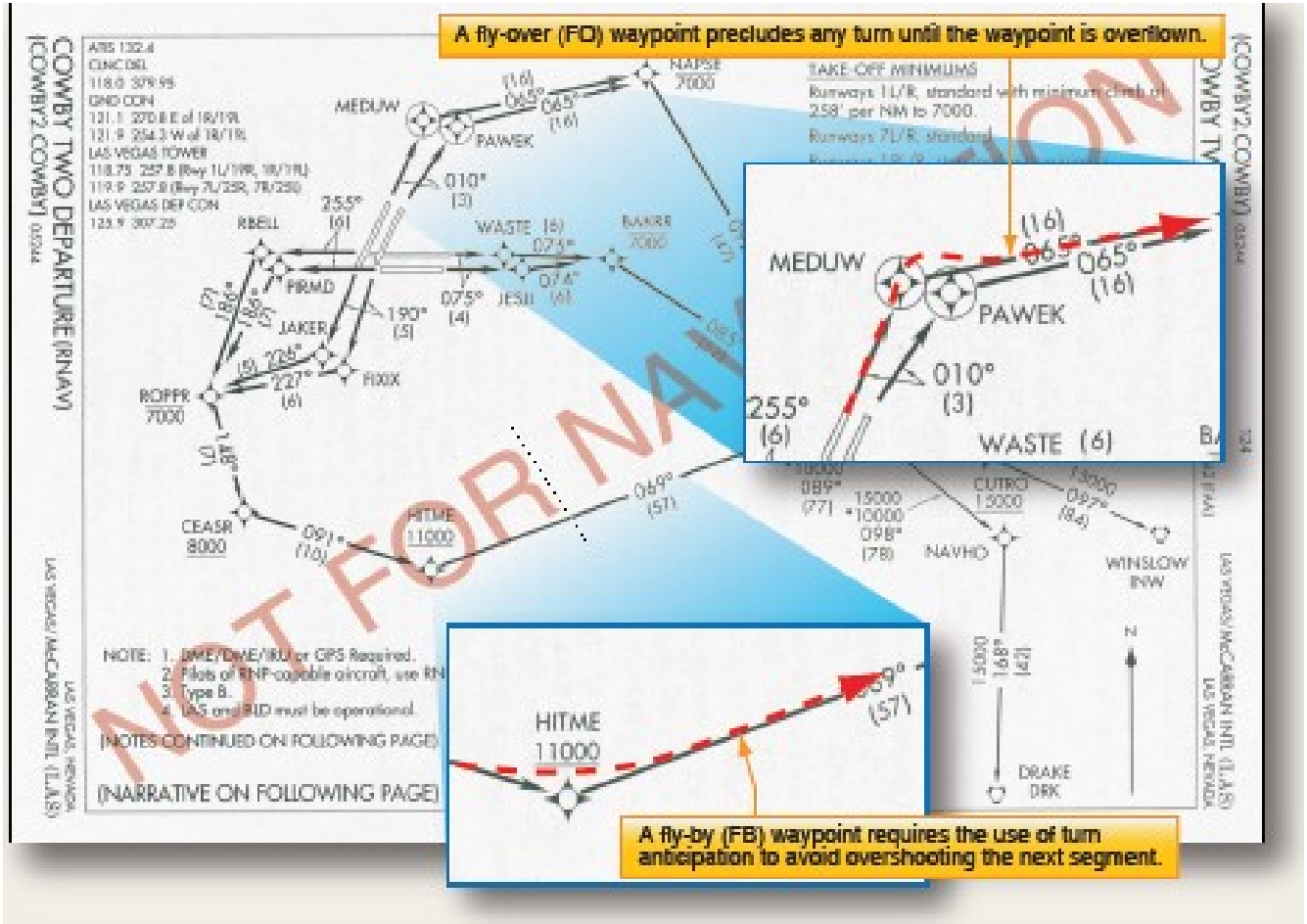
Historically, departure procedures were built around existing ground-based technology and were typically designed to accommodate lower traffic volumes. Often, departure and arrival routes use the same NAVAIDs creating interdependent, capacity diminishing routes. RNAV is a method of navigation that permits aircraft operation on any desired flight path within the coverage of ground- or spaced- based NAVAIDs or within the limits of the capability of self-contained aids or a combination of these. In the future, there will be an increased dependence on the use of RNAV in lieu of routes defined by ground-based NAVAIDs. As a part of the evolving RNAV structure, the FAA has developed departure procedures for pilots flying aircraft equipped with some type of RNAV technology. RNAV allows for the creation of new departure routes that are independent of present fixes and NAVAIDs. RNAV routing is part of the National Airspace Redesign (NAR) and is expected to reduce complexity and increase efficiency of terminal airspace.


Initial departure descriptions from various runways to COWBY waypoint
Transition route codes
Secondary departure instructions from COWBY waypoint
Minimum en route altitude (MEA) and minimum obstacle clearance altitude (MOCA)
Departure route heading and distance between waypoint
Fly-by (FB) waypoint
Denotes RNAV departure
General notes
Minimum altitude restriction
COWBY THREE DEPARTURE (RNAV)
(COWBY3.COWBY)
LAS VEGAS / MC CARRAN INTL (LAS)
LAS VEGAS, NEVADA
SW-4, 23 SEP 2010 to 21 OCT 2010
NOT FOR NAVIGATION



Example of RNAV ODP.

DPs utilize waypoints. There are two types of waypoints currently in use: fly-by (FB) and fly-over (FO). A FB waypoint typically is used in a position at which a change in the course of procedure occurs. Charts represent them with four-pointed stars. This type of waypoint is designed to allow you to anticipate and begin your turn prior to reaching the waypoint, thus providing smoother transitions. Conversely, RNAV charts show a FO waypoint as a four-pointed star enclosed in a circle. This type of waypoint is used to denote a missed approach point, a missed approach holding point, or other specific points in space that must be flown over.



Visual Climb Over Airport (VCOA)

A visual climb over airport (VCOA) is a departure option for an IFR aircraft, operating in VMC equal to or greater than the specified visibility and ceiling, to visually conduct climbing turns over the airport to the published "climb-to" altitude from which to proceed with the instrument portion of the departure. A VCOA is a departure option developed when obstacles farther than 3 SM from the airport require a CG of more than 200 FPNM. These procedures are published in the Take-Off Minimums and (Obstacle) Departure Procedures section of the TPP. Prior to departure, pilots are required to notify ATC when executing the VCOA.

Noise Abatement Procedures

As the aviation industry continues to grow and air traffic increases, so does the population of people and businesses around airports. As a result, noise abatement procedures have become commonplace at most of the nation’s airports. While most DPs are designed for obstacle clearance and workload reduction, there are some SIDs that are developed solely to comply with noise abatement requirements.

DP Responsibilities

Responsibility for the safe execution of DPs rests on the shoulders of both ATC and the pilot. Without the interest and attention of both parties, the IFR system cannot work in harmony, and achievement of safety is impossible.

The pilot has a number of responsibilities when simply operating in conjunction with ATC or when using DPs under an IFR clearance:

- Acknowledge receipt and understanding of an ATC clearance.
- Read back any part of a clearance that contains “hold short” instructions.
- Request clarification of clearances.
- Request an amendment to a clearance if it is unacceptable from a safety perspective.
- Promptly comply with ATC requests. Advise ATC immediately if unable to comply with a clearance.
- You are required to contact ATC if you are unable to comply with all-engines-operating climb gradients and climb rates. It is also expected that you are capable of maintaining the climb gradient outlined in either a standard or non-standard DP. If you cannot maintain a standard climb gradient or the climb gradient specified in an ODP, you must wait until you can depart under VMC.

When planning for a departure, pilots should:

- Consider the type of terrain and other obstructions in the vicinity of the airport.
- Determine if obstacle clearance can be maintained visually, or if they need to make use of a DP.
- Determine if an ODP or SID is available for the departure airport.
- Determine what actions allow for a safe departure out of an airport that does not have any type of affiliated DPs.

Find published DPs in your "U.S. TERMINAL PROCEDURES" → **CLASS EXERCISE** ← REVIEW CONTENTS OF *U.S. TERMINAL PROCEDURES (SE)*

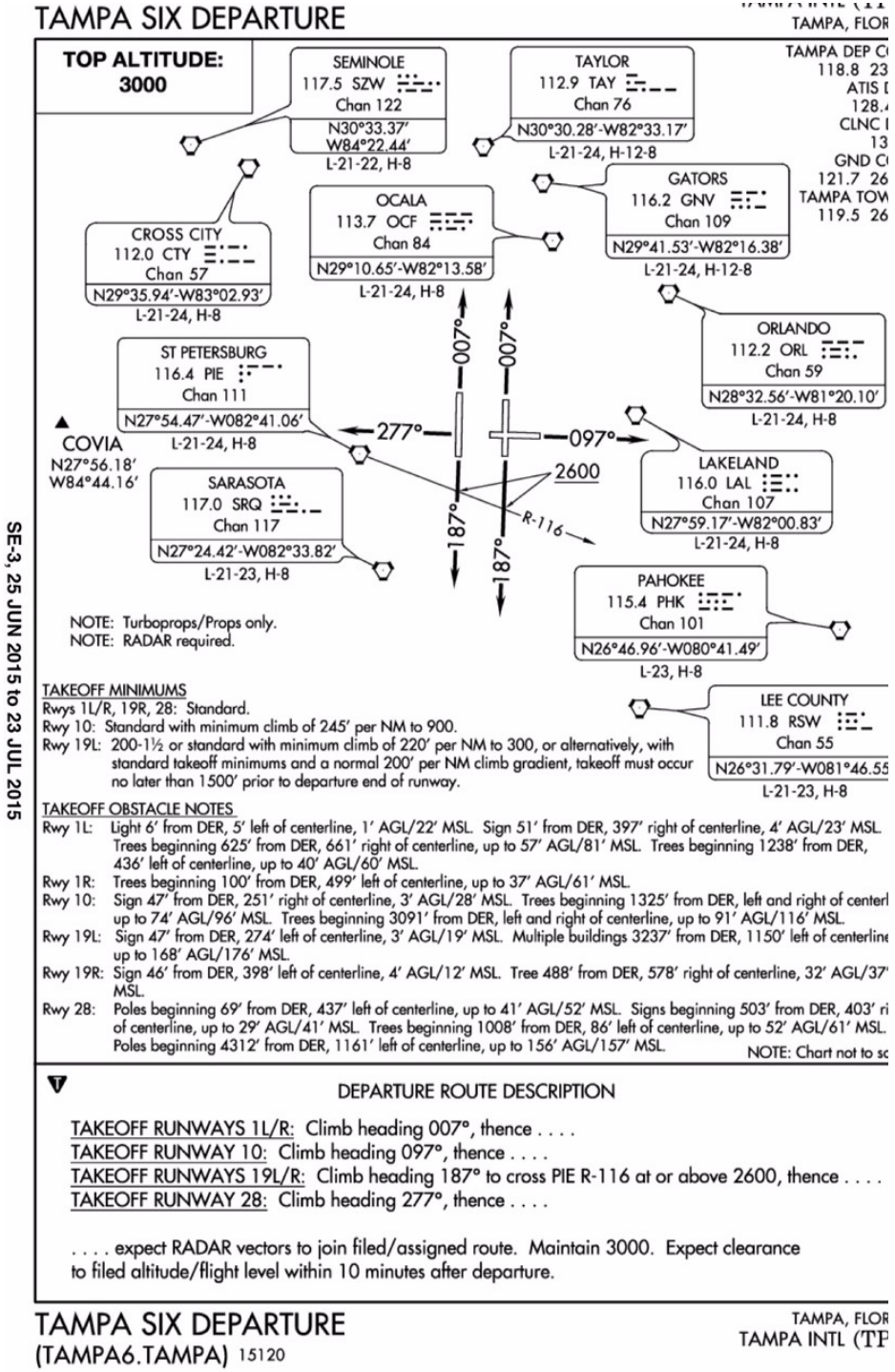
- Take Off Minimums
- Rate of Climb Table
- IFR Alternate Minimums
- Legends
- Radar Minimums
- Arrivals, by Name (not location)
- IFR Approach Plates - by
  - Location/Airport:
  - All Approaches: ILS, RNAV(GPS), LOC, VOR, NDB, GPS
  - Airport Diagram
  - Departures (DPs)

"TAMPA SIX DEPARTURE" for RWY 19L Climb GS is 120 KTs & conditions are standard.

What obstacles are cautioned?

What is the departure route?

What is them minimum rate of climb?



Departure Chart Summary Checklist

- Charted departure procedures simplify clearances, reduce frequency congestion, ensure obstacle clearance, control traffic flow around an airport, include noise abatement procedures, and reduce fuel consumption
- Instrument departure procedures (DPs) are used after takeoff to provide a transition between the airport and enroute structures.
- When issued at DP, you must ensure your aircraft is capable of achieving the DP performance requirements.
- DPs require minimum climb gradients of at least 200 feet per nautical mile, to ensure you can clear departure path obstacles
- DPs may specify a minimum ceiling and visibility to allow you to see and avoid obstacles, a climb gradient greater than 200 feet per mile, detailed flight maneuvers, or a combination of all
- When you accept a DP in a clearance, or file one in your flight plan, you must possess the DP chart or the textual description.
- To avoid being issued DPs, enter the phrase “NO DP” in the remarks section of the flight plan.
- Pilot nav DPs allow you to navigate along a route with minimal ATC communications. They usually contain instructions to all aircraft, followed by transition routes to navigate to an enroute fix, and may include radar vectors to help join the DP.
- Jeppesen and NACO list the airport served by the procedure, the name, and the type of DP at the top of the chart.
- If you are instructed to maintain runway heading, it means you should maintain the runway magnetic heading of the runway centerline
- DP initial takeoff procedures may apply to all runways, or apply to only the specific runway identified.

Departure Chart Summary Checklist

- Since the actual mileage between a given runway and the first fix varies with aircraft performance, pilot technique, and length of the radar vector, Jeppesen charts include the direct distance from the airport to the first fix.
- DP transition routes are shown with dashed lines on Jeppesen charts and with light, solid lines on NACO charts.
- The computer identification code for a transition in your flight plan informs ATC you intend to fly both the DP and appropriate transition.
- Because of the large area covered, most DPs are usually not drawn to scale.
- Vector DPs exist where ATC provides radar navigation guidance. They usually contain a heading to fly, and an altitude for the initial climb. When ATC establishes radar contact, they provide vectors to help reach fixes portrayed on the chart.
- Minimum climb gradients are given in feet per nautical mile and must be converted to feet per minute for use in departure. FPM=(climb groundspeed / 60) x feet per nautical mile.

Departure Procedures Summary Checklist

- Runway visibility value (RVV) is reported in statue miles or fractions of miles
- RVR represents the distance you can expect to see down the runway from a moving aircraft
- When RVR is out of service, convert published RVR values to visibility in statute miles.
- Prevailing visibility or RVR in the aviation routine weather report should normally be used only for informational purpose. The current visibility at the time of departure is the value you should use for determining compliance with takeoff minimums.
- IFR takeoff minimums do not apply to private aircraft operating under IFR and part 91, but good judgment should dictate compliance.
- If you wish to fly a graphic DP, you must possess the charted DP procedure or at least the textual description.
- Textual DPs are not assigned as a portion of your IFR clearance unless required for separation purposes.
- During the IFR departure, you should not contact departure control until advised to do so by tower.
- Radar departures are often assigned at radar-equipped approach control facilities and require close coordination with the tower
- The term "*radar contact*" means your aircraft has been identified and radar flight following will be provided until radar identification has been terminated
- During departure, terrain and obstruction clearance remains your responsibility until the controller begins to provide navigation guidance in the form of radar vectors.
- "*Resume own navigation*" is a phrase used by ATC to advise you to assume responsibility for your own navigation.