

# Instrument Approach

## Classification of Instrument Approaches

### Segments of an Instrument Approach:

#### Arrival Segment

This segment represents the transition from the enroute phase to the approach phase of the flight.

#### Initial Approach Segment

This segment begins at the **Initial Approach Fix (IAF)** and ends at the **Intermediate Fix (IF)**.

#### Intermediate Approach Segment

This segment usually begins at the **Intermediate Fix (IF)** and ends at the **Final Approach Fix (FAF)** (for non-precision approaches) or the **Final Approach Point (FAP)** (for precision approaches).

#### Final Approach Segment

This segment normally starts at the **FAF/FAP** and ends at the **Missed Approach Point (MAPt)**.

#### Missed Approach Segment

This segment begins at the **MAPt** and typically ends in the **published holding procedure** at the IAF. This segment provides obstacle protection during the missed approach procedure.

### Final Approach Fix or Point?

- **Precision Approach:** Called a **Final Approach Point (FAP)**
- **Non-Precision Approach:** Called a **Final Approach Fix (FAF)**

## Approach Classifications

There are several ways to conduct instrument approaches. The goal of these procedures is to guide traffic to the runway as efficiently and safely as possible, considering local conditions and weather constraints.

Approaches require specific ground or aircraft equipment, and all available procedures are published in airport charts.

Instrument approaches are classified into:

- **Two-Dimensional (2D) Approaches** – Provide **lateral guidance only**.
- **Three-Dimensional (3D) Approaches** – Provide **both lateral and vertical guidance**.

## Guidance Sources:

- **Ground-based radio navigation aids**
- **Computer-generated navigation data** from ground-based, space-based, or autonomous navigation aids (or a combination of these)

### Examples of 2D Approach Procedures (Lateral Guidance Only):

- **LOC Approach** (*Non-Precision Approach - NPA*)
- **VOR Approach** (*NPA*)
- **NDB Approach** (*NPA*)
- **RNP Approach** (*RNAV(GPS) without vertical guidance - NPA*)

### Examples of 3D Approach Procedures (Lateral and Vertical Guidance):

- **RNP Approach** (*RNAV(GPS) with Baro VNAV or SBAS - APV*)
- **ILS Approach** (*Precision Approach - PA*)
- **GLS Approach** (*PA*)
- **PAR Approach** (*PA*)
- **RNP Approach augmented with SBAS CAT I** (*PA*)

*Visual approaches are not included in these categories.*

## Common Instrument Approach Procedures

### ILS Approach

The **Instrument Landing System (ILS)** is one of the most widely used approach procedures. It provides both **lateral guidance** (via the **localizer - LOC**) and **vertical guidance** (via the **glide slope - GS**). This enables precise landings even in poor weather conditions and can support fully automated landings.

### RNP/RNAV Approach

The **RNAV(GPS)** approach, also called an **RNP approach**, relies on GPS for navigation. Unlike ILS, this is a **non-precision approach (NPA)** unless equipped with **vertical guidance (APV)**.

Common RNP Approach Variants:

- **LNAV Only** (*Lateral Navigation Only - NPA*)

- **LNAV + VNAV** (*Lateral and Vertical Navigation - APV*)
- **LPV** (*Localizer Performance with Vertical Guidance - APV*)

## VOR Approach

If **ILS** or **RNAV** is unavailable, a **VOR (DME) approach** may be used. This **non-precision approach** relies on a ground-based **VOR station**. The approach follows a radial from the station, and due to the lack of vertical guidance, decision heights are relatively high, making it less suitable in poor weather conditions.

## NDB Approach

The **NDB approach** is one of the least precise methods. Unlike VOR, which transmits radials, an **NDB** transmits signals in all directions. Pilots align to a **QDR (magnetic bearing from the station)** instead of a radial, making alignment more challenging.

# Vectoring to Final

## Precision Approaches

- The aircraft should fly **straight and level** for **1 NM** before intercepting the glide slope.
- Example: **Final Approach Point (FAP) at 10 NM → Glide slope intercept at 11 NM**

## RNP/RNAV Approaches

- The aircraft should fly **straight and level** for **2 NM** before the **Final Approach Fix (FAF)**.
- Example: **FAF at 12 NM → Intercept at 14 NM**
- If a course change occurs at the FAF, the aircraft should be cleared **directly to an initial approach waypoint**.

## Non-Precision Approaches (NPA)

- If an aircraft is vectored onto final, the controller must provide **position information**.
- Example: *"You are 15 NM southwest of (fix), cleared (approach) runway XX"*
- If vectored to an ILS intercept, the pilot must be instructed to **report established**.
- Example: *"Cleared ILS approach Runway XX, report established."*

# Visual Approach

A **visual approach** is often requested in good weather. Although some airports prohibit them due to noise restrictions, they remain a useful tool in **VATSIM** and real-world operations. A visual approach is **not a change in flight rules**; the aircraft remains under **IFR but follows a visual approach procedure**.

## Requirements

- **The pilot must request or accept a visual approach.**
- **The aircraft must be below the cloud ceiling** and in sufficient visibility.
- **The pilot must have the airport and preceding traffic in sight.**
- **The approach must be coordinated with the tower.**

## Visual Approach Clearance

- If conditions are met, the IFR aircraft can be cleared for a **visual approach**.
- The pilot is responsible for **obstacle clearance**, while ATC remains responsible for **separation** unless delegated.
- Since there is **no published missed approach procedure** for a visual approach, controllers must specify this along with the clearance.

Example Clearance:

ATC	Phraseology
ATC	<i>"DTH123, runway is at 2 o'clock, range 8 miles, advise able to accept visual approach Runway 10."</i>
Pilot	<i>"DTH123, able to accept visual approach Runway 10."</i>
ATC	<i>"DTH123, cleared visual approach Runway 10, in case of missed approach, fly runway heading and climb to 3000 feet."</i>

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