The "Stump the Chump" Instrument Rating Workbook — Sampler

Real-world scenarios and practical questions to fine-tune your oral preparation for the FAA Instrument Rating-Airplane practical test.

Daniele Paolo Scarpazza

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Available on Amazon.

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Chapter 1 Before we start

This Sampler

This publication is a sampler of the book *The "Stump the Chump" Instrument Rating Workbook*, containing only the questions and not the answers.

It is offered as a preview of the book's contents for only promotional purposes.

Only the figures associated with the questions are presented. Figures only associated with the answers do not appear in this sampler.

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To purchase the book please visit:

https://independentaviation.training/the-stump-the-chump-instrument-rating-workbook/

Available in paperback and digital format.

Goals

The book that this sampler is an excerpt of is an advanced preparation workbook for the oral portion of the FAA Instrument Rating–Airplane practical test, both for pilot candidates and for instructor candidates.

The book puts great emphasis on real-world scenarios. The author believes that scenarios and their concrete, relatable details are the key to making an otherwise arid topic vivid and interesting.

It collects a number of what are colloquially called "stump the chump" questions, and it offers deeply researched and curated answers, intended to satisfy the highest level of scrutiny.

One of the book's main goals is to familiarize candidates with the kind of scenarios, reasoning, and reference to sources that might be expected of them by a particularly stringent examiner.

The level of elaboration offered is beyond what is typically asked of an instrument pilot candidate, but is at the level of CFII candidates, or better.

A significant portion of each answer's discussion is aimed at "getting at the bottom" of the topic, thus frequently leading to a lot more information than a candidate would be expected to produce from memory during an oral exam. The extra elaboration is the product of the book's goal to illustrate in practice what primary sources to

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access—it would be very impractical for the student to treat it as a list of notions to memorize. The student is better served treating the book as an assortment of skills to practice.

The book is best used as a preparation workbook by candidates who are close to oral exam readiness, to touch up on advanced topics. It assumes that the reader is already familiar with traditional oral preparation material.

Errata

Any errata and updates to the book will be made available on the publisher's website as soon as practical: http://independentaviation.training

To mitigate the risk of using incorrect information, candidates should verify they have the latest errata as they approach their test date.

Value and originality

While many questions in this book come from a common oral tradition passed from instructors to candidates and back, including Reddit's *r/flying* community, the novel contribution of this book is in the **answers** rather than the questions, and in the elaboration and research presented to support them.

Reference to primary sources

Oral exam candidates are expected to support their answers with reference to official primary sources. This is even more true for instrument flight instructor candidates than for instrument pilot candidates. By primary sources we mean:

- the law, e.g., sections of Title 14 of the Code of Federal Regulations (14 CFR);
- Airworthiness Directives (ADs), which have regulatory force;
- advisory material published by the FAA, e.g., Advisory Circulars (AC*nn-nn*),
- handbooks published by the FAA, such as the Instrument Flying Handbook (IFH) and the Instrument Procedures Handbook (IPH);
- FAA Orders;
- FAA general information publications, such as the Aeronautical Information Manual (AIM) and the Pilot-Controller Glossary (PCG);
- aircraft manufacturer documentation, such as Aircraft Flight Manuals (AFMs), Pilot Operating Handbooks (POHs), Service Bulletins (SBs) and Instructions for Continued Airworthiness (ICAs).

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To help students, this book makes a deliberate effort to support all answers with references to these primary sources. In the electronic version of this book, references are active links wherever possible.

Publications that do not appear in the list are secondary sources: commercial textbooks (such as the excellent ASA Oral Exam Guides), online test preparation resources, this very book, CFI notebooks, lessons, and videos. While they can be invaluable study materials and possibly completely accurate, secondary sources never have authority: neither regulatory, nor advisory.

Students should pay special attention to **avoid** citing a secondary source in support of their answers to an examiner. Students can and should use secondary sources to learn—in fact, secondary sources tend to be *better* study materials because they were written from the start with that goal in mind. Candidates should not, however, cite them during the oral exam.

Abbreviations

Acronyms and initialisms are ubiquitous in aviation—it's almost impossible to communicate concisely and accurately without using them all the time, especially on a topic like instrument flight that is so knowledge-intensive and does not forgive approximation or ambiguity.

The author has struggled to strike the right balance between defining abbreviations where the reader is most likely to need it, and not burdening the text with excessive repetitions. The non-obvious acronyms are defined at their first use, but the threshold for obviousness is subjective and keeps changing as the student learns more and more about a topic. Also, the book wants to be organized so that questions could be consumed by the readers in their favorite order, and random-order readers still need assistance in figuring out what the abbreviations mean.

In an attempt achieve that right balance, an Abbreviations list has been added at the end of the book. Readers should refer to it, without hesitation, any time they have any doubt on an acronym or abbreviation they encounter. The list defines the abbreviations used in the book and, more importantly, tells the candidates which underlying concepts are most relevant for the purposes of the oral exam.

Updates

In aviation, things change frequently. Regulations are revised. New editions of FAA handbooks are published. Advisory Circular versions are superseded by new ones.

This means that all books start aging the day they reach the press. However, it is the duty of every pilot and instructor to keep learning, and remain abreast of changes in the regulatory, advisory and teaching environments.

By teaching how to validate information against primary sources, this book hopes to offer its readers the very tools to detect and correct the aging of its contents.

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The Author

The author is a FAA-certificated flight instructor with an instrument rating (CFII). He also holds commercial privileges on ASEL, ASES and AMEL. In addition to his primary R&D engineering occupation (outside of the aviation field), he trains local flight students and assists local pilot-owners with their flight reviews, instrument proficiency checks, and transition training. He is active at the White Plains, New York and the Danbury, Connecticut airports.

Use of generative AI

No contents in this book (textual, graphics or otherwise) have been produced with the use of generative AI.

As of January 2026, the author has found that generative AI still suffers from hallucinations to an extent that its use is very problematic for aviation, a field well-known for its intolerance to errors.

Not for navigation – Not for flight planning

No person of good judgment would navigate using charts from a textbook. You are prohibited from using any chart in this book for any real-life decision making, including navigation or flight planning.

In addition, you are prohibited from using any excerpt of an aircraft's POH, AFM, TCDS, STC or ICA reproduced in this book as the basis for any real-life decision, flight-related or otherwise. The same applies to technical standards. The book's charts and excerpts are only for scenario practice and for training.

For real-life decisions, always refer to the latest revision of charts and publications, retrieved directly from the respective issuers.

To avoid graphical clutter, the author states these disclaimers here, once, instead of adding "NOT FOR NAVIGATION" watermarks to each chart. The prohibition stands equally.

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Chapter 2 Regulations

1 When do you need an instrument rating?

Expanded Question. List all circumstances in which the regulations require you to hold an instrument rating.

This is, frequently, the first question asked in an oral exam, although it may be worded differently, e.g., "List the privileges that an instrument rating confers to a pilot."

2 What flight experience is required for an instrument rating airplane?

3 If it is prudent to elect an alternate when you file an IFR flight plan, why wouldn't you *always* do so, even when not legally required?

Expanded Question. You already know that:

- the law requires you to list an alternate in your flight plan only if the weather at your intended destination is below legal minimums,
- but researching a suitable alternate at planning time and familiarizing yourself with its instrument approaches, their respective performance requirements, and the fuel needed makes your flight plans safer and more robust.

Then **why not do it all the time?**

Why would you not always elect a suitable alternate, even when it is not legally required?

4 Is an instrument rating ever needed when not flying under IFR?

Expanded Question. It seems quite obvious that an instrument rating is required for the pilot acting as PIC when flying under an active IFR flight plan and an active IFR clearance given by ATC.

Can you think of less obvious circumstances when an instrument rating is needed, and the flight is not operating

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under IFR?

5 Can you depart under IFR, in instrument conditions, from an non-towered airport located in Class G airspace that has no published SIDs or ODPs?

Expanded Question. You are planning to depart for a personal flight, under IFR, from a non-towered airport located in Class G airspace:

- the airport has no published instrument procedures in the TPP;
- Class G is uncontrolled (which means you are not required to obtain a clearance to operate in it, even under IFR);
- weather conditions at the field are well below VFR minimums: visibility is 1/4 SM and ceiling is 400 ft;
- you called the local departure control facility on the phone and obtained an IFR clearance starting at the boundary of the Class E airspace that overlies the Class G airspace over the airport, and a release at a specific time;
- you plan to depart the airport, climb over the airport taking responsibility for your own separation from obstacles, and use the CTAF to coordinate separation from other local traffic;
- while climbing in Class G and before entering Class E airspace, you plan to contact ATC and join your cleared route under positive ATC control.

Is this takeoff legal?

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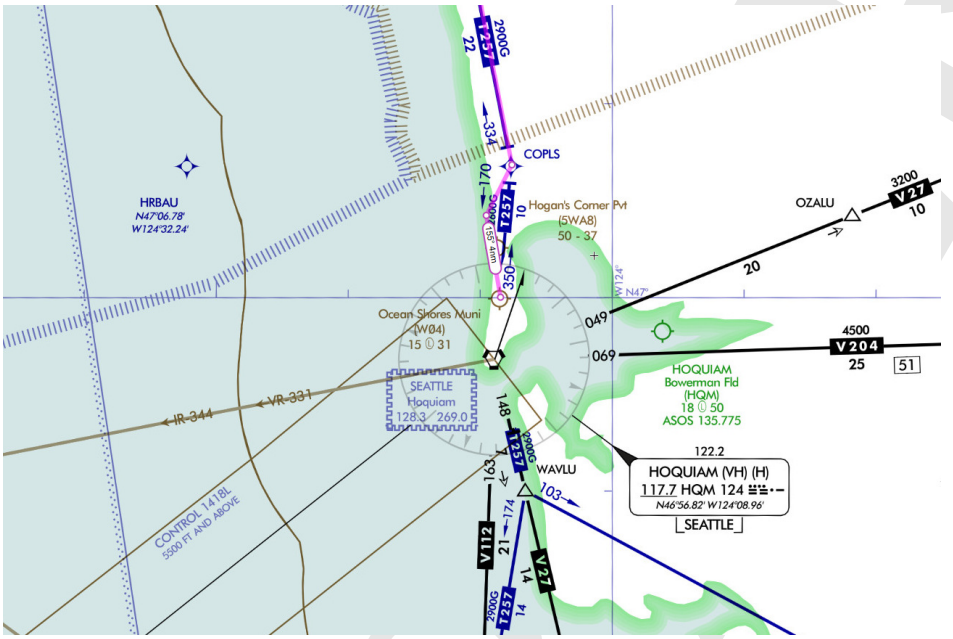

Figure 1: IFR chart with the route flown in the scenario of Question 6.

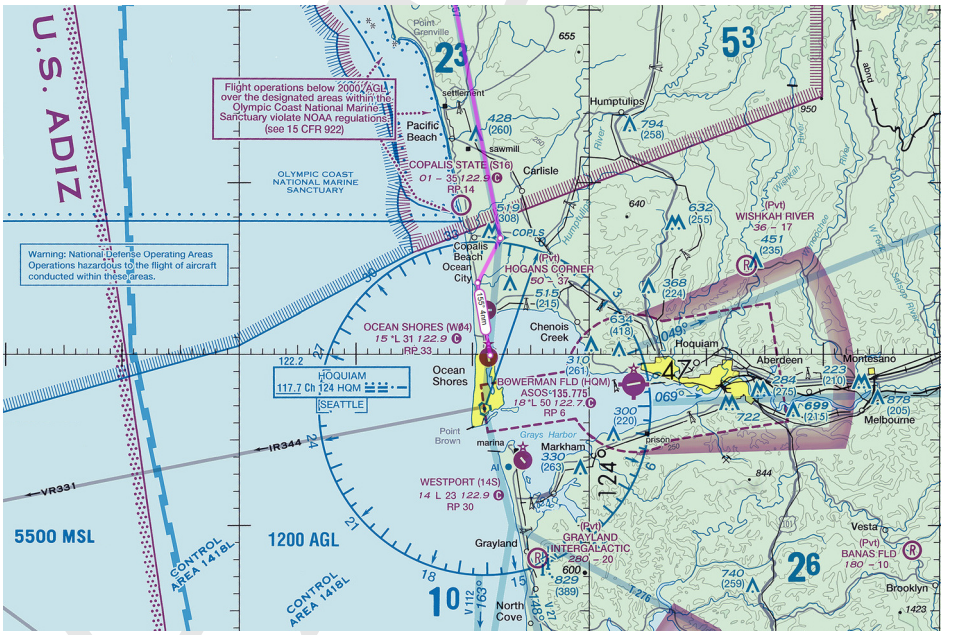

Figure 2: VFR sectional chart with the route flown in the scenario of Question 6.

6 Can you land under IFR, in instrument conditions, at the Ocean Shores, Washington, Municipal airport?

Expanded Question. You are flying under IFR from the Quillayute, Washington airport (KUIL) to the Ocean Shores Municipal airport (W04), an airport in Class G airspace with no published instrument approaches.

The weather at the destination airport does not allow for a VFR landing, as the ceiling is at 600 ft AGL. Visibility under the ceiling is good. En-route, you'll be in clouds most of the time.

You cleared route is via GPS airway T257 to COPLS waypoint, and then to your destination.

During planning you examined the VFR sectional chart (Figure 2, on page 7) and found no obstacles on a 3-degree glide path starting at 1,400 ft MSL (inside Class G), roughly 4.5 NM north of the field, along an extended centerline for Runway 15. The magenta line in Figure 1 and 2 reflects your desired route.

The top-of-descent, 4.5-mile final point is above the Ocean City point marked on the VFR chart. You created a corresponding user waypoint named "MYFAF" in your GPS navigator, and entered it in your flight plan after COPLS. Then, you loaded the visual approach to Runway 15 to get GPS guidance in the visual portion of your descent. That creates another waypoint, located on a 3-mile final, called V3NM, at an altitude corresponding to a 3-degree glide path from that point. Figure 3, on page 11 shows your flight plan after these two operations.

The last two segments of your route (COPLS to MYFAF, MYFAF to the airport) are not part of your clearance. Instead, you request and obtain a descent to 1,500 ft MSL, which takes you into Class G airspace. At this altitude, as you pass COPLS, you head to MYFAF under your own navigation. In Class G, IFR flight is permissible without a flight plan or an ATC clearance.

At MYFAF, you turn toward the extended centerline. You use the VNAV feature of your GPS navigator to guide your descent along a 3-degree glide path ending on Runway 15: at MYFAF, you activate the "VNAV Direct-to" feature to obtain vertical guidance during the descent. Your GPS unit displays a view similar to Figure 3 (right): a VSR label shows your "Vertical Speed Required": it's a suggested correction to your instantaneous vertical speed, expressed in feet per minute. A negative value means you are above glide path and should descend at a higher rate; a positive value, vice versa.

You perform an accurate descent on the glide path, with the VSR never exceeding ±100 fpm.

At 600 ft AGL you break out of the clouds and land uneventfully.

Was this legal? Why, or why not?

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7 Can you fly under IFR rules while not being on a flight plan?

8 How do you determine if you are over mountainous terrain for the purpose of determining the minimum IFR altitude?

Expanded Question. The regulations distinguish between mountainous and non-mountainous areas, for example for the purpose of requiring a minimum IFR altitude above terrain in 14 CFR § 91.177(a)(2).

How can you tell if an area is mountainous?

What source designates an area as mountainous or not?

9 Is instrument currency per 61.57 category-specific? ... class-specific? ... type-specific?

Expanded Question. You know that, in order to exercise the privileges of PIC under IFR rules or in less-than-VFR conditions, you must have performed certain tasks (at least 6 instrument approaches, holding procedures, intercepting and tracking courses via electronic navigation systems) in the 6 calendar months prior to the month of the flight.

Does instrument recency on one **class** of aircraft (e.g., aircraft single engine land) transfer to another (e.g., aircraft single engine sea)?

Does instrument recency on one **category** of aircraft (e.g., airplane) transfer to another (e.g., helicopter)?

... or is instrument recency specific to aircraft **category, class, and even a type** rating, if a type rating is needed to act as PIC in the aircraft?

10 Can you depart on an IFR flight if the weather at the alternate airport has degraded below alternate minimums?

Consider the following scenario:

- in the early morning, you filed an IFR flight plan for a flight departing at 10:10am;
- in your flight plan, you elected an alternate airport where weather forecasts satisfy the alternate selection requirements;
- you have pre-flighted your plane;
- at 10:05am, engine running, you call Clearance Delivery and are told to stand by for your clearance;

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- it is now 10:06am. As you wait for your clearance, you check the weather at the alternate once more. An amended TAF has been issued and weather at the ETA is now forecast to be much worse, no longer satisfying alternate minimums.

Question: Can you legally depart? What are your options?

11 Can you use precision (600/2) minimums for an alternate airport that has LPV approaches but no ILS?

Expanded Question. You are about to file an IFR flight plan. You intend to elect, as an alternate, an airport that only has RNAV approaches and other non-precision approaches.

The RNAV approaches have LPV and LNAV/VNAV minima.

For the purposes of determining the standard IFR alternate airport weather minima (in compliance with 14 CFR § 91.169(c)(1), quoted below), do you consider the LPV approach precision or non-precision?

> **(c) IFR alternate airport weather minima.** Unless otherwise authorized [...] no person may include an alternate airport in an IFR flight plan unless appropriate weather reports or weather forecasts, or a combination of them, indicate that, at the estimated time of arrival at the alternate airport, the ceiling and visibility at that airport will be at or above the following weather minima:
>
> (1) If an instrument approach procedure has been published in part 97 of this chapter [...], the following minima:
>
> (i) **For aircraft other than helicopters:** The alternate airport minima specified in that procedure, or if none are specified the following standard approach minima:
>
> (A) **For a precision approach procedure.** Ceiling 600 feet and visibility 2 statute miles.
>
> (B) **For a nonprecision approach procedure.** Ceiling 800 feet and visibility 2 statute miles.
>
> [...]
>
> [...]

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Figure 3: Flight plan setup (view at departure) and final descent segment with "Vertical Speed Required" (VSR) in a Garmin GTN750 unit, as configured per the scenario of Question 6.

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Chapter 3 Equipment

12 If a piece of equipment in your airplane is inoperative, how do you determine if you can fly?

13 What's a sensitive altimeter?

Expanded Question. The equipment required for IFR flight includes, according to 14 CFR § 91.205(d)(5), a "sensitive altimeter adjustable for barometric pressure."

What does it mean for an altimeter to be "sensitive"?

How can you determine if your airplane's altimeter meets the requirements to be deemed "sensitive"?

What authoritative sources define what is a sensitive altimeter?

14 Where is the DME antenna in your Piper Pilot 100i?

Context. The Piper Pilot 100i is a popular trainer aircraft used in many flight schools across the country and it's used in this question merely as a reasonable example of the small, single-engine planes used for training.

Candidates taking their instrument checkride in a plane should expect questions on that exact airplane's on-board equipment.

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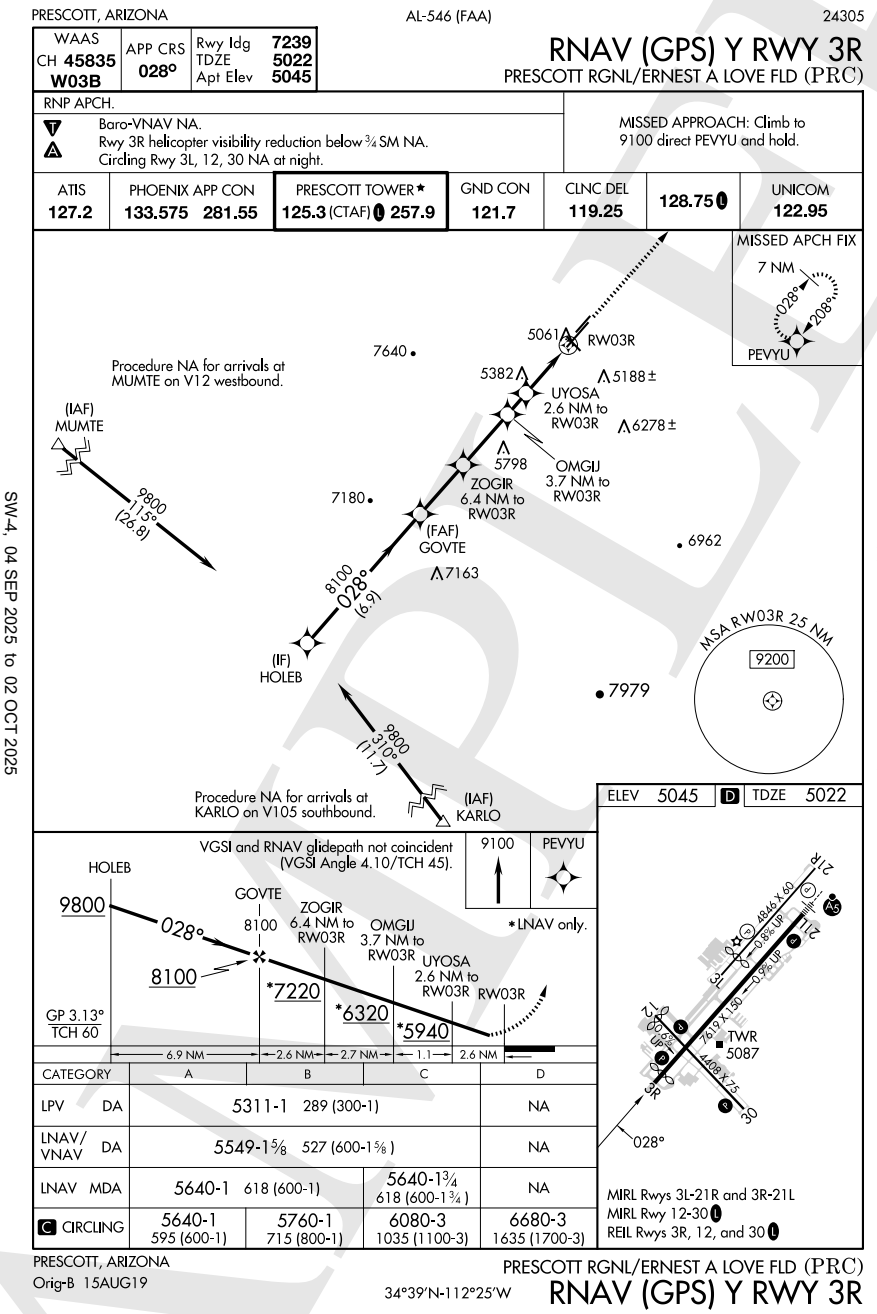

Figure 4: The RNAV (GPS) Y Runway 3R approach at the Prescott Love Field, Arizona.

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15 How do you verify that your GPS equipment meets the requirements to fly the RNAV Y Rwy 3R approach at Prescott, Arizona?

Expanded Question. Consider the RNAV (GPS) Y Runway 3R approach to the Prescott Love Field airport, Arizona (Figure 4, on page 14).

Explain the process you follow to determine whether the GPS in your plane satisfies the equipment requirements necessary to fly the approach.

Assume an airplane of your choosing, for which you have a valid AFM.

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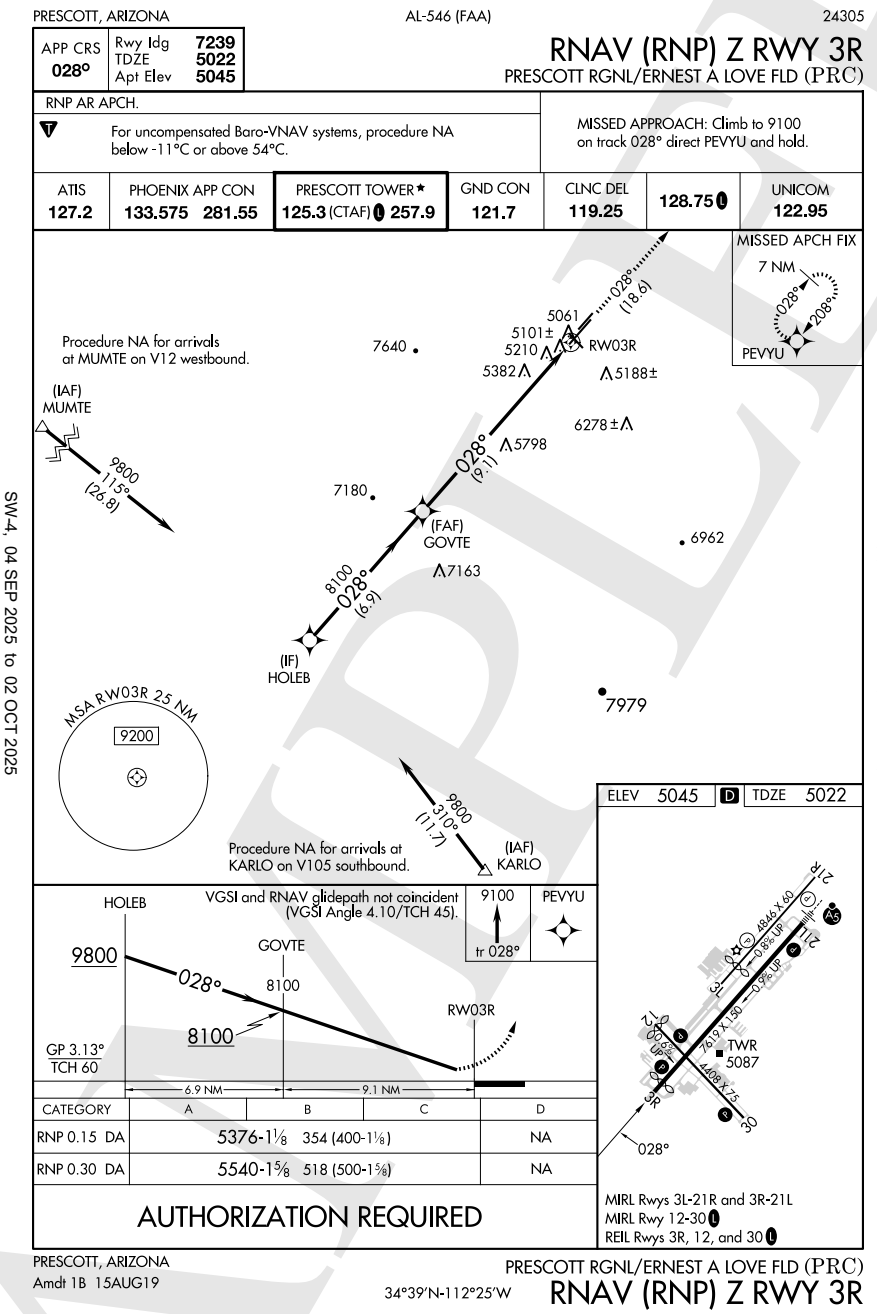

Figure 5: The RNAV (RNP) Z Runway 3R approach at the Prescott Love Field, Arizona.

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16 How do you verify that your GPS equipment meets the requirements to fly the RNAV Z Rwy 3R approach at Prescott, Arizona?

Note. This is a small variation on the previous question.

Expanded Question. Consider the RNAV (RNP) Z Runway 3R approach to the Prescott Love Field airport, Arizona (Figure 5, on page 16).

Explain the process you follow to determine whether the GPS in your plane satisfies the equipment requirements necessary to fly the approach.

Assume a plane of your choosing, for which you have a valid AFM.

17 What are TSO-C129, -C196, -C145, and -C146?

Expanded Question. The AIM, the ACs and the IPH refer to GPS equipment by TSO standard numbers, for example they impose certain preflight actions and certain constraints on the choice of destination and alternate airports (depending on whether those airports only have GPS approaches) when the equipment is certified according to the named TSOs.

For illustration, consider the passages underlined in the following excerpt from Instrument Procedures Handbook, FAA-H-8083-16B, Chapter 1, Page 1-13 (underline emphasis is mine):

> The requirement for an alternate depends on the aircraft category, equipment installed, approach navigational aid (NAVAID), and forecast weather. For example, airports with only a global positioning system (GPS) approach procedure cannot be used as an alternate by TSO-C129 or C196 users unless certain requirements are met (see AIM) even though the "N/A" has been removed from the approach chart. For select area navigation (RNAV) GPS and GPS approach procedures, the "N/A" is being removed so they may be used as an alternate by aircraft equipped with an approach-approved Wide Area Augmentation System (WAAS) receiver complying with (TSO-C145 or C146) or TSO-C129 or C196 meeting certain requirements (see AIM).

One of the AIM passages that the IPH excerpt refers to is Aeronautical Information Manual 1-2-3.d (underline for emphasis is mine):

> **Alternate Airport Considerations.**
> For the purposes of flight planning, any required alternate airport must have an available instrument approach procedure that does not require the use of GPS. [...] This restriction does not apply to RNAV systems using TSO-C145/-C146 WAAS equipment. [...]
>
> 1. For flight planning purposes, TSO-C129 and TSO-C196 equipped users (GPS users) whose navi-

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gation systems have Fault Detection and Exclusion (FDE) capability, who perform a preflight RAIM prediction at the airport where the RNAV (GPS) approach will be flown, and have proper knowledge and any required training and/or approval to conduct a GPS-based IAP, may file based on a GPS-based IAP at either the destination or the alternate airport, but not at both locations. [...]

2. If the above conditions cannot be met, any required alternate airport must have an approved instrument approach procedure other than GPS that is anticipated to be operational and available at the estimated time of arrival, and which the aircraft is equipped to fly.
3. This restriction does not apply to TSO-C145 and TSO-C146 equipped users (WAAS users).

Also, consider these similar excerpts from AC 90-100A - U.S Terminal and En Route Area Navigation (RNAV) Operations, Change 2 (relevant passages underlined):

10. U.S. RNAV FLIGHTCREW OPERATING PROCEDURES.
Pilots should be familiar with the normal operating and contingency procedures associated with U.S. RNAV routes, DPs, and STARs.
a. Preflight Planning.
[...]

(5) If TSO-C129 equipment is used to solely satisfy the RNAV requirement, GPS RAIM availability must be confirmed for the intended route of flight (route and time) using current GPS satellite information. [...]

(6) If TSO-C145/C146 equipment is used to satisfy the RNAV requirement, the pilot/operator need not perform the prediction if wide area augmentation system (WAAS) coverage is confirmed to be available along the entire route of flight.

NOTE: Outside the U.S. or in areas where WAAS coverage is not available, operators using TSO-C145/C146 receivers are required to check GPS RAIM availability.

This question is relevant for all instrument candidates and pilots using GPS equipment. While the AIM, the ACs and the IPH do not have regulatory force, they are official documents establishing standard operational procedures, a deviation from which could be later deemed careless or reckless operation, in violation of 14 CFR § 91.13.

So, what exactly are TSO-C129, -C196, -C145, and -C146?

18 Does your AFM require you to perform RAIM prediction, ever? Show me how you do it.

Expanded Question. Modern GPS receivers support a functionality called Receiver Autonomous Integrity Monitoring (RAIM). This technology allows the receiver, when enough GPS satellites are in view, to detect if a satellite is transmitting a faulty signal. In that case, rather than using that signal and computing an incorrect position solution, the receiver will exclude the faulty satellite from the computation. This feature is called Fault Detection and Exclusion (FDE).

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However, the RAIM/FDE feature is only available if the number of satellites directly in view of the aircraft at the time is sufficient. That's typically 5 GPS satellites for most FDE implementations. With fewer than 5 satellites visible, most GPS units can't detect a faulty satellite signal and may compute a wrong position solution.

Because satellites fly along predictable orbits, it is possible for a computer algorithm to predict whether enough satellites will be in view along all points of an arbitrary route specified by the pilot, at the time when the aircraft will be flying that route.

Running a RAIM prediction consists of performing that verification. RAIM prediction programs are available as software running on on-board GPS units, and also as web services such as the RAIM Service Availability Prediction Tool (SAPT) offered by the FAA, or the RAIM/FDE prediction web service offered by Garmin.

According to your AFM or POH, is it ever mandatory for you to perform a RAIM prediction operation before initiating a flight?

19 What are some non-obvious limitations of your GPS equipment?

Expanded Question. In the previous questions we have seen a few, probably lesser known, limitations imposed on the use of on-board GPS navigation.

What are other, non-obvious, limits to the GPS navigation you can perform in your airplane?

What sources do you consult to answer this question?

Exam Relevance. Candidates should expect this kind of question during an oral exam because the ACS requires them to be able to describe the operation and limitations of the avionics of the plane in which they conduct the practical test. Specifically, this is part of "Area of Operations II. Preflight Procedures" in the Instrument Rating – Airplane ACS, FAA-S-ACS-8C, elements:

- IR.II.B.K2b "Area navigation (RNAV), global positioning system (GPS), Wide Area Augmentation System (WAAS), flight management system (FMS), autopilot," and
- IR.II.C.K2 "IFR airworthiness, including aircraft inspection requirements and required equipment for IFR flight."

20 What kind of distance from a VOR station is displayed by a Garmin GNS530? How is it determined?

Expanded Question. While flying over upstate New York, you tune to the Sparta (SAX) VOR. After you identify the ground station, the unit displays that you are on the 032 radial, and that you are at a distance of

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3.1 NM from the station, as in Figure 6.

Figure 6: Distance and bearing from the Sparta (SAX) VOR station as displayed by a Garmin GNS530 GPS unit.

Questions:

- How is that distance determined?
- What equipment produced it?
- Is it slant or ground distance?

21 How does your HSI display ground track? How is that useful during instrument flight?

Expanded Question. This question is intended for candidates who have a digital HSI included in a PFD (e.g., Avidyne Entegra, or Garmin G1000 or G3X, or Aspen Avionics Evolution E5) or as a stand-alone digital instrument (e.g., Garmin G5).

How does the HSI display what course is the plane following?

What is that useful for?

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22 When can you safely unsuspend sequencing during an RNAV GPS missed approach procedure?

Expanded Question. GPS units typically offer automatic waypoint sequencing: when the aircraft reaches the endpoint of one leg in the flight plan, the unit will activate the next leg.

However, GPS units will typically suspend their automatic sequencing when, during an instrument approach, the aircraft reaches the Missed Approach Point (MAP). In this suspended state, units will not automatically activate the next leg, i.e., the first leg of the missed approach procedure. Instead, the flight plan will remain "frozen" on the final approach segment (from the FAF to the MAP). This leg will stay marked active even if you are well past the MAP. In the suspended state, the kind of guidance that the avionics will offer is the most generically useful and least harmful: extended runway centerline as a desired track.

The GPS unit will then display an annunciation that waypoint sequencing was suspended, such as "SUSP" or an equivalent message.

Is it safe for the pilot to unsuspend waypoint sequencing as soon as they decide to go missed?

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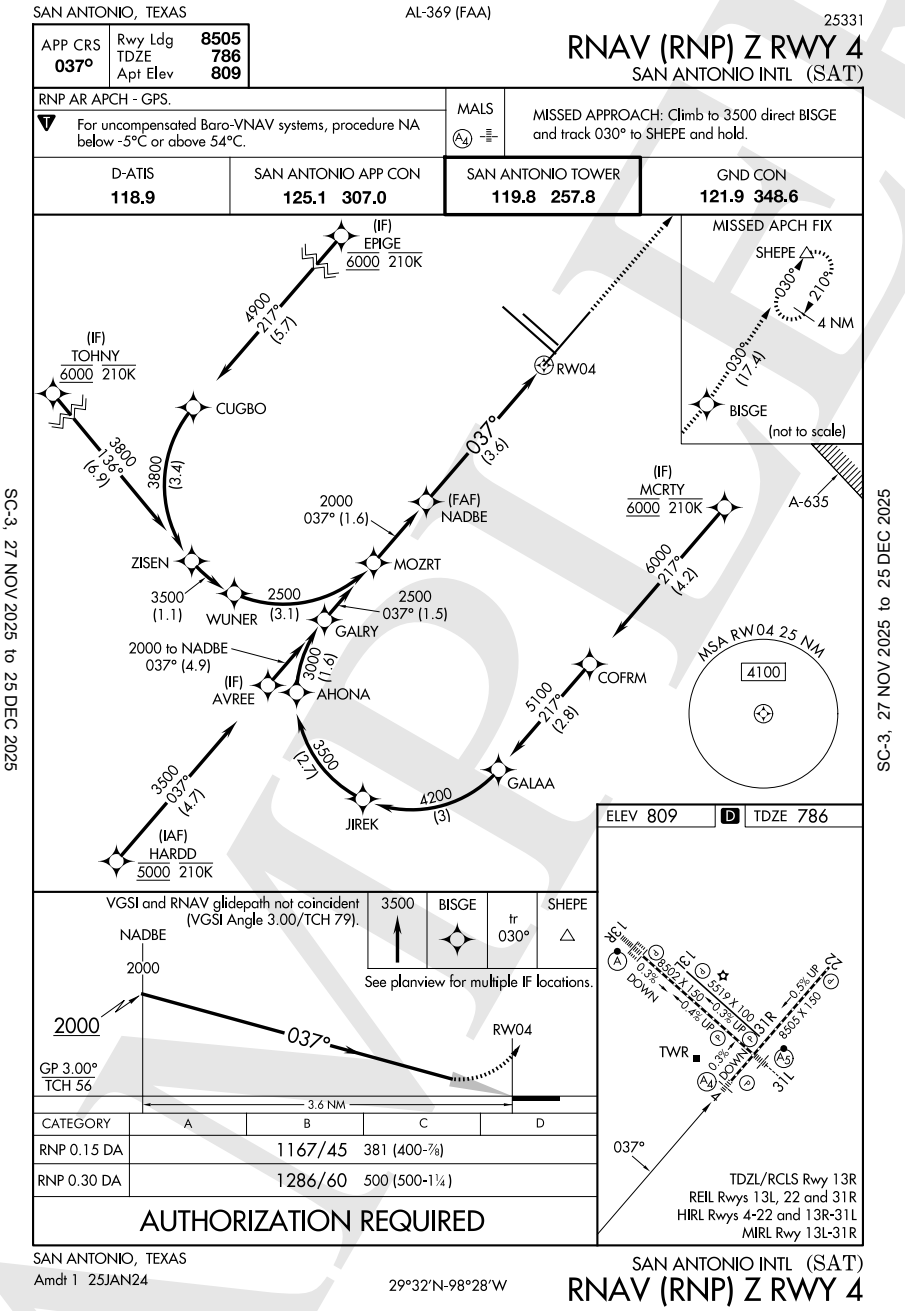

Figure 7: The Radius-to-Fix (RF) turns that are characteristic of RNP AR approaches are visible in the RNAV (RNP) Z Runway 4 approach at the San Antonio International airport, Texas.

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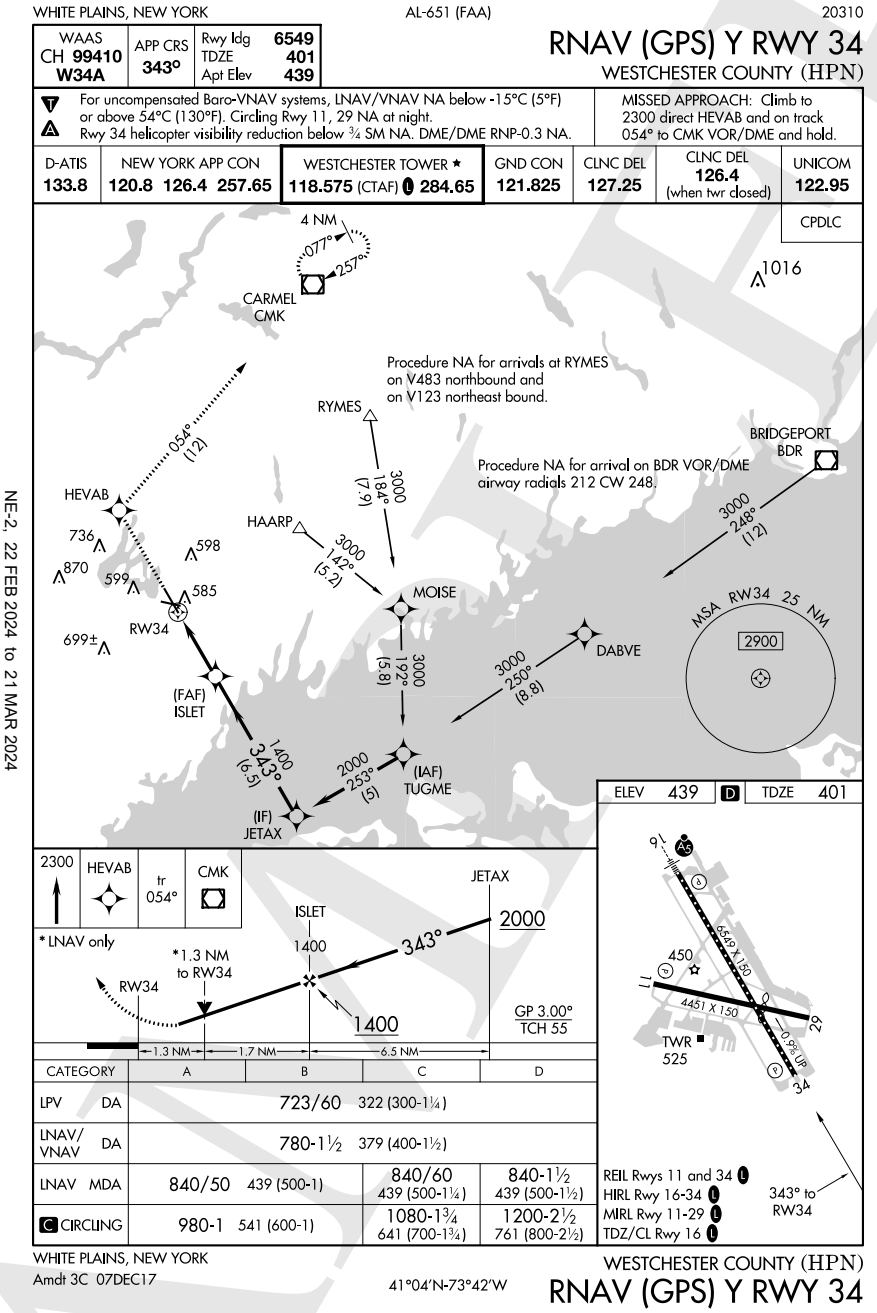

Figure 8: The RNAV (GPS) Y Runway 34 approach at the Westchester County, New York airport, used in the Garmin GTN650Xi waypoint sequencing suspension example.

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Chapter 4 Navigation Systems

23 Is an approved GPS a valid source of navigation to fly the final segment of a VOR approach?

Expanded Question. Can you use GPS alone to fly the final segment of the VOR or GPS-A approach to the Gunnison, Colorado airport (Figure 9, on page 26)?

Can you use GPS alone to fly the final segment of the VOR/DME-A approach at the Grant County, West Virginia, airport (Figure 24, on page 51)?

24 Is approved GPS a valid source of navigation to fly the final segment of a ILS or LOC approach?

Expanded Question. This is a follow-up to the previous question.

Consider a scenario in which you are flying any of the ILS or LOC approaches presented in this book:

- the ILS Runway 1 approach at Rockford, Illinois (Figure 10, on page 27)
- the ILS or LOC Z Runway 6 approach at Teterboro, New Jersey (Figure 36, on page 69)
- the ILS or LOC Runway 9 approach at Melbourne Orlando, Florida (Figure 39, on page 74)
- the ILS or LOC Runway 15 approach at Burlington, Vermont (Figure 40, on page 76)
- the ILS or LOC Runway 11 approach at Porland, Maine (Figure 15, on page 38)
- the ILS or LOC Runway 7 approach at Orlando Executive, Florida (Figure 27, on page 54)
- the LOC/DME-E approach at Aspen, Colorado (Figure 16, on page 41)
- the ILS or LOC Runway 4 approach at Easton, Maryland (Figure 18, on page 44)
- the ILS or LOC Runway 15 approach at the Coleman Young airport in Detroit, Michigan (Figure 20, on page 47)
- the LOC Runway 8L approach at Honolulu International, Hawaii (Figure 19, on page 46)

Assume you are about to reach the FAF of the ILS or LOC approach, whichever you are flying.

You have been using GPS navigation to fly the initial and intermediate segments of that approach.

Can you use GPS navigation alone for lateral guidance on the final segment of the approach?

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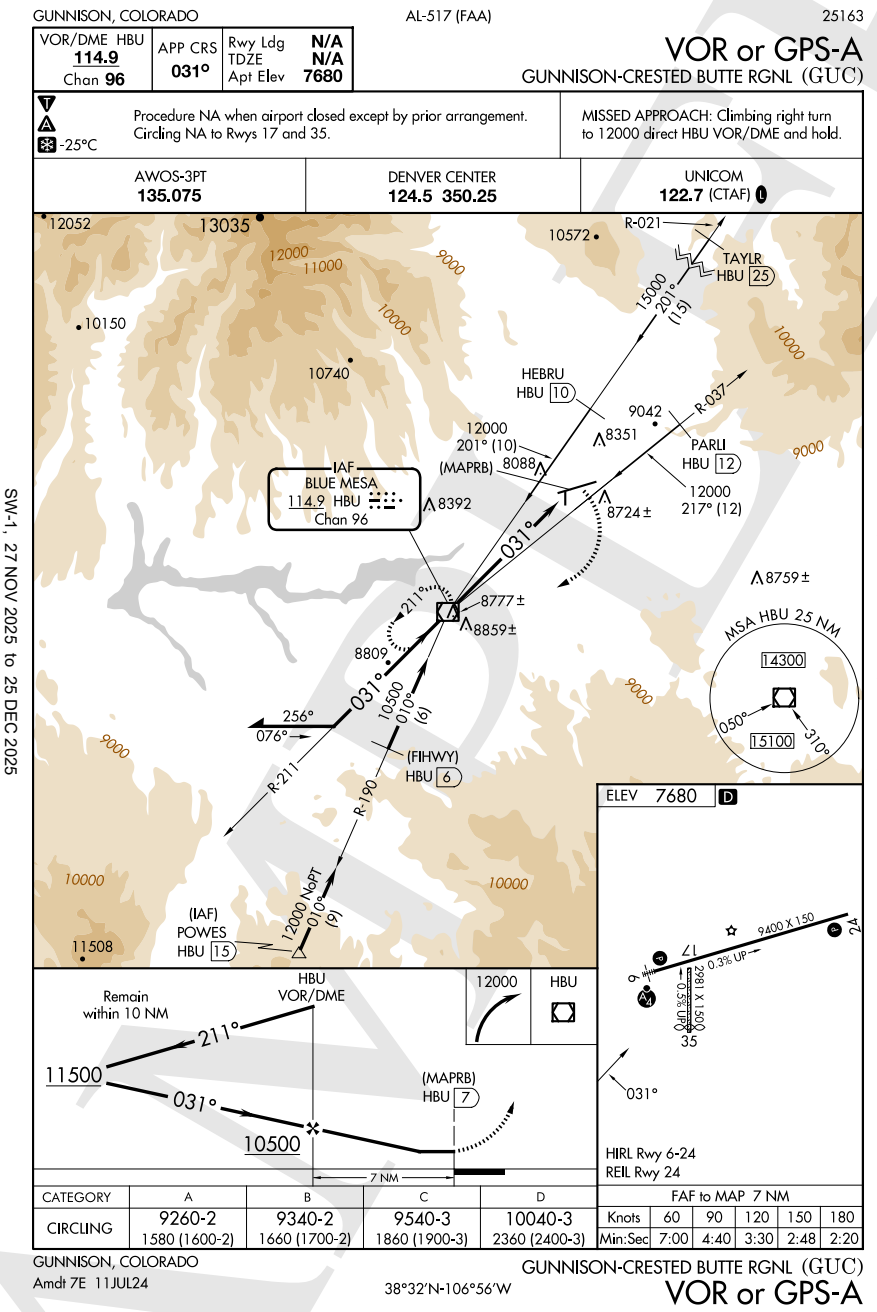


Figure 9: The VOR or GPS-A approach at Gunnison, Colorado, the subject of Questions 23, 42 and 59.

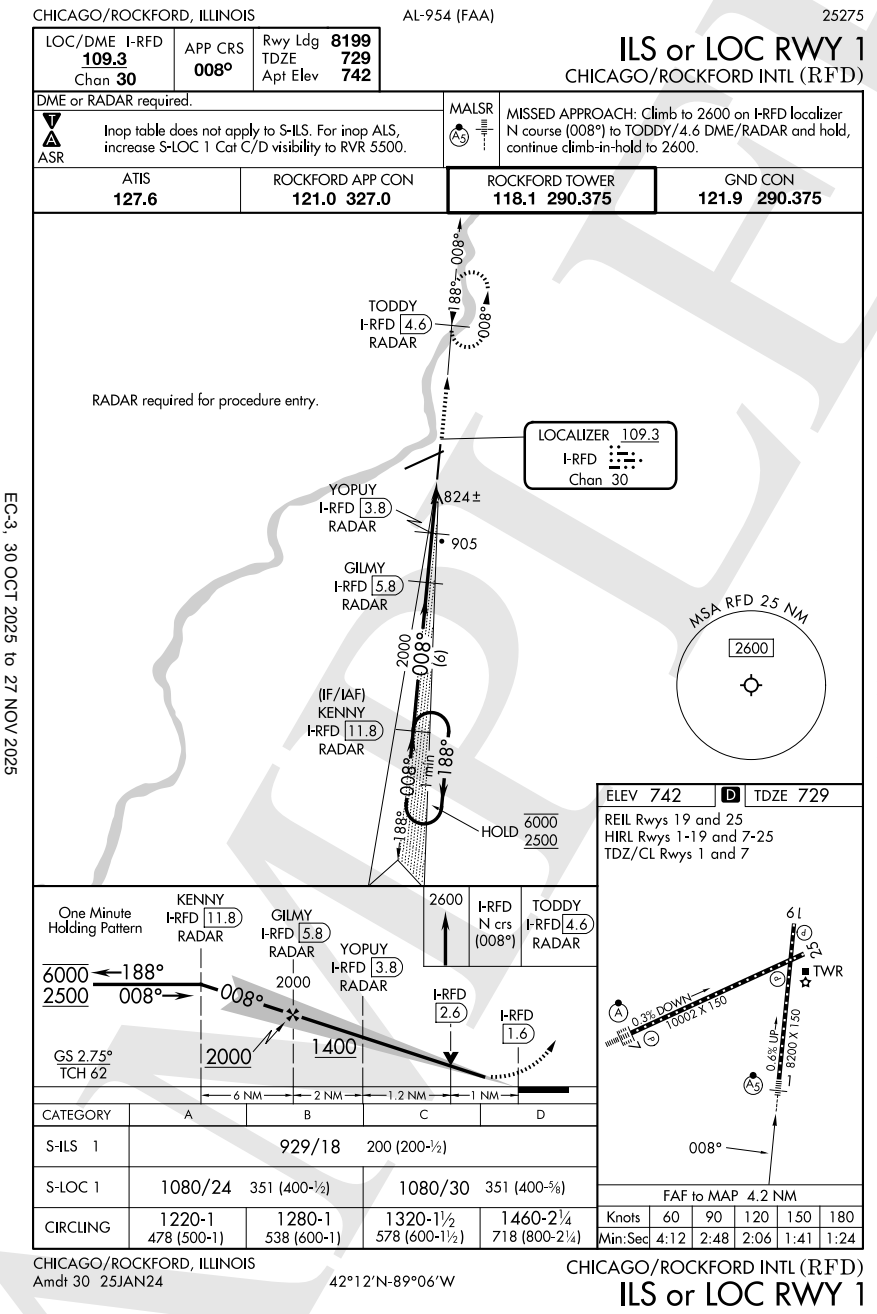


Figure 10: The ILS Runway 1 approach at Rockford, Illinois, the subject of Questions 24, 25, 42, and 59.

SAMPLE

25 Can you use DME to determine if you are abeam during a localizer hold?

Expanded Question. You are flying the ILS Runway 1 approach to Rockford (Figure 10) and you are about to join the hold-in-lieu-of-procedure-turn at the KENNY fix.

You intend to fly the hold using ILS and DME equipment. You do not have GPS equipment that you intend to substitute for ILS and DME.

You have reached the KENNY fix and are about to complete your 1-minute standard-rate turn outbound.

You want to determine when you are abeam KENNY in order to start your timer to time the 1-minute leg outbound.

The question is: could you use DME distance I-RFD 11.8 to determine you are abeam of KENNY? ...or should you instead start your 1-minute timer after completing your 1-minute standard-rate turn?

26 Where do you find all the radar approaches for a given airport? Where do you find all the radar approaches in a given area?

Expanded Question. In addition to approaches based on ground- and satellite-based electronic navigation, two types of radar approaches exist: Approach Surveillance Radar (ASR) approaches and Precision Approach Radar (PAR) approaches. These approaches require no on-board equipment other than a radio.

Where can you find the charts for these approaches?

SAMPLER

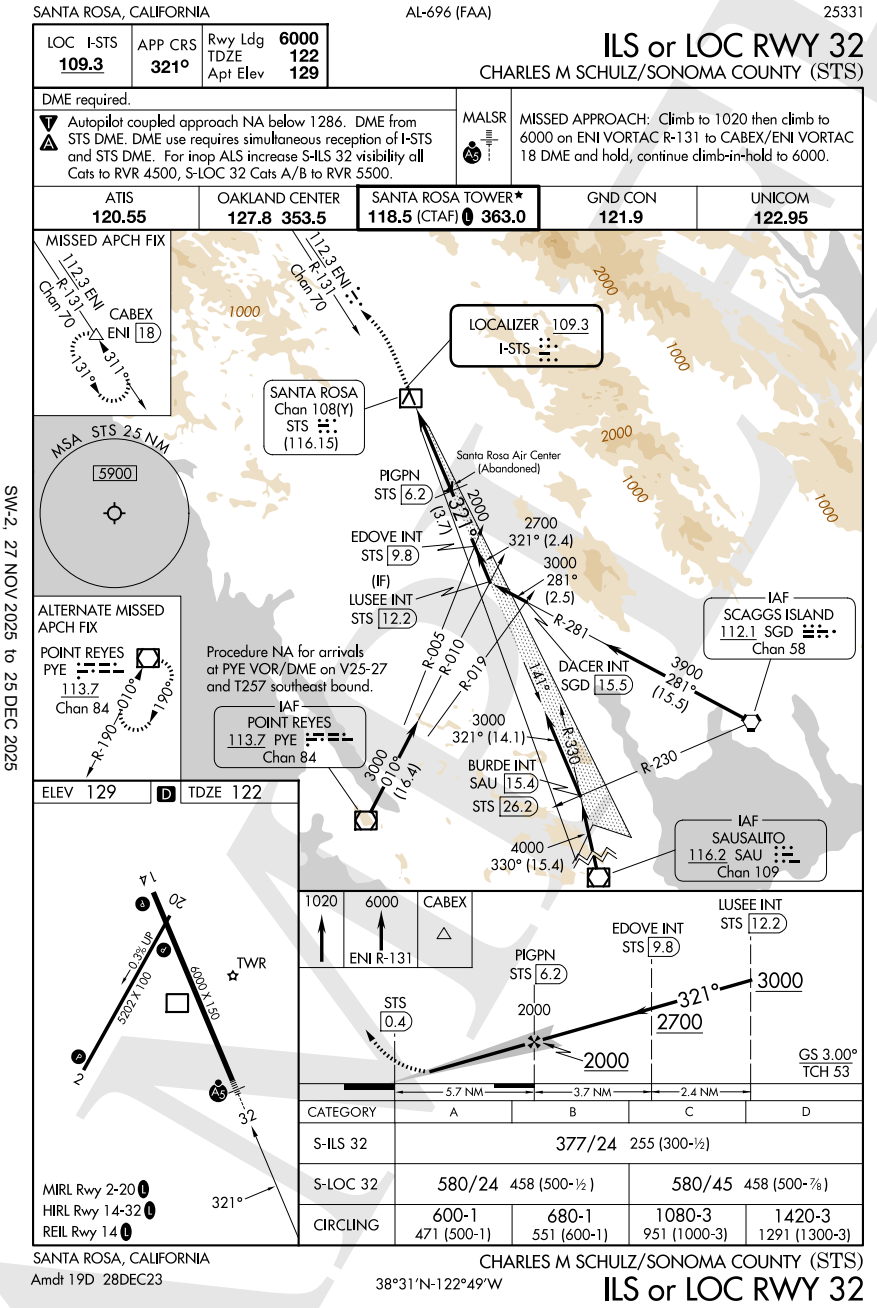


Figure 11: The ILS or LOC Runway 32 approach at the Sonoma County, California airport, subject of Questions 27 and 45.

27 Why exactly do you need DME when flying the ILS or LOC Runway 32 approaches at Sonoma County, respectively?

Expanded Question. Please examine the chart for the ILS or LOC Runway 32 approach at Sonoma County, California (Figure 11, on page 29).

Focus on the two straight-in lines of minimums (S-ILS 32, S-LOC 32).

The briefing strip contains the note "DME required."

Let's momentarily ignore the fact that you can substitute GPS for DME.

Could either the ILS or the LOC approach be completed without DME, using VOR intersections only?

Is DME required for the ILS approach? Why, exactly?

Is DME required for the LOC approach? Why, exactly?

SAMPLER

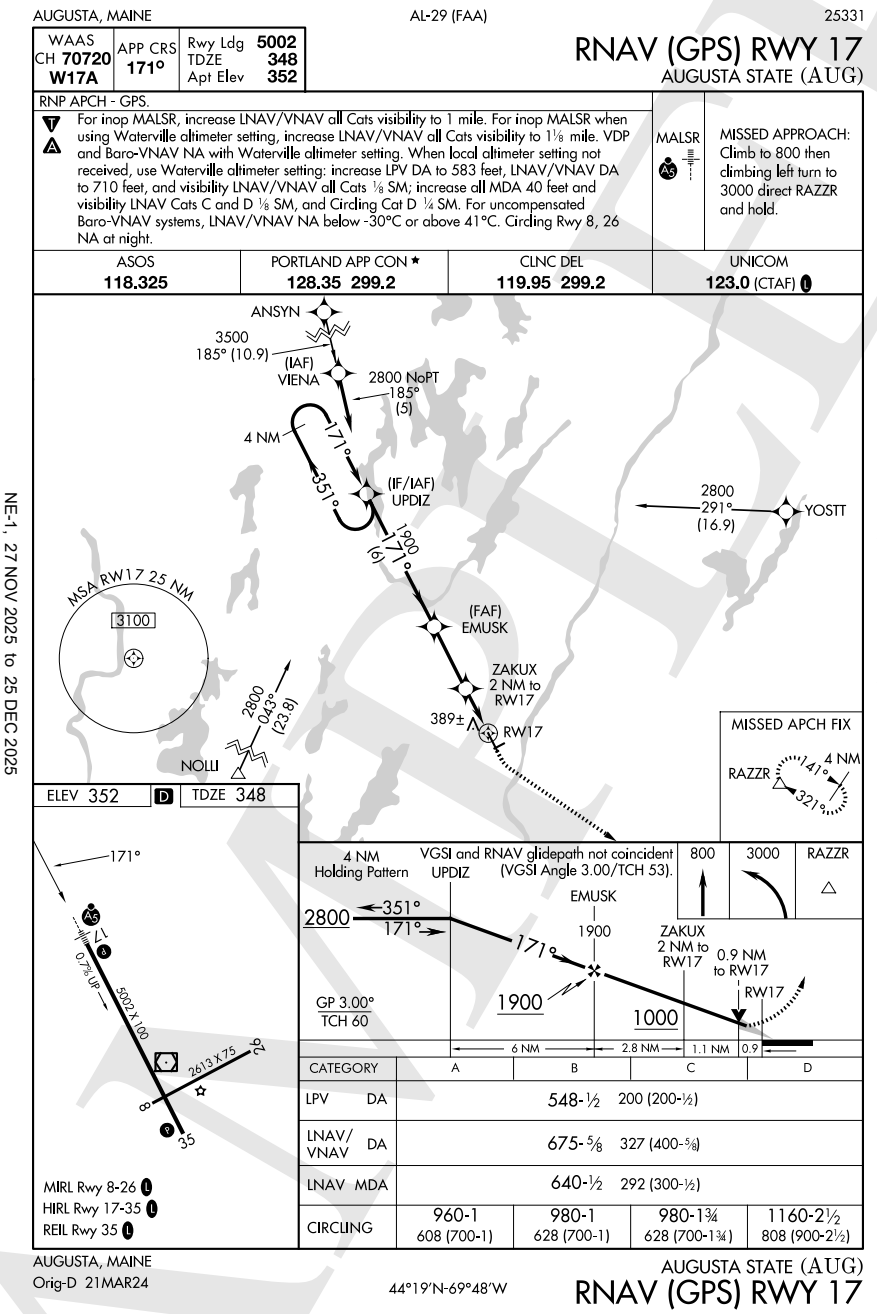


Figure 12: The RNAV Runway 17 approach into Augusta, Maine, the subject of Questions 28 and 59.

SAMPLE

28 What does Baro-VNAV have to do with LNAV/VNAV approaches?

What is Baro-VNAV?

What is the relation between Baro-VNAV and LNAV/VNAV approaches?

What is the relation between WAAS and LNAV/VNAV approaches?

Why do uncompensated Baro-VNAV systems have temperature limits, as in the RNAV Runway 17 approach to the Augusta State airport, Maine (Figure 12, on page 31)?

Additional examples of the same kind of prohibition are in Figures 4, 7, 8, 29, and 37.

29 If the glide slope failed while flying an LPV approach, could you continue on the LP approach, if one is available?

Expanded Question. It is common for pilots to brief co-located ILS and LOC approaches with the assumption that, if a glide slope failure occurred early enough, the pilot could switch to the LOC line of minimums and "downgrade" the ILS to the localizer approach. The pilot would arrest their descent at or above the LOC MDA and continue the approach to LOC minimums.

LPV and LP line of minimums are commonly found on RNAV approach charts: the LPV procedures have vertical guidance and are precision approaches, whereas the LP procedures are non-precision. Both have lateral navigation considered as accurate as a traditional localizer.

So, if the glide slope failed during an RNAV approach for which the unit was offering guidance to LPV specifications, could the pilot continue to LP minimums?

SAMPLER

Chapter 5 Approaches

30 What are the requirements to descend below DA or MDA on an instrument approach? How do you practically determine whether each requirement is satisfied?

31 What are the weather requirements to land on an instrument approach?

Expanded Question. What weather minimums must be present before the pilot can complete an instrument approach with a landing?

[Remainder of this page left intentionally blank to separate the answer from its question.]

SAMPLER

32 What is the meaning of an early letter of the alphabet (A, B, C, ...) in the name of an approach?

33 What is the meaning of a late letter of the alphabet (Z, Y, X, ...) in the name of an approach?

34 If an airport had many "alphabet" approaches, how would you tell whether an approach with a letter in the title is circling-only, or part of a series?

Expanded Question. We have seen that early letters of the alphabet in the title of an approach procedure denote circling-only approaches, whereas late letters denote members of a series of same-guidance approaches to the same runway.

Given the title of an approach containing a letter in the middle of the alphabet, how would you immediately tell if it's a circling-only approach or a member of a series?

35 Why is the RNAV (GPS)-B approach in Greenville, Maine designated as a circling-only approach?

Expanded Question. Consider the RNAV (GPS)-B approach in Figure 13. In question 32 we discussed how letter-designated approaches without a runway number in the title are circling-only approaches.

What is the most likely reason why this approach was designated as circling-only?

SAMPLER

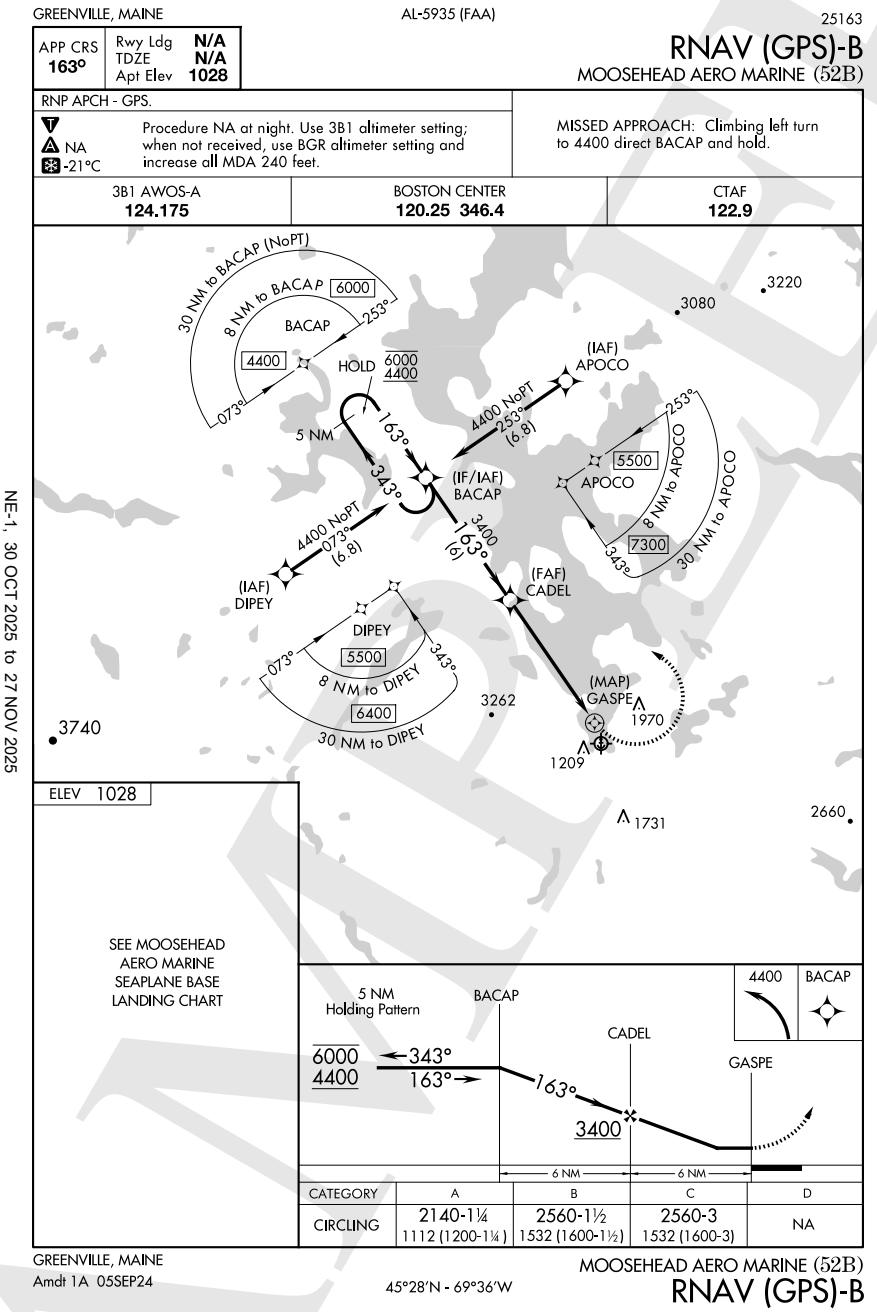


Figure 13: Chart for the RNAV (GPS)-B approach at the Moosehead Aero Marine base in Greenville, Maine, the subject of Questions 35 and 59.

SAMPLE

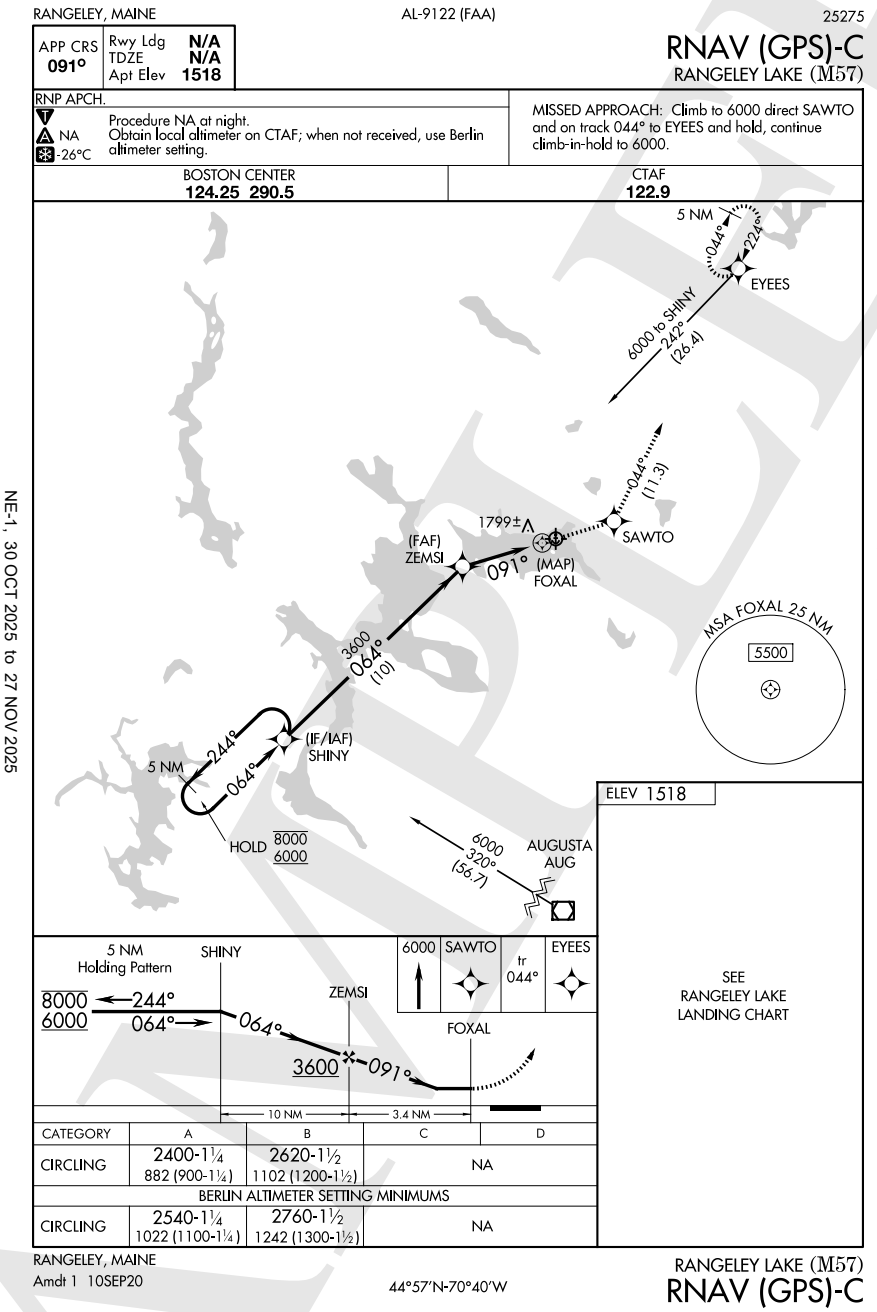


Figure 14: The RNAV (GPS)-C approach at the Rangeley Lake seaplane base in Rangeley, Maine.

36 How are the MAPs depicted on co-located ILS and LOC approaches?

Expanded Question. Virtually all ILS approach charts concurrently depict two approaches on the same page: a precision ILS approach, and its non-precision LOC counterpart.

How do you graphically tell what the Missed Approach Point (MAP) is for each respective approach?

For illustration, refer to the ILS or LOC approach to Runway 11 at the Portland, Maine, International Jetport (Figure 15, on page 38).

SAMPLER

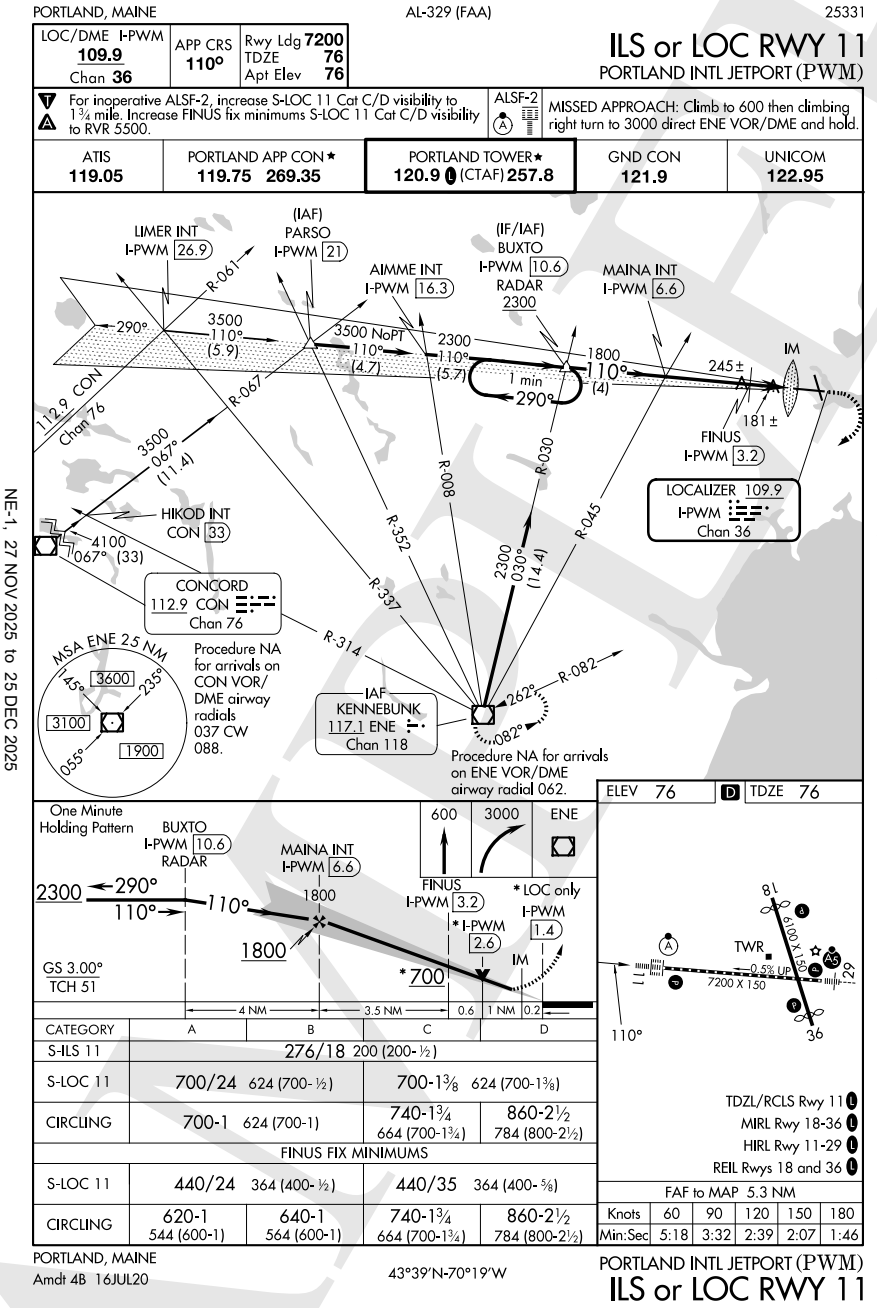


Figure 15: The ILS or LOC approach to Runway 11 at the Portland, Maine, International Jetport, referenced in Questions 36 and 59.

37 On an RNAV approach chart that depicts both precision and non-precision approaches, how are the MAPs depicted?

Expanded Question. This is a variant of the previous question, now aimed at RNAV approaches.

Many RNAV approach charts concurrently depict multiple line of minimums, some precision, some non-precision.

The precision procedures have vertical guidance (LPV and LNAV/VNAV), and the non-precision ones don't (LP, LNAV, circling).

When both kinds are present, how are Missed Approach Points (MAPs) graphically represented in the profile views of the respective approach charts?

For illustration and as an exercise, refer to any (or all) of the following approaches:

- RNAV Y Runway 3R at Prescott, Arizona (Figure 4, on page 14)
- RNAV Y Runway 34 at Westchester County, New York (Figure 8, on page 23)
- RNAV Runway 17 at Augusta, Maine (Figure 12, on page 31)
- RNAV Z Runway 8 at Danbury, Connecticut (Figure 37, on page 72)

(Ideally, candidates should be able to point out the MAP for every distinct line of minimum in any of the above RNAV charts.)

SAMPLE

38 The LOC/DME-C final approach course at Aspen, Colorado is aligned with Runway 15. Why is this procedure not the "LOC/DME Runway 15"?

Expanded Question. Examine the LOC/DME-E approach to the Aspen, Colorado airport (Figure 16, on page 41).

The final approach course, 151, is perfectly aligned with Runway 15.

Why is it not called "LOC/DME Runway 15"?

SAMPLER

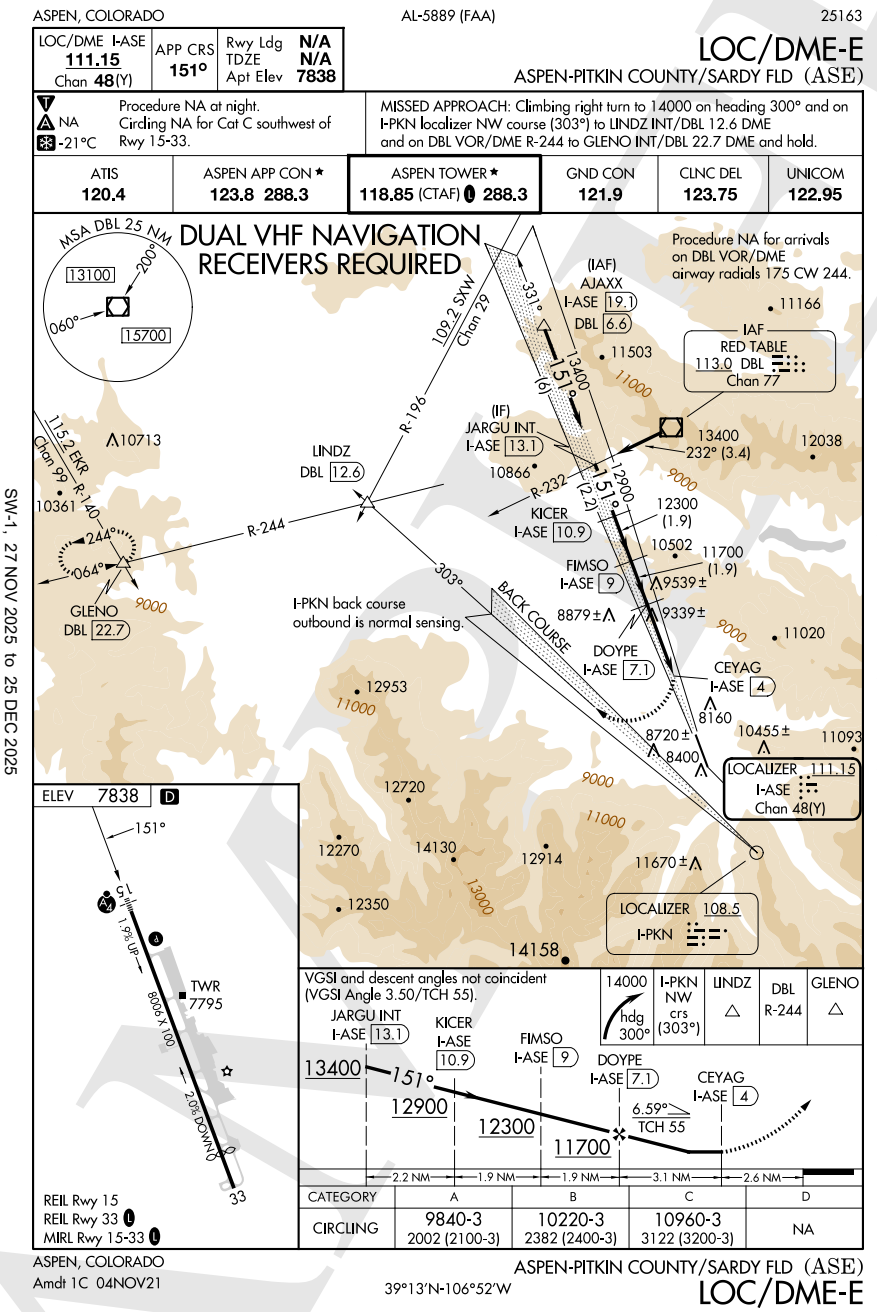


Figure 16: The LOC/DME-C approach at Aspen, Colorado, the subject of Questions 24 and 38.

39 The RNAV (GPS)-B final approach course at Chatham, Massachusetts is perfectly aligned with Runway 24. Why is the procedure not titled "RNAV (GPS) Runway 24"?

Expanded Question. This is a variation on the previous question. Examine the RNAV (GPS)-B approach to the Chatham Municipal airport, Massachusetts (Figure 17, on page 43).

The final approach course, 240, is perfectly aligned with Runway 24.

The final course descent angle is 3.05°, corresponding to 324 ft/NM, well within the 400 ft/NM limit to designate straight-in minimums.

No obstacles penetrate the visual segment.

Then why does the procedure not publish a straight-in line of minimums?

Why is the procedure not titled "RNAV (GPS) Runway 24"?

40 What is the "V" symbol depicted in the profile views of certain approach charts?

Expanded Question. Please examine the approach chart in Figure 18. There is a bold "V" symbol on the profile view, with a "I-FGH 2.5" indication.

What is the meaning of this symbol?

[Remainder of this page left intentionally blank to separate the answer from its question.]

SAMPLER

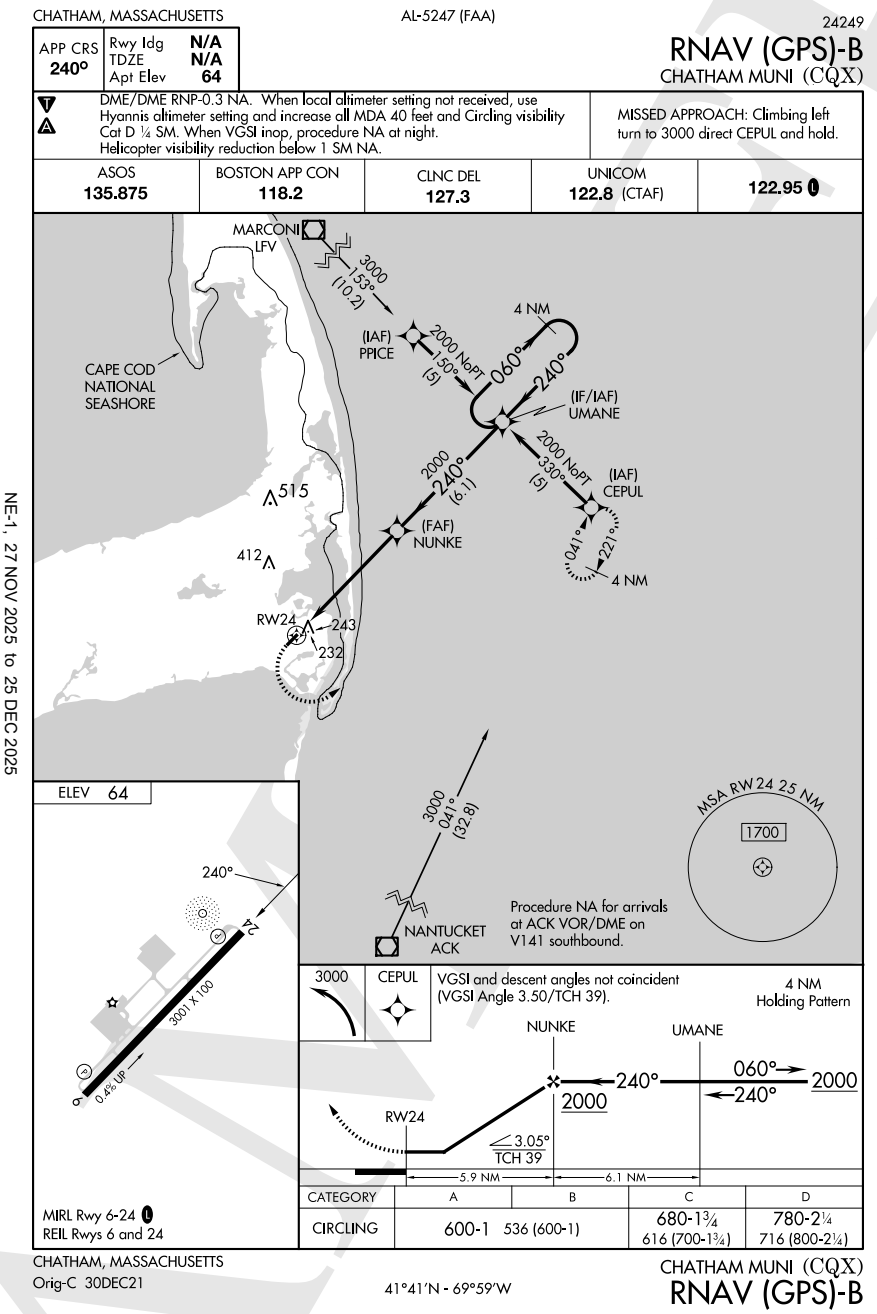


Figure 17: The RNAV (GPS)-B approach at Chatham, Massachusetts, the subject of Question 39.

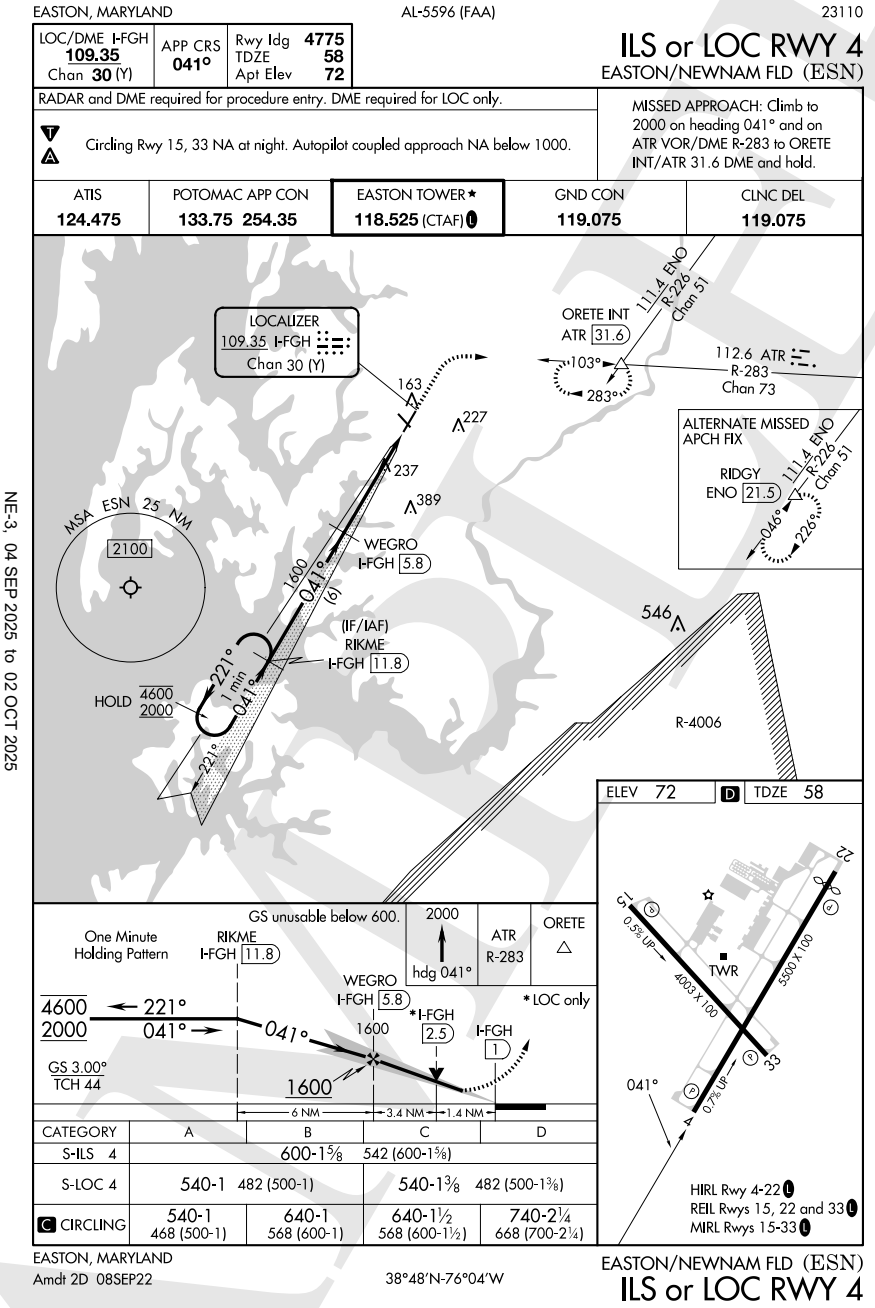


Figure 18: The ILS/LOC Runway 4 approach to the Easton/Newnam, Maryland airport, the subject of Questions 24 and 40.

41 Can you start descending from the MDA after the VDP?

Expanded Question. You are flying the LOC Runway 4 approach into Easton, Maryland (Figure 18, on page 44). You approach and pass the VDP (fix "I-FGH 2.5") at the prescribed MDA of 540 ft without initiating a descent below MDA.

You gain visual contact with the runway at the midpoint between the VDP and the MAP.

Are you allowed to start your descent to the runway from that point, and land?

SAMPLER

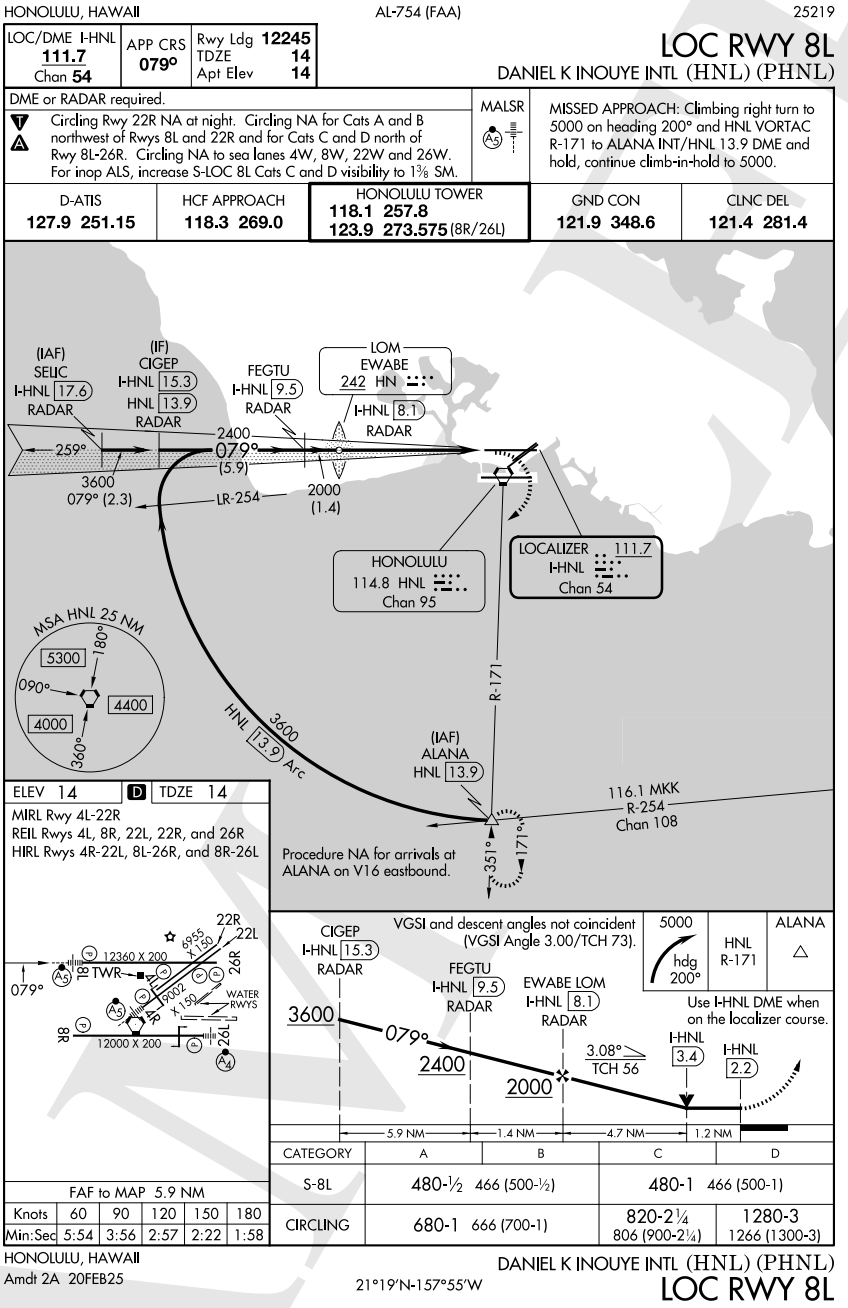


Figure 19: The LOC approach to Runway 8L at the Honolulu, Hawaii, airport, subject of Questions 24 and 42.

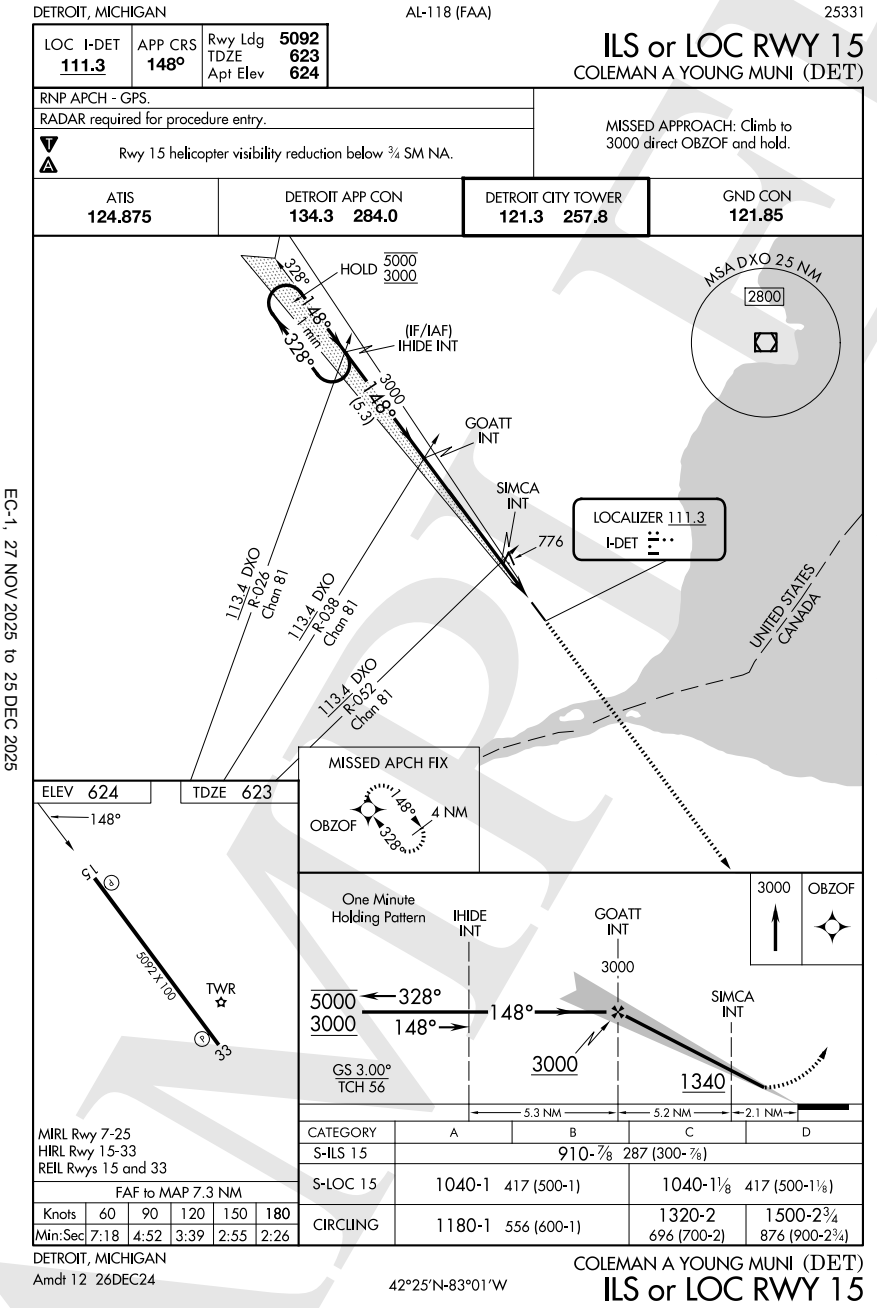


Figure 20: The ILS or LOC approach to Runway 15 at the Coleman Young Municipal airport in Detroit, Michigan, subject of Questions 24 and 42.

SAMPLER

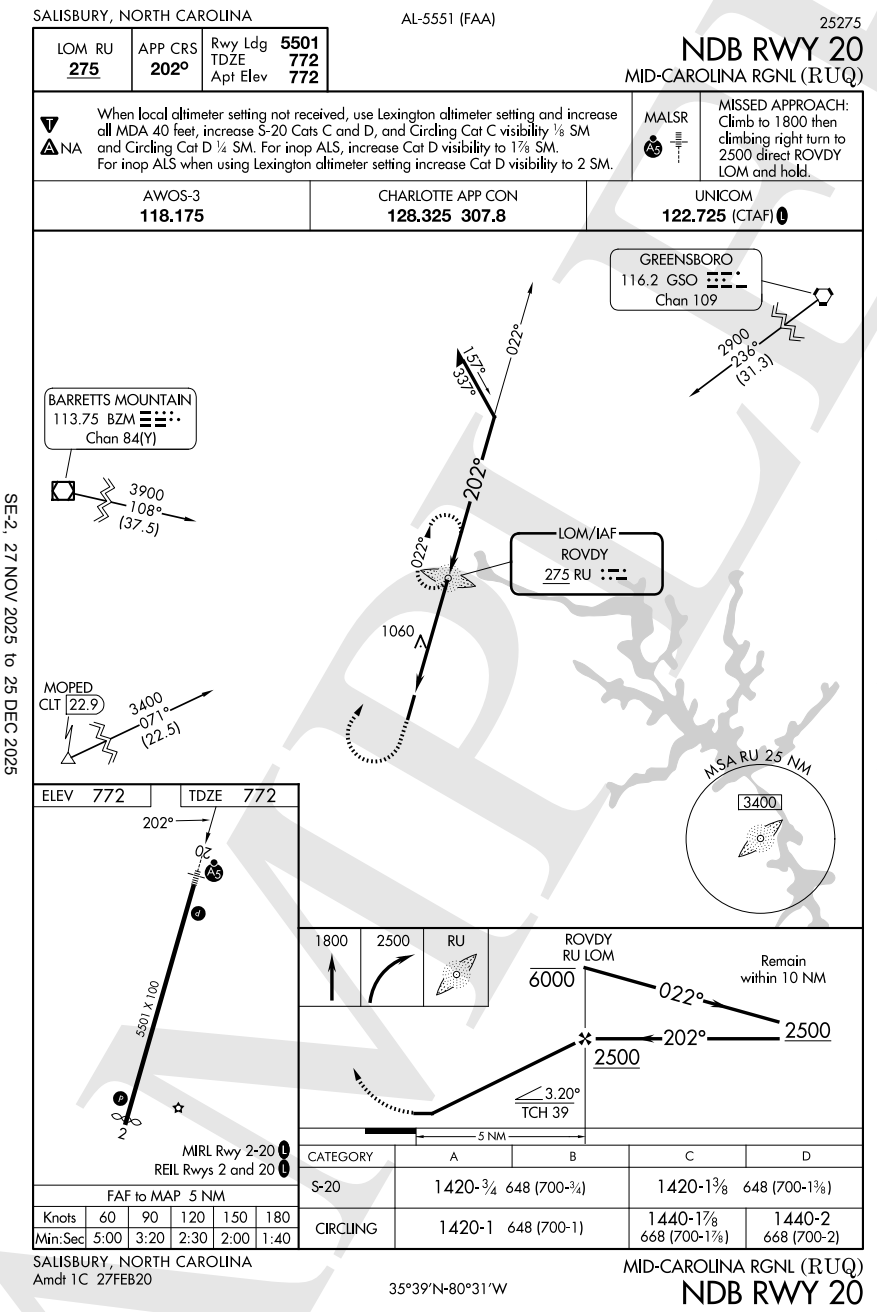


Figure 21: The NDB approach to Runway 20 at the Salisbury, North Carolina airport, subject of Question 42.

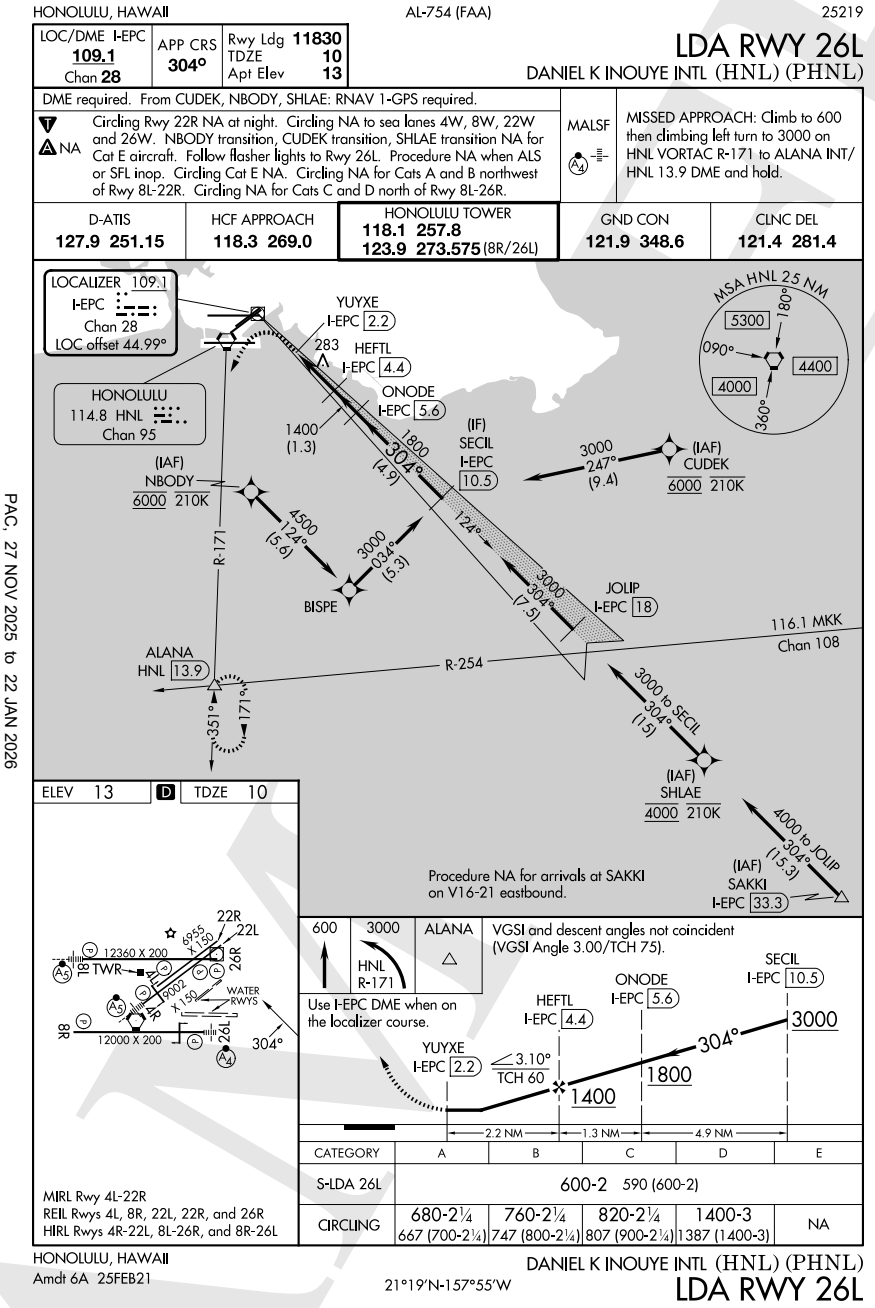


Figure 22: The LDA approach to Runway 26L at the Honolulu international airport, Hawaii, subject of Question 42.

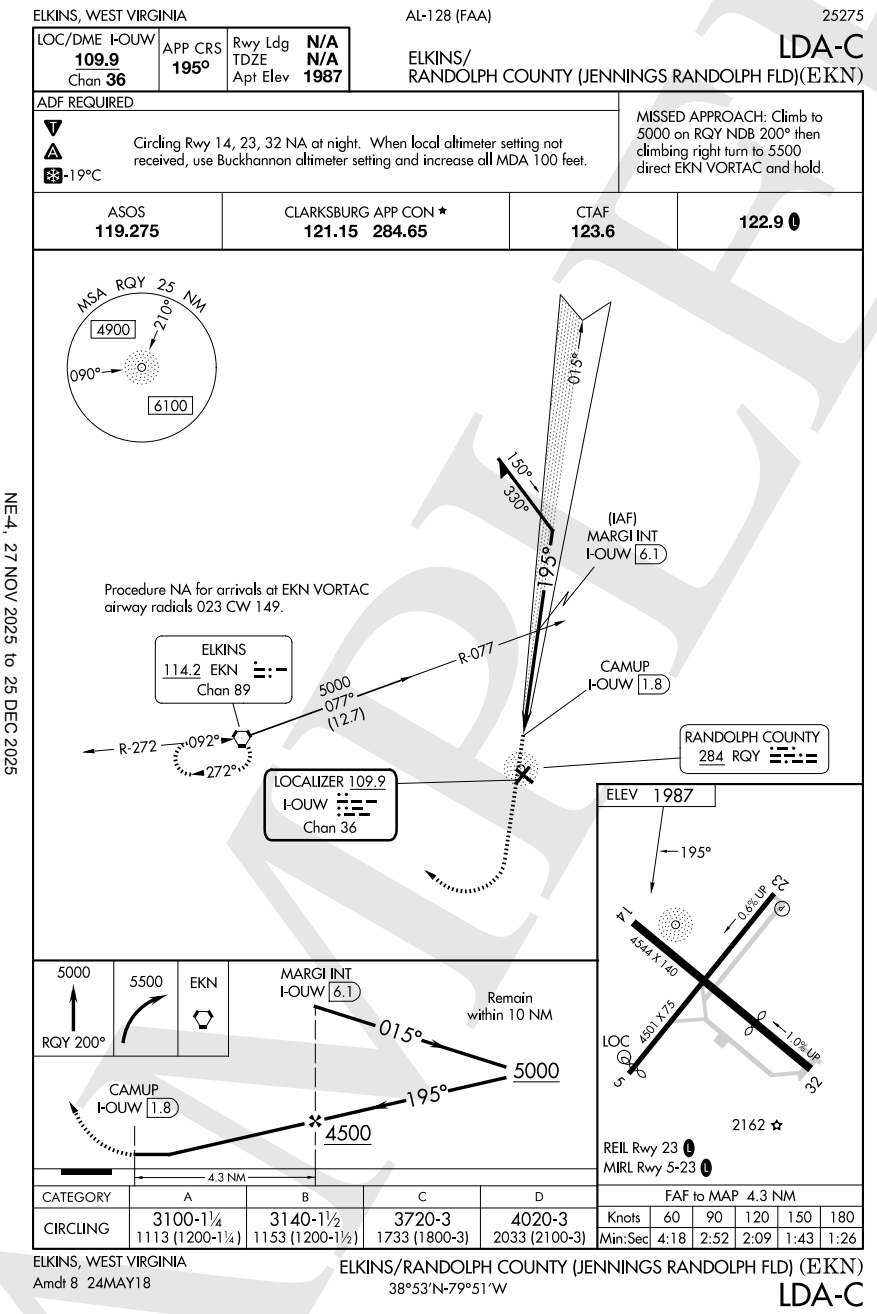


Figure 23: The LDA-C approach at the Randolph County, Virginia airport, subject of Questions 42 and 59.

SAMPLE

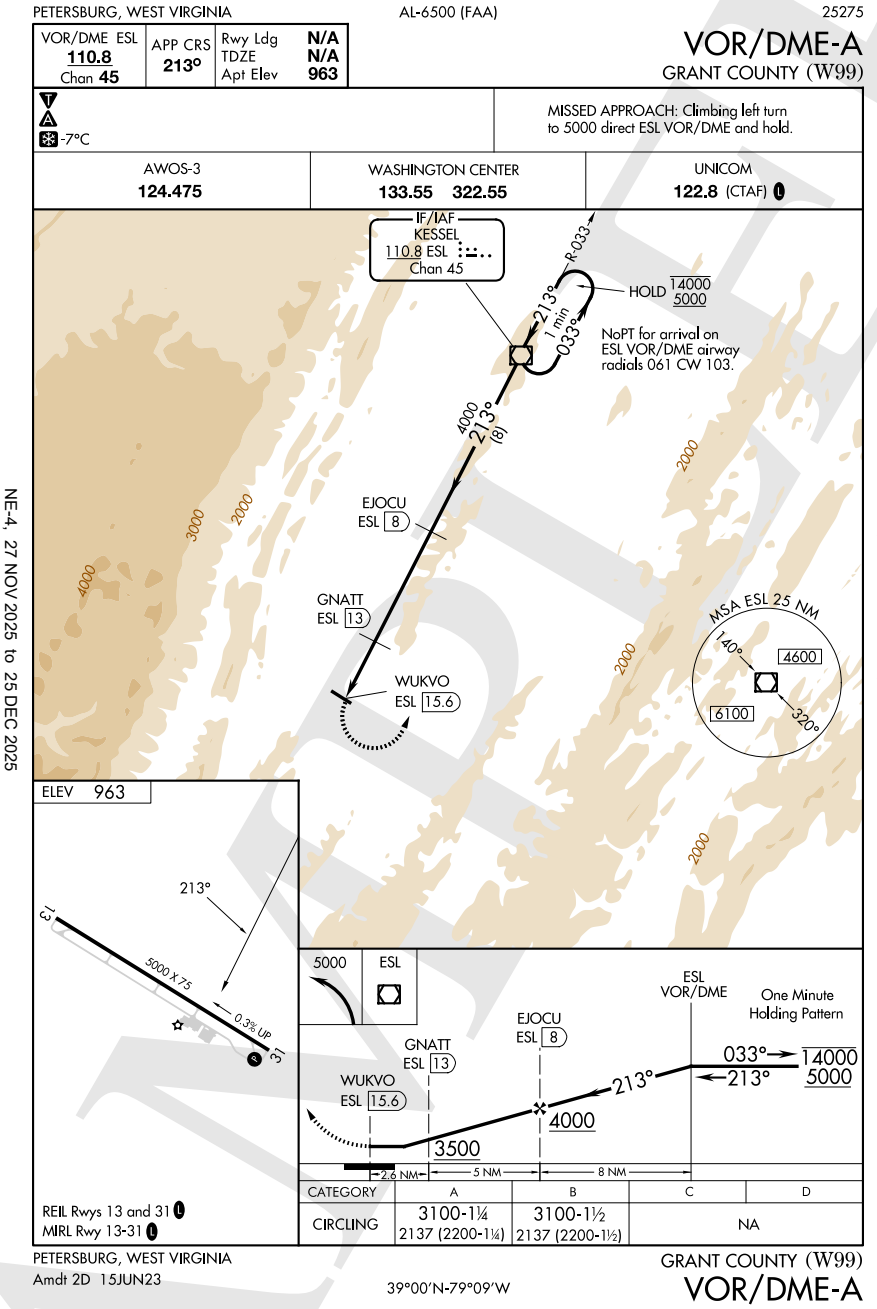


Figure 24: The VOR/DME-A approach at the Grant County, West Virginia airport, subject of Questions 42 and 59.

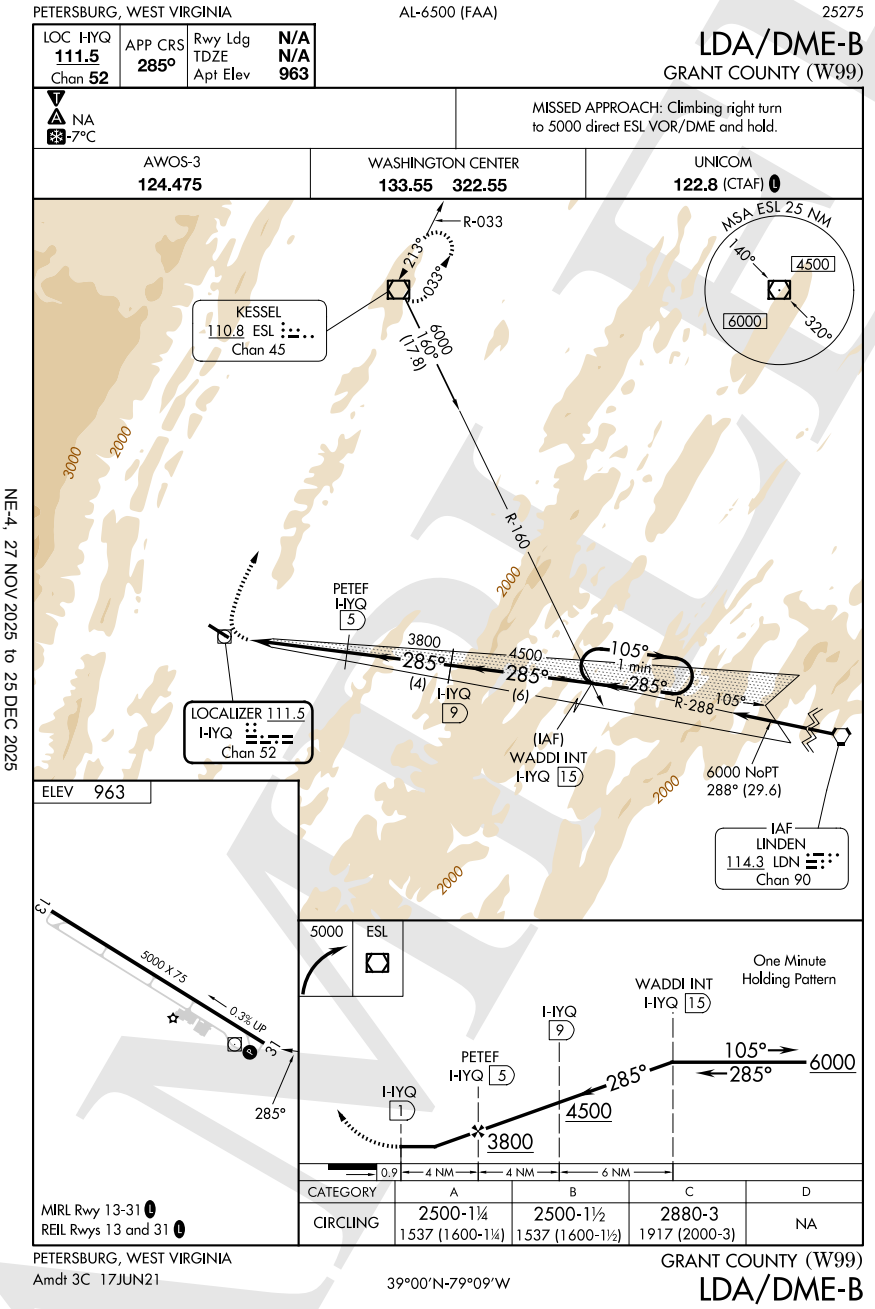


Figure 25: The LDA/DME-B approach at the Grant County, West Virginia airport, subject of Questions 42 and 59.

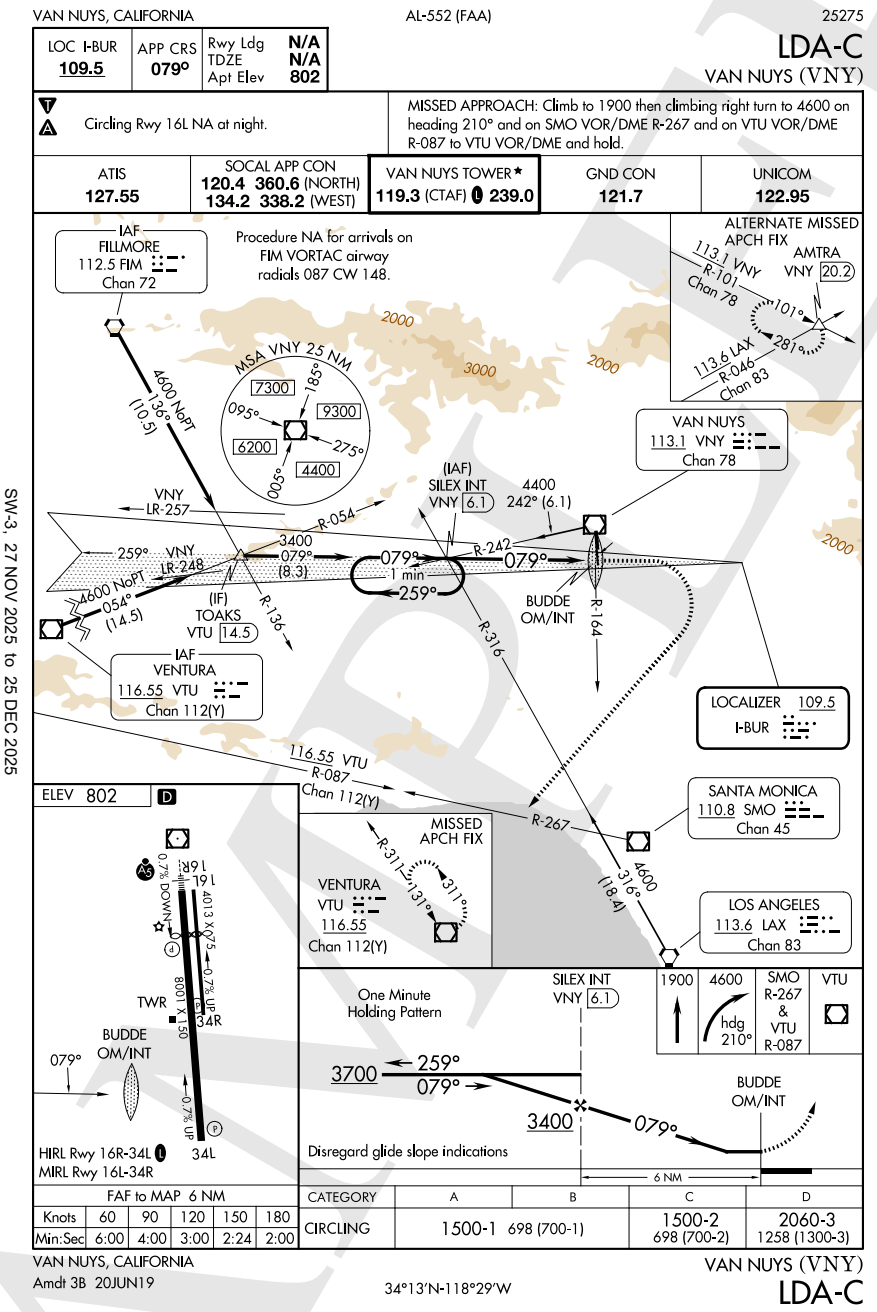


Figure 26: The LDA-C approach at the Van Nuys, California airport, subject of Questions 42 and 59.

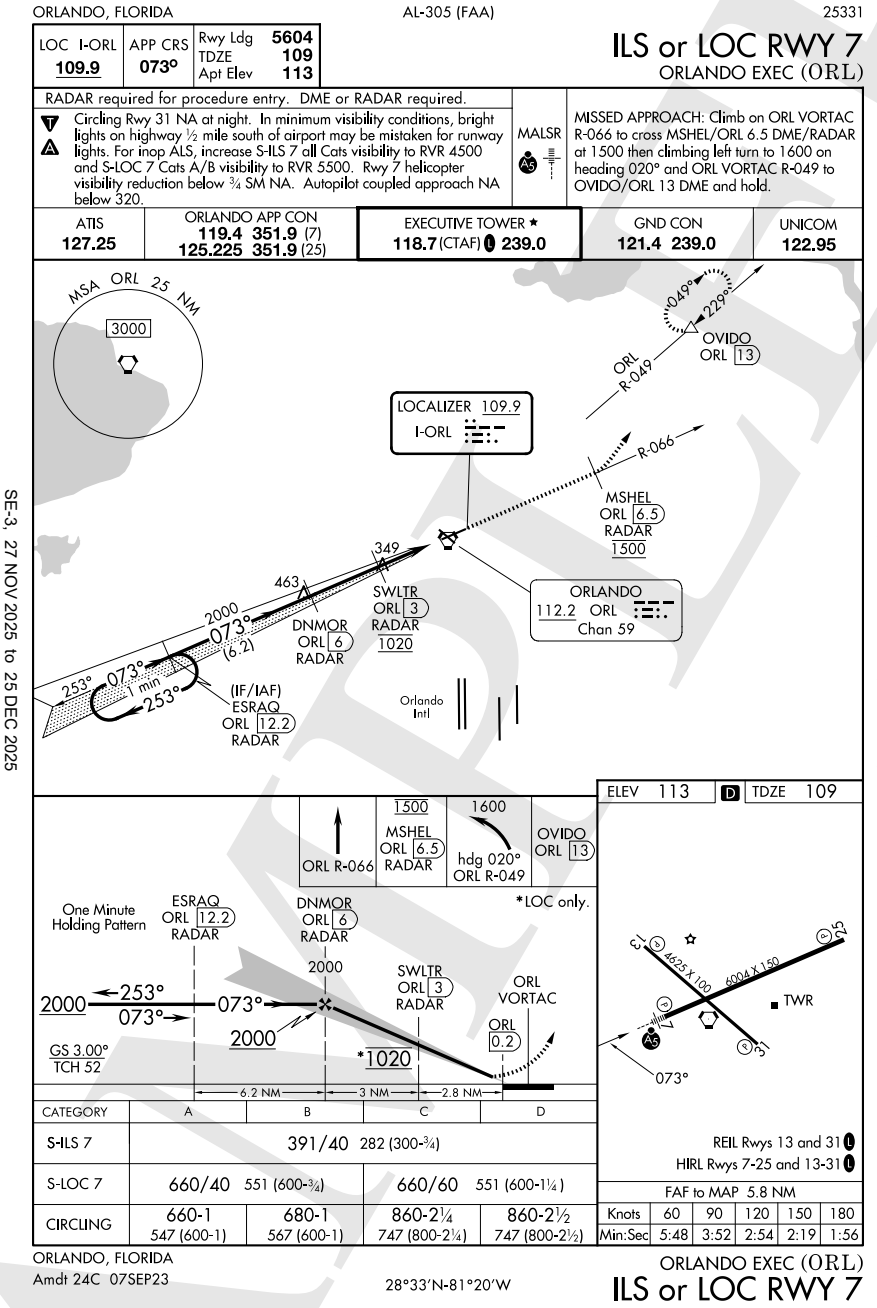


Figure 27: The ILS or LOC approach to Runway 7 at Orlando Executive airport, Florida, referenced in Questions 24, 36, and 59.

42 Why do some approach charts publish a FAF-to-MAP time table, while others don't?

Expanded Question. You have seen the FAF-to-MAP time tables that certain approach charts include, under the airport sketch.

Many approaches have such a time table, for example:

- the LOC Runway 11 at the Portland International Jetport, Maine (Figure 15, on page 38)
- the LOC Runway 7 approach at Orlando Executive, Florida (Figure 27, on page 54)
- the LOC Runway 36 approach at Dubuque, Iowa (Figure 31, on page 62)
- the LOC Z Runway 6 approach at Teterboro, New Jersey (Figure 36, on page 69)
- the LOC Runway 1 approach at Rockford, Illinois (Figure 10, on page 27)
- the LOC Runway 8 approach at Honolulu International, Hawaii (Figure 19, on page 46)
- the LOC Runway 15 approach at the Coleman Young Municipal airport in Detroit, Michigan (Figure 20, on page 47)
- the NDB Runway 20 approach at Salisbury, North Carolina (Figure 21, on page 48)
- the LDA-C approach at Randolph County, Virginia (Figure 23, on page 50)
- the LDA-C approach at Van Nuys, California (Figure 26, on page 53)
- the VOR or GPS-A approach at Gunnison, Colorado (Figure 9, on page 26).

Many other approaches don't have that table, for example:

- the RNAV Runway 17 approach at the Augusta State airport, Maine (Figure 12, on page 31)
- the RNAV Z Runway 3R approach at Prescott Love Field, Arizona (Figure 5, on page 16)
- the RNAV Y Runway 3R approach at Prescott Love Field, Arizona (Figure 4, on page 14)
- the RNAV (GPS)-C approach to Rangeley Lake (M57), Maine (Figure 14, on page 36)
- the LOC Runway 4 approach at the Easton/Newnam, Maryland airport (Figure 18, on page 44)
- the LOC Runway 32 at Sonoma County, California (Figure 11, on page 29)
- the LDA Z Rwy 6 approach at Roanoke, Virginia (Figure 34, on page 66)
- the LDA/DME Runway 25 approach at Columbia Gorge Regional, Oregon (Figure 35, on page 68)
- the LDA Runway 26 approach at Honolulu, Hawaii (Figure 22, on page 49)
- the VOR/DME-A approach at Grant County, West Virginia (Figure 24, on page 51)
- the LDA/DME-B approaches at Grant County, West Virginia (Figure 25, on page 52).

Why? What characteristics distinguish approaches in the first list from those in the second?

SAMPLE

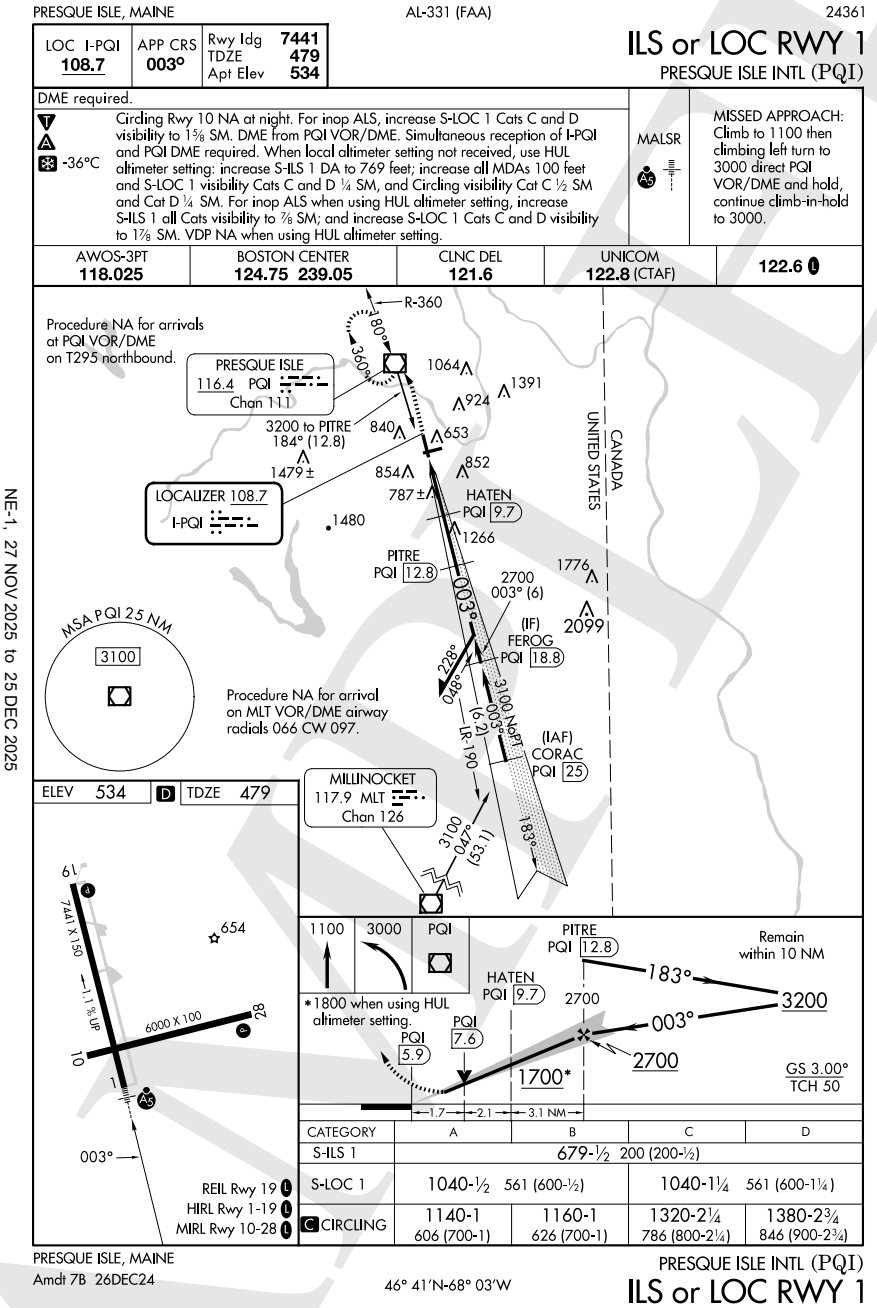


Figure 28: The ILS or LOC Runway 1 approach at the Presque Isle, Maine, International airport, a cold-weather airport; the subject of Questions 43 and 59.

43 What is the snowflake symbol shown in the briefing strip on the approach chart for the ILS or LOC Runway 1 approach at Presque Isle, Maine?

Expanded Question. The ILS or LOC Runway 1 approach at Presque Isle, Maine (Figure 28, on page 56) has a snowflake symbol in its briefing strip, accompanied by a "−36°" note.

What does the snowflake symbol mean?

How do you practically comply with its requirements?

What document offers guidance on those requirements?

SAMPLER

44 Why are the LNAV minimums lower than the LNAV/VNAV ones on the RNAV Runway 11 approach at San Luis Obispo, California?

Expanded Question. Please review the different lines of minimums published for the RNAV Runway 11 approach at San Luis Obispo, California (Figure 29, on page 59).

You will notice that the LNAV procedure has an MDA (840 ft) that is lower than the LNAV/VNAV MDA (946 ft).

But the LNAV/VNAV procedure is precision, whereas the LNAV is non-precision.

Shouldn't precision procedures allow for lower minimum altitudes?

SAMPLER

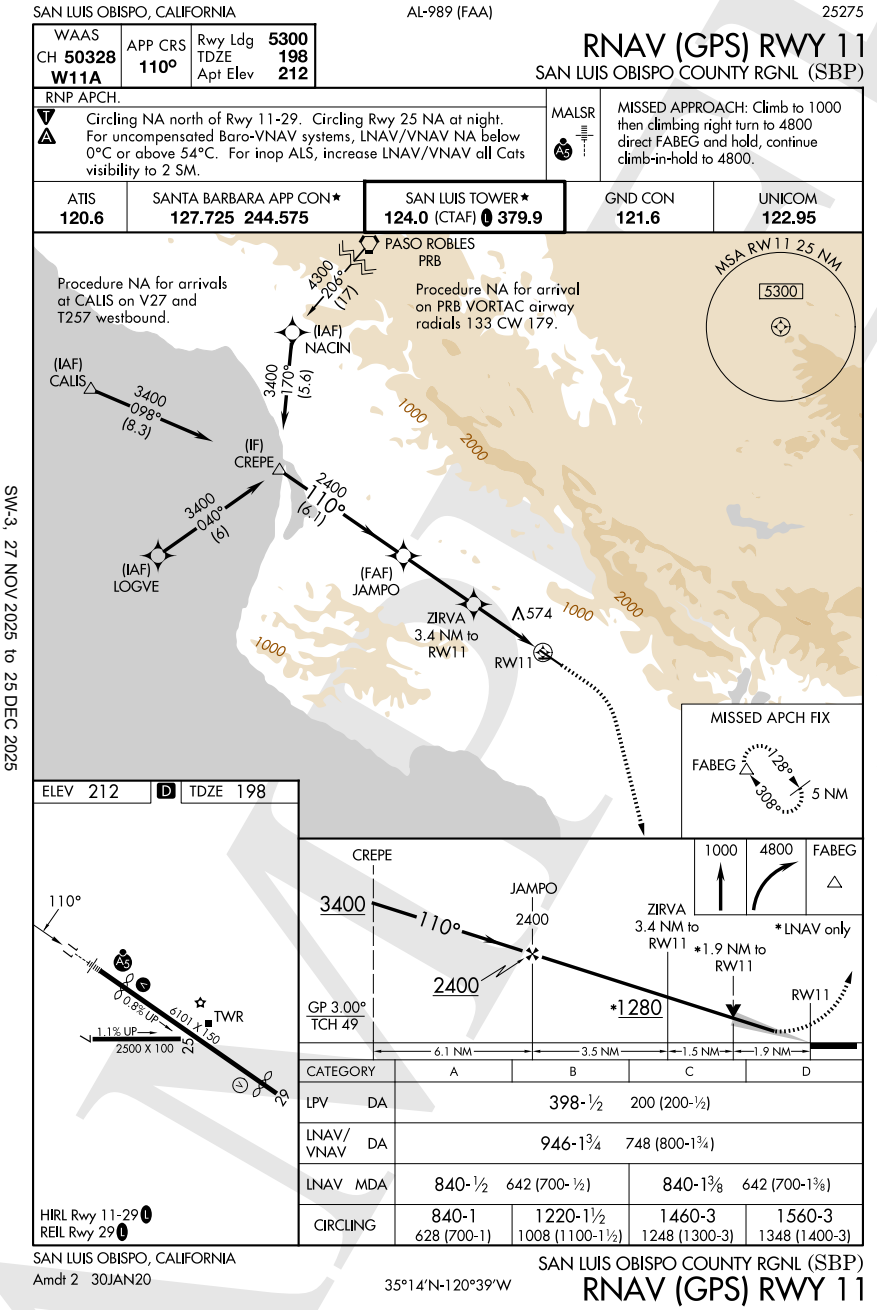


Figure 29: The RNAV Runway 11 approach at the San Luis Obispo County Regional airport, California, subject of Question 44.

TAKEOFF MINS

25331

SAN LUIS OBISPO, CA

SAN LUIS OBISPO COUNTY RGNL (SBP)

TAKEOFF MINIMUMS AND (OBSTACLE) DEPARTURE PROCEDURES

AMDT 8 25FEB21 (24081) (FAA)

TAKEOFF MINIMUMS:

Rwys 7, 25, NA-Obstacles.

Rwy 11, std w/min climb of 412' per NM to 2100 or 2800-3 for VCOA.

Rwy 29, std w/min climb of 460' per NM to 2000 or 2800-3 for VCOA.

DEPARTURE PROCEDURE:

Rwy 11, climb on heading 110° to 700, then climbing right turn to intercept MQO VORTAC R-115 to MQO VORTAC and hold, continue climb in MQO holding pattern (hold southeast, left turns, 306° inbound) to cross MQO VORTAC at or above 4000 or MEA for route of flight.

Rwy 29, climb on heading 290° to intercept MQO VORTAC R-050 to MQO VORTAC and hold, continue climb in MQO holding pattern (hold southeast, left turns, 306° inbound) to cross MQO VORTAC at or above 4000 or MEA for route of flight.

VCOA:

Rwys 11, 29, obtain ATC approval for VCOA when requesting IFR clearance. Climb in visual conditions to cross San Luis Obispo County Rgnl at or above 2900 before proceeding direct MQO VORTAC.

TAKEOFF OBSTACLE NOTES:

Rwy 11, fence 14' from DER, 492' left of centerline, 6' AGL/214' MSL.
Tree 295' from DER, 565' left of centerline, 27' AGL/235' MSL.
Vehicle on road 398' from DER, 389' right of centerline, 223' MSL.
Trees beginning 498' from DER, 383' left of centerline, up to 34' AGL/240' MSL.
Vehicle on road 591' from DER, 396' right of centerline, 231' MSL.
Vehicle on road 600' from DER, 507' right of centerline, 240' MSL.
Vehicle on road, building beginning 621' from DER, 269' right of centerline, up to 247' MSL.
Tree, terrain beginning 994' from DER, 596' right of centerline, up to 10' AGL/262' MSL.
Tree 1061' from DER, 751' right of centerline, 54' AGL/311' MSL.
Tree 1072' from DER, 80' left of centerline, 26' AGL/242' MSL.
Lighting 1090' from DER, 22' left of centerline, 34' AGL/252' MSL.
Pole, lighting, terrain beginning 1101' from DER, on centerline, up to 27' AGL/253' MSL.
Trees, pole, lighting, terrain, building, vehicle on road beginning 1107' from DER, 2' right of centerline, up to 56' AGL/316' MSL.
Terrain 1696' from DER, 96' left of centerline, 256' MSL.
Vehicle on road 1795' from DER, 488' left of centerline, 258' MSL.
Terrain 1798' from DER, 99' left of centerline, 259' MSL.
Terrain beginning 1883' from DER, 14' left of centerline, up to 261' MSL.
Vehicle on road 1980' from DER, 561' left of centerline, 264' MSL.
Trees, terrain beginning 1989' from DER, 3' left of centerline, up to 25' AGL/284' MSL.
Trees, terrain, buildings, poles, vehicle on road beginning 2099' from DER, 3' left of centerline, up to 35' AGL/290' MSL.
Building, vehicle on road beginning 2245' from DER, 592' left of centerline, up to 30' AGL/291' MSL.
Buildings, vehicle on road beginning 2267' from DER, 198' left of centerline, up to 31' AGL/293' MSL.
Buildings, vehicle on road beginning 2400' from DER, 54' left of centerline, up to 44' AGL/294' MSL.
Rwy 29, trees beginning 69' from DER, 463' right of centerline, up to 26' AGL/176' MSL.
Terrain 2 NM from DER, 2497' right of centerline, 507' MSL.
Terrain beginning 2 NM from DER, 2498' right of centerline, up to 514' MSL.
Terrain 2.1 NM from DER, 2713' right of centerline, 557' MSL.
Fence 2.1 NM from DER, 2691' right of centerline, 3' AGL/560' MSL.
Fence 2.1 NM from DER, 2698' right of centerline, 3' AGL/561' MSL.
Terrain 2.2 NM from DER, 2704' right of centerline, 564' MSL.
Fence, terrain beginning 2.2 NM from DER, 2481' right of centerline, up to 3' AGL/565' MSL.

27 NOV 2025 to 25 DEC 2025

27 NOV 2025 to 25 DEC 2025

SAN NICOLAS ISLAND NOLF (KNSI)

SAN NICOLAS ISLAND, CA

TAKEOFF MINIMUMS AND (OBSTACLE) DEPARTURE PROCEDURES

AMDT 2 10JUL25 (25191) (USN)

DEPARTURE PROCEDURE:

Rwy 30, diverse departures authorized 300° to 120° CW.

SANTA ANA, CA

JOHN WAYNE/ORANGE COUNTY (SNA)

DIVERSE VECTOR AREA (RADAR VECTORS)

AMDT 1 16OCT14 (14289) (FAA)

Rwys 2L, 2R, headings as assigned by ATC.
Rwy 20L, headings as assigned by ATC; requires minimum climb of 260' per NM to 1300.
Rwy 20R, headings as assigned by ATC; requires minimum climb of 270' per NM to 1300.

TAKEOFF MINIMUMS AND (OBSTACLE) DEPARTURE PROCEDURES

AMDT 6 18SEP14 (21168) (FAA)

DEPARTURE PROCEDURE:

Rwys 2L/R, climbing left turn direct SLI VORTAC.
Rwys 20L/R, climbing right turn direct SLI VORTAC.
All aircraft climb in SLI holding pattern (hold S, left turns, 351° inbound) to cross SLI VORTAC at or above MEA for direction of flight before proceeding on course.

CON'T

TAKEOFF MINS

SW-3

25331

L29

Figure 30: The takeoff minimum page for the San Luis Obispo, California airport, referenced in the discussion of Question 44. Text coloring for emphasis is mine.

SAMPLE

45 Do the FAFs coincide on the ILS and on the LOC approach to Runway 32 at Sonoma County, California?

Expanded Question: Consider the two straight-in approaches to Runway 32 at Sonoma County, California (Figure 11, on page 29).

How are the two FAFs depicted on the ILS and on the LOC approaches, respectively?

The two points appear to coincide on the profile view.

Can you conclusively show that the two points coincide?

Can you conclusively show that the two points differ?

46 What's the meaning of the VDP symbol when flying the circle-to-land RNAV Z Rwy 32 approach into Bethel, Maine?

Expanded Question. You are flying the RNAV (GPS) Z Runway 32 approach to the Bethel Regional airport in Bethel, Maine (Figure 32, on page 63).

You have elected to fly it as a **circling** approach.

What does the VDP symbol at "1.8 NM to IRANE" require you to do?

47 Why are circling radii larger at higher altitude?

Expanded Question. The radii of the protected areas that are safe to use during a circle-to-land approach are defined in the TERPS.

They are also offered in the TPP, specifically in the top table of Page 5 (Figure 33, on page 64), at the time of this writing. In that table, note how radii vary both by aircraft speed category and by how high the MDA is above sea level.

The reason why faster aircraft need larger circling radii should be evident: faster aircraft travel a longer distance during the same pilot reaction interval.

However, it may not be as evident why higher circling at higher MDAs MSL also require a larger radius. Note that the radius growth is not a function of the Minimum Descent Height (MDH), but of the MDA's *true altitude* value (MSL).

SAMPLER

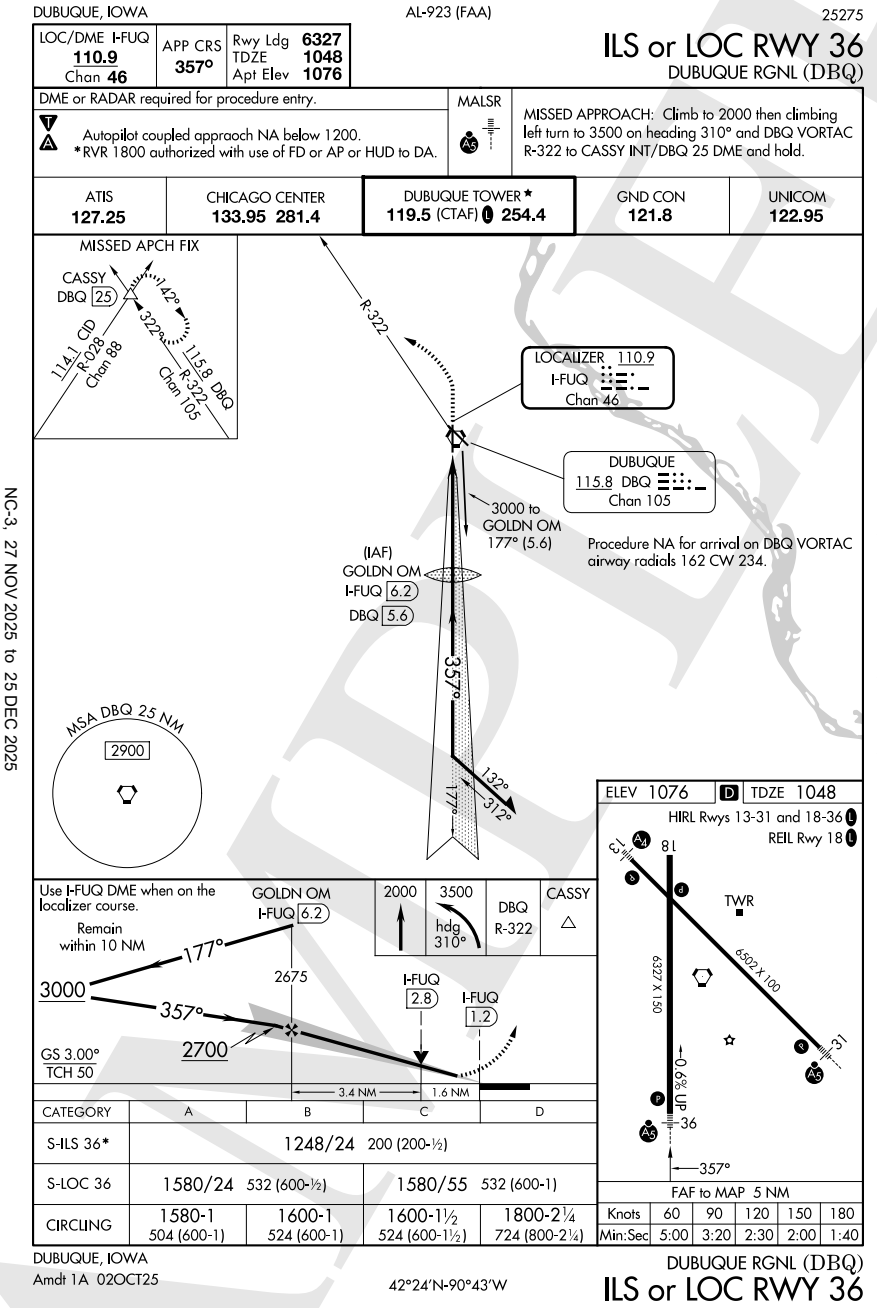


Figure 31: The ILS or LOC Runway 36 approach at the Dubuque Regional airport, Iowa, an example where the LOC FAF and the ILS PFAF clearly do not coincide.

SAMPLE

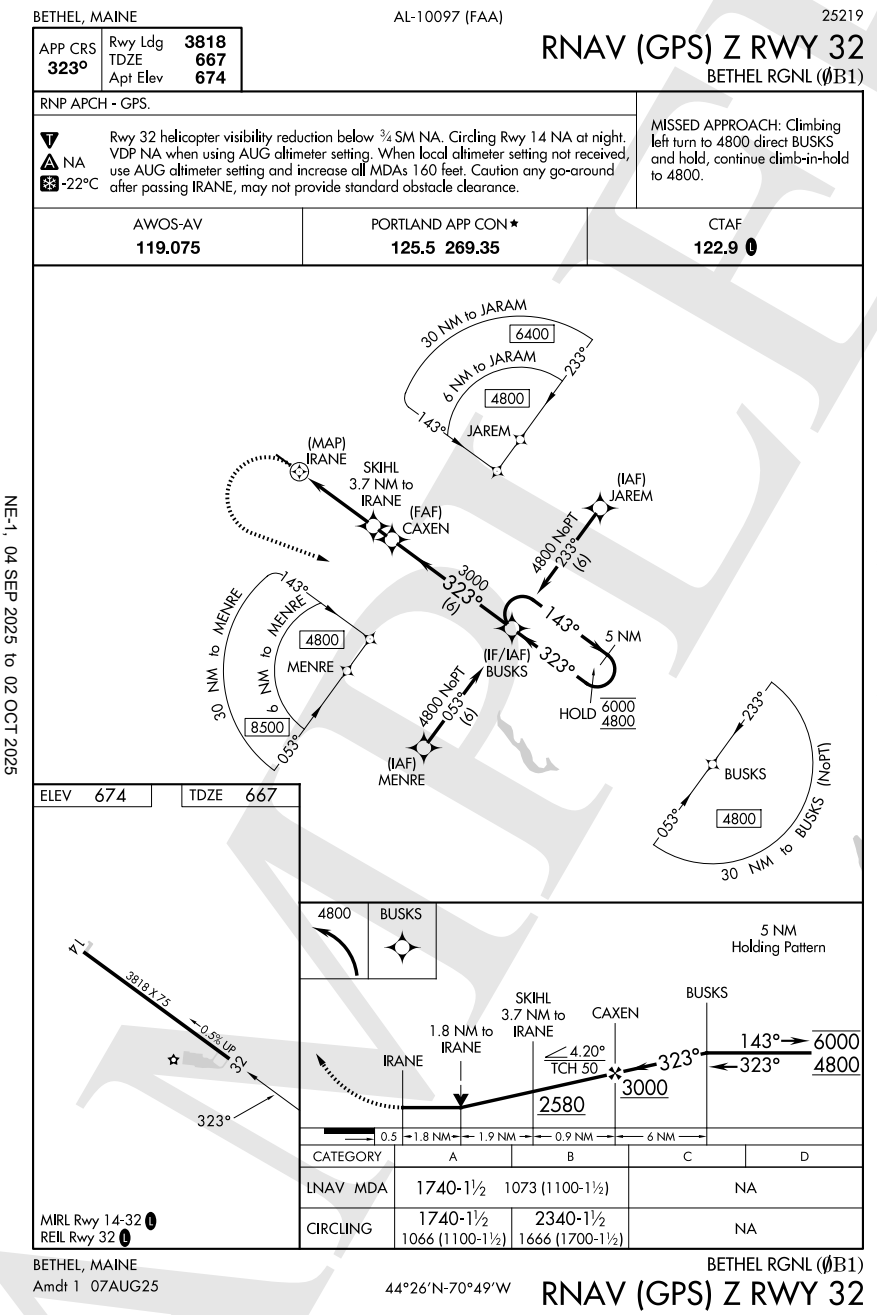


Figure 32: The RNAV Runway 32 approach at the Bethel, Maine airport, the subject of Questions 46 and 59.

SAMPLE

02 OCT 2025 to 30 OCT 2025

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 table below. The resultant arcs are then connected tangentially to define the protected area.

CIRCLING APPROACH MANEUVERING AIRSPACE RADIUS

Circling MDA protected areas 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.

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

Users may ignore the presence of C symbols on charts which will be removed on a day-forward basis. All circling areas within this volume have been evaluated for the circling MDA protected area radius shown in the table above.

Comparable Values of RVR and Visibility

The following table may be used for converting RVR to ground or flight visibility. For 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)
1200	¼	2200	½	3200*	⅝	5000*	1
1600*	¼	2400*	½	3500	⅝	5500	1
1800	½	2600	½	4000*	¾	6000*	1¼
2000	½	3000	⅝	4500*	⅞		

*Values repeated from 14 CFR 91.175 and shall be used for takeoff or landing minima.

If a visibility adjustment is required for a procedure with an RVR value, the RVR value should first be converted to visibility using this table. The visibility should then be increased by the adjustment value, and then may be converted back to the highest RVR value associated with that visibility. For example, if a procedure with 2000 RVR requires a ⅛ mile adjustment, first convert 2000 RVR to ½ SM. Adding ⅛ SM results in ⅝ SM, which may then be converted to 3500 RVR.

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)				Visibility
	28	2.5°/48/1068	ABCDE	**187**/16	100	(100-¼)				(RVR 100's of feet)
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 minimums in parentheses not applicable to Civil Pilots. Military Pilots refer to appropriate regulations.

Radar Minima:

1. Minima shown are the lowest permitted by established criteria. Pilots should consult applicable directives for their category of aircraft.
2. 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".

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

TERMS/LANDING MINIMA DATA 25275

Figure 33: Circling minimums page from legends pages found in any volume of the TPP.

Why is a larger protected radius required to circle safely at higher true altitudes?

SAMPLER

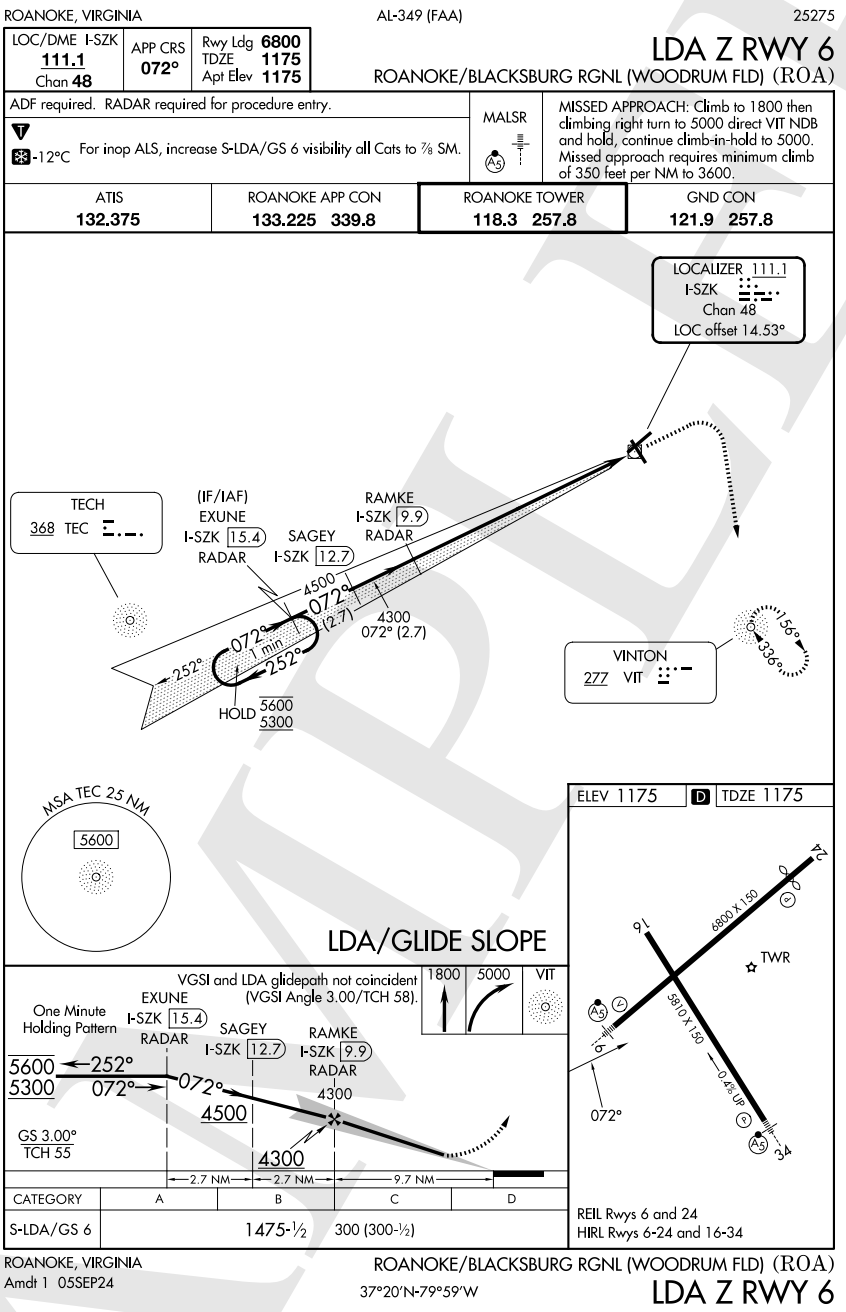


Figure 34: The LDA Z Rwy 6 approach into Roanoke, Virginia, subject of Questions 48 and 59.

SAMPLER

48 Why does the LDA Z Rwy 6 approach with glideslope at Roanoke have both a lightning bolt and a Maltese cross symbol?

Expanded Question. You are planning to fly the LDA Z Rwy 6 approach into Roanoke (Figure 34, on page 66). The only line of minimums is the "LDA/GS 6" line which corresponds to an approach with glide slope. A lightning bolt symbol indicates that glideslope interception should occur at or above 4,300 ft. However, there is also a Maltese cross symbol at the RAMKE fix, designating it as the FAF.

We have learned from a prior discussion on co-located ILS and LOC approaches that the lightning bolt indicates the Precision Final Approach Fix (PFAF) for the approach with vertical guidance, whereas the Maltese cross indicates the FAF for the LOC approach, i.e., the co-located approach without vertical guidance.

But this plate does not display two co-located approaches: it only has one line of minimums, for an approach with vertical guidance.

Then why are there **both** a lightning bolt symbol and a Maltese cross?

Which one is the FAF?

Is this a precision or a non-precision approach?

Regardless of which symbol denotes the FAF, why is the other symbol needed?

Warning. This is a trick question. The candidate should develop an answer grounded in references to official sources, and be ready to defend it in spite of misleading and conflicting information. The rationale for allowing this trick question in the book is that its discussion offers great teaching opportunities.

SAMPLER

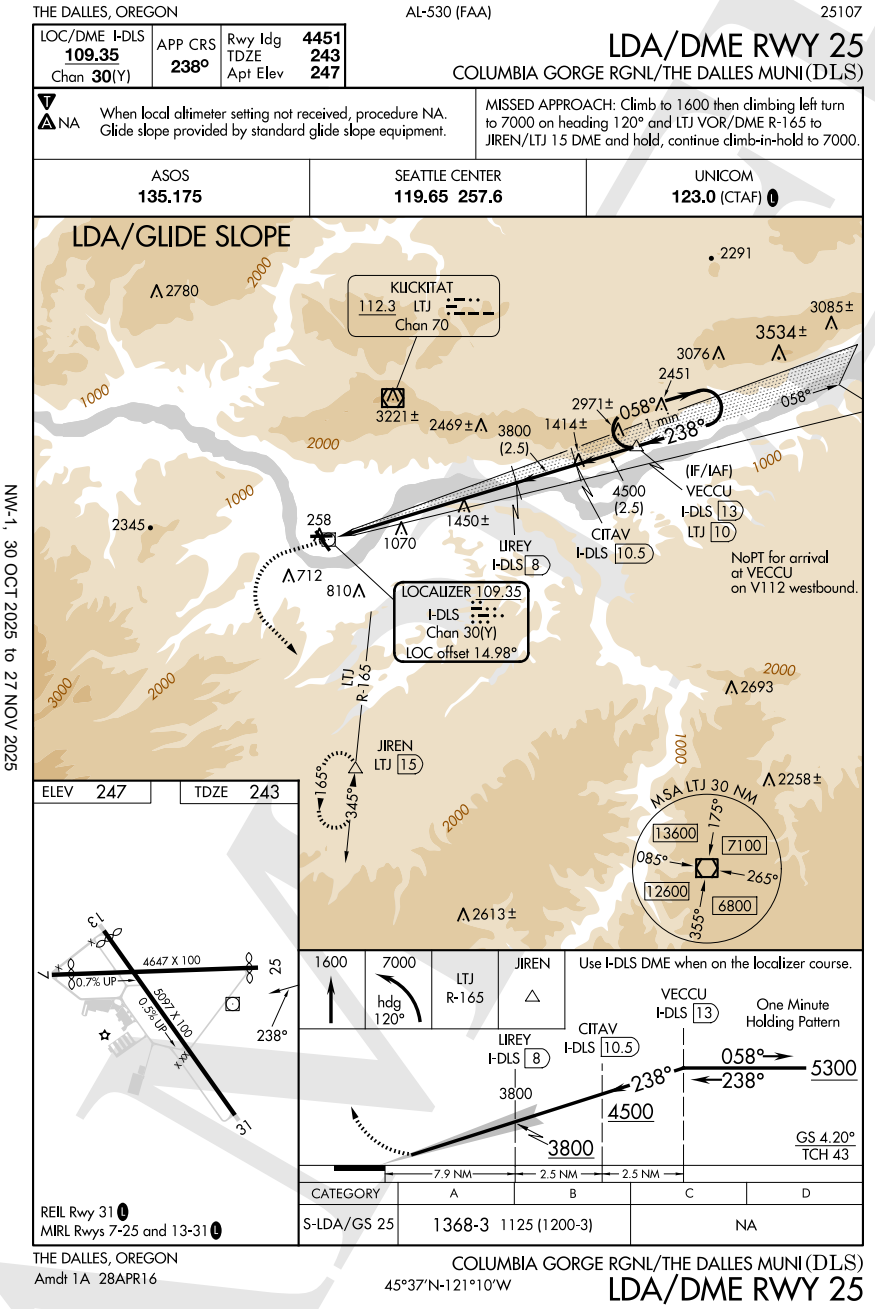


Figure 35: The LDA/DME Runway 25 approach into the Columbia Gorge Regional airport, cited in the explanation of Question 48.

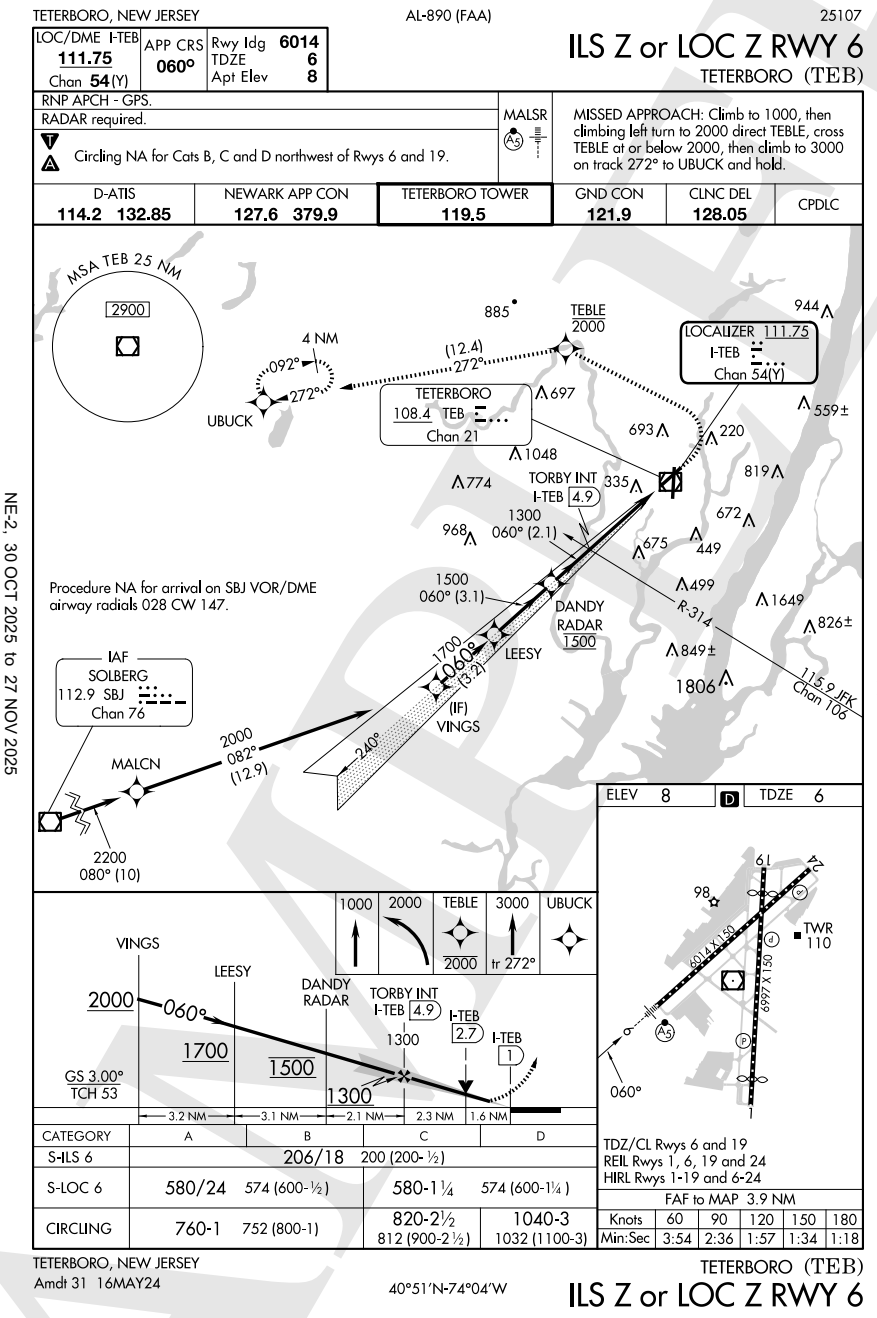


Figure 36: The ILS Z Runway 6 approach at Teterboro, New Jersey, the subject of Questions 24, 42, and 49.

49 Can you fly the ILS Z Rwy 6 approach to a landing at Teterboro if the reported RVR is below approach minimums?

Expanded Question. You are expecting to fly the ILS Z Runway 6 approach at Teterboro (Figure 36, on page 69). The weather reported at Teterboro is:

```
METAR KTEB 100351Z 00000KT M1/4SM R06/1000V1400FT BR OVC002 15/14 A2970 RMK AO2 SFC
VIS 1/2 SLP057 T01500144 $
```

You are operating a General Aviation flight under Part 91.

Can you initiate the approach?

Can you descend below DA?

Can you land?

SAMPLER

50 Choose the best RNAV Runway 8 approach into Danbury, Connecticut

Expanded Question. Consider the following scenario:

- you are performing an IFR flight from Scranton, PA (KAVP) to Danbury, CT (KDXR), direct route;
- winds at Danbury favor landing on Runway 8;
- you have a preference for approaches using RNAV guidance rather than LOC;
- in the vicinity of R-5206, New York Approach asks you to say your approach request at Danbury (R-5206 is otherwise of no interest to your flight).

Which approach should you choose between RNAV Z Runway 8 and RNAV Y Runway 8 (Figures 37 and 38 on pages 72 and 73, respectively)?

What factors guide your choice?

SAMPLER

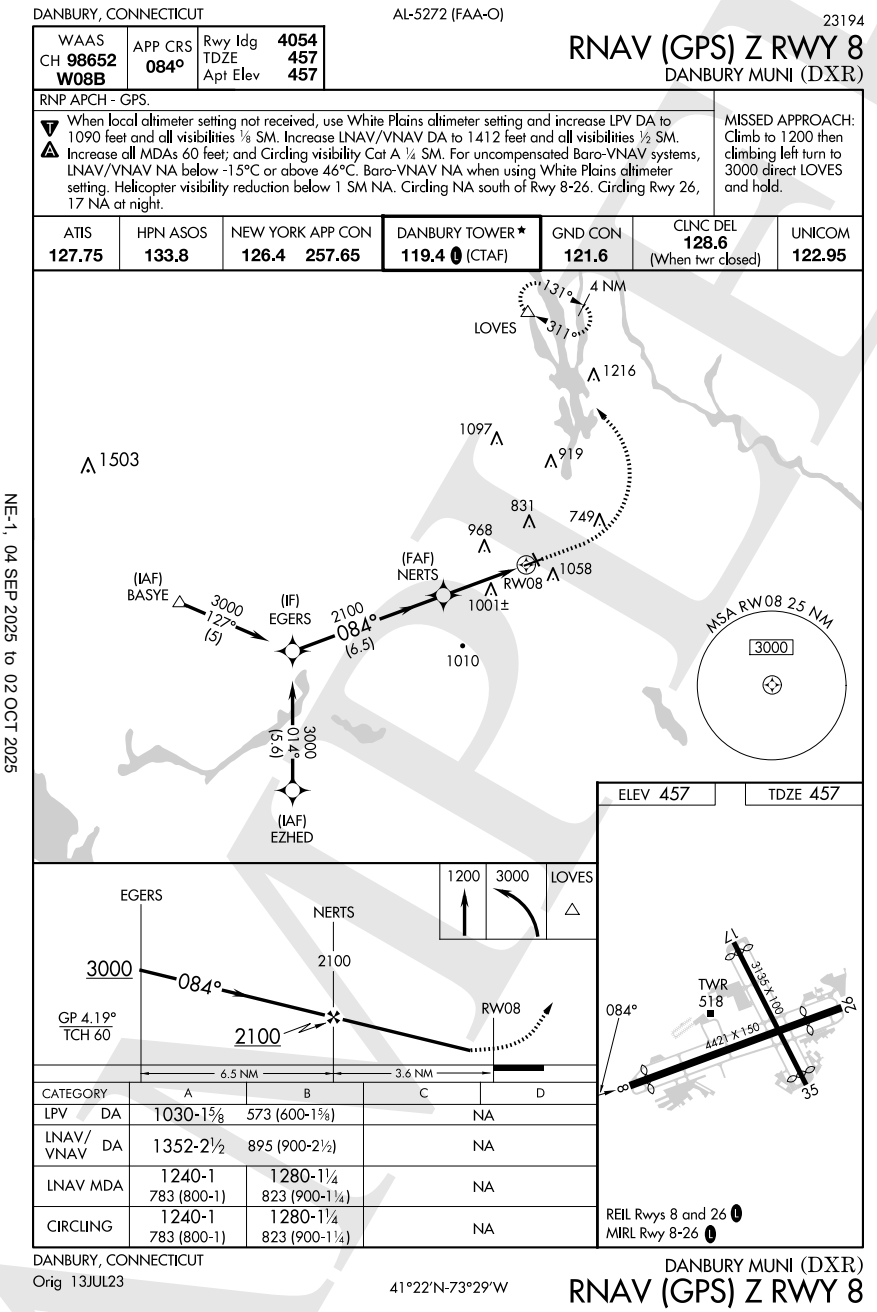


Figure 37: The RNAV (GPS) Z Runway 8 approach to the Danbury, Connecticut airport, the subject of Questions 28, 37, and 50.

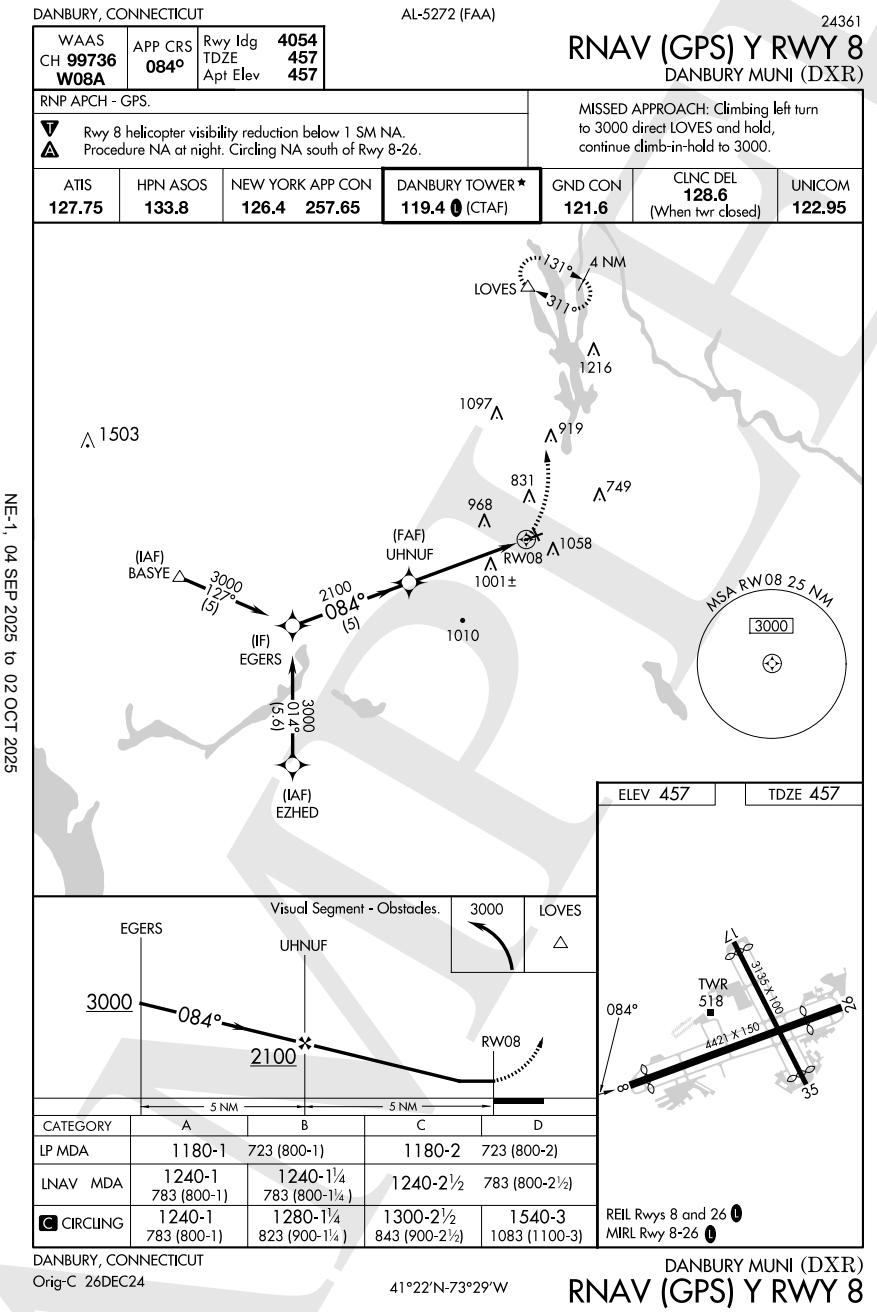


Figure 38: The RNAV (GPS) Y Runway 8 approach to the Danbury, Connecticut airport, the subject of Question 50.

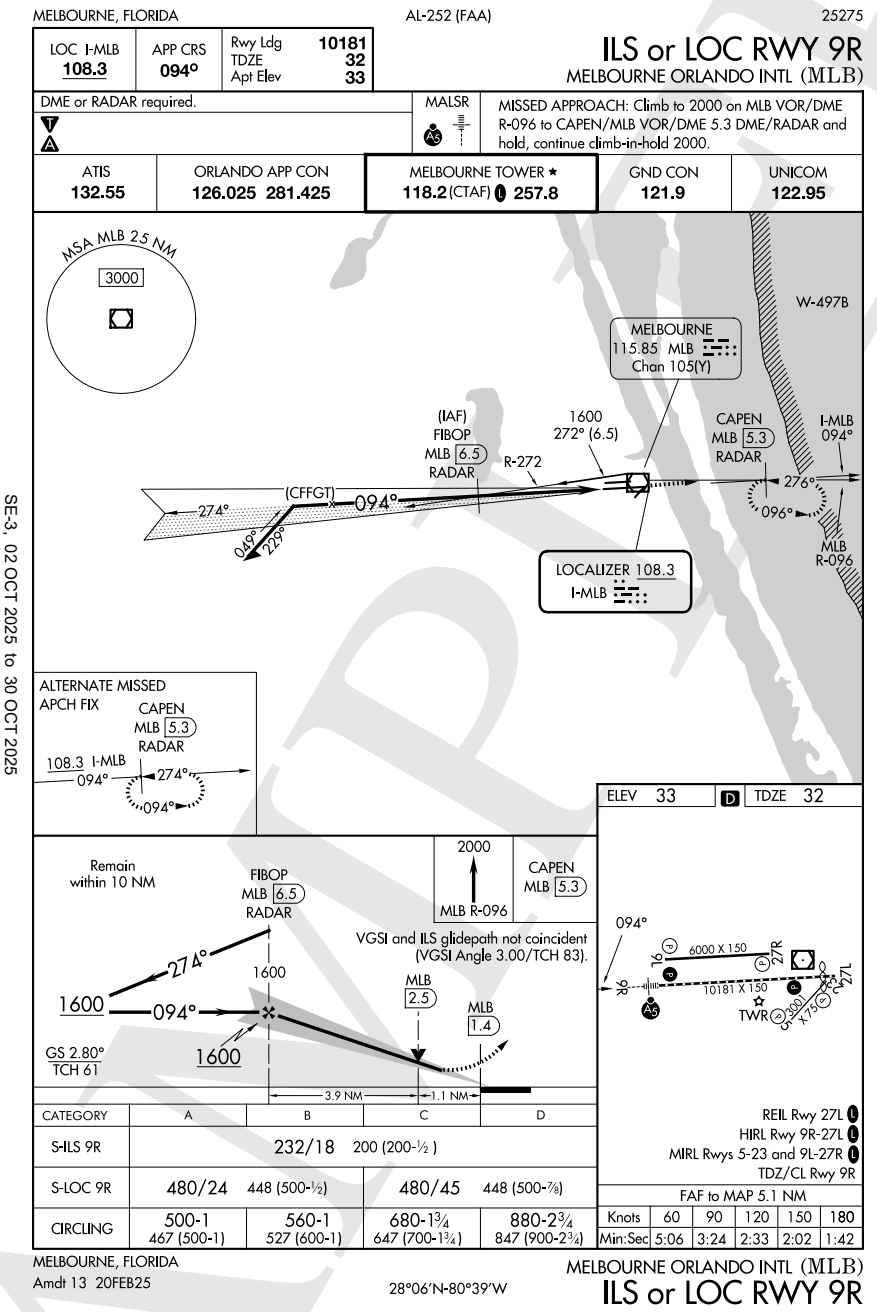


Figure 39: The ILS Runway 9 approach into Melbourne Orlando, Florida, the subject of Questions 24 and 51.

51 Describe how to fly the ILS Runway 9R approach at Melbourne, Florida, without airborne GPS equipment

You are planning the ILS Runway 9R approach at the Melbourne-Orlando International airport (Figure 39, on page 74).

Your aircraft is not equipped with GPS.

You have conventional VHF navigation receivers and a DME transceiver.

Assume that ATC will not radar vector you.

Answer the following questions.

1. Describe what kind of clearance you expect to receive.
2. At what altitude should you fly the segment from MLB VOR to FIBOP?
3. Is the segment from MLB to FIBOP a feeder route or part of the approach?
4. Can you legally fly the approach if you don't have DME?
5. Your procedure turn needs to be completed "within 10 NM." How do you determine your compliance with that requirement?
6. What is CFFGT and why is it depicted on the plan view?
7. How many VOR/LOC NAV receivers do you legally need to complete the approach?

SAMPLE

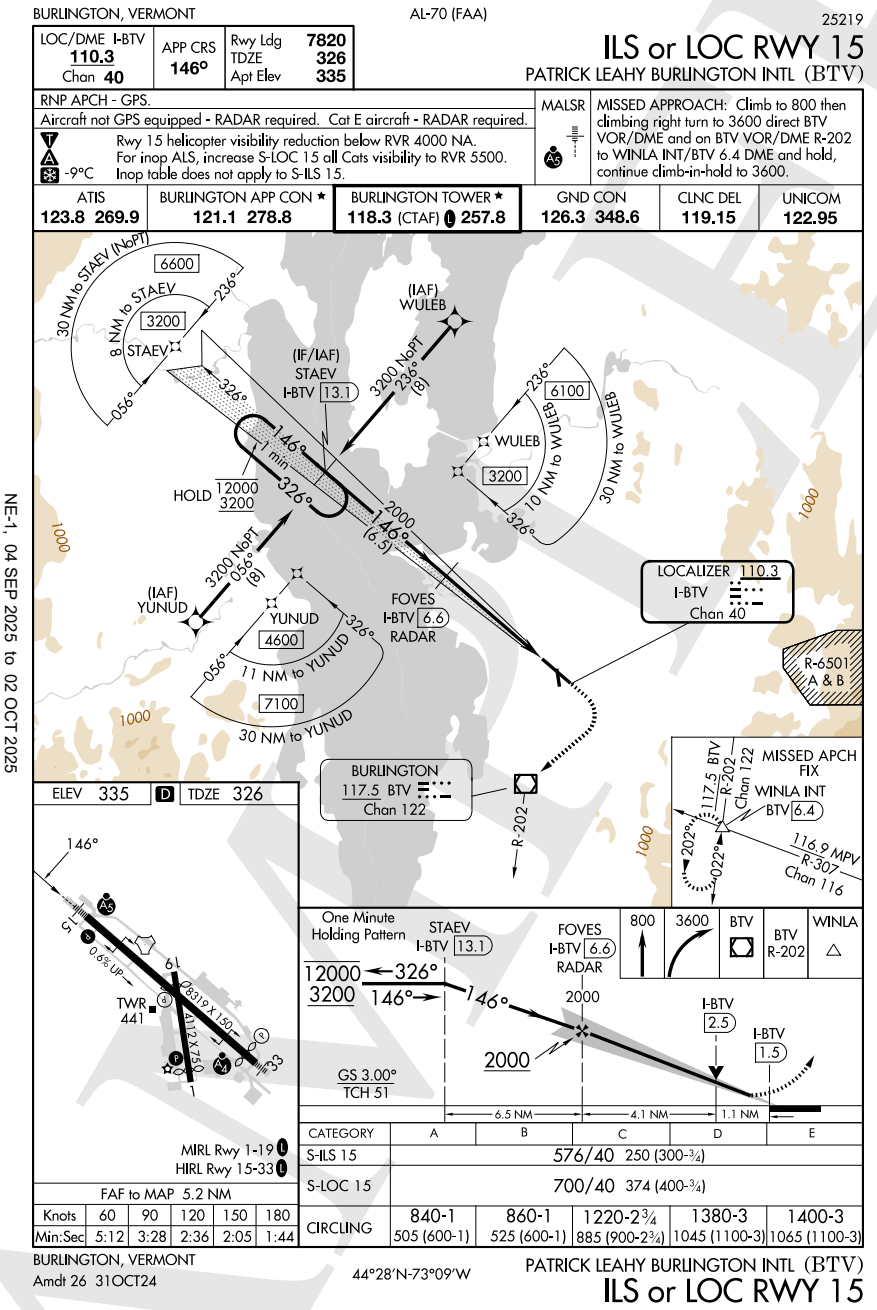


Figure 40: Chart of the ILS or LOC Runway 15 approach to the Burlington, Vermont airport.

52 How should you act when reaching the VDP as you fly the ILS Runway 15 approach into Burlington, Vermont?

Expanded Question. Consider the following scenario:

- you are flying the ILS approach at Burlington (Figure 40, on page 76);
- you have passed the FAF and are established on the glide slope, inbound toward Runway 15;
- you are approaching the fix denoted as I-BTV 2.5 DME.

What are you expected to do as you cross the fix?

SAMPLER

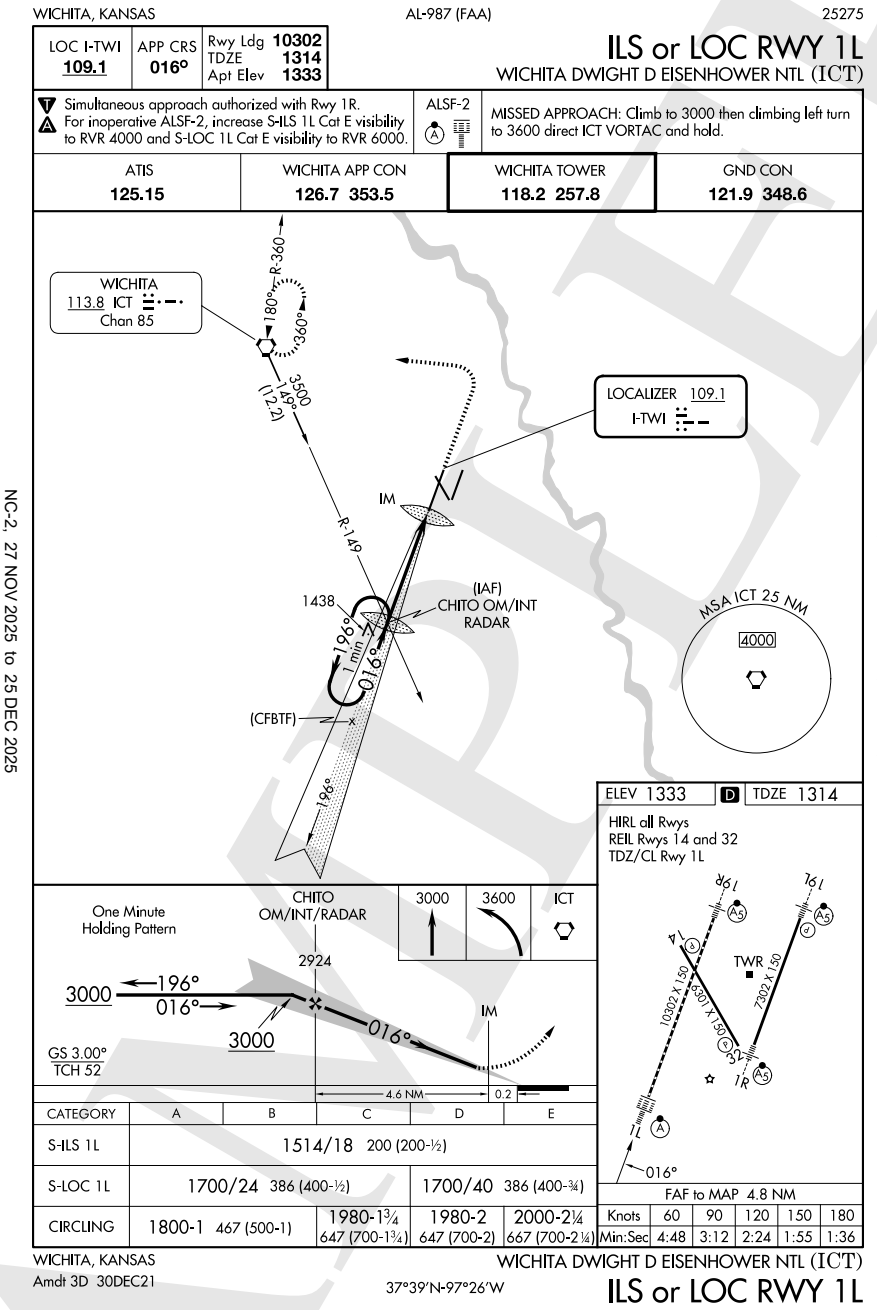


Figure 41: The ILS or LOC Runway 1L approach to the Wichita International airport, Kansas: one of the relatively few approaches featuring a locator outer marker NDB.

SAMPLE

Chapter 6 Air Traffic Control Procedures

53 During a climb on ATC-assigned altimeter setting 30.92, you cross 18,000 ft and re-adjust your altimeter. What does your altimeter show now?

Expanded Question.

In what airspace class are you flying now?

What type of altitude is displayed by your altimeter before and after the setting changes?

54 Can ATC spontaneously issue a contact approach?

(No expanded question.)

SAMPLER

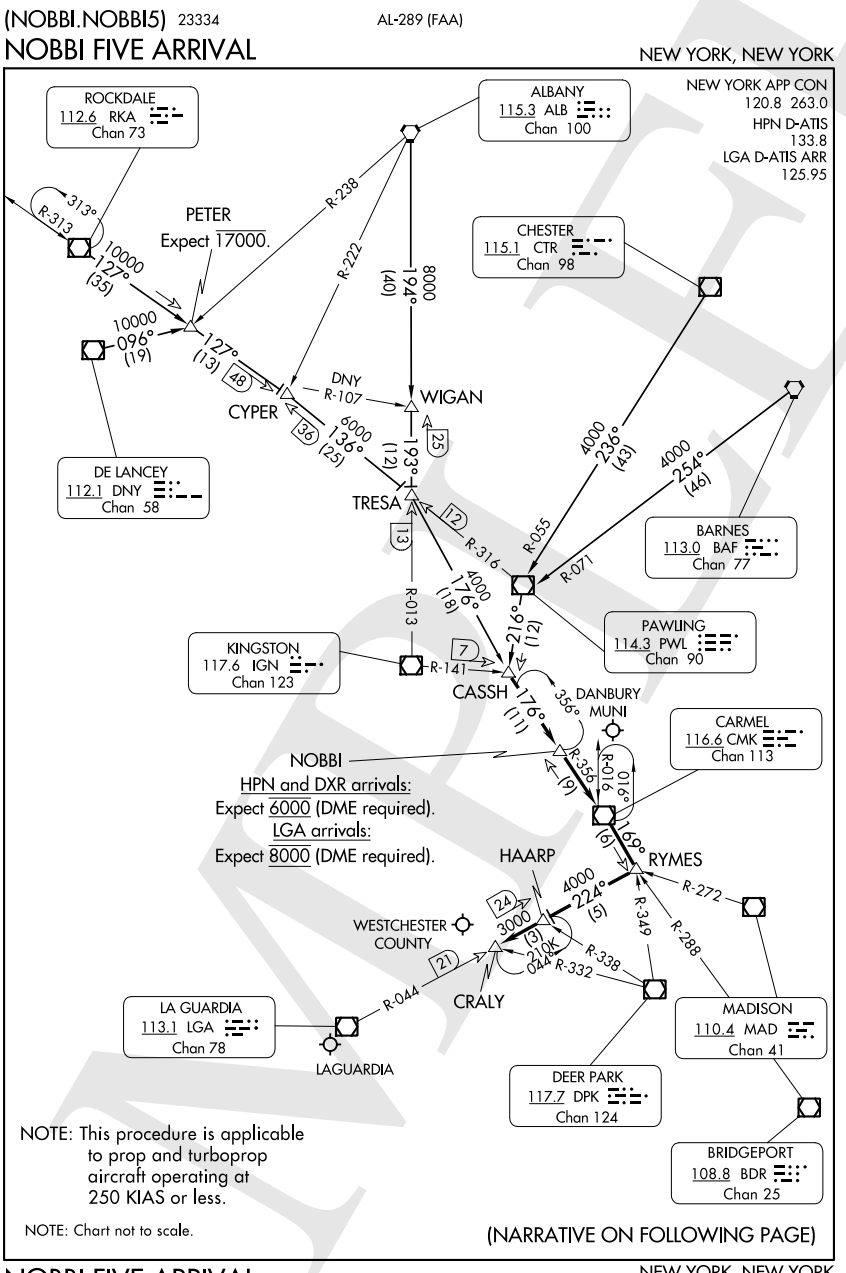


Figure 42: The NOBBI FIVE arrival, referenced in Question 55.

SAMPLE

55 Altitude deviation alert while flying the NOBBI Five Arrival toward White Plains, New York

Consider the following scenario:

- you are on an IFR flight from Chicago Executive, Illinois (KPWK) to Westchester County, New York (KHPN) and you are cleared to your destination via the Delancey VOR (DNY);
- as you approach DNY at 14,000 ft, ATC says "N123DS you are cleared to White Plains via the NOBBI FIVE arrival. Cross CYPER at or above 10,000 ft." See the NOBBI FIVE arrival in Figure 42 on page 80;
- after crossing CYPER, you set your autopilot target altitude to 6,000 ft per altitude noted on that STAR segment between CYPER and TRESA, and you begin your descent;
- after a minute, ATC asks you to verify you are still level at 10,000 ft.

What is going on?

SAMPLER

56 Change of mind while landing after a visual approach at the Schaumburg airport

Consider the following scenario:

- you are on an IFR flight from Cleveland Burke Lakefront (KBKL) to Schaumburg (06C), where you plan to have a hamburger at the famous Pilot Pete's;
- you designated Chicago Executive (KPWK) as your alternate;
- you also filed the return flight plan (06C - KBKL) via the LOT, CGT, FBC, and MFD VORs;
- Schaumburg has no instrument approaches, but Chicago Approach was kind enough to descend you to 3,000 ft, where you are now in clear air, under the ceiling, with Schaumburg in sight;
- ATC clears you for the visual approach to Runway 29 and instructs you to change frequency to the CTAF;
- while touching down at Schaumburg, you see that Pilot Pete's is closed! You apply full power, head South and reach cruise altitude over the LOT VOR in clear air;
- as you tune back to Chicago Approach/Departure and request to activate the flight plan back to Cleveland, you are advised of a possible pilot deviation.

Question: what went wrong?

SAMPLER

57 How do you answer “Are you able to maintain your terrain and obstruction clearance through the MVA?” in this scenario?

Consider the following scenario:

- you have filed a flight plan from Ionia County airport (Y70) to South Bend (KSBN) via the following route: VIO, V274, PMM, V55, GIJ, direct; with a filed altitude of 6,000 ft (Figure 43, on page 84);
- the AWOS at Y70 reports ceiling OVC015 and visibility 10SM—that’s marginal VFR, to be sure, but still legal VFR;
- your mobile phone carrier has poor coverage near Ionia and it’s hard for you to pick up your IFR clearance via phone call, so you elect to depart VFR;
- you take off from Runway 28;
- because you are VFR, you maintain 500 ft below the cloud layer: 1,000 ft AGL, 1,800 ft MSL;
- you now contact Great Lakes Approach while airborne, to pick up your IFR clearance;
- the Great Lakes Approach controller issues you a squawk code and identifies you on radar. They give you the Grand Rapids altimeter setting and confirm that you are at 1,800 ft MSL. Then they add: *Skyhawk N123AB, you’re below my MVA. Are you able to maintain your own terrain and obstruction clearance through 2,500 ft?*

Question. How do you answer, and why?

Note. Figure 43 is only provided for context; the figure alone is not sufficient to answer the question. To answer, the reader should consult all appropriate sources of flight planning information.

In the figure, please ignore that the segment of V274 between VIO and PMM is marked unusable.

58 What is the difference between a straight-in approach and a straight-in landing?

Expanded Question. Most approach plates offer “straight-in” lines of minimum. Pilots can request a “straight-in” approach clearance.

What is the relationship between the two?

How are the two related?

Can you perform a straight-in landing at an airport where all approaches are circling-only?

SAMPLE

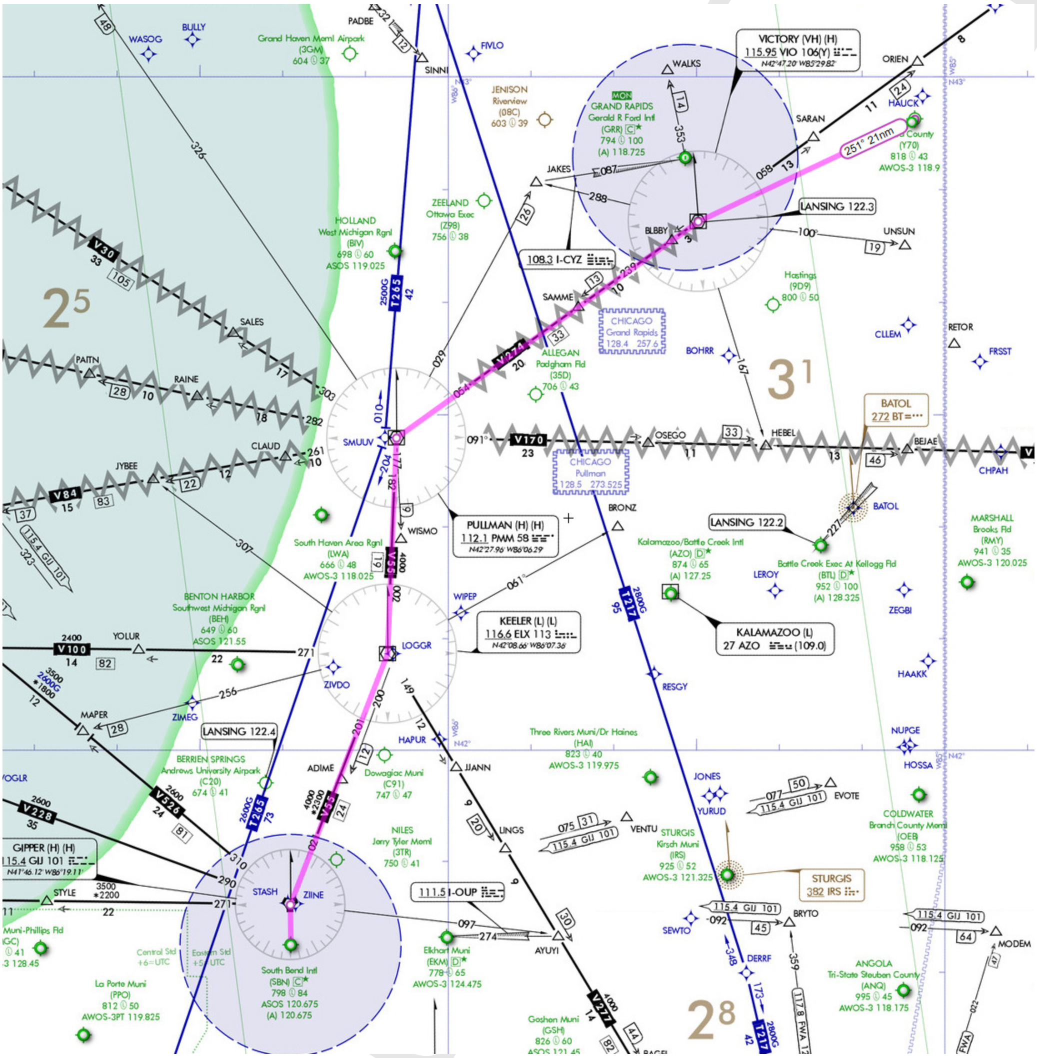


Figure 43: Route from Y70 to KSBN cleared in the scenario. Please ignore that the segment of V274 between VIO and PMM is marked unusable.

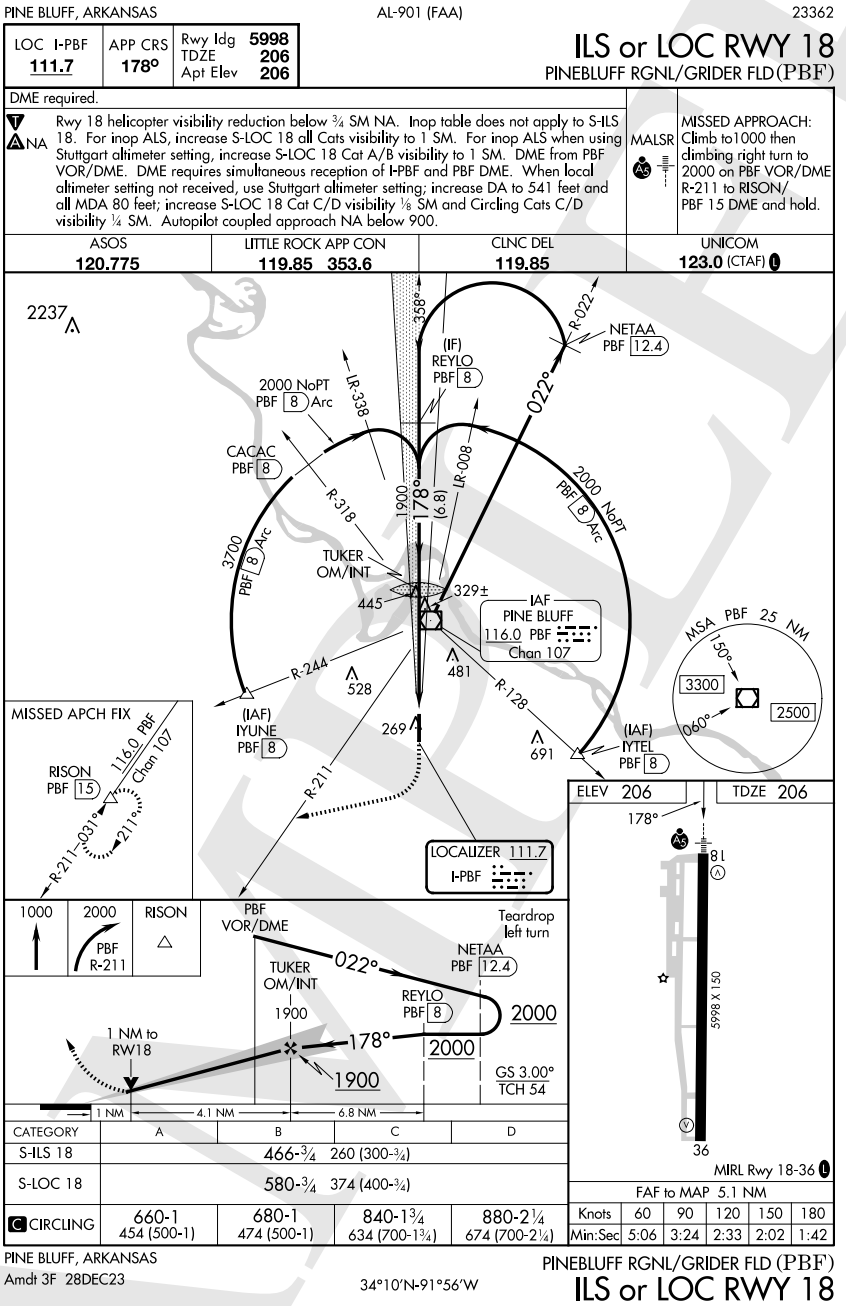


Figure 44: The ILS or LOC Runway 18 at Pine Bluff, Arkansas. The approach features a teardrop course reversal, which is relatively uncommon. It is referenced in Question 59.

59 When is the pilot supposed to fly a course reversal or procedure turn, if the approach chart depicts one?

Expanded Question. In the previous question, we dove into the distinction between straight-in approaches and landings. Let's now focus on straight-in approaches (i.e., approaches flown without performing a course reversal or a procedure turn) and the conditions in which they are authorized.

Many approach charts depict either a procedure turn barb, or a teardrop, or a hold-in-lieu-of-procedure-turn (HILPT). Examples of charts containing these features are:

- ILS or LOC Runway 1 at Rockford, Illinois (Figure 10, on page 27)
- ILS or LOC Runway 11 at the Portland, Maine, International Jetport (Figure 15, on page 38)
- ILS or LOC Runway 7 at Orlando Executive, Florida (Figure 27, on page 54)
- ILS or LOC Runway 4 at Easton/Newnam, Maryland (Figure 18, on page 44)
- ILS or LOC Runway 15 at the Coleman Young Municipal airport in Detroit, Michigan (Figure 20, on page 47)
- ILS or LOC Runway 15 at Burlington, Vermont (Figure 40, on page 76).
- ILS or LOC Runway 18 at Pine Bluff, Arkansas (Figure 44, on page 85)
- ILS or LOC Runway 1 at Presque Isle, Maine (Figure 28, on page 56)
- RNAV Runway 32 at Bethel, Maine (Figure 32, on page 63)
- RNAV Runway 17 at Augusta, Maine (Figure 12, on page 31)
- RNAV (GPS)-B at the Moosehead Aero Marine base in Greenville, Maine (Figure 13, on page 35)
- RNAV (GPS)-C at the seaplane base in Rangeley Lake, Maine (Figure 14, on page 36)
- RNAV (GPS)-B at Chatham, Massachusetts (Figure 17, on page 43)
- RNAV (GPS)-B at Ramona, California (Figure 48, on page 95)
- LDA-C at Randolph County, Virginia (Figure 23, on page 50)
- LDA/DME-B at Grant County, West Virginia (Figure 25, on page 52)
- LDA-C at Van Nuys, California (Figure 26, on page 53)
- LDA Z Runway 6 at Roanoke, Virginia (Figure 34, on page 66)
- VOR or GPS-A at Gunnison, Colorado (Figure 9, on page 26)
- VOR/DME-A at Grant County, West Virginia (Figure 24, on page 51)
- VOR/DME-A at Ramona, California (Figure 49, on page 96)
- NDB Runway 20 at Salisbury, North Carolina (Figure 21, on page 48).

Can you explain, for each of the charts listed above, in what circumstances should the pilot not fly the procedure turn or the HILPT that is depicted there?

SAMPLER

60 Compare and contrast your obligations when approaching two airports under IFR, one towered and one non-towered

Question. Compare and contrast the following two scenarios.

Scenario 1:

- a pilot flying under IFR is cleared direct to Ionia County airport, Michigan (Y70), descending to 3,000 ft;
- 10 NM out, the pilot reports the field in sight;
- ATC instructs as follows: "N123AB you are cleared for the visual approach Ionia County. Report cancellation of IFR in the air on this frequency or on the ground via telephone. Change to advisory frequency approved."

Scenario 2:

- a pilot flying under IFR is cleared direct to the Capital Region airport at Lansing, Michigan (KLAN), descending to 3,000 ft;
- 10 NM out, the pilot reports the field in sight;
- ATC instructs as follows: "N123AB you are cleared for the visual approach to Runway 28L, contact Lansing Tower."

Discuss what elements are common between the two scenarios.

Discuss how the interaction with ATC differs between the two scenarios, considering both the possibility of a landing and a missed approach.

SAMPLER

61 Compare two IFR departures from non-towered fields, with a clearance obtained on the ground via telephone

Question. Compare and contrast the two following scenarios.

Scenario 1:

- IFR departure from Ionia County airport (Y70).
- The AWOS reports 3 SM visibility and sky OVC007.
- You obtained an IFR clearance on the ground via telephone.

Scenario 2:

- IFR departure from Hiram Cure airport (C43).
- You obtained an IFR clearance on the ground via telephone.
- The field has no AWOS.
- You have mobile connectivity and access to ForeFlight, via which you obtain weather at the Ionia County (Y70) and at the Lansing (KLAN) airports, and see that they are reporting 3 SM visibility, and ceiling OVC007.

How do you safely navigate yourself from the surface to the minimum safe IFR altitude?

SAMPLER

Chapter 7 Anomalies and Emergencies

62 You have an engine failure while flying an ILS's final segment, on glide slope. Will you be able to glide safely to the runway?

Expanded Question. You are flying an ILS approach of your choice, for example the straight-in ILS approach to Runway 15 at Patrick Leahy in Burlington, Vermont, as in Figure 40 on page 76.

You are flying your preferred general aviation single-engine piston airplane.

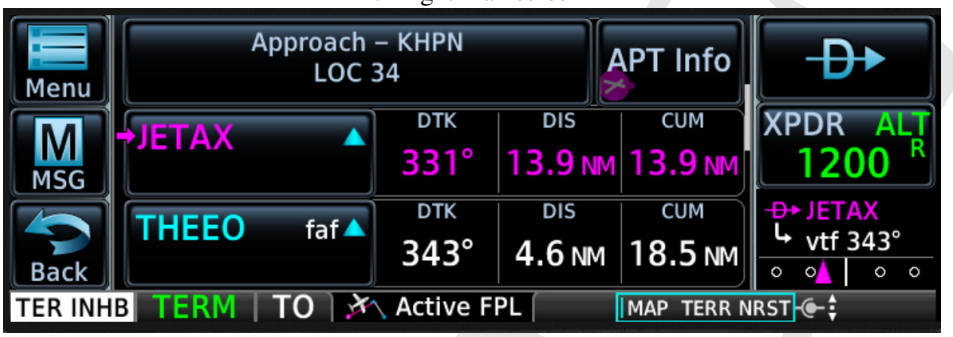
You are established on final, on glideslope, at the recommended final approach airspeed, and just descended below 2,000 ft—thus passing the PFAF, marked by the lightning bolt on the profile view.

At that point, you experience an engine failure and a complete loss of power.

Will you be able to glide to the runway safely?

SAMPLER

1. Flight Plan screen



2. Map screen

3. Terrain screen

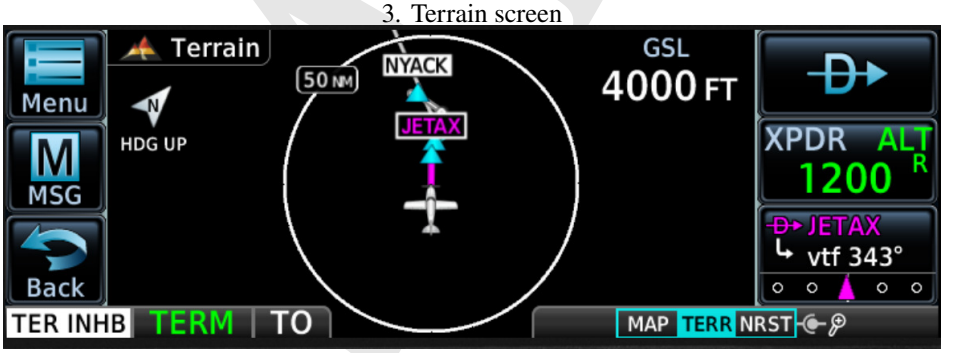


Figure 45: Screens of a Garmin GNX375 GPS per the scenario of Question 63, all of which include a CDI display (right bottom corner).

63 IFR flight continuation with a G3X display failure

Expanded Question. Consider the following scenario:

- you are at a remote field, planning to depart IFR on your way back to Westchester County, NY (KHPN), your home airport;
- your Piper Pilot 100i airplane is equipped with one Garmin G3X flight display (with integrated AHRS and ADC), one Garmin GNX 375 GPS unit and one Garmin G5 backup attitude indicator;
- while loading your baggage onto the back seat, you accidentally hit the G3X screen, damaging the lower half, so that the HSI display is no longer visible; the unit appears to be functioning normally otherwise;
- as you load your flight plan on the GNX 375 unit, you expect to be able to navigate your departure, your route, and multiple approaches at your destination (LOC and RNAV) using the GPS unit's moving map, flight plan and terrain screens, which all include a backup CDI display at their bottom right corner (Figure 45, on page 90);
- in the light of these considerations, you decide to depart IFR to your home base, where you'll arrange for repairs.

Is it legal for you to perform the flight?

Why, or why not?

SAMPLER

64 Lost communications after departing Orange County on your way to Ramona, California

Question. You want to fly your Cessna 172 airplane, equipped with steam-gauge instruments and a non-WAAS GPS, out of the John Wayne Orange County Airport in Santa Ana, California, to Ramona, California.

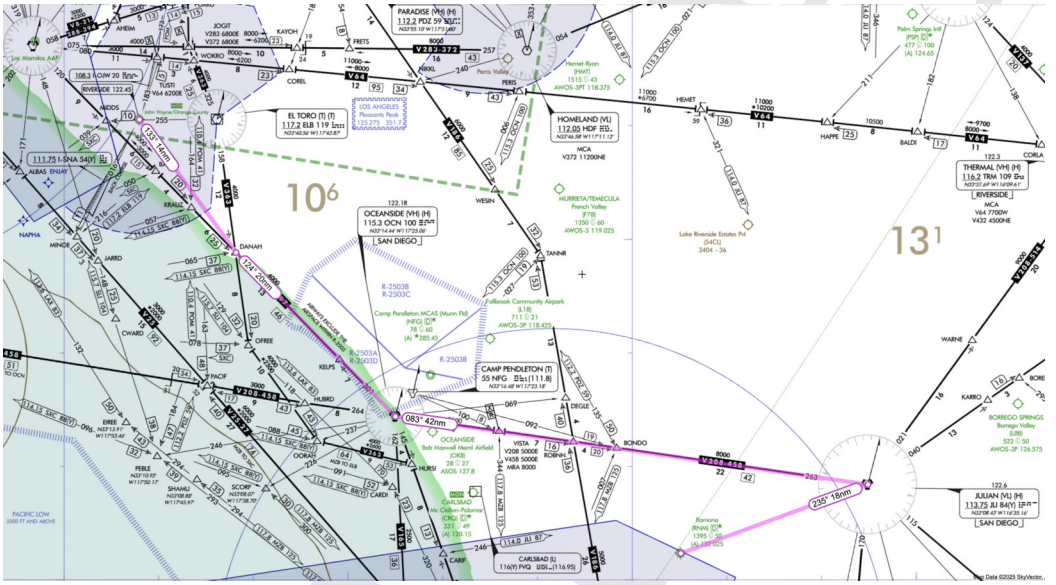


Figure 46: The route from Santa Ana to Ramona cleared in the scenario of Question 64.

You request a Tower-en-Route clearance to Ramona and receive the transmission from Clearance Delivery:

"N123AB you are cleared:

- to the Ramona Airport
- via: Radar Vectors, DANAH fix, Airway V23, OCN VOR, Airway V208, JLI VOR, then direct;
- on departure, make a climbing left turn to heading 175;
- maintain 5,000 ft, expect 7,000 ft 10 minutes after departure;
- departure frequency is 128.1;
- squawk 5256."

You take off from Runway 20R and climb on heading 175.

As you pass 800 ft during your climb, you enter solid IMC.

You hear Tower say "N123AB, contact Departure 128.1."

You attempt to contact Departure, but receive no answer. You switch go back to Tower, and no longer raise any answer.

Both communication radios seem dead.

Your navigation equipment (GPS, VOR NAV1 and VOR NAV2) seems to be working, but you aren't able to audibly identify any VOR station.

You did not carry a backup handheld radio, and your mobile phone's battery is dead.

What do you do?

Figures. For your convenience, the route is depicted in Figure 46 and all the approaches into the destination airport are in Figures 47, 48 and 49 (on the following pages).

Goal of this exercise. The answer offered here is academic: it is **only** intended to demonstrate how a candidate should apply the lost-communication reasoning prescribed by 14 CFR § 91.185 in a scenario presented by the DPE during an oral exam. The primary goal is practicing the application of § 91.185, not exercising real-life aeronautical decision making.

In real life, a different courses of action from the one prescribed by the letter of 14 CFR § 91.185 may be reasonable and arguably safer. Pilots must also not forget that the loss of communications in IMC is a valid reason to exercise their emergency powers, and diverge from Part 91 regulations as much as needed to meet the emergency.

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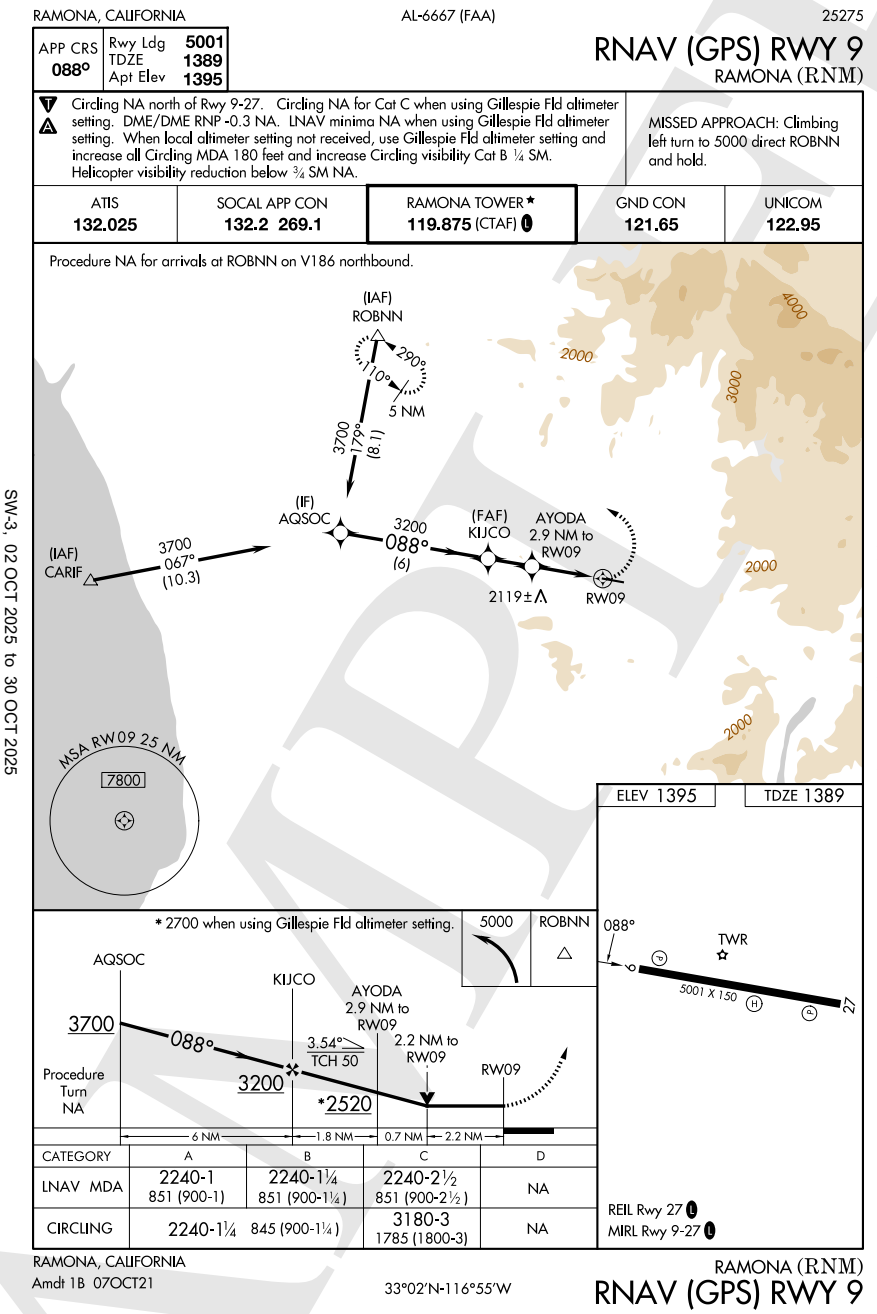

Figure 47: The RNAV (GPS) Runway 9 approach at Ramona, California.

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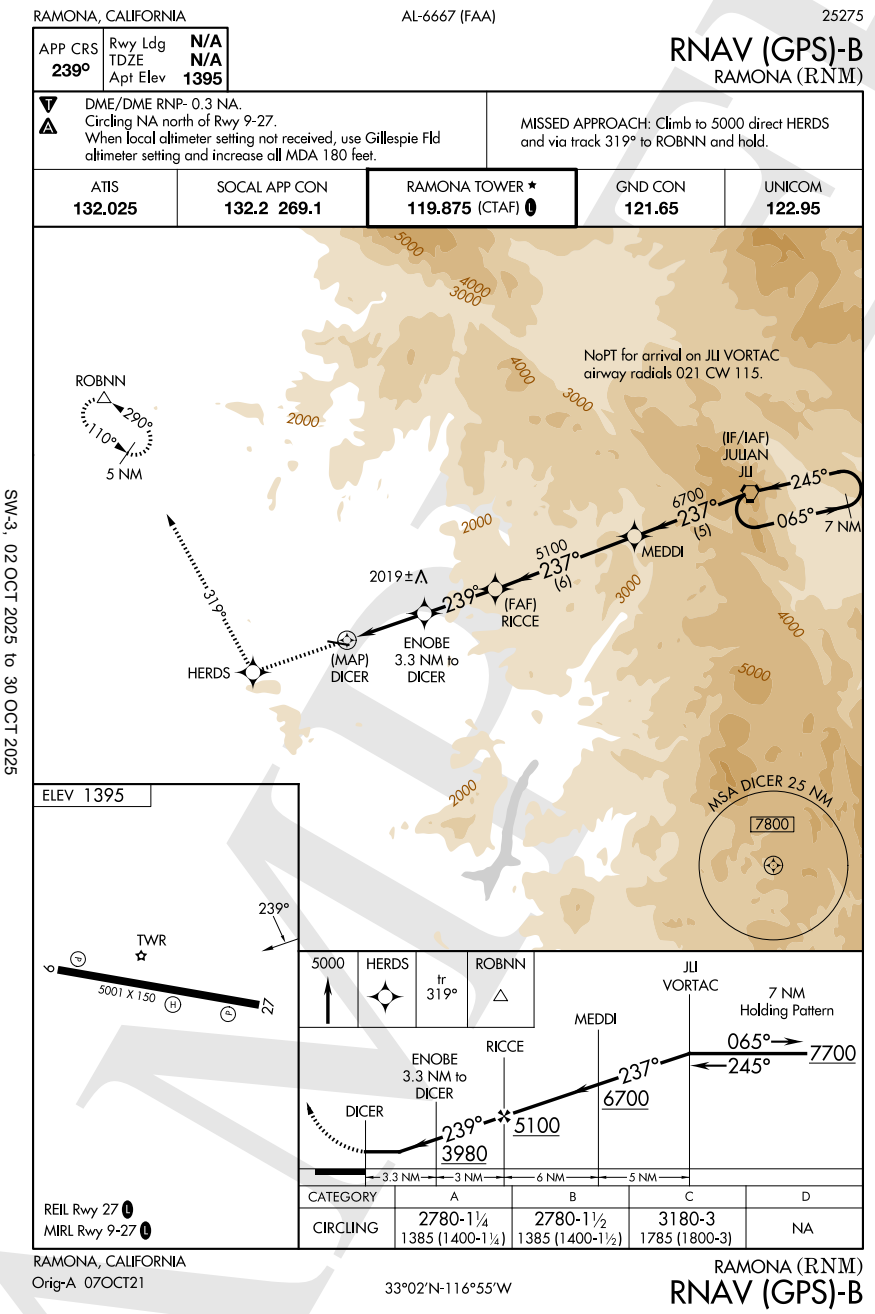

Figure 48: The RNAV (GPS)-B, circling-only approach at Ramona, California.

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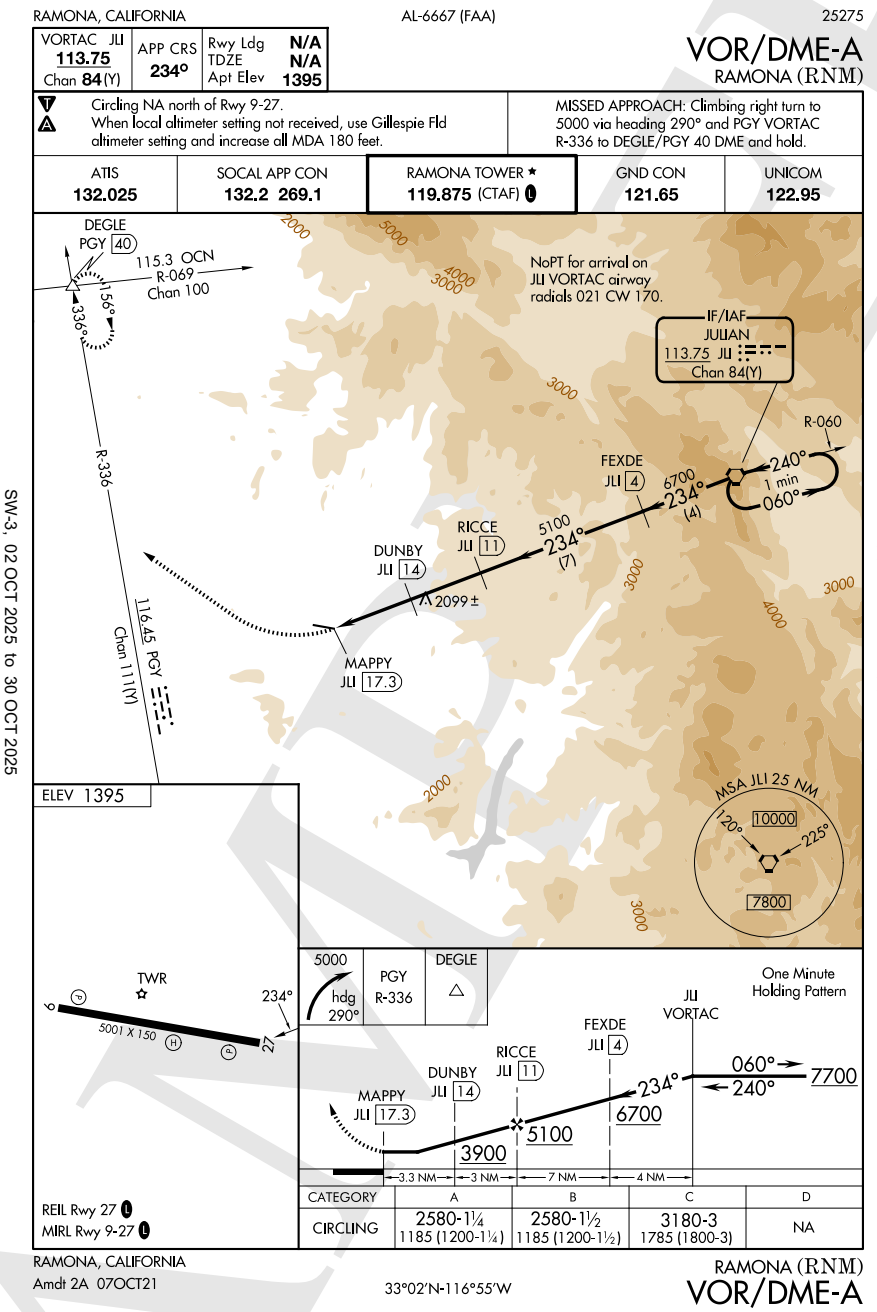

Figure 49: The VOR/DME-A, circling-only approach at Ramona, California.

SAMPLE

List of Figures

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