Classification of Instrument Approaches

Segment of an instrument approach

Arrival Segment: This segment represents a transition from the enroute phase to the approach phase of the flight.

Initial Approach Segment: This segment begins with 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) (non-precision) or Final Approach Point (FAP) (precision).

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 usually ends in the published holding procedure at the IAF. It is intended to provide protection against obstacles during the entire missed approach procedure.

> Final Approach Fix or Point? During a Precision Approach, it is called a Final Approach Point, during a non-precision approach, it is called a Final Approach Fix.

Classification

There are several ways to conduct approaches under instrument flight rules.

The purpose of the various approaches is to guide traffic to the runway as efficiently and precisely as possible in line with local circumstances and depending on weather conditions. Some approaches require specific equipment on the ground, while others are solely dependent on the aircraft's equipment. All available approaches are published in the respective airport charts.

In addition to the larger commercial airports, various small airports with an RMZ also have such approach procedures to enable IFR traffic there.

A basic distinction is made between two-dimensional (2D) and three-dimensional (3D) approach procedures.

2D approach procedures only include lateral guidance, while 3D approach procedures also include vertical guidance.

Note: lateral and vertical refers to the guidance provided by either:

- a ground-based radio navigation aid or
- computer-generated navigation data from ground-based, space-based, autonomous navigation aids or a combination of these.

Examples of 2D approach procedures:

- 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:

- RNP Approach (RNAV(GPS)) with Baro VNAV or SBAS (Approach with vertical guidance (APV))
- ILS Approach (Precision Approach (PA))
- GLS Approach (PA)
- PAR Approach (PA)
- RNP approach argumented with SBAS CAT I (PA)

Note: Visual approaches do not belong to any of these categories!

ILS approach

The ILS approach is the most widely used approach procedure in Germany and the only one that is accurate enough to be considered a **precision approach**. ILS stands for Instrument Landing System and consists of a landing course transmitter (LOC - shows the deviation to the left and right of the extended centerline) and a glide path transmitter (GS - shows the deviation from the ideal altitude for the approach). The combination of these two components guides the pilot precisely onto the runway, even in poor weather conditions, and in some cases also enables completely automatic landings. In order to use this approach procedure, the airport must be equipped accordingly.

RNP/RNAV approach

An RNP and an RNAV approach are - in principle - not the same. However, as we are looking at these approach procedures from the controller's perspective, we can consider both approach types the same.

RNAV approaches use GPS for correct guidance. In contrast to an ILS approach, this approach is **non-precision approach**. These approaches are usually flown when the ILS is not operational for some reason. Due to the various possible combinations, this approach also offers low decision altitudes. Possible combinations are, for example: **LNAV only** (lateral navigation only), **LNAV + VNAV** (lateral and vertical navigation) or **LPV** (Localizer performance with vertical guidance). For the controller, the different options make no difference in handling.

VOR approach

Sometimes no ILS/RNAV is available at the destination airport or the expected runway. A somewhat outdated method is the VOR/(DME) approach. This approach is considered a **non-precision approach** as well.

The challenge here is that the pilot aims at a fixed radio navigation station on the ground and follows its radial.

It is important for the controller to know that this approach procedure is rather imprecise compared to the ILS. The pilot might deviate noticeably to the left or right of the extended centerline. They fly the approach to the missed approach point (MAPt) or until the runway is in sight. As there is no vertical guidance for this approach, the decision height is relatively high. It is therefore not worth flying a VOR approach in bad weather.

NDB Anflug

The NDB approach is the last point in the approach list. This approach is by far the least accurate and therefore also classified as a **non-precision approach**. In contrast to a VOR, which transmits a clear radial, the NDB transmits signals in all directions simultaneously. With a VOR approach, the pilot recognizes directly whether he is correctly aligned. This is not very easy with the NDB approach due to its inaccuracy.

Alignment to the extended centerline of the runway is not based on a radial, but on a QDR (magnetic bearing from the station) transmitted by the station. The descent is started from a defined point and is similar to the VOR approach, as there is no vertical guidance here either.

Vectoring to Final

- During a **precision approach**, the pilot should fly **straight and level for 1 NM** before intercepting the glide slope. E.g. FAP at 10 NM -> glide slope intercept at 11 NM
- With an **RNP or RNAV(GPS)** approach, the pilot shall fly **straight and level for 2NM** before passing the final approach fix. E.g. FAF at 12 NM -> intercept at 14 NM

- If the RNP or RNAV(GPS) approach includes a course change at the FAF, the pilot should be cleared directly to a waypoint on the initial approach. E.G. RNP X RWY 25L (EDDF)
- For NPAs, the pilot must be given information about their position when they are guided to the final approach by vectors. E.g. "DLH123, you are 15 NM southwest of FFM VOR, cleared VOR Approach runway 25L"
- If an aircraft is vectored to the intercept of the final approach, the pilot must be instructed to report "established". "DLH123, cleared ILS approach runway 25L, report established." This does not apply if an independent feeder (director) is used.

Visual approach

Frequently requested in good weather conditions: The visual approach. Although there are many airports in real life where such an approach is no longer permitted for noise protection reasons, it could certainly be used more often on the VATSIM network. This is not a flight rule change, so the aircraft is not VFR, but on a visual approach for IFR traffic.

Requirements

The following conditions must be met for a visual approach to be carried out:

- Pilot requests or accepts the Visual Approach
- Aircraft is below the ceiling, which is above the MVA or the pilot confirms that the visibility conditions are sufficient for the approach
- Pilot has the airport and the traffic ahead in sight

A visual approach must always be coordinated with the tower.

Clearance

If the above conditions are met, an IFR inbound can be cleared for a visual approach. The pilot is then responsible for obstacle clearance. However, the APP controller is still responsible for the separation.This responsibility can be delegated to the pilot with the remark that the pilot needs to maintain separation to traffic ahead autonomously.

As there is no published missed approach procedure for a visual approach, this must be communicated to the pilot together with the clearance.

Station	Phraseology
ATC	DLH123, Runway is at XX o'clock, Range XX Miles, advise able (to accept) visual approach RWY XX
Pilot	DLH123, able (to accept) visual approach RWY XX

ATC	DLH123, cleared visual approach Runway XX, in case of missed approach (missed approach procedure)

Revision #3
Created 11 September 2024 19:26:55 by 1583954
Updated 12 September 2024 11:57:26 by 1583954