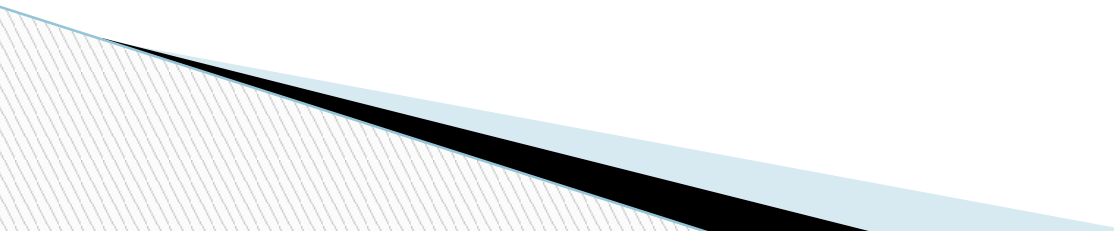


# Marker beacon

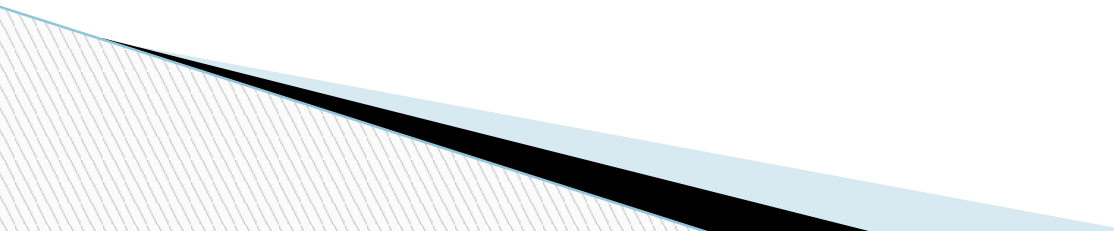
Beisenbaev S.S  
Kukushin.V.A

- A **marker beacon** is a particular type of VHF radio beacon used in aviation, usually in conjunction with an instrument landing system (ILS), to give pilots a means to determine position along an established route to a destination such as a runway.

# History

- From the 1930s until the 1950s, markers were used extensively along airways to provide an indication of an aircraft's specific position along the route, but from the 1960s they have become increasingly limited to ILS approach installations. They are now very gradually being phased out of service, especially in more developed parts of the world, as GPS and other technologies have made marker beacons increasingly obsolete.
- 

# Marker beacon types

- ▣ **Outer marker**
  - ▣ **Middle marker**
  - ▣ **Inner marker**
  - ▣ Back course marker
  - ▣ Fan marker
- 

# Outer marker

- The Outer Marker, which normally identifies the final approach fix (FAF), is situated on the same course/track as the localizer and the runway center-line, four to seven nautical miles<sup>[2]</sup> before the runway threshold. It is typically located about 1 NM (1.85 km) inside the point where the glideslope intercepts the intermediate altitude and transmits a 400 Hz tone signal on a low-powered (3 watts), 75 MHz carrier signal. Its antenna is highly directional, and is pointed straight up. The valid signal area is a 2,400 ft (730 m) × 4,200 ft (1,280 m) ellipse (as measured 1,000 ft (300 m) above the antenna.) When the aircraft passes over the outer marker antenna, its marker beacon receiver detects the signal. The system gives the pilot a visual (blinking blue outer marker light) and aural (continuous series of audio tone morse code-like 'dashes') indication.

# A locator outer marker

- In the [United States](#), the outer marker has often been combined with a [non-directional beacon \(NDB\)](#) to make a Locator Outer Marker (LOM). An LOM is a navigation aid used as part of an [instrument landing system \(ILS\)](#) instrument approach for aircraft. Aircraft can navigate directly to the location using the NDB as well as be alerted when they fly over it by the beacon.
- The LOM is becoming less important now that [GPS](#) navigation is well established in the aviation community.<sup>[3]</sup> Some countries, such as [Canada](#), have abandoned marker beacons completely, replacing the outer marker with a [non-directional beacon \(NDB\)](#); and, more recently, with GPS fixes.
- In the U.S., LOMs are identified by two-letter Morse code modulated at 1020 Hz. LOMs use the first two letters of the parent ILS's identification. For example, at [New York's JFK](#) runway 31R the ILS identifier is I-RTH and the LOM ident is RT. If this facility were a locator middle marker (LMM) its identifier would be the last two letters, TH.

# Middle marker

- A middle marker works on the same principle as an outer marker. It is normally positioned 0.5 to 0.8 nautical miles (1 km) before the runway threshold. When the aircraft is above the middle marker, the receiver's amber middle marker light starts blinking, and a repeating pattern of audible morse code-like dot-dashes at a frequency of 1,300 Hz in the headset. This alerts the pilot that the CAT I missed approach point (typically 200 feet (60 m) above the ground level on the glideslope) has been passed and should have already initiated the missed approach if one of several visual cues has not been spotted.

# Inner marker

- Similar to the outer and middle markers; located at the beginning (threshold) of the runway on some ILS approach systems (usually Category II and III) having decision heights of less than 200 feet (60 m) AGL. Triggers a flashing white light on the same marker beacon receiver used for the outer and middle markers; also a series of audio tone 'dots' at a frequency of 3,000 Hz in the headset.
- On some older marker beacon receivers, instead of the "O", "M" and "I" indicators (outer, middle, inner), the indicators are labeled "A" (or FM/Z), "O" and "M" (airway or Fan and Z marker, outer, middle). The airway marker was used to indicate reporting points along the centerline of now obsolete "Red" airways; this was sometimes a "fan" marker, whose radiated pattern was elongated at right angles across the airway course so an aircraft slightly off course would still receive it. A "Z" marker was sometimes located at low/medium frequency range sites to accurately denote station passage. As airway beacons used the same 3,000 Hz audio frequency as the inner marker, the "A" indicator on older receivers can be used to detect the inner marker.



# Back course marker

- A back course marker (BC) normally indicates the ILS back course final approach fix where approach descent is commenced. Its cockpit audio and visual indications are the same as for an inner marker (IM), but its location on the approach course is very different (final approach fix for BC vs. runway threshold for IM).

# Fan marker

- The term *fan marker* refers to the older type of beacons used mostly for en-route navigation.<sup>[5][6]</sup> Fan-type marker beacons were sometimes part of a non-precision approach and are identified by a flashing white light and a repeating dot-dash-dot signal.<sup>[7]</sup> Recent editions of the FAA's AIM publication no longer mention fan markers

□ Thank you