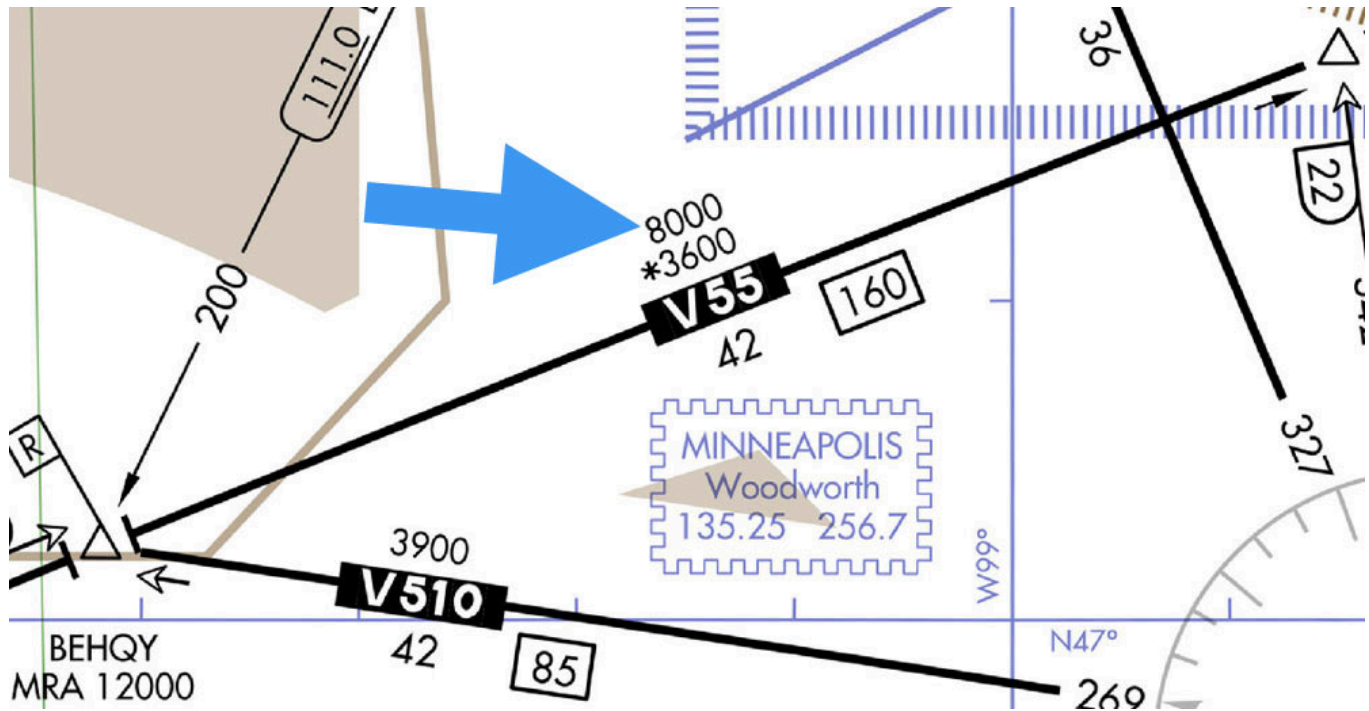


IFR Altitudes

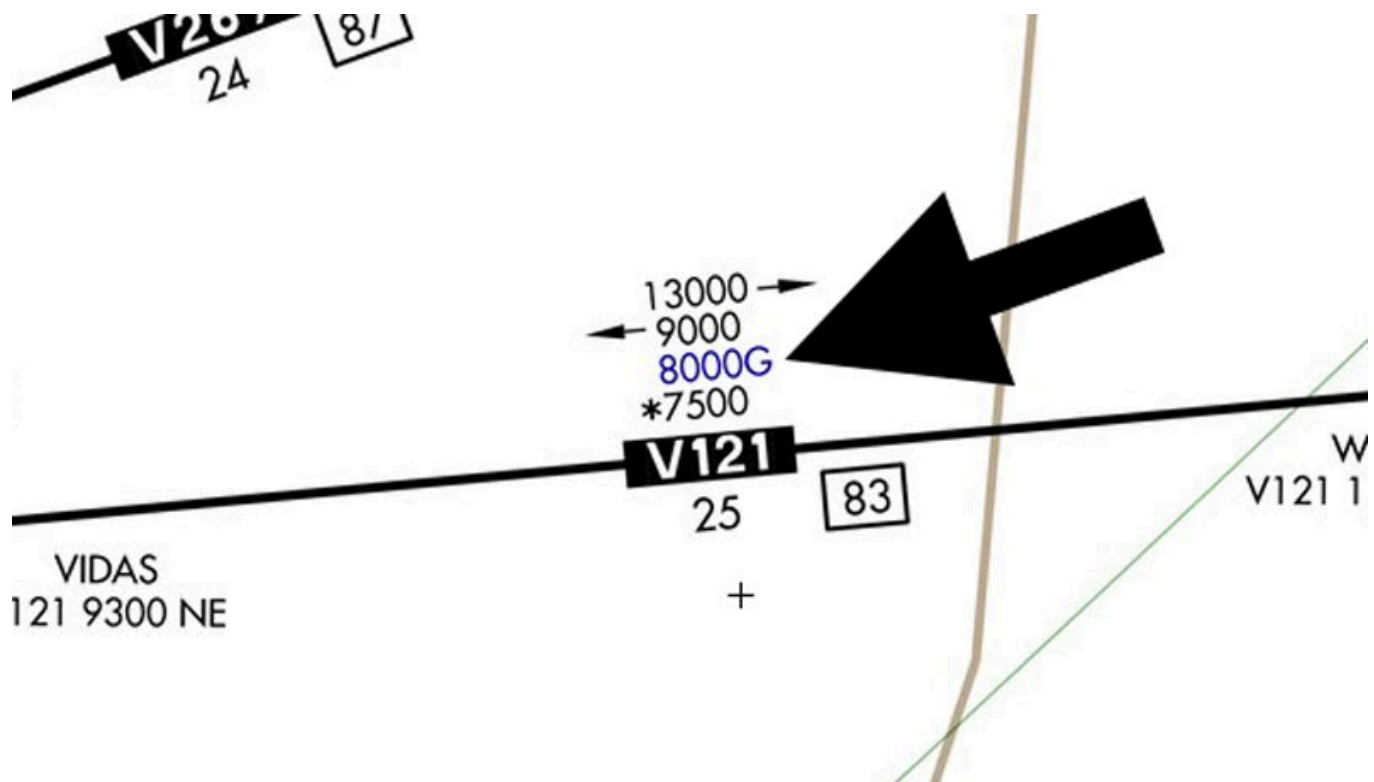
Minimum En Route Altitude (MEA)

The MEA is the lowest published altitude between radio fixes that ensures navigation signal coverage and meets obstacle clearance requirements between those fixes.



RNAV Minimum En Route Altitude

RNAV MEA's are depicted on some IFR en route low altitude charts, allowing both RNAV and non-RNAV pilots to use the same chart for instrument navigation.

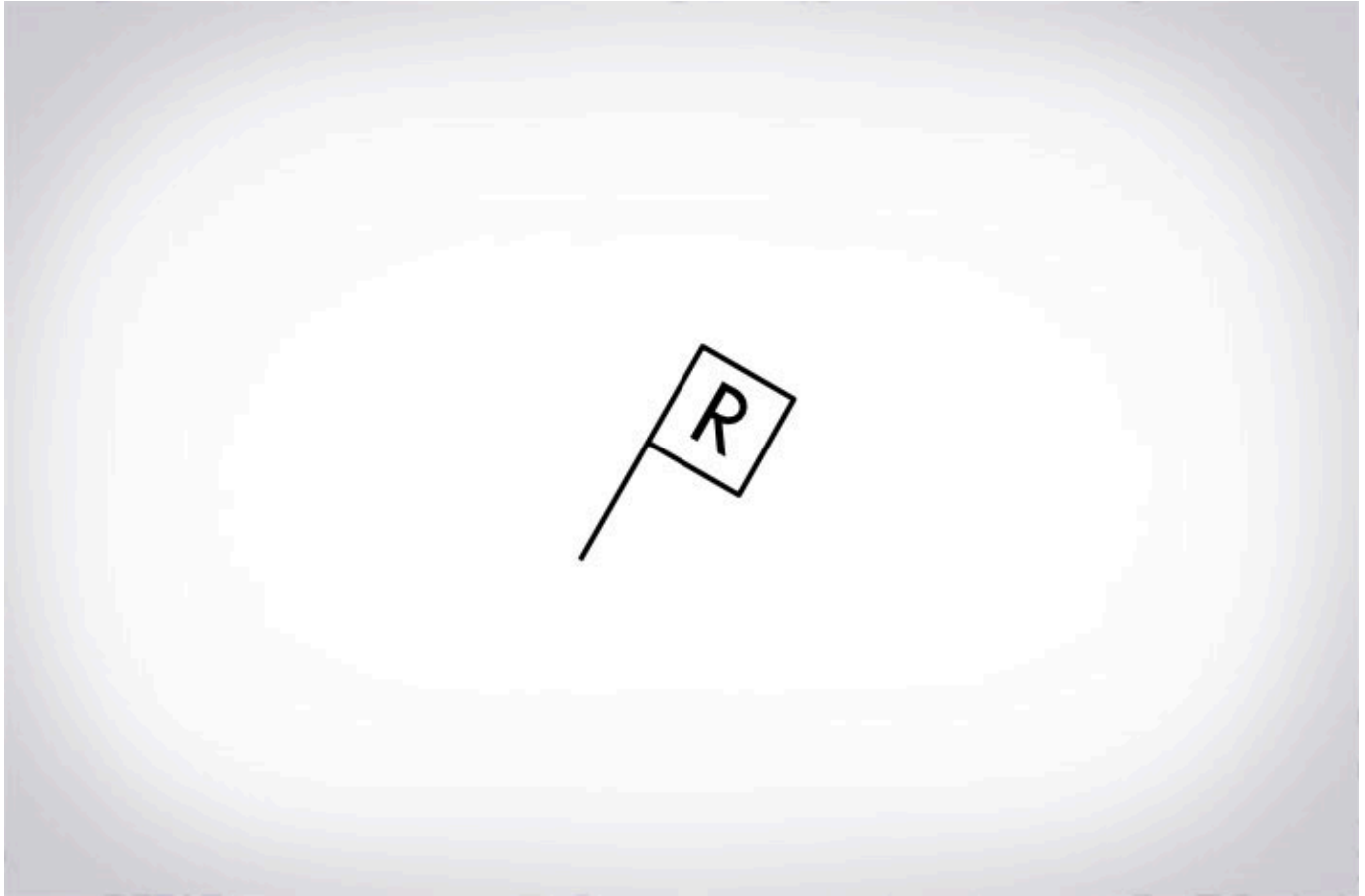


Minimum Reception Altitude

MRA's are determined by FAA flight inspection traversing an entire route of flight to establish the minimum altitude the navigation signal can be received for the route and for off-course NAVAID facilities that determine a fix.

When the MRA at the fix is higher than the MEA, an MRA is established for the fix and is the

lowest altitude at which an intersection can be determined.



Maximum Authorized Altitude (MAA)

An MAA is a published altitude representing the maximum usable altitude or flight level for an airspace structure or route segment.

It is the highest altitude on a Federal Airway, jet route RNAV low or high route, or other direct

route for which an MEA is designated. Adequate reception of navigation signals is assured.



Minimum Obstruction Clearance Altitude (MOCA)

The MOCA is the lowest published altitude in effect between fixes on VOR airways, off airway routes, or route segments that meets obstacle clearance requirements for the entire route segment.

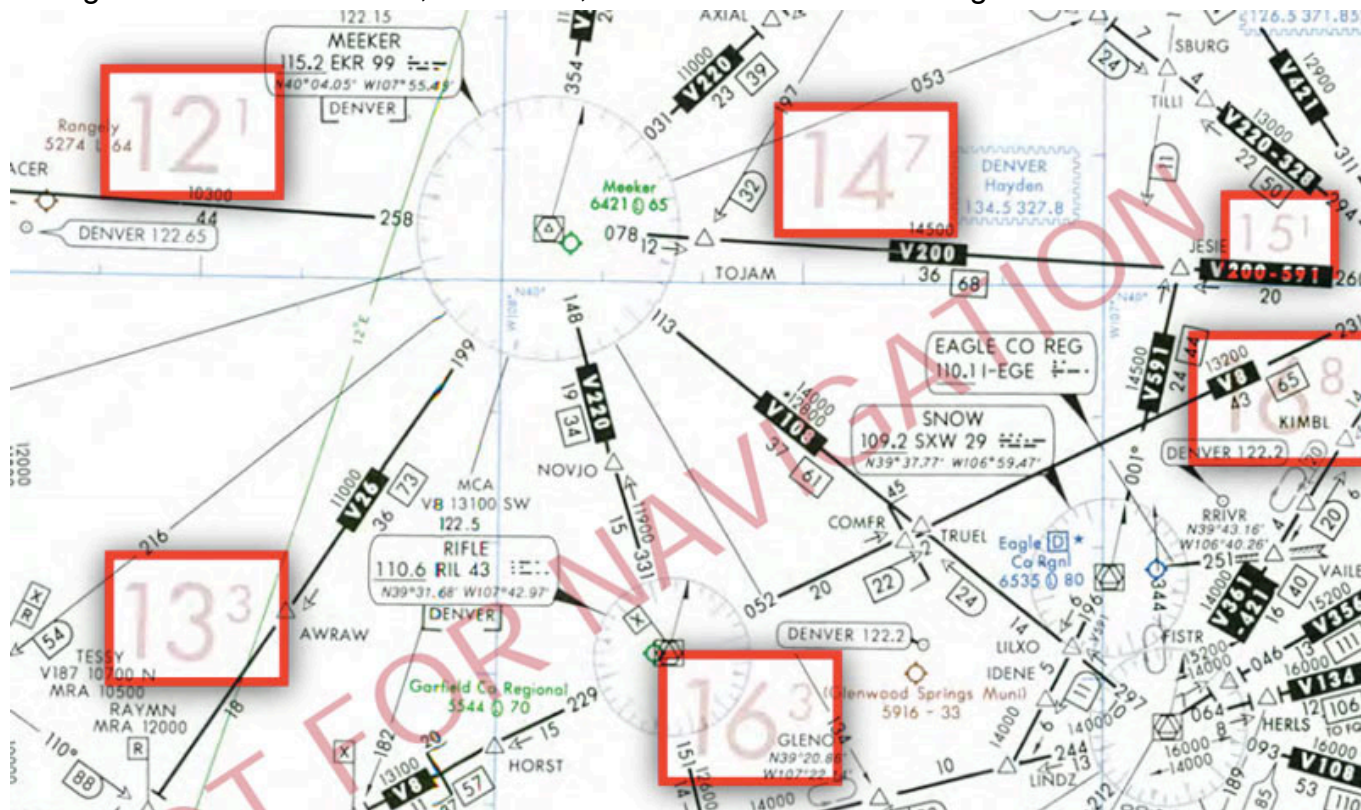
This altitude also assures acceptable navigational signal coverage only within 22 NM of a VOR.



Off-Route Obstruction Clearance Altitude (OROCA)

An off-route obstruction clearance altitude (OROCA) is an off-route altitude that provides obstruction clearance with a 1,000-foot buffer in non-mountainous terrain areas, and a 2,000-foot buffer in designated mountainous areas. This altitude doesn't guarantee signal coverage

from ground-based NAVAIDs, ATC radar, or communications coverage.



Minimum Turning Altitude (MTA)

Minimum turning altitude (MTA) is a charted altitude providing vertical and lateral obstruction clearance based on turn criteria over certain fixes, NAVAIDs, waypoints, and on charted route segments. Check out Page 2-38 in [Chapter 2](#) of the FAA's Instrument Procedures Handbook for more.

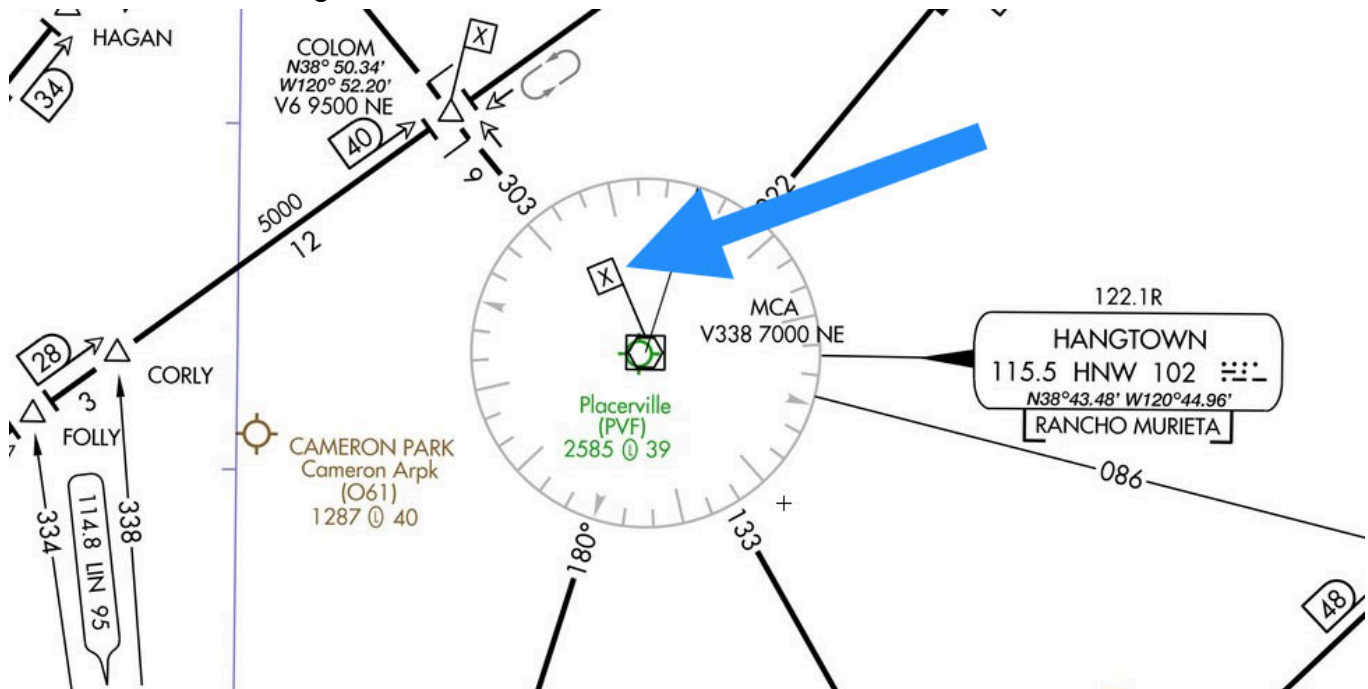
The turn area provides obstacle clearance for both turn anticipation (turning prior to the fix) and flyover protection (turning after crossing the fix). This does not violate the requirement to fly the centerline of the airway. Many factors enter into the construction and application of the turning area to provide pilots with adequate obstacle clearance protection. These may include aircraft

speed, the amount of turn versus NAVAID distance, flight track, curve radii, MEAs, and MTA.



Minimum Crossing Altitude (MCA)

An MCA is the lowest altitude at certain fixes at which the aircraft must cross when proceeding in the direction of a higher minimum en route IFR altitude.



Minimum IFR Altitude

The MIA for operations is prescribed in 14 CFR Part 91. These MIAs are published on aeronautical charts and prescribed in 14 CFR Part 95 for airways and routes, and in 14 CFR Part 97 for standard instrument approach procedures.



Minimum Vectoring Altitude

MVAs are established for use by ATC when radar ATC is exercised. The MVA provides 1,000 feet of clearance above the highest obstacle in non-mountainous areas and 2,000 feet above the highest obstacle in designated mountainous areas.

Because of the ability to isolate specific obstacles, some MVAs may be lower than MEAs, MOCAs, or other minimum altitudes depicted on charts for a given location. While being radar

vectored, IFR altitude assignments by ATC are normally at or above the MVA.

