ILS APPROACH WITH BE90

1. Introduction

This documentation will present an example of Instrument landing system (**ILS**) approach performed with the Beechcraft BE90 at LFBO airport runway 32 left.

This documentation will not present the full automatic ILS CAT IIIc approach procedure and requirements.

1.1. Instrument Landing System

*An **ILS*** (Instrument Landing System) is a radio beam transmitter that provides a VHF/UHF radio signal on the air in order to help the pilot to perform a precision approach.
An ILS has two parts:

- Localizer which provides runway guidance to aircraft (horizontal guidance)
- Glide path which provides descent guidance to aircraft (vertical guidance)

1.2. Charts

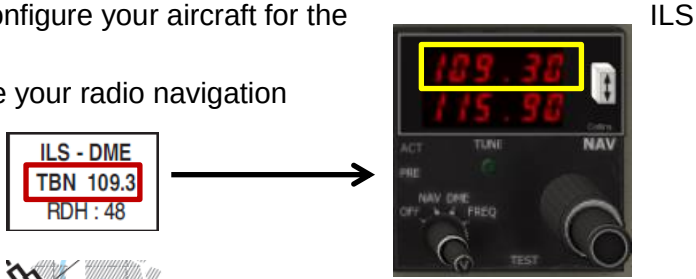
Each ILS approach, during instrument flight rules (IFR) operations, is published on an instrument approach procedure chart named IAC chart.
This chart shall include:

- Radio frequencies
- Navigation aid and course
- Descent profile
- Prescribed minimum visibility requirements.

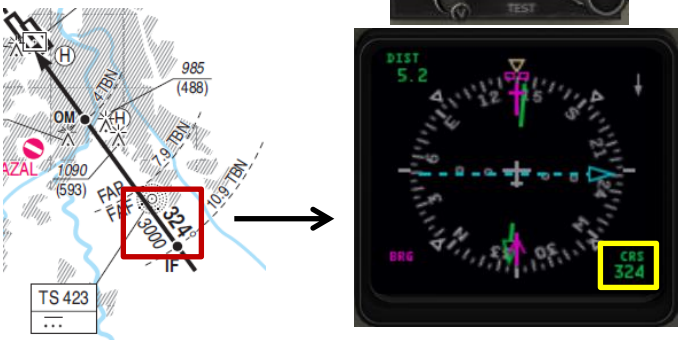
2. First step

During the approach phase of your flight, you must configure your aircraft for the ILS approach:

1. Take the ILS frequency from charts : configure your radio navigation receiver NAV1



2. Take the ILS course and interception altitude of the localizer from charts : configure the course and configure your descent to this altitude



3. Before joining the localizer

Before joining the localizer, you must check the following points:

1. Aircraft speed shall be reduced between **140KT to 160KT** (do not approach with a too high speed)
2. Aircraft descent altitude shall be set to the **interception altitude** of the localizer published on charts.
3. Aircraft flaps are set to **APPROACH position** (usually only 2 positions for a dual propeller)
4. If you want to perform an automatic ILS approach, the **APP** button shall be activated

When performing an ILS approach, you must establish the localizer before the glide path.
You can consider established when the indicator is staying at the central position ± 1 bullet.

If you are far from the localizer path and glide path, ILS indicators are stayed to maximum deviation and remains at this position (like the image hereunder). If you are close to the path, the indicator shall move to the central position.

When the localizer indicator is on the left that means that the localizer path is on the aircraft's left, or the aircraft is on the right of the localizer path.

An ILS approach can be performed manually by the pilot. The use of autopilot is not mandatory

4. Establishing the localizer

When the localizer indicator is moving to the central position, you must turn toward the runway.

You must handle your heading in order to keep the localizer indicator near the centre position.
If you do that, you will keep the runway alignment until the touchdown.

In the picture hereunder, you can notice:

1. The localizer needle is aligned with the localizer course (red). You are established on the localizer.
2. The glide indicator is still at the maximum deviation (green). You are still below the glide path.

When the glide indicator is on the top that means that the glide path is above the aircraft or the aircraft is below the glide path.
During normal ILS approach, you must always intercept and establish the localizer when the glide path indicator is on top or above the middle (like the image above n°2).

The spoilers can be armed at this stage.
The runway can be seen now (depends on the weather, distance)

5. Establishing the glide path

When the glide path indicator is moving to the central position, you must initiate your descent:

1. Reduce the power and speed down to 120kt (be careful to monitor your speed permanently)
2. Set the flaps to FULL or DOWN position
3. Set gear leveller to down position. And check that the gear feedback indicators are green
4. Maintain localizer and glide path indicator near the centre position.
5. Check your vertical speed indicator. The approximate value shall be calculated: ground speed x descent path in degrees (example: 120kt x 5° = 600ft/min).

You must handle your pitch and power in order to keep the glide path indicator near the centre position. If you do that, you will maintain a constant descent until the short final.

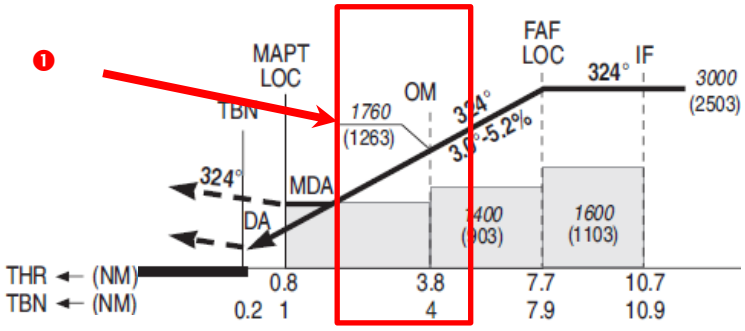
When localizer and glide path indicator are located near the middle of the indicator, you can consider that the ILS is established.

In this type of aircraft, there is usually no auto-throttle equipment. The pilot shall operate and adjust the throttle manually.

6. Check point at the outer marker

When stabilized on the ILS, it is time to check your approach progress:

1. Locate on your charts the intermediate altitude check mainly located at outer marker (OM on chart).
2. Check the altitude when reaching this point (it can be a DME distance or navigation aid reference)
3. Set final approach speed. Here set 90 to 95kt.



In the example, the altitude to check is 1760ft at 4NM DME of TBN radio navigation aid.

7. Approaching decision altitude

When you will be on short final, it is time to decide to land or to go around, after Outer Marker:

1. Check on your charts the decision altitude (on chart you will find mainly ILS CAT I decision altitude)
2. Check that aircraft speed is stabilized at the target speed
3. When reaching the decision altitude, you need to decide to land or to go around. At this time, you must disconnect the autopilot if it is still engaged

At decision altitude, if you see the runway or 3 consecutives approach lights on the ground, you can continue the ILS approach, if you don't have this visual reference, you must go around.

CAT	ILS DA (H)	RVR
A	700 (200)	
B	700 (200)	
C	700 (200)	1000
D	700 (210)	
DL	710 (210)	

The aircraft must be stabilized on final in landing configuration at least 1000ft above the ground. The pilot in command shall not hesitate to go around if his aircraft is not stabilized on final, or approach speed is excessive.

8. Recommended elements of a stabilized approach

We just give you the following recommendation consistent with criteria developed by the Flight Safety Foundation.

Note that the recommended elements of a stabilized approach can differ slightly in function of aircraft operation manual or company recommendations.

All approaches should be stabilized by 1000 feet in IMC and 500 feet in VMC.
An approach is considered stabilized when all of the following criteria are met:

- The aircraft is on the correct flight path.
- Only small changes in heading and pitch are required to maintain the correct flight path
- The airplane speed is not more than V_{REF} + 20 Knots indicated airspeed and not less than V_{REF}
- The airplane is in the correct landing configuration.
- Sink rate is not greater than -1000 feet/minutes except if the approach procedure requires a sink rate greater than -1000 feet/minutes.
- Thrust settings appropriate for the airplane configuration.
- All briefing and checklist have been conducted.
- ILS approach should be flown within one dot of the glide slope and localizer, or within the expanded localizer scale.
- During circling approach, wings should be level on final when the airplane reaches 300 feet

Pitch attitude is between +10° and -2.5°
Bank angle is maximum 7°

An approach becoming unstabilized below 1000 feet IMC or below 500 feet VMC requires an immediate go-around.

As the airplane crosses the runway threshold it should be:

- Stabilized on target airspeed to within + 10 Knots until arresting descent rate at flare
- On a stabilized flight path using normal manoeuvring
- Positioned to make a normal landing in the touchdown zone (the first third of the runway)

Initiate a go-around if the above criteria cannot be maintained.