

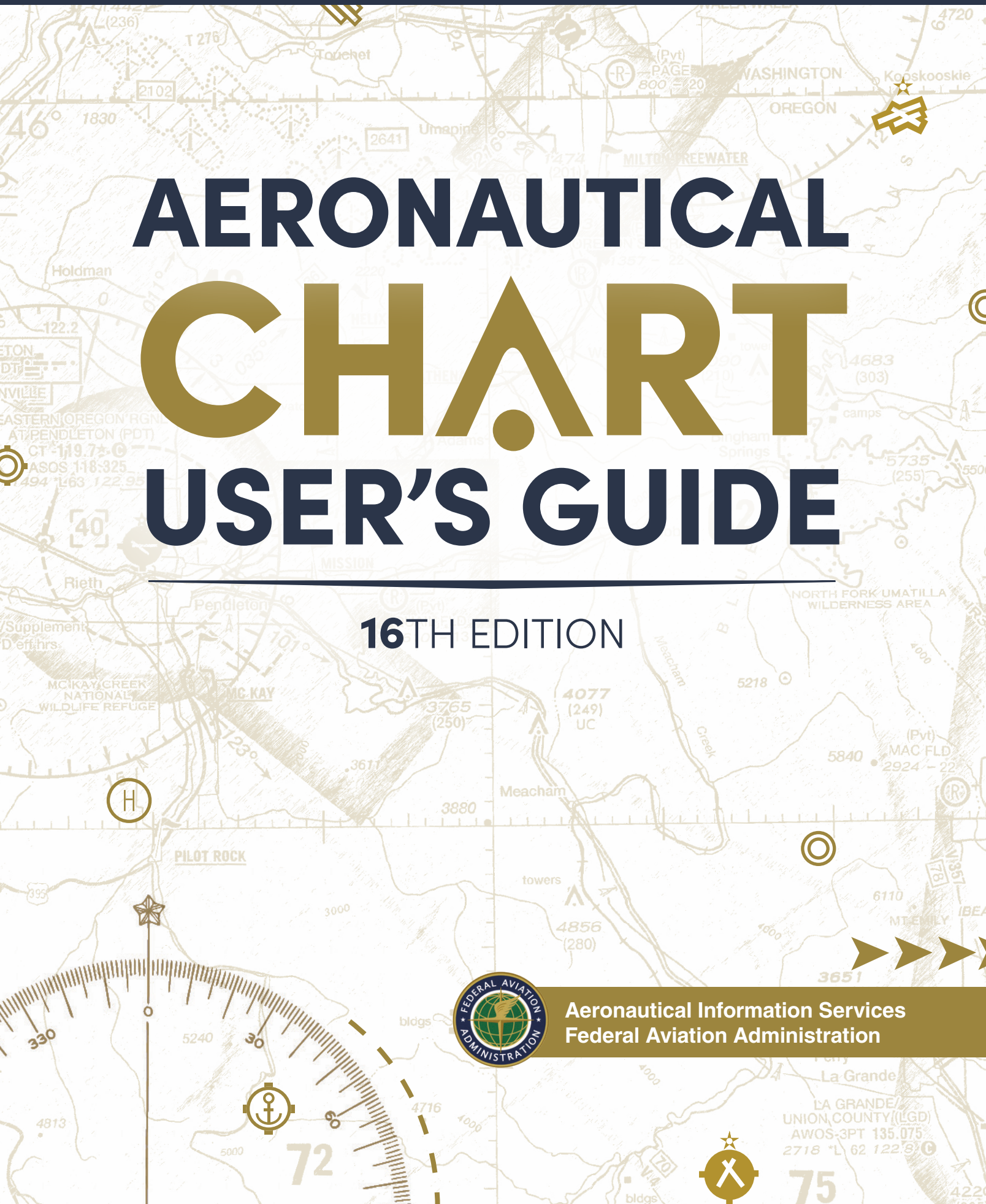


AERONAUTICAL CHART USER'S GUIDE

16TH EDITION



Aeronautical Information Services
Federal Aviation Administration





**Federal Aviation
Administration**

**Aeronautical Information Services
Aeronautical Chart
Users' Guide**

Effective as of 5 September 2024

TABLE OF CONTENTS

TABLE OF CONTENTS	3
INTRODUCTION	7
KEEP YOUR CHARTS CURRENT	7
EFFECTIVE DATE OF CHART USERS' GUIDE AND UPDATES.....	7
COLOR VARIATION	7
REPORTING CHART DISCREPANCIES.....	7
WHAT'S NEW?	9
VFR CHARTS.....	9
IFR ENROUTE CHARTS	9
TERMINAL PROCEDURE PUBLICATION (TPP)	9
EXPLANATION OF VFR TERMS AND SYMBOLS	11
WATER FEATURES (HYDROGRAPHY)	11
LAND FEATURES (TERRAIN) AND OBSTRUCTIONS.....	11
LAND FEATURES - MOUNTAIN PASSES.....	14
RADIO AIDS TO NAVIGATION	15
AIRPORTS	15
AIRSPACE.....	17
FOREIGN AREAS	20
TERMINAL AREA CHART (TAC) COVERAGE.....	21
INSET AND SPECIAL CHART COVERAGE.....	21
CHART TABULATIONS.....	21
VFR SECTIONAL AND TERMINAL AREA CHARTS	23
AIRPORTS	23
RADIO AIDS TO NAVIGATION	25
AIRSPACE INFORMATION.....	26
NAVIGATIONAL AND PROCEDURAL INFORMATION	32
CULTURE.....	34
HYDROGRAPHY	37
RELIEF	40
VFR FLYWAY PLANNING CHARTS	43
GENERAL INFORMATION.....	43
AIRPORTS	43
RADIO AIDS TO NAVIGATION	43
AIRSPACE INFORMATION.....	44
NAVIGATIONAL AND PROCEDURAL INFORMATION	47
CULTURE.....	48
BOUNDARIES.....	48
HYDROGRAPHY	48
RELIEF	48

TABLE OF CONTENTS

HELICOPTER ROUTE CHARTS	49
GENERAL INFORMATION.....	49
AIRPORTS	49
RADIO AIDS TO NAVIGATION	50
AIRSPACE INFORMATION.....	51
NAVIGATIONAL AND PROCEDURAL INFORMATION	54
CULTURE.....	55
CARIBBEAN VFR AERONAUTICAL CHARTS (CAC)	57
AIRSPACE	59
EXPLANATION OF IFR ENROUTE TERMS	61
AIRPORTS	61
RADIO AIDS TO NAVIGATION	63
AIRSPACE INFORMATION.....	65
INSTRUMENT AIRWAYS	66
FOREIGN AREAS	70
TERRAIN CONTOURS ON AREA CHARTS.....	71
AIRPORTS	73
IFR ENROUTE LOW / HIGH ALTITUDE SYMBOLS (U.S., PACIFIC AND ALASKA CHARTS)	73
RADIO AIDS TO NAVIGATION	74
AIRSPACE INFORMATION.....	79
NAVIGATIONAL AND PROCEDURAL INFORMATION	92
CULTURE.....	93
HYDROGRAPHY	93
TOPOGRAPHY	93
U.S. TERMINAL PROCEDURES PUBLICATION	95
EXPLANATION OF TPP TERMS AND SYMBOLS	95
INSTRUMENT APPROACH PROCEDURE CHART.....	96
PLANVIEW.....	102
MISSED APPROACH INFORMATION.....	113
PROFILE VIEW.....	114
LANDING MINIMUMS	118
AIRPORT SKETCH.....	120
AIRPORT DIAGRAMS	121
DEPARTURE PROCEDURES (DPs).....	123
STANDARD TERMINAL ARRIVAL (STARs) CHARTS.....	124
CHARTED VISUAL FLIGHT PROCEDURE (CVFP) CHARTS	124
U.S. TERMINAL PROCEDURES PUBLICATION SYMBOLS	125
GENERAL INFORMATION.....	125
PLANVIEW SYMBOLS.....	125

TABLE OF CONTENTS

PROFILE VIEW.....	127
STANDARD TERMINAL ARRIVAL (STAR) CHARTS.....	128
DEPARTURE PROCEDURE (DP) CHARTS.....	129
AIRPORT DIAGRAM/AIRPORT SKETCH	130
APPROACH LIGHTING SYSTEM.....	131
REFERENCES	133
ABBREVIATIONS.....	134

SAMPLE

INTRODUCTION

This Chart Users' Guide is an introduction to the Federal Aviation Administration's (FAA) aeronautical charts and publications. It is useful to new pilots as a learning aid, and to experienced pilots as a quick reference guide.

The FAA is the source for all data and information utilized in the publishing of aeronautical charts through authorized publishers for each stage of Visual Flight Rules (VFR) and Instrument Flight Rules (IFR) air navigation including training, planning, departures, enroute (for low and high altitudes), approaches, and taxiing charts. Digital charts are available online at:

- [VFR Charts](#)
- [IFR Charts](#)
- [Terminal Procedures Publication](#)
- [Chart Supplements](#)

Paper copies of the charts are available through an FAA Approved Print Provider. A complete list of current providers is available at http://www.faa.gov/air_traffic/flight_info/aeronav/print_providers/.

The FAA Aeronautical Information Manual (AIM) Pilot/Controller Glossary defines all terms and abbreviations used throughout this publication. Unless otherwise indicated, miles are nautical miles (NM), altitudes indicate feet above Mean Sea Level (MSL), and times used are Coordinated Universal Time (UTC).

Notices to Air Missions (NOTAMs) alert pilots to time-critical aeronautical information that is either temporary or not sufficiently known in advance to permit publication on aeronautical charts or in other operational publications. Pilots can access NOTAM information via Flight Service Stations (FSS) or online via NOTAM Search at <https://notams.aim.faa.gov/notamSearch/>.

In addition to NOTAMs, the Safety Alerts/Charting Notices page of the Aeronautical Information Services website is also useful to pilots.

KEEP YOUR CHARTS CURRENT

Aeronautical information changes rapidly, so it is important that pilots check the effective dates on each aeronautical chart and publication. To avoid danger, it is important to always use current editions and discard obsolete charts and publications.

To confirm that a chart or publication is current, refer to the next scheduled edition date printed on the cover. Pilots should also check NOTAMs for important updates between chart and publication cycles that are essential for safe flight.

EFFECTIVE DATE OF CHART USERS' GUIDE AND UPDATES

All information in this guide is effective as of **5 September 2024**. All graphics used in this guide are for educational purposes. Chart symbology may not be to scale. Please do not use them for flight navigation.

The Chart Users' Guide is published in accordance with the 56-day aeronautical chart product schedule.

COLOR VARIATION

Although the digital files are compiled in accordance with charting specifications, the final product may vary slightly in appearance due to differences in printing techniques/processes and/or digital display techniques.

REPORTING CHART DISCREPANCIES

Your experience as a pilot is valuable and your feedback is important. We make every effort to display accurate information on all FAA charts and publications, so we appreciate your input. Please notify us concerning any requests for changes, or potential discrepancies you see while using our charts and related products.

*FAA, Aeronautical Information Services
1305 East-West Highway
SSMC4, Room 3424
Silver Spring, MD 20910-3281*

*Telephone Toll-Free 1-800-638-8972
Aeronautical Inquires: https://www.faa.gov/air_traffic/flight_info/aeronav/aero_data/Aeronautical_Inquiries/*

WHAT'S NEW?

Update as of 5 September 2024

The following charting items have been added to the Chart Users' Guide since the Guide was last published on 11 July 2024:

VFR CHARTS

No Significant Changes Applied

IFR ENROUTE CHARTS

No Significant Changes Applied

TERMINAL PROCEDURE PUBLICATION (TPP)

Starting with the October 31, 2024 publication cycle, Aeronautical Information Services (AIS) will begin charting stopways, overruns and blast pads on airport diagrams using a chevron symbol to indicate that these surfaces are not available for taxiing. Currently, Stopways/Overruns and Blast Pads are charted in gray and are labeled with dimensions when specifically requested by an airport. When these surfaces are depicted using the new chevron symbol they will no longer be labeled, nor will dimensions be provided. See the airport diagram on page 122 for examples of the new symbol.

EXPLANATION OF VFR TERMS AND SYMBOLS

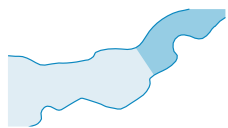
This chapter covers the Sectional Aeronautical Chart (Sectional). These charts include the most current data at a scale of (1:500,000), which is large enough to be read easily by pilots flying by sight under Visual Flight Rules. Sectionals are named after a major city within its area of coverage.

The chart legend includes aeronautical symbols and information about drainage, terrain, the contour of the land, and elevation. You can learn to identify aeronautical, topographical, and obstruction symbols (such as radio and television towers) by using the legend.

A brief description next to a small black square indicates the exact location for many of the landmarks easily recognized from the air, such as stadiums, pumping stations, refineries, etc. A small black open circle with descriptive type indicates oil, gas or mineral wells. A small black circle with descriptive type indicates water, oil or gas tanks. The scale for some items may be increased to make them easier to read on the chart.

Aeronautical Information Services' charts are prepared in accordance with specifications of the Interagency Air Committee (IAC) and are approved by representatives of the Federal Aviation Administration (FAA) and the Department of Defense (DoD).

WATER FEATURES (HYDROGRAPHY)



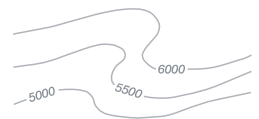
Water features are depicted using two tones of blue, and are considered either "Open Water" or "Inland Water." "Open Water," a lighter blue tone, shows the shoreline limitations of all coastal water features at the average (mean) high water levels for oceans and seas. Light blue also represents the connecting waters like bays, gulfs, sounds and large estuaries.

Exceptionally large lakes like the Great Lakes, Great Salt Lake, and Lake Okeechobee, etc., are considered Open Water features. The Open Water tone extends inland as far as necessary to adjoin the darker blue "Inland Water" tones. All other bodies of water are marked as "Inland Water" in the darker blue tone.

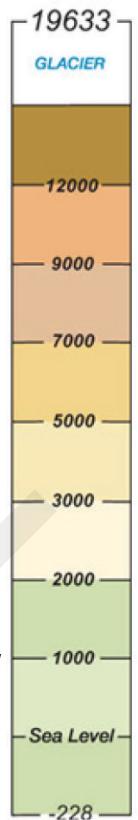
LAND FEATURES (TERRAIN) AND OBSTRUCTIONS

The elevation and configuration of the Earth's surface is important to pilots. Our Aeronautical Information Specialists are devoted to showing the contour of the earth and any obstructions clearly and accurately on our charts. We use five different techniques: contour lines, shaded relief, color tints, obstruction symbols, and Maximum Elevation Figures (MEF).

1. Contour lines join points of equal elevation. On Sectionals, basic contours are spaced at 500' intervals. Intermediate contours are typically at 250' intervals in moderately level or gently rolling areas. Auxiliary contours at 50', 100', 125', or 150' intervals occasionally show smaller relief features in areas of relatively low relief. The pattern of these lines and their spacing gives the pilot a visual concept of the terrain. Widely spaced contours represent gentle slopes, while closely spaced contours represent steep slopes.
2. Shaded relief shows how terrain may appear from the air. Shadows are shown as if light is coming from the northwest, because studies have shown that our visual perception has been conditioned to this view.



- Different color tints show bands of elevation relative to sea level. These colors range from light green for the lower elevations, to dark brown for the higher elevations.
- Obstruction symbols show man made vertical features that could affect safe navigation. The FAA maintains a database of obstacles. Aeronautical Specialists evaluate each obstacle based on charting specifications before adding it to a visual chart. When a Specialist is not able to verify the position or elevation of an obstacle, it is marked UC, meaning it is "under construction" or being reported, but has not been verified.



The FAA uses a Digital Obstacle File (DOF) to collect and disseminate data. Because land and obstructions frequently change, the source data on obstructions and terrain is occasionally incomplete or not accurate enough for use in aeronautical publications. For example, when the FAA receives notification about an obstruction, and there is insufficient detail to determine its position and elevation, the FAA Flight Edit Program conducts an investigation.

The Flight Edit crew visually verifies the cultural, topographic, and obstacle data. Charts are generally flight-checked every four years. This review includes checking for any obstruction that has been recently built, altered, or dismantled without proper notification.

- Obstacles less than 1000' AGL.** Sectional Charts and Terminal Area (TACs) typically show man-made obstacles extending more than 200' Above Ground Level (AGL), or more than 299' AGL in yellow city tint. Obstacles may be lit or unlit. Features considered to be hazardous obstacles to low-level flight are; smokestacks, tanks, factories, lookout towers, antennas, and wind turbines, etc.
- Obstacles 1000' AGL or greater.**
- Wind Turbines.**

5540 (650)
GARFIELD STACK
 Man-made features used by FAA Air Traffic Control as checkpoints use a graphic symbol shown in black with the required elevation data in blue. The elevation of the top of the obstacle above Mean Sea Level (MSL) and the height of the structure (AGL) is also indicated (when known or can be reliably determined by a Specialist). The AGL height is in parentheses below the MSL elevation. In extremely congested areas, the FAA typically omits the AGL values to avoid confusion.

4977 (1432)
Group Obstacle Symbol
 Whenever possible, the FAA depicts specific obstacles on charts. However, in high-density areas like city complexes, only the highest obstacle is represented on the chart using the group obstacle symbol to maximize legibility.

5000 (1500) UC
 If space is available the AGL height of the obstruction is shown in parentheses.
 Obstacles under construction are indicated by placing the letters UC adjacent to the obstacle type.

Guy wires may extend outward from obstacles.
Wind turbines with high intensity lighting.
 Obstacles with high-intensity strobe lighting systems may operate part-time or by proximity activation and are shown as follows:

2894 UC
 Concentrated obstructions of wind turbine farms shall be portrayed by an overlying hatched area and dotted outline to represent the approximate parameters of the farm. One or more single turbine symbols will populate the farm. A boxed elevation figure representing the MSL elevation of the highest wind turbine within the area shall be placed inside the farm or, if space is limited, just outside. Pilots are reminded that wind turbine blades and/or blade tips are not lighted. Wind turbine obstruction lights are located on top of the nacelle (generator) at the hub of wind turbines, which in some cases can be 200-300' below the rotating blade tips.

- The Maximum Elevation Figure (MEF) represents the highest elevation within a quadrant, including terrain and other vertical obstacles (towers, trees, etc.). A quadrant on Sectionals is the area bounded by ticked lines dividing each 30 minutes of latitude and each 30 minutes of longitude. MEF figures are rounded up to the nearest 100' value and the last two digits of the number are not shown.

125

In this example the MEF represents 12,500'.

MEFs over land and open water areas are used in areas containing man-made obstacles such as oil rigs.

In the determination of MEFs, the FAA uses extreme care to calculate the values based on the existing elevation data shown on source material. Aeronautical Information Specialists use the following procedure to calculate MEFs:

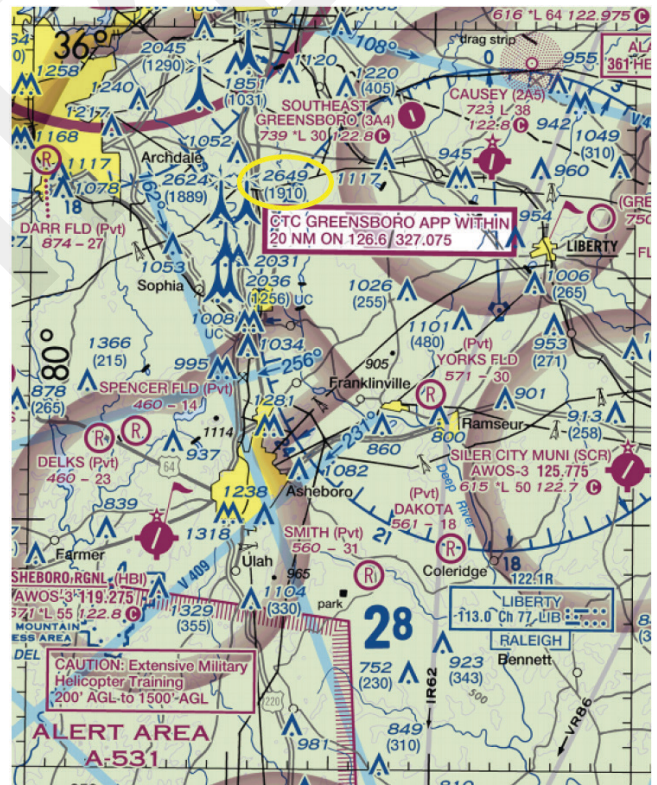
MEF - Man-made Obstacle

When a man-made obstacle is more than 200' above the highest terrain within the quadrant:

- Determine the elevation of the top of the obstacle above MSL.
- Add the possible vertical error of the source material to the above figure (100' or 1/2 contour interval when interval on source exceeds 200'. U.S. Geological Survey Quadrangle Maps with contour intervals as small as 10' are normally used).
- Round the resultant figure up to the next higher hundred-foot level.

Example:

Elevation of obstacle top (MSL)	2649
Possible obstacle error	+100
equals	2749
Raise to the following 100' level	2800
Maximum Elevation Figure (MEF)	28



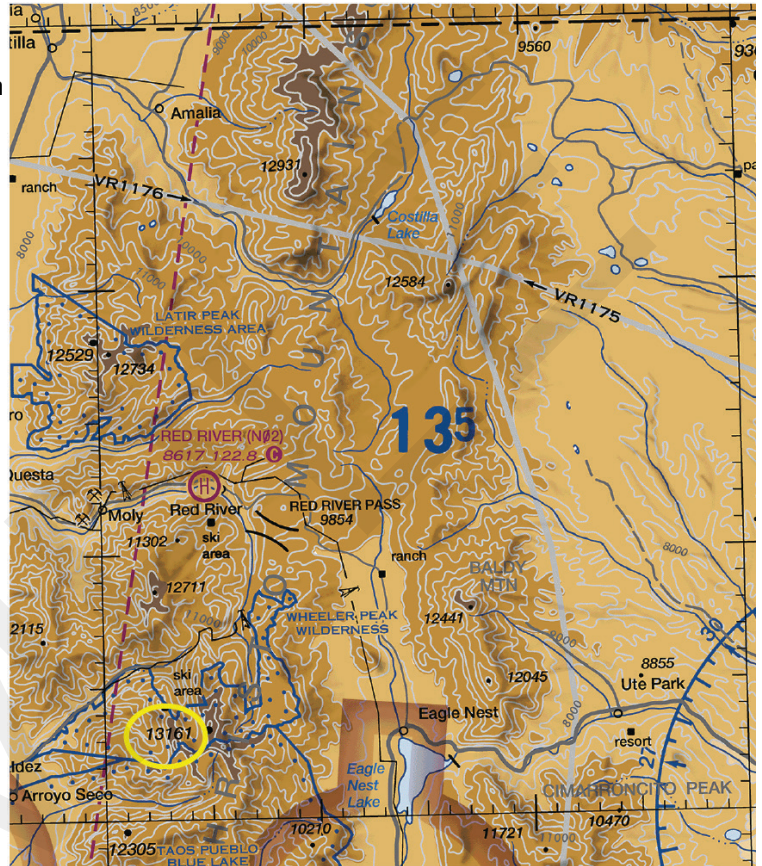
MEF - Natural Terrain Feature or Natural Vertical Obstacle

When a natural terrain feature or natural vertical obstacle (e.g. a tree) is the highest feature within the quadrangle:

1. Determine the elevation of the feature.
2. Add the possible vertical error of the source to the above figure (100' or 1/2 the contour interval when interval on source exceeds 200').
3. Add a 200' allowance for uncharted natural or manmade obstacles. Chart specifications don't require the portrayal of obstacles below minimum height.
4. Round the figure up to the next higher hundred-foot level.


Example:

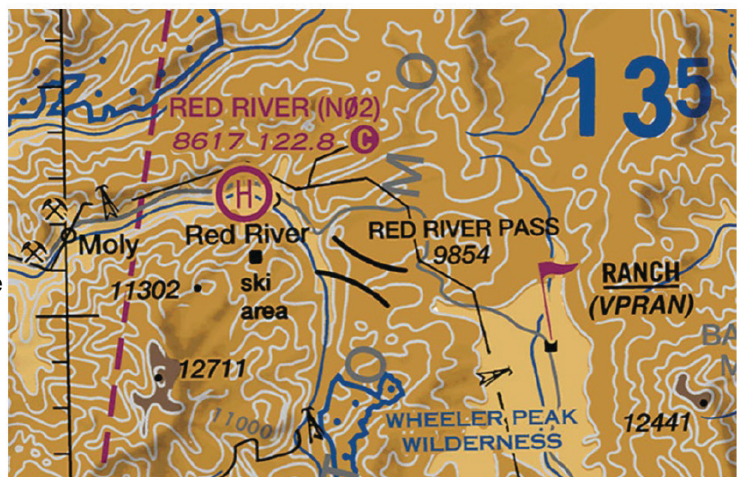
Elevation of obstacle top (MSL)	13161
Possible vertical error	+100
Obstacle Allowance	+200
equals	13461
Raise to the following 100' level	13500
Maximum Elevation Figure (MEF)	135



Pilots should be aware that while the MEF is based on the best information available to the Specialist, the figures are not verified by field surveys. Also, users should consult the Aeronautical Information Services website to ensure that your chart has the latest MEF data available.

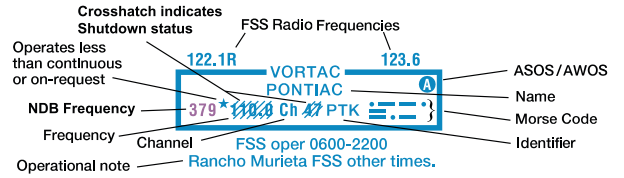
LAND FEATURES - MOUNTAIN PASSES

The Mountain Pass symbol  does not indicate a recommended route or direction of flight, and pass elevation does not indicate a recommended clearance altitude. Hazardous flight conditions may exist within and near mountain passes. For high-traffic mountain passes, VFR Checkpoints may be provided to increase situational awareness by indicating key landmarks inside confined terrain. A collocated VFR Waypoint and Checkpoint may be provided to assist with identifying natural entry points for commonly flown mountain passes.



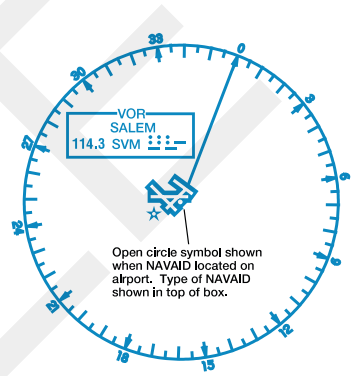
RADIO AIDS TO NAVIGATION

On VFR Charts, information about radio aids to navigation (NAVAID) are boxed, as illustrated. Duplication of data is avoided. When two or more radio aids in a general area have the same name with different frequencies, Tactical Air Navigation (TACAN) channel numbers, or identification letters, and no misinterpretation can result, the name of the radio aid may be indicated only once within the identification box. Very High Frequency/Ultra High Frequency (VHF/UHF) NAVAID names and identification boxes (shown in blue) take precedence. Only those items that differ (e.g., frequency, Morse Code) are repeated in the box in the appropriate color. The choice of separate or combined boxes is made in each case on the basis of economy of space and clear identification of the radio aids.



A NAVAID that is physically located on an airport may not always be represented as a typical NAVAID symbol. A small open circle indicates the NAVAID location when collocated with an airport icon.

The type of NAVAID will be identified by: "VOR," (VHF Omni-Directional Range) "VORTAC" (VOR Tactical Aircraft Control), "VOR-DME," (VOR-Distance Measuring Equipment) or "DME" (Distance Measuring Equipment) positioned on and breaking the top line of the NAVAID box.



DMEs are shown without the compass rose.

AIRPORTS

Airports in the following categories are charted as indicated (additional symbols are shown later in this Section).
Public use airports:

- Hard-surfaced runways greater than 8069' or some multiple runways less than 8069'
- Hard-surfaced runways 1500' to 8069'
- Other than hard-surfaced runways
- Seaplane bases

Military airports:

- Other than hard-surfaced runways

Foreign airports:



Hard-surfaced runways are depicted the same as public-use airports.

U.S. military airports are identified by abbreviations such as AAF (Army Air Field), AFB (Air Force Base), MCAS (Marine Corps Air Station), NAS (Naval Air Station), NAV (Naval Air Facility), and NAAS (Naval Auxiliary Air Station).

Fuel Available:

- Fuel availability indicated by use of tick marks around the basic airport symbol. Consult Chart Supplement for details and availability.

Aeronautical Chart User's Guide **16th Edition**

*The definitive FAA reference source for understanding
and interpretation of all aviation charts*



**Aeronautical Information Services
Federal Aviation Administration**

The Federal Aviation Administration (FAA) publishes aeronautical charts for each stage of visual (VFR) and instrument (IFR) flight, including training, planning, departure, enroute (low and high altitude), approach, and taxiing. This guide is an excellent reference for novice and experienced pilots alike, as well as for international pilots becoming familiar with U.S. charts. This 16th Edition of the *Aeronautical Chart User's Guide* is the definitive learning aid, reference document, and introduction to the wealth of information provided on FAA charts and in chart navigation publications.

Produced by the FAA's Aeronautical Information Services branch, it explains all the symbology for FAA sectional, terminal area, flyway planning, helicopter route, enroute low- and high-altitude, and oceanic route charts, as well as standard terminal arrival routes, standard instrument departures, and instrument approach procedures. Also includes chart legends, airspace classification tables, and is illustrated throughout with full-color graphics.

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