



## Learning Goals VOR DME APPROACH

### The VOR DME approach

Most virtual pilots are quite familiar with the Precision approach (ILS) but not so with the Non-Precision approach.

Of course flying an ILS is easy as all that is required is to tune it and select APP on the FD/AP panel and follow the commands or watch the AP do it and, if your aircraft is capable of it, sit back and watch it auto land.

The VOR DME approach is a **Non- precision approach** ("Non-ILS approach"). As the term implies Non-ILS means any approach other than an ILS. This includes **LOC, VOR, NDB, GPS, GNSS and RNAV**.

An ILS system essentially consists of a ground based localizer located on the extended centerline of the runway for tracking guidance, a glide slope that is radiated from an antenna located adjacent to the touchdown area and a series of marker beacons, or more commonly a co-located DME, for range information.

With a Non ILS approach the pilot uses a **less precise navigation** aid for tracking (NDB, VOR or GPS) and additionally is responsible for calculating and maintaining his own glide slope path in order to conform to the various minimum altitude requirements of the approach.

Because the descent path on the approach is determined and monitored by the pilot(s) it can vary considerably and aviation history books are littered with accidents as a result of miscalculation, error and poorly executed approaches.

An approach would consist of a series of points along the approach at which the aircraft had to pass over at not less than the charted altitude.

Essentially a pilot would pass one point and then descend down quickly to the next altitude and level out until passing that point and so on.

Eventually the pilot would descend down quickly to the minimum descent altitude for the approach in an attempt to acquire the required approach visibility. This resulted in a series of step downs with level portions in between. This was fine for slower moving aircraft but when jets attempted the same it led to destabilized approaches and together with slow spool up time (accelerating) engines led to many accidents or trouser staining go-around as the engines slowly and painfully powered up.

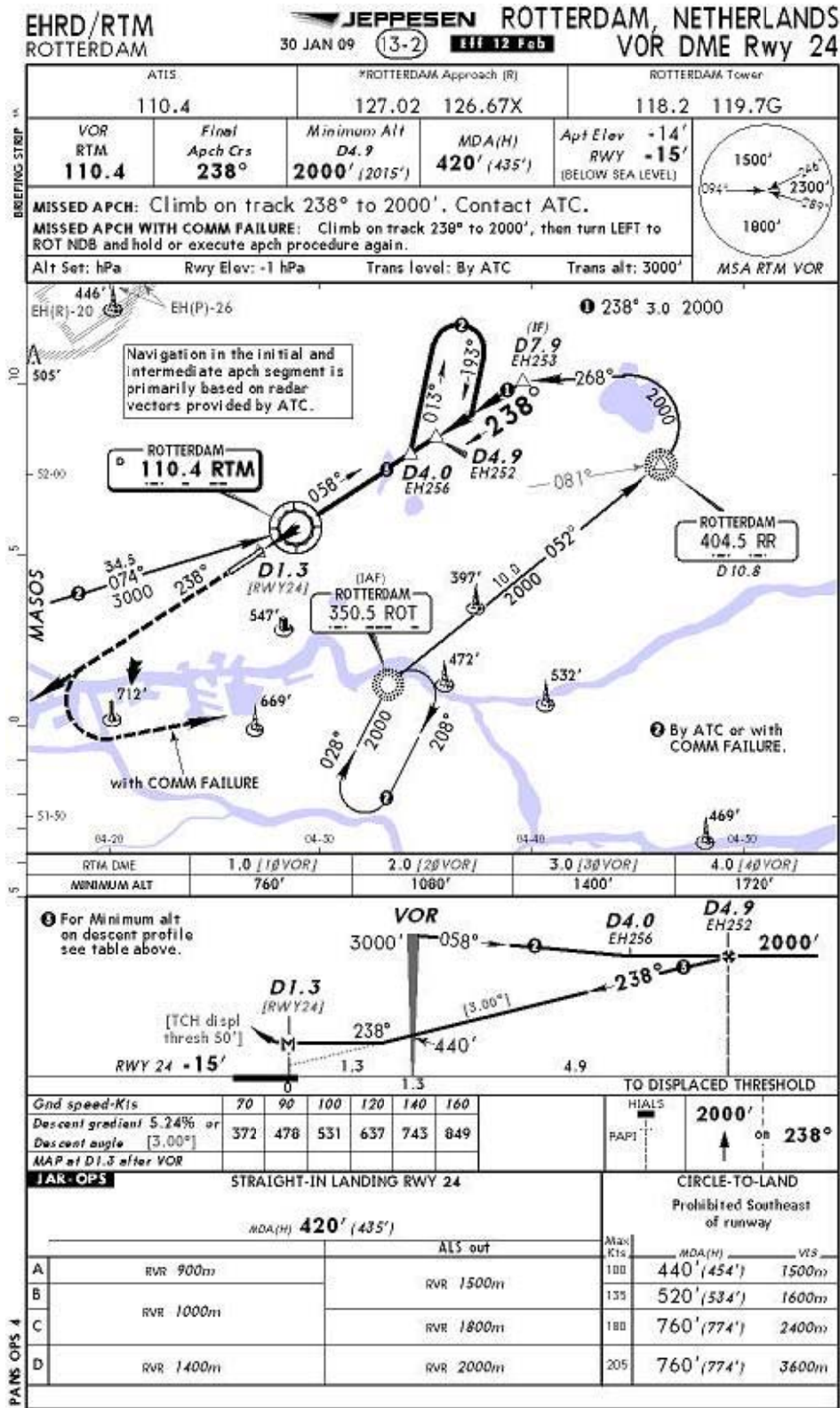
The accepted method for jet aircraft flying Non-ILS approaches today is to fly them using a constant descent path and therefore rate of descent. This is referred to as a stable approach. They also have the advantage of fitting in better with noise abatement procedures. Many airports now require that STAR's an approaches are flown with a constant descent.



**Example:**

Let's do a flight from London (EGLL) to Rotterdam (EHRD). We are on the REDFA 2R arrival inbound MASOS intersection and descending to FL 060.

ATC clears us for the VOR DME approach rwy 24 as published !



## Flying the procedure

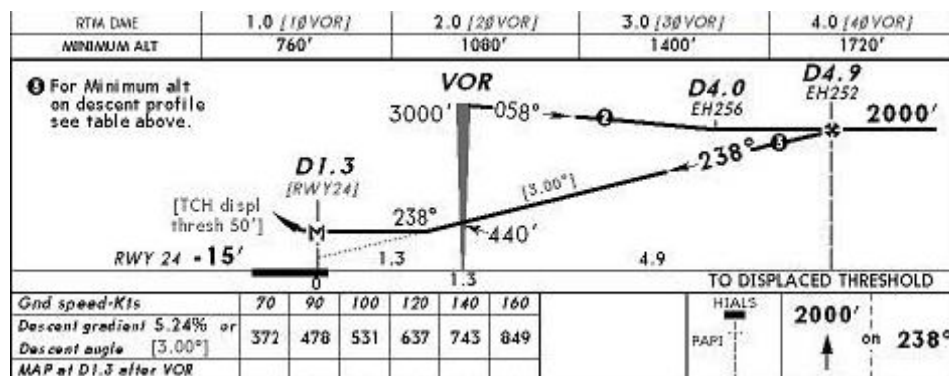
We see that the charts provides 2 VOR DME procedures. One starting at MASOS and one starting at ROT NDB.

We leave MASOS on track 074 to RTM VOR. And now since this is a non-precision approach the fun begins.

We need to track RTM VOR on heading 058° for 4.0 nm. Turn left heading 013 and after 1 minute turn 180° right to heading 193° to intercept the inbound radial 058 of RTM VOR.

## How about the descent?

Let's have a look at the Profile view. At MASOS intersection we were at FL060. Since we were cleared for the VOR DME approach rwy 24 as published we need to be at 3000 ft overhead RTM VOR. At 4.0nm from RTM we must be at 2000ft to make the procedure turn. Once we intercepted the inbound radial 058 we can start our descent at 4.9 nm from the VOR. With a groundspeed of 160kts our descent should be 849ft/min



When you slow down during the descent ...also adjust your vertical speed to maintain the 3° descent angle.

Looks easy doesn't it....but keep watching your Groundspeed. STAY on the descent profile. Make adjustments if needed to be at 440 feet when overhead the VOR. Continue the descent and land when clearance was given or execute the missed approach procedure.

We encourage you to practice the VOR DME approach without using your FMC !

