

Area of Operation II - Task C

Regulations and Publications related to IFR



Key References:

- Instrument Flying Handbook
- AIM
- 14 CFR Part 61, 71, 91, 95, 97

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 - TPP – Departure
 - TPP – Arrival
 - TPP – Approach
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1. Introduction

- **What:** Overview of relevant publications governing the issuance of an instrument rating and the rules of IFR flight
- **Why:** Understand requirements and comply with rules and regulations for IFR operations
- **PART 61 – Acquiring an Instrument Rating** [\[61.65\]](#)
 - 61.65(a): Instrument Rating Requirements
 - 61.65(b): Aeronautical Knowledge
 - 61.65(c): Flight Proficiency
 - 61.65(d): Aeronautical Experience
 - *50h of XC time as PIC (10h in an Airplane)*
 - *40h of Act/Sim Instrument time in the areas of 61.65(c)*
 - *15h of those by a CFII (3h withing 2 cal months)*
 - *IFR XC 250nm+ with 3 kinds of approaches (nav systems)*
 - 61.65(h): Use of Simulators / FTDs
 - 61.65(i): Use of an Aviation Training Device
 - *20h of AATD (10h of BATD) can be used*



2. Part 61 | Pilot Certification

- **Recent Flying Experience [61.57(c)]** →
- **If recency ends:**
 - Cannot be PIC in an IFR flight
 - Have 6 months to regain currency
 - After these 6 months, needs IPC
- **Instrument Proficiency Check [61.57(d)]**
 - DPE, CFII, FAA examiner, Check pilot (121/125/135)
 - Areas of ACS, including
 - *Non-precision, Precision and Missed appr*
 - *Partial Pannel approach, Circling Approach*
 - *Intercepting, Tracking, Holds*
 - *Recovery from Unusual Attitudes*
 - Can be done in AATD, **except for circling approach, landing task, and multi-engine tasks** (per ACS, Appendix 1, page 29)
 - AC 61.98E has checklist samples and other information

(c) **Instrument experience.** Except as provided in [paragraph \(e\)](#) of this section, a person may act as pilot in command under IFR or weather conditions less than the minimums prescribed for VFR only if:

(1) **Use of an airplane, powered-lift, helicopter, or airship for maintaining instrument experience.** Within the 6 calendar months preceding the month of the flight, that person performed and logged at least the following tasks and iterations in an airplane, powered-lift, helicopter, or airship, as appropriate, for the instrument rating privileges to be maintained in actual weather conditions, or under simulated conditions using a view-limiting device that involves having performed the following—

(i) Six instrument approaches. Logging requirements in another lesson


(ii) Holding procedures and tasks.

(iii) Intercepting and tracking courses through the use of navigational electronic systems.

(2) **Use of a full flight simulator, flight training device, or aviation training device for maintaining instrument experience.** A pilot may accomplish the requirements in [paragraph \(c\)\(1\)](#) of this section in a full flight simulator, flight training device, or aviation training device provided the device represents the category of aircraft for the instrument rating privileges to be maintained and the pilot performs the tasks and iterations in simulated instrument conditions. A person may complete the instrument experience in any combination of an aircraft, full flight simulator, flight training device, or aviation training device.

3. Part 71 | Airspaces, Air Traffic Routes and Reporting Points

- Incorporates FAA Order JO7400.11J into the 14 CFR
- Covered
 - Airspaces (Class A, B, C, D, E)
 - Reporting Points
 - Defines size of an Air Traffic Service (ATS) routes



U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

ORDER
JO 7400.11J

Air Traffic Organization Policy 07/31/2024

SUBJ: Airspace Designations and Reporting Points

1. Purpose of This Order. This order is published annually, which is incorporated by reference, to add all amendments to the listings of Class A, B, C, D, and E airspace areas; air traffic service routes; and reporting points as published by the Federal Aviation Administration (FAA) as final rules in the *Federal Register*.

2. Audience. Airspace and Aeronautical Operations personnel, Air Traffic Controllers, and interested aviation parties.

3. Where Can I Find This Order. You can find this order on FAA Air Traffic Plans and Publications website at https://www.faa.gov/air_traffic/publications/, and FAA employees' website at https://employees.faa.gov/tools_resources/orders_notices/.

4. What This Order Cancels. FAA Order JO 7400.11H, Airspace Designations and Reporting Points, dated August 11, 2023, is canceled.

5. Effective Date: September 15, 2024.

§ 71.11 Air Traffic Service (ATS) routes.

Unless otherwise specified, the following apply:

- (a) An Air Traffic Service (ATS) route is based on a centerline that extends from one navigation aid, fix, or intersection, to another navigation aid, fix, or intersection (or through several navigation aids, fixes, or intersections) specified for that route.
- (b) An ATS route does not include the airspace of a prohibited area.

[Doc. No. FAA-2003-14698, 68 FR 16947, Apr. 8, 2003, as amended by Amdt. 71-33, 70 FR 23004, May 3, 2005]

§ 71.13 Classification of Air Traffic Service (ATS) routes.

Unless otherwise specified, ATS routes are classified as follows:

- (a) In subpart A of this part:
 - (1) Jet routes.
 - (2) Area navigation (RNAV) routes.
- (b) In subpart E of this part:
 - (1) VOR Federal airways.
 - (2) Colored Federal airways.
 - (i) Green Federal airways.
 - (ii) Amber Federal airways.
 - (iii) Red Federal airways.
 - (iv) Blue Federal airways.
 - (3) Area navigation (RNAV) routes.

[Doc. No. FAA-2003-14698, 68 FR 16947, Apr. 8, 2003]

4. Part 91 | General Operation

• Can the airplane fly IFR?

- [91.205\(d\)](#): Required Instruments and Equipment
- [91.411](#): Altimeter/Pitot-Static Tests & Inspections
- [91.171](#): VOR Equipment Check

IFR → **GRAB CARD** (+VFR Day or Night)

- **G** – Generator/Alternator
- **R** – Radios (and Navigation)
- **A** – Altimeter (adjustable)
- **B** – Ball (slip-skid indicator)
- **C** – Clock (aircraft equipment)
- **A** – Attitude indicator
- **R** – Rate of Turn indicator
- **D** – Directional gyro (heading ind.)

• Preflight


- [91.103](#): Preflight Actions
- [91.169](#): IFR Alternate Requirements
- [91.167](#): Fuel Requirements

Filing Alternate [§91.169]

ALTERNATE IS REQUIRED WHEN: (**0-1-2-3** Rule)

- **0** – Destination airport doesn't have an IAP, or...
- **1** – Within ±1h from ETA, the destination airport has...
- **2** – Ceiling lower than 2,000ft AGL, or...
- **3** – Visibility lower than 3sm

CONDITIONS FOR AN AIRPORT TO BE ELIGIBLE AS ALTERNATE

- Precision approach → Min 600ft ceiling and 2sm visibility at ETA
- Non-precision approach → Min 800ft ceiling and 2sm visibility ETA
- Airport with no IAP → Ceiling/Visibility at VFR conditions from MEA to landing
- NOTE: if approach has a  then the above is not applicable and Alternate Minimums must be used (see Arrival → Alternate Minimums in Foreflight)

OTHER CONSIDERATIONS [AIM 1-2-3(d) and 1-1-18(c9)]

- Non-WAAS GPS (TSO 129/196): a GPS approach can be flight-planned at either the destination or alternate, but not both
- WAAS GPS (TSO 145/146): no restrictions, can use GPS approaches for flight planning at both the destination and alternate.

When to Descend below MDA/DA [§91.175]

- Aircraft in position where landing can be made w/ normal maneuvers, RoD, and...
 - Flight visibility at/above the minimum for the selected approach, and...
 - At least one of the following is distinctly visible:
 - Threshold, or threshold markings, or threshold lights
 - Touchdown zone, or touchdown zone markings, or touchdown zone lights
 - Runway, or runway markings, or runway lights
 - REIL, or PAPI/VASI, or Red terminating bars, or Red side row bars
- NOTE: if only see the ALS (not the above), can descend to 100ft above TDZ

• Departure & Landing

- [91.173](#): ATC Clearance & Flight Plan
- [91.175](#): Takeoff and Landing IFR

4. Part 91 | General Operation

• Enroute

- [91.177](#): Minimum Altitudes
- [91.179](#): IFR Cruising Altitudes
- [91.181](#): Course to be Flown (*where you can fly IFR: ATS, Direct navadis, etc*)
- [91.183](#): IFR Communications (*unforecast weather, safety, reporting points*)
- [91.185](#): Communications Failures
- [91.187](#): Malfunction Reports
 - *Equip affected, degree of impact to fly IFR, assist needed from ATC*

• Approach ([FAR 91.175](#))

- 91.175(a)(c): Takeoff and Landing IFR
- 91.175(k): ILS Components
- 91.175(d): Landing
- 91.175(e): Missed Approach Procedures
- 91.175(j): Procedure Turns

• [Part 95](#): IFR Altitudes

- Mountainous terrain, MAA, MCA, MEA, MOCA, MRA

• [Part 97](#): Standard Instrument Procedures

IFR Minimum Safe Altitudes [§91.177]

- If applicable minimum altitudes prescribed → cannot fly below MOCA
- Otherwise → 1000ft above the highest obstacle (2000ft if mountainous terrain) within a horizontal distance of 4nm from the course

IFR Enroute Altitudes [FAA Glossary]

- MOCA: Minimum Obstruction Clearance Altitude (*nav reception within min 22nm*)
- MEA: Minimum Enroute Altitude (*nav reception assured*)
- MAA: Maximum Authorized Altitude (*denoted as "MAA-" followed by altitude in ft*)
- MCA: Minimum Crossing Altitude (*to cross an intersection; flag with a "X"*)
- MRA: Minimum Reception Altitude (*to identify intersections; flag w/ a "R"*)
- MTA: Minimum Turning Altitude (*in intersections; denoted as a flag with a "X"*)
- MVA: Minimum Vectoring Altitude (*lowest altitude that allows vectors from ATC*)
- OROCA: Off Route Obstruction Clearance Altitude (*ensure 1000ft, or 2000ft if mountainous area, clearance from obstruction*)

IFR Cruising Altitudes [§91.179]

- In controlled airspace: maintain the altitude or flight level assigned by ATC
- In uncontrolled airspace, except while in holding of 2min or less, or turning:

0° → 179° [N/E]:
Odd (5000ft, 7000ft, FL190, FL210)

180° → 359° [S/W]:
Even (4000ft, 6000ft, FL180, FL200)

If FL290 or above an RSVM (Reduced Vertical Separation Minimum), then separation remains 2000ft interval. If Non-RSVM, separation of 4000ft intervals
NOTE: All courses magnetic

Lost Communications under IFR [§91.185]

- Route (fly on this order): Assigned → Vectored → Expected → Filed
- Altitude (fly the highest of M.E.A.): Minimum, Expected, Assigned altitude
- Leaving the clearance limit:
 - If that's a point where approach begin → start descent/approach as close as possible to the EFC (Expect Further Clearance time) or ETA (if no EFC)
 - Otherwise → proceed to the fix where the approach begins at the EFC (or ETA if no EFC) and start the descent/approach
- *NOTE: If VFR conditions* → continue under VFR and land as soon as practical

5. Publications | Certification Standards (ACS/PTS)

- Set the standards a pilot must perform (and knowledge to demonstrate) in order to achieve a certificate/rating
- **Airman Certification Standards (ACS)** is gradually replacing the **Practical Test Standards (PTS)**
- Download PDF in the FAA Website or printed through 3rd party
- **Current PTS:**
 - Sport, Recreational, **Instrument Instructor**
- **Current ACS:**
 - Private, **Instrument**, Commercial Flight Instructor, ATP, Type Rating



V. Navigation Systems

Task	A. Intercepting and Tracking Navigational Systems and Arcs
References	14 CFR parts 61, 91; FAA-H-8083-15, FAA-H-8083-16; AFM; AIM Note: The evaluator must reference the manufacturer's equipment supplement(s) as necessary for appropriate limitations, procedures, etc.
Objective	To determine the applicant exhibits satisfactory knowledge, risk management, and skills associated with intercepting and tracking navigation aids and arcs solely by reference to instruments.
Knowledge	The applicant demonstrates understanding of:
IR.V.A.K1	Ground-based navigation (orientation, course determination, equipment, tests and regulations) including procedures for intercepting and tracking courses and arcs.
IR.V.A.K2	Satellite-based navigation (orientation, course determination, equipment, tests and regulations, interference, appropriate use of databases, RAIM, and WAAS) including procedures for intercepting and tracking courses and arcs.
Risk Management	The applicant demonstrates the ability to identify, assess and mitigate risks, encompassing:
IR.V.A.R1	Failure to manage automated navigation and autoflight systems.
IR.V.A.R2	Distractions, loss of situational awareness, or improper task management.
IR.V.A.R3	Limitations of the navigation system in use.
Skills	The applicant demonstrates the ability to:
IR.V.A.S1	Tune and correctly identify the navigation facility/program the navigation system and verify system accuracy as appropriate for the equipment installed in the airplane.
IR.V.A.S2	Determine airplane position relative to the navigational facility or waypoint.
IR.V.A.S3	Set and correctly orient to the course to be intercepted.
IR.V.A.S4	Intercept the specified course at appropriate angle, inbound to or outbound from a navigational facility or waypoint.
IR.V.A.S5	Maintain airspeed ± 10 knots, altitude ± 100 feet, and selected headings $\pm 5^\circ$.
IR.V.A.S6	Apply proper correction to maintain a course, allowing no more than $\frac{3}{4}$ -scale deflection of the CDI. If a DME arc is selected, maintain that arc ± 1 nautical mile.
IR.V.A.S7	Recognize navigational system or facility failure, and when required, report the failure to ATC.
IR.V.A.S8	Use an MFD and other graphical navigation displays, if installed, to monitor position, track wind drift, and to maintain situational awareness.
IR.V.A.S9	Use the autopilot to make appropriate course intercepts, if installed.

5. Publications | FAA Handbooks

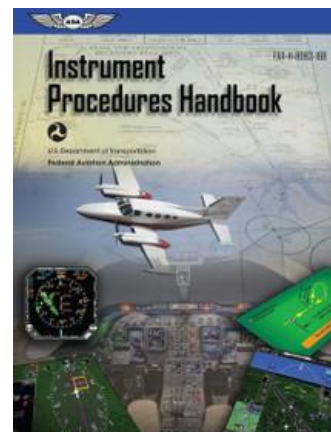
- Contain the technical knowledge required for pilots
- Free to download on the FAA's website (printed version available through 3rd Party vendors)



- **Knowledge & skills to operate in IMC**
- Used to prepare for instrument rating tests
- Contents include:
 - Air Traffic Control
 - Instrument Flying Skills
 - Navigation & IFR Flight
 - Emergency Operations

▶ *“Foundational Knowledge”*

“Application, Advanced” ◀

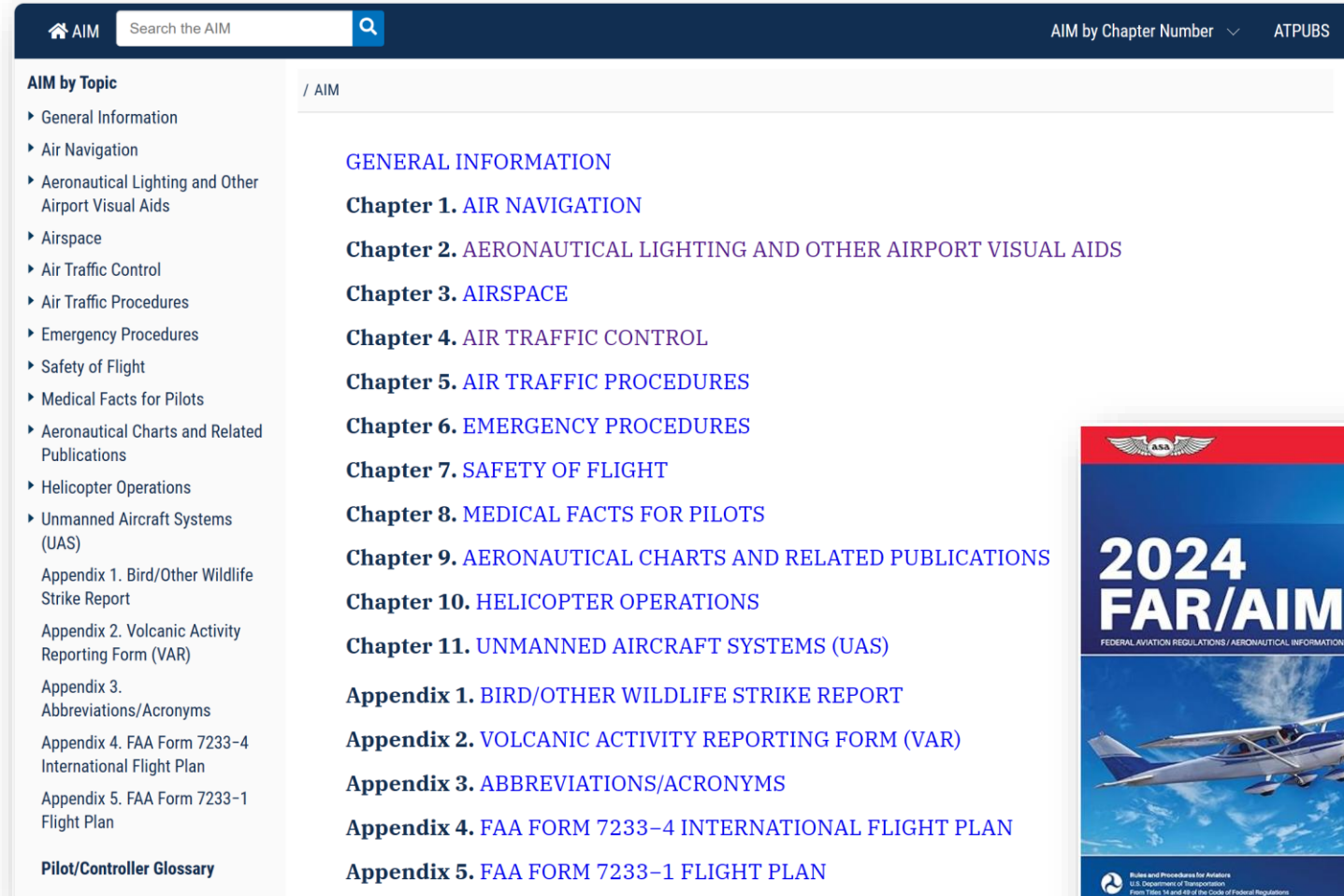


- **Technical reference focused on Procedures**
- Explain procedures plates and how to read them
- Contents include:
 - Departure and Arrival Procedures
 - Approach Procedures
 - Enroute Navigation

5. Publications | Aeronautical Information Manual (AIM)

- Official guide by the FAA to basic flight information and ATC procedures
 - *Navigation*
 - *Airspace*
 - *Air Traffic Control*
 - *Air Traffic Procedures*
 - *Emergency Procedures*
 - *Pilot/Controller Glossary*
- Available online or purchased from 3rd party
- Issued annually (black bar indicates change)
- Often overlapping with other publications
- Often reinforce regulations

https://www.faa.gov/air_traffic/publications/atpubs/aim_html/



The screenshot shows the FAA's Aeronautical Information Manual (AIM) website. The top navigation bar includes a search function and links to 'AIM by Chapter Number' and 'ATPUBS'. The left sidebar, titled 'AIM by Topic', lists various categories such as General Information, Air Navigation, Aeronautical Lighting and Other Airport Visual Aids, Airspace, Air Traffic Control, Air Traffic Procedures, Emergency Procedures, Safety of Flight, Medical Facts for Pilots, Aeronautical Charts and Related Publications, Helicopter Operations, and Unmanned Aircraft Systems (UAS). The main content area displays a list of chapters and appendices, including Chapter 1. AIR NAVIGATION, Chapter 2. AERONAUTICAL LIGHTING AND OTHER AIRPORT VISUAL AIDS, Chapter 3. AIRSPACE, Chapter 4. AIR TRAFFIC CONTROL, Chapter 5. AIR TRAFFIC PROCEDURES, Chapter 6. EMERGENCY PROCEDURES, Chapter 7. SAFETY OF FLIGHT, Chapter 8. MEDICAL FACTS FOR PILOTS, Chapter 9. AERONAUTICAL CHARTS AND RELATED PUBLICATIONS, Chapter 10. HELICOPTER OPERATIONS, Chapter 11. UNMANNED AIRCRAFT SYSTEMS (UAS), Appendix 1. BIRD/OTHER WILDLIFE STRIKE REPORT, Appendix 2. VOLCANIC ACTIVITY REPORTING FORM (VAR), Appendix 3. ABBREVIATIONS/ACRONYMS, Appendix 4. FAA FORM 7233-4 INTERNATIONAL FLIGHT PLAN, and Appendix 5. FAA FORM 7233-1 FLIGHT PLAN. To the right of the website screenshot is the cover of the 2024 FAR/AIM book, which features the title '2024 FAR/AIM' and a photograph of a small aircraft in flight.

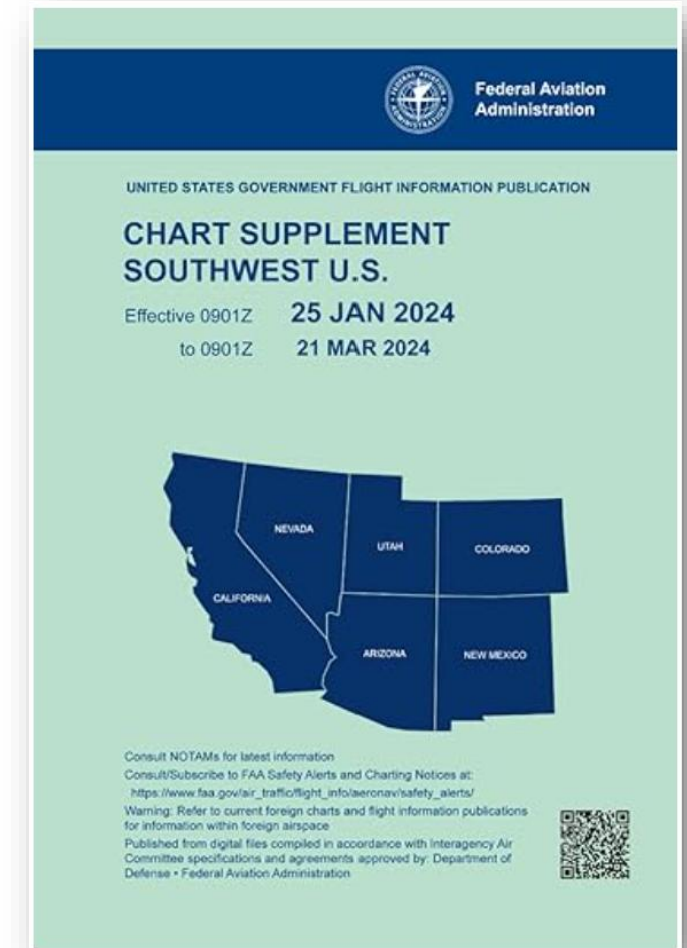
5. Publications | Chart Supplement

- **Chart Supplement**

- Information about airports, weather facilities, Preferred IFR routes, VFR waypoints, VOR checkpoints, etc
- 7 books organized by region (NW, SW, NC, SC, EC, NE, SE)
- Can be downloaded (or added as “document” in Foreflight)
- Revised every 56 days

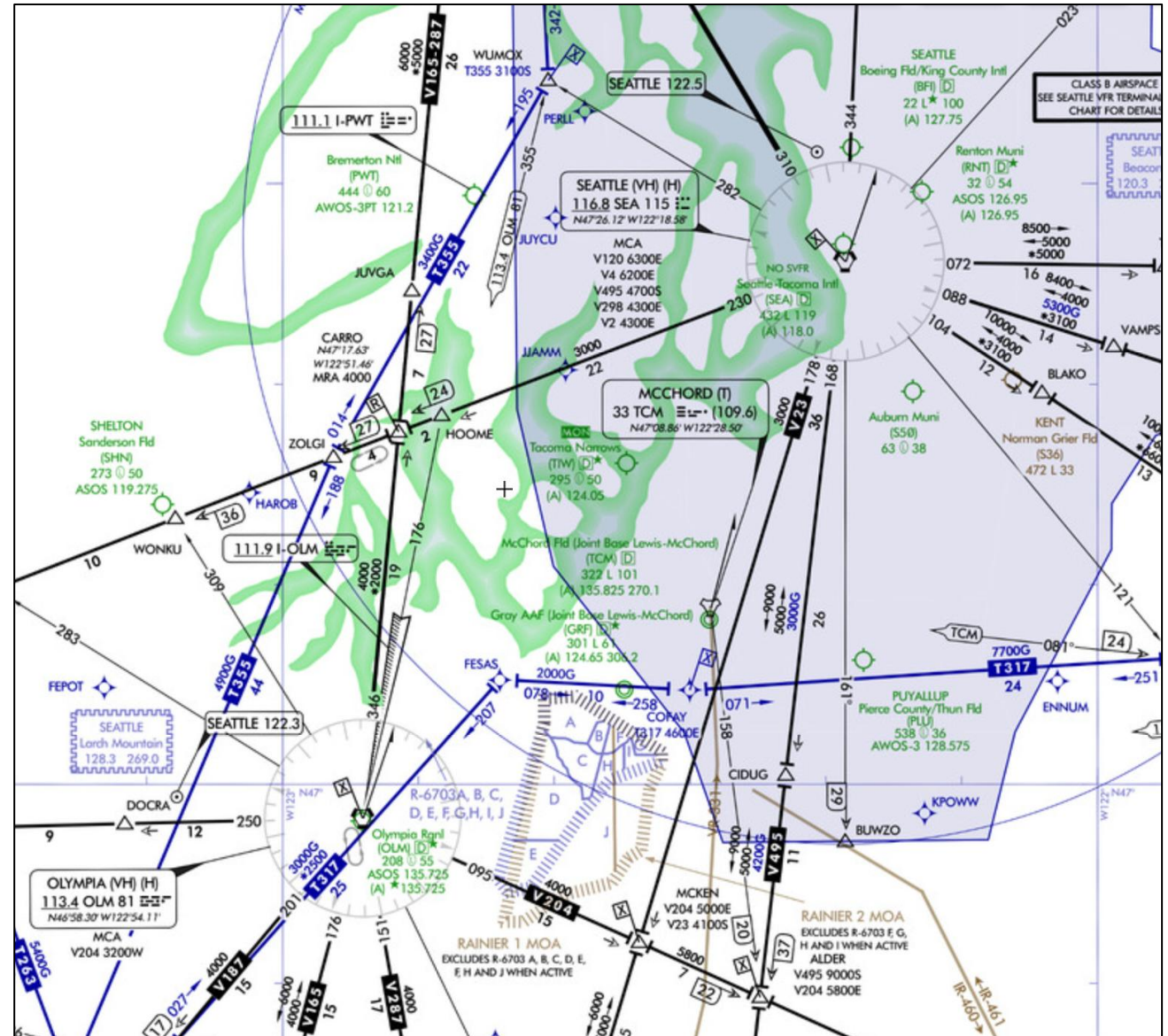
- **Relevance for IFR (What you will find)**

- Airport Information (frequencies, diagram, remarks, elevation, etc)
- Air Route Traffic Control Centers (ARTCC)
- FSS Frequencies
- VOR Receiver Checkpoints and VOR Test Facilities
- MON Airport Listing
- Preferred IFR Routes



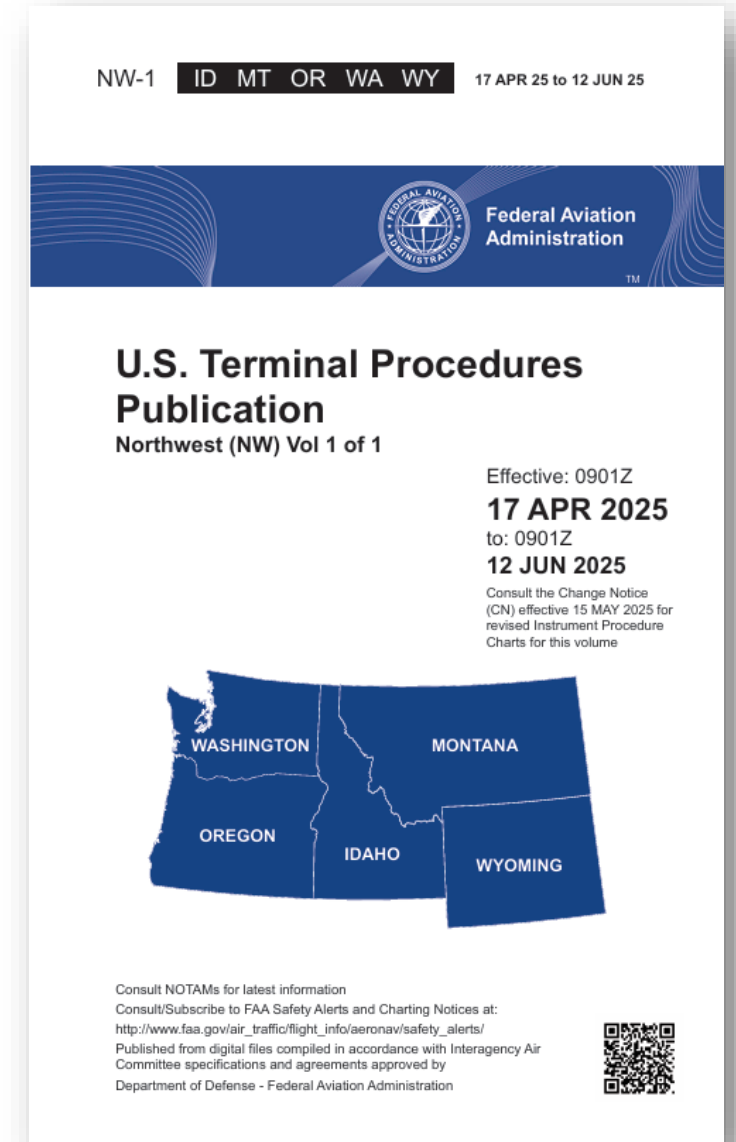
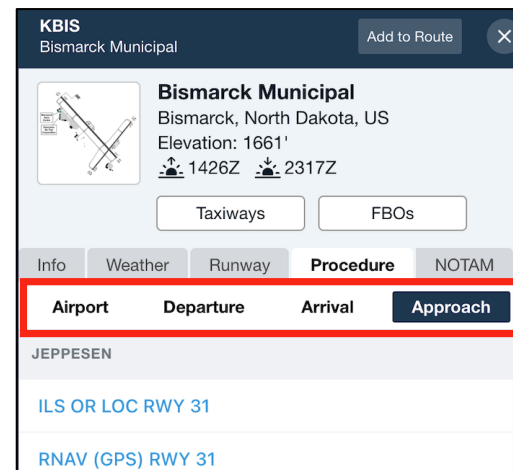
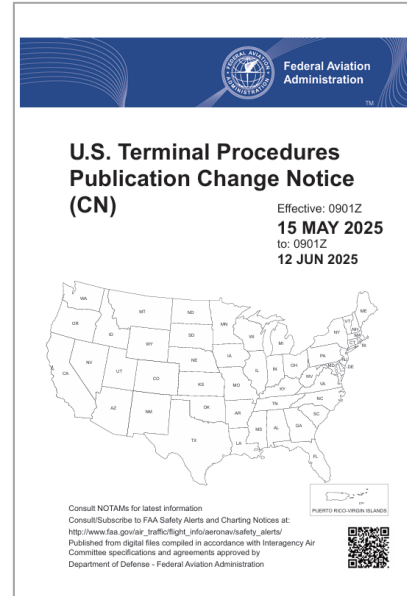
5. Publications | Low Altitude Enroute Charts

- For IFR navigation below 18,000' MSL
- Equivalent to the VFR sectional chart
- General Content
 - Airport Information
 - Charted IFR Altitudes
 - Navigation Features
- Revised every 56 days
- [FAA Aeronautical Chart User's Guide](#)



6. Terminal Procedures Publication (TPP)

- **Flight procedures in the airport area**
- **Contains:**
 - Supplement and Symbology (how to read the plates)
 - Takeoff, Alternate, & Radar Minimums
 - Departure Procedures (DPs)
 - Standard Terminal Arrival Routes (STARs)
 - Instrument Approach Procedures (IAPs)
- **Revised every 56 days**
 - Change Notice at 28 days (mid-point)
 - d-TPP issued every 28 days
 - Note it expires at 0901Z
- **Available digitally in the FAA Website**
 - Usually used by pilots via EFB software
 - Digital version of the Supplement downloaded in separate



6. Terminal Procedures Publication (TPP) | Supplement

A1

INOP COMPONENTS 19339

INOPERATIVE COMPONENTS OR VISUAL AIDS TABLE
(For Civil Use Only)

Straight-in and Sidestep landing minima published on instrument approach procedure charts are based on full operation of all components and visual aids (see exception below for ALSF 1 & 2) associated with the particular approach chart being used. Higher minima are required with inoperative components or visual aids as indicated below. If more than one component is inoperative, each minimum is raised to the highest minimum required by any single component that is inoperative. ILS glideslope inoperative minima are published on the instrument approach charts as localizer minima. This table applies to approach categories A thru D and is to be used unless amended by notes on the approach chart. Such notes apply only to the particular approach category(ies) as stated. Category E inoperative notes will be specified when published on civil charts. The inoperative table does not apply to Circling minima. See legend page for description of components indicated below.

Full Operation Exception: For ALSF 1 & 2 operated as SSALR, or when the sequenced flashing lights are inoperative, there is no effect on visibility for ILS lines of minima.

(1) ILS, PAR, LPV, GLS minima

Inoperative Component or Visual Aid	Increase Visibility
All ALS types (except ODALS)	¼ mile

(2) ILS, LPV, GLS with visibility minima of RVR 1800/2000/2200*

Inoperative Component or Visual Aid	Increase Visibility
ALSF 1 & 2, MALSR, SSALR	To RVR 4000† To RVR 4500*
TDZL or RCLS	To RVR 2400#
RVR	To ½ mile

#For ILS, LPV, GLS procedures with a 200 foot HAT, RVR 1800 authorized with use of FD or AP or HUD to DA.

(3) All Approach Types and all lines of minima other than (1) & (2) above

Inoperative Component or Visual Aid	Increase Visibility
ALSF 1 & 2, MALSR, SSALR	½ mile
MALSF, MALS, SSALF, SSALS, SALSF, SALS	¼ mile

(4) Sidestep minima (CAT C-D)

Inoperative Component or Visual Aid to Sidestep Runway	Increase Visibility
ALSF 1 & 2, MALSR, SSALR	½ mile

(5) All Approach Types, All lines of minima

Inoperative Component or Visual Aid	Increase Visibility
ODALS (CAT A-B)	¼ mile
ODALS (CAT C-D)	½ mile

INOP COMPONENTS 19339

TERMS/LANDING MINIMA DATA 20142

IFR LANDING MINIMA

The United States Standard for Terminal Instrument Procedures (TERPS) is the approved criteria for formulating instrument approach procedures. Landing minima are established for six aircraft approach categories (A, B, C, D, E, and F). In the absence of COPTER MINIMA, helicopters may use the CAT A minima of other procedures.

LANDING MINIMA FORMAT

In this example airport elevation is 1179, and runway touchdown zone elevation is 1152.

Category	A	B	C	D
S-ILS 27	1352/24	200	(200-½)	
S-LOC 27	1440/24	288	(300-½)	1440/50 288 (300-1)
CIRCLING	1540-1 361 (400-1)	1640-1 461 (500-1)	1640-1½ 461 (500-1½)	1740-2 561 (600-2)

DA, HAT, MDA, HAA, Visibility (RVR 100's of feet), Aircraft Approach Category, All weather minima in parentheses not applicable to Civil Pilots. Military Pilots refer to appropriate regulations.

COPTER MINIMA ONLY

Category	COPTER
H-176°	680-½ 363 (400-½)

Copter Approach Direction, Height of MDA/DA Above Landing Area (HAA), No circling minima are provided.

NOTE: The **W** symbol indicates outages of the WAAS vertical guidance may occur daily at this location due to initial system limitations. WAAS NOTAMS for vertical outages are not provided for this approach. Use UNAV minima for flight planning at these locations, whether as a destination or alternate. For flight operations at these locations, when the WAAS avionics indicate that UNAV/VNAV or LPV service is available, then vertical guidance may be used to complete the approach using the displayed level of service. Should an outage occur during the procedure, reversion to UNAV minima may be required. As the WAAS coverage is expanded, the **W** will be removed.

RNAV minima are dependent on navigation equipment capability, as stated in the applicable AFM, AFMS, or other FAA approved document. See AIM paragraph 5-6.5, AC 90-105 and AC 90-107 for detailed requirements for each line of minima.

COLD TEMPERATURE AIRPORTS

NOTE: A **12°C** symbol indicates a cold temperature altitude correction is required at this airport when reported temperature is at or below the published temperature. See the following Cold Temperature Error Table to make manual corrections. Advise ATC with altitude correction. Advising ATC with altitude corrections is not required in the final segment. See Aeronautical Information Manual (AIM), Chapter 7, for guidance and additional information. For a complete list, see the "Cold Temperature Airports" link under the Additional Resources heading at the bottom of the following page: http://www.faa.gov/air_traffic/flight_info/aeronav/digital_products/dtpp/search/

COLD TEMPERATURE ERROR TABLE

HEIGHT ABOVE AIRPORT IN FEET

Reported Temp. °C	200	300	400	500	600	700	800	900	1000	1500	2000	3000	4000	5000
+10	10	10	10	10	20	20	20	20	20	30	40	60	80	90
0	20	20	30	30	40	40	50	50	60	90	120	170	230	280
-10	20	30	40	40	50	60	70	80	90	150	200	290	390	490
-20	30	50	60	70	90	100	120	130	140	210	280	420	570	710
-30	40	60	80	100	120	140	150	170	190	280	380	570	760	950
-40	50	80	100	120	150	170	190	220	240	360	480	720	970	1210
-50	60	90	120	150	180	210	240	270	300	450	590	890	1190	1500

AIRCRAFT APPROACH CATEGORIES

Aircraft approach category indicates a grouping of aircraft based on a speed of VREF, if specified, or if VREF not specified, 1.3 VSO at the maximum certificated landing weight. VREF, VSO, and the maximum certificated landing weight are those values as established for the aircraft by the certification authority of the country of registry. Helicopters are Category A aircraft. An aircraft shall fit in only one category. When necessary to operate the aircraft at an airspeed in excess of the maximum airspeed of its certified aircraft approach category, pilots should use the applicable higher category minima. For additional options and to ensure the aircraft remains within protected airspace, consult the AIM. See following category limits:

MANEUVERING TABLE

Approach Category	A	B	C	D	E
Speed (Knots)	0-90	91-120	121-140	141-165	Abr 165

TERMS/LANDING MINIMA DATA 20142

Designated Extreme Cold Weather Airports

TERMS/LANDING MINIMA DATA 19339

CIRCLING APPROACH OBSTACLE PROTECTED AIRSPACE

The circling MDA provides vertical obstacle clearance during a circle-to-land maneuver. The circling MDA protected area extends from the threshold of each runway authorized for landing following a circle-to-land maneuver for a distance as shown in the tables below. The resultant arcs are then connected tangentially to define the protected area.

STANDARD CIRCLING APPROACH MANEUVERING RADIUS

Circling approach protected areas developed prior to late 2012 used the radius distances shown in the following table, expressed in nautical miles (NM), dependent on aircraft approach category. The approaches using standard circling approach areas can be identified by the absence of the **C** symbol on the circling line of minima.

Circling MDA in feet MSL	Approach Category and Circling Radius (NM)				
	CAT A	CAT B	CAT C	CAT D	CAT E
All Altitudes	1.3	1.5	1.7	2.3	4.5

EXPANDED CIRCLING APPROACH MANEUVERING AIRSPACE RADIUS

Circling approach protected areas developed after late 2012 use the radius distance shown in the following table, expressed in nautical miles (NM), dependent on aircraft approach category, and the altitude of the circling MDA, which accounts for true airspeed increase with altitude. The approaches using expanded circling approach areas can be identified by the presence of the **C** symbol on the circling line of minima.

Circling MDA in feet MSL	Approach Category and Circling Radius (NM)				
	CAT A	CAT B	CAT C	CAT D	CAT E
1000 or less	1.3	1.7	2.7	3.6	4.5
1001-3000	1.3	1.8	2.8	3.7	4.6
3001-5000	1.3	1.8	2.9	3.8	4.8
5001-7000	1.3	1.9	3.0	4.0	5.0
7001-9000	1.4	2.0	3.2	4.2	5.3
9001 and above	1.4	2.1	3.3	4.4	5.5

Comparable Values of RVR and Visibility

The following table shall be used for converting RVR to ground or flight visibility. For converting RVR values that fall between listed values, use the next higher RVR value; do not interpolate. For example, when converting 4800 RVR, use 5000 RVR with the resultant visibility of 1 mile.

RVR (feet)	Visibility (SM)	RVR (feet)	Visibility (SM)	RVR (feet)	Visibility (SM)	RVR (feet)	Visibility (SM)
1600	¼	2400	½	3500	¾	5500	1
1800	¼	2600	½	4000	¾	6000	1¼
2000	½	3000	¾	4500	¾		
2200	½	3200	¾	5000	1		

RADAR MINIMA

	RWY	GP/TCH/RPI	CAT	DA/ MDA-VIS	HAT HAA	CEIL-VIS	CAT	DA/ MDA-VIS	HAT HAA	CEIL-VIS
PAR	10	2.5°/42/1000	ABCDE	195/16	100	(100-¼)				
	28	2.5°/48/1068	ABCDE	187/16	100	(100-¼)				
ASR	10		ABC	560/40	463	(500-¾)	DE	560/50	463	(500-1)
	28		AB	600/50	513	(600-1)	CDE	600/60	513	(600-1¼)
CIR	10		AB	560-1¼	463	(500-1¼)	CDE	560-1½	463	(500-1½)
	28		AB	600-1¼	503	(600-1¼)	CDE	600-1½	503	(600-1½)

Visibility in Statute Miles, All minima in parentheses not applicable to Civil Pilots. Military Pilots refer to appropriate regulations.

Radar Minima:

- Minima shown are the lowest permitted by established criteria. Pilots should consult applicable directives for their category of aircraft.
- The circling MDA and weather minima to be used are those for the runway to which the final approach is flown - not the landing runway. In the above RADAR MINIMA example, a category C aircraft flying a radar approach to runway 10, circling to land on runway 28, must use an MDA of 560 feet with weather minima of 500-1½.

NOTE: Military RADAR MINIMA may be shown with communications symbology that indicates emergency frequency monitoring capability by the radar facility as follows:

- (E) VHF and UHF emergency frequencies monitored
- (V) VHF emergency frequency (121.5) monitored
- (U) UHF emergency frequency (243.0) monitored

Additionally, unmonitored frequencies which are available on request from the controlling agency may be annotated with an "x".

- ▲ Alternate Minima not standard. Civil users refer to tabulation. USA/USN/USAF pilots refer to appropriate regulations.
- ▲ NA Alternate minima are Not Authorized due to unmonitored facility or absence of weather reporting service.
- ▼ Airport is published in the Takeoff Minima, (Obstacle) Departure Procedures, and Diverse Vector Area (Radar Vectors) tabulation.

TERMS/LANDING MINIMA DATA 19339

6. Terminal Procedures Publication (TPP) | Minimums

- **Takeoff Minimums**

- ① Nonstandard IFR takeoff mins
- ② Obstacle Departure Procedure (ODPs)
 - Diverse Vector Area

- **Alternate Minima**

- ### ③ Nonstandard IFR alternate mins

- **Radar Minimums**

- ④ PAR/ASR approaches
 - Pilot receives course & altitude guidance from a controller, or emergency situations

Standard Departure Profile [AIM 5-2-9(e)]

Unless specified otherwise, obstacle clearance for all departures req the pilot to:

- Cross the departure end of runway at or above 35ft AGL, climb to 400ft AGL before turning, and maintain climb of at least 200ft/nm to the min. IFR altitude
- **FPM = FPNM x (GS/60)**

IFR Takeoff Minimums [§91.175]

- Follow minimums prescribed by the airport (if it has a **T** in the approach plate)
- If airport doesn't have minimums:
 - No minimums if Part 91
 - Airplane w/ 1-2 engines → 1 sm visibility (Part 121, 125, 129, 135)
 - Airplane w/ >2 engines → ½ sm visibility (Part 121, 125, 129, 135)
- **Example: T (KELN) Rwy 29, 4600-3 or std. w/min. climb of 320' per NM to 7800**
Mean min of 4600ft ceiling and 3sm visibility (if standard departure profile), OR
std takeoff min (e.g. 0ft / 0sm for Part 91) if climbing ≥320ft/nm to 7800ft MSL

3

A **ALTERNATE MINS**

24305

NAME	ALTERNATE MINIMUMS
ROSEBURG, OR	
ROSEBURG	
RGNL (RBG).....	RNAV (GPS)-B
NA when local weather not available.	
Categories A, B, 1200-2; Category C, 1500-3;	
Category D, 1600-3.	

TAKEOFF MINIMUMS, (OBSTACLE) DEPARTURE PROCEDURES, AND DIVERSE VECTOR AREA (RADAR VECTORS)

24305

FRIDAY HARBOR, WA

FRIDAY HARBOR (FHR)

TAKEOFF MINIMUMS AND (OBSTACLE) DEPARTURE PROCEDURES

AMDT 3A 28APR16 (16119) (FAA)

- 1** TAKEOFF MINIMUMS:
Rwy 34, 400-2.
- 2** DEPARTURE PROCEDURE:
Rwy 16, climb to 1000 on heading 161° then climbing left turn direct FHR NDB, thence ...
Rwy 34 climb to 1000 on heading 341° then climbing left turn direct FHR NDB, thence...
...continue climb-in-hold in FHR NDB holding pattern (Hold S, right turns, 339° inbound) to cross FHR NDB at or above 2300 before proceeding on course.

4 RADAR INSTRUMENT APPROACH MINIMUMS

CHEYENNE, WY

Amdt 2, 29MAR18 (21112) (FAA)

ELEV 6160

CHEYENNE RGNL/JERRY OLSON FLD (CYS)

RADAR-1 124.55 263.075 NA

	<u>RWY</u>	<u>GP/TCH/RPI</u>	<u>CAT</u>	<u>DA/</u> <u>MDA-VIS</u>	<u>HAT/</u> <u>HAA</u>	<u>CEIL-VIS</u>	<u>CAT</u>	<u>DA/</u> <u>MDA-VIS</u>	<u>HAT/</u> <u>HAA</u>	<u>CEIL-VIS</u>
PAR	27	3.0°/55/918	AB CDE	6321/24	200	(200-½)				
ASR	27		AB	6560/24	439	(500-½)	CDE	6560/40	439	(500-¾)
C CIR	ALL RWY		AB D	6640-1 6940-2½	480 780	(500-1) (800-2½)	C E	6900-2 6980-3	740 820	(800-2) (900-3)

For inoperative ALS, increase PAR 27 Cat E visibility to RVR 4000 and ASR 27 Cat E visibility to 1% SM. PAR not available when ASR out of service.

6. Terminal Procedures Publication (TPP) | Departure Procedures

• Standard Instrument Departures (SID)

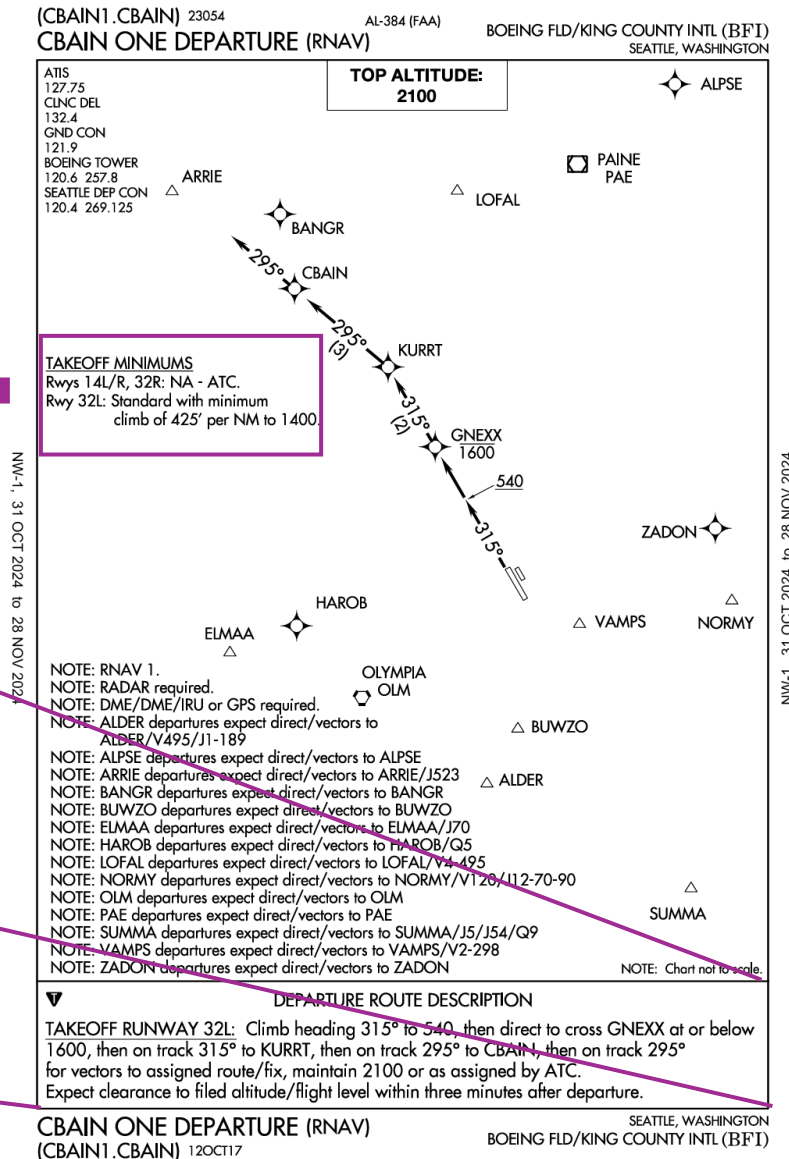
- Preplanned IFR routing to depart an airfield
- Provide obstacle clearance, and reduces communication & departure delays
- Text & graphic form

TAKEOFF MINIMUMS
Rwys 14L/R, 32R: NA - ATC.
Rwy **32L**: Standard with minimum
climb of **425'** per NM to **1400**.



DEPARTURE ROUTE DESCRIPTION

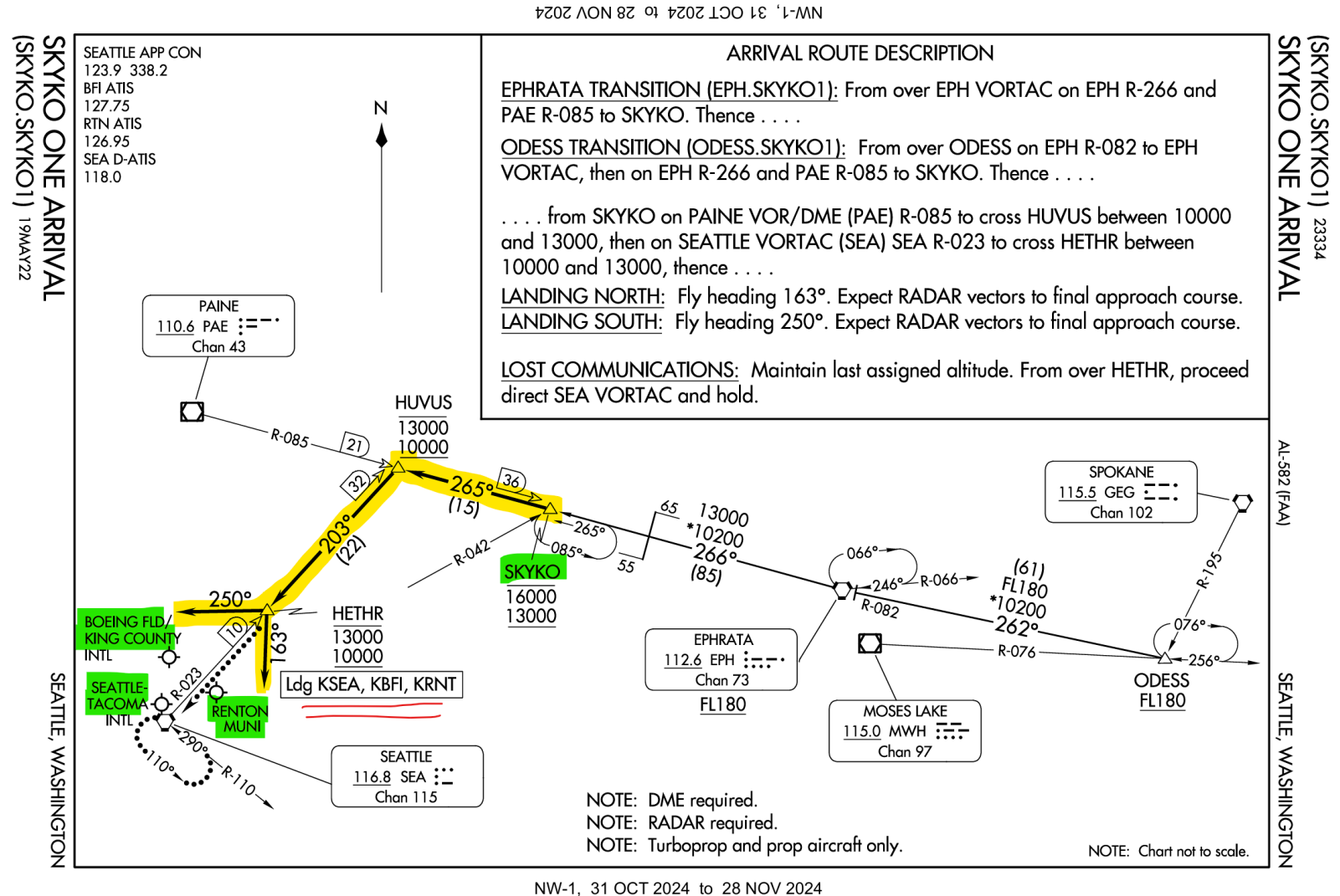
TAKEOFF RUNWAY 32L: Climb heading **315°** to **540**, then direct to **cross GNEXX** at or below **1600**, then on track **315°** to **KURRT**, then on track **295°** to **CBAIN**, then on track **295°** for **vectors to assigned route/fix**, maintain **2100** or as assigned by ATC.
Expect clearance to filed altitude/flight level within **three minutes** after departure.



6. Terminal Procedures Publication (TPP) | Arrival Procedures

• Standard Terminal Arrival Route (STAR)

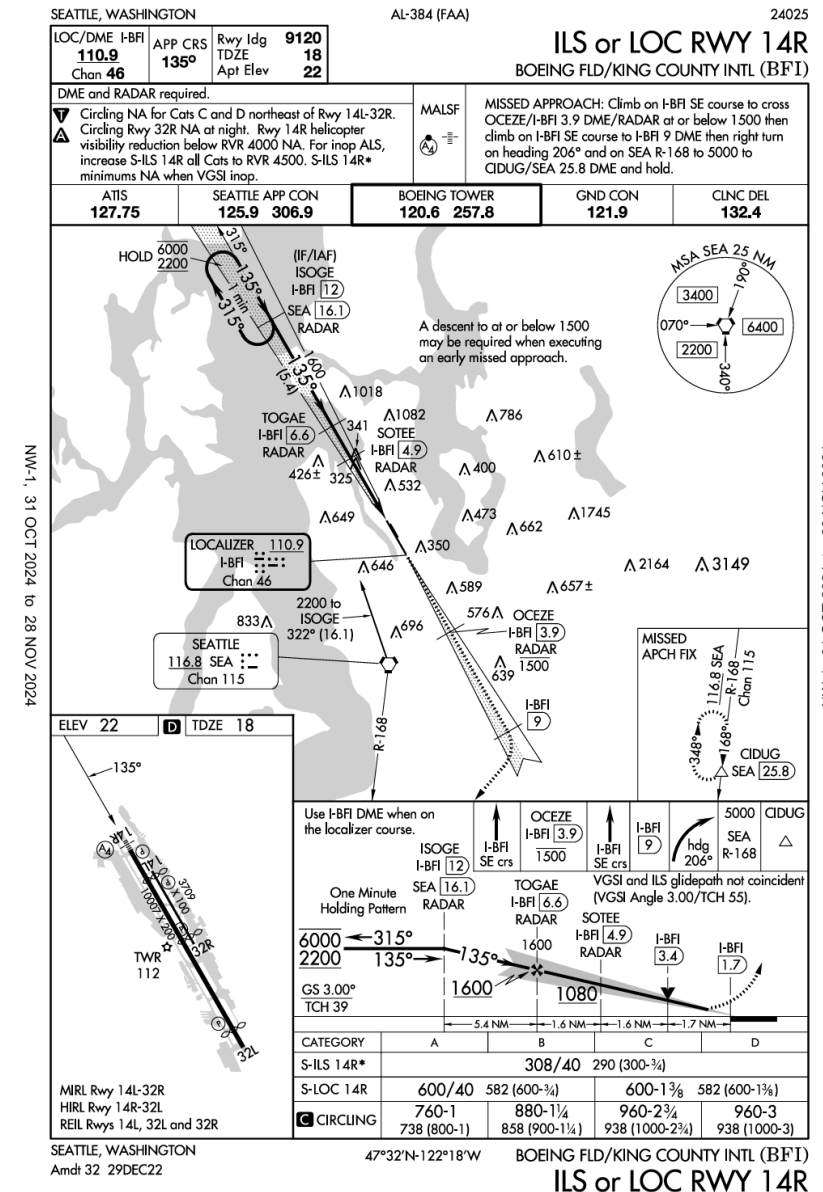
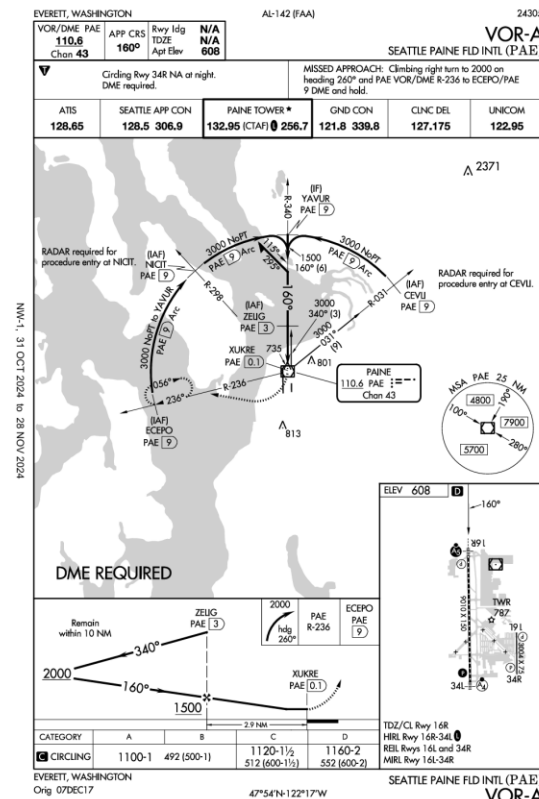
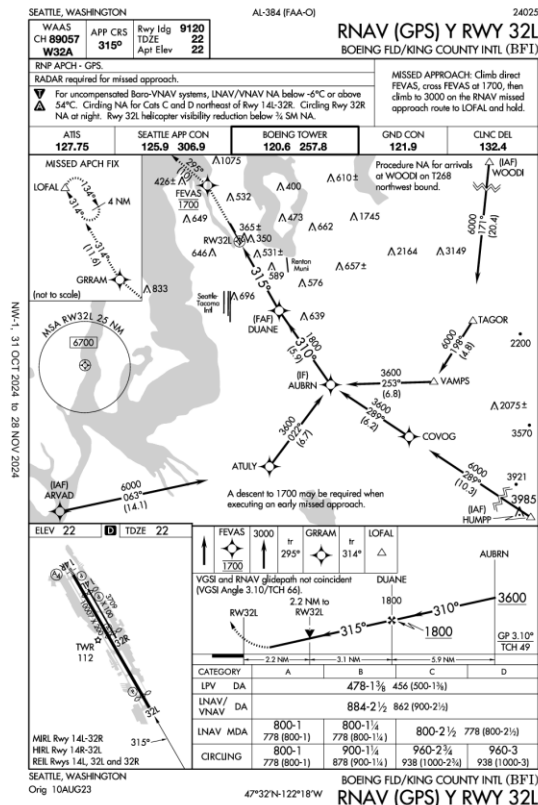
- Preplanned IFR arrival procedures
- Transition from the enroute structure to a terminal fix
- Text & graphic form



6. Terminal Procedures Publication (TPP) | Instrument Approach


• Instrument Approach Procedure (IAP)

- Provide the method to descend and land safely in low visibility conditions
- Describes navigation requirements, altitude changes, course changes, and other limitations



7. Terminal Instrument Procedures | TERPS – Order 8260.3

- Used for **designing instrument procedures**
- Comprehensive set of criteria established by the FAA to standardize the design and evaluation of IFPs in the US



U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

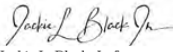
National Policy

ORDER
8260.3G

Effective Date:
07/01/2024

SUBJ: United States Standard for Terminal Instrument Procedures (TERPS)

This order prescribes standardized methods for design and evaluation of instrument flight procedures (IFPs) and Air Traffic Control (ATC) procedures in the United States and its territories.


Jackie L. Black, Jr. for
Lawrence Fields
Executive Director, Flight Standards Service

Distribution: Electronic Distribution

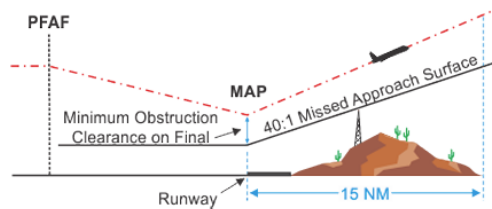
Initiated By: AFS-400

07/01/2024

Order 8260.3G

- (1) Calculate the elevation of the 40:1 surface at the end of the segment (clearance limit). The 40:1 surface starts at the same elevation as it does for obstacle evaluations. Compute the 40:1 rise from a point on the line defining the origin of the 40:1 surface in the shortest distance and perpendicular to the end-of-segment line at the clearance limit.
- (2) Compute the ROC surface elevation at the clearance limit by subtracting the appropriate ROC (plus adjustments) from the preliminary charted missed approach altitude.
- (3) Compare the ROC surface elevation at the clearance limit with the 40:1 surface elevation.
 - (a) If the computed 40:1 surface elevation is equal to or greater than the ROC surface elevation, a climb-in-hold evaluation is not required.
 - (b) If the computed 40:1 surface elevation is less than the ROC surface elevation, a climb-in-hold evaluation is required. Section 16-7 specifies higher speed groups; therefore, larger template sizes, are usually necessary for the climb-in-hold evaluation. These templates may require an increase to the MHA under paragraph 16-2.4. If this evaluation requires an increase to the MHA, evaluate the new altitude using the higher speed group specified in section 16-7. This sequence of review must be used until the MHA does not increase, then the 40:1 surface is re-evaluated. If obstacles penetrate the 40:1 surface, take action to eliminate the penetration.
- (4) The charted missed approach altitude is the higher of the preliminary charted missed approach altitude or the MHA established under paragraph 2-8-5.c(3).

Figure 2-8-2. Straight Missed Approach Obstacle Clearance



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Initiated By: AFS-400

07/01/2024

Order 8260.3G

Section 14-3. Altitudes

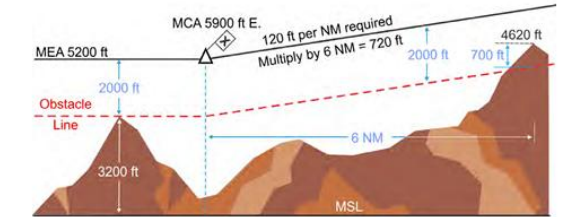
14-3-1. Minimum Crossing Altitude. It is necessary to establish MCAs in all cases where obstacles intervene to prevent a pilot from maintaining obstacle clearance during a normal climb to a higher MEA after the aircraft passes a point beyond which the higher MEA applies. The same vertical obstacle clearance requirement for the primary and secondary areas must be considered in the determination of the MCA (see paragraph 14-1-9). The standard for determining the MCA must be based upon the following climb rates, and is computed from the flight altitude:

Table 14-3-1. Assumed Climb Rates

Altitude ≤ 5000 ft MSL	150 ft/NM
Altitude > 5000 ft MSL and ≤ 10000 ft MSL	120 ft/NM
Altitude > 10000 ft MSL	100 ft/NM

a. To determine the MCA, the distance from the obstacle to the radio fix must be computed from the point where the centerline of the en route course in the direction of flight intersects the farthest displacement from the fix (see figure 14-3-1 and figure 14-3-2).

Figure 14-3-1. MCA Determination Point



Obstacle Height	4620 ft
Required Clearance	+ 2000 ft
MOCA at Obstacle	6620 ft
Climb Value*	+ 720 ft
MCA Required	5900 ft

*Based on 6 NM @ 120 ft/NM

Distribution: Electronic Distribution

Initiated By: AFS-400

Appendix: GPS Certification

A certified (TSO-approved) GPS is required for IFR GPS approaches because:

- 14 CFR §91.205(d) mandates “suitable” navigation equipment for IFR operations
“...navigation equipment suitable for the route to be flown”
- FAA AC 90-100A (U.S. Terminal and En Route RNAV Operations) and
 FAA AC 20-138D (Airworthiness Approval of Positioning and Navigation Systems)
 define “suitable” GPS equipment as one that is
TSO-certified (TSO-C129/196, TSO-C145/146)

U.S. Department
of Transportation
**Federal Aviation
Administration**

Advisory Circular

Subject: Airworthiness Approval of
Positioning and Navigation Systems

Date: 3/28/14

AC No: 20-138D

Initiated by: AIR-130

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Questions?

