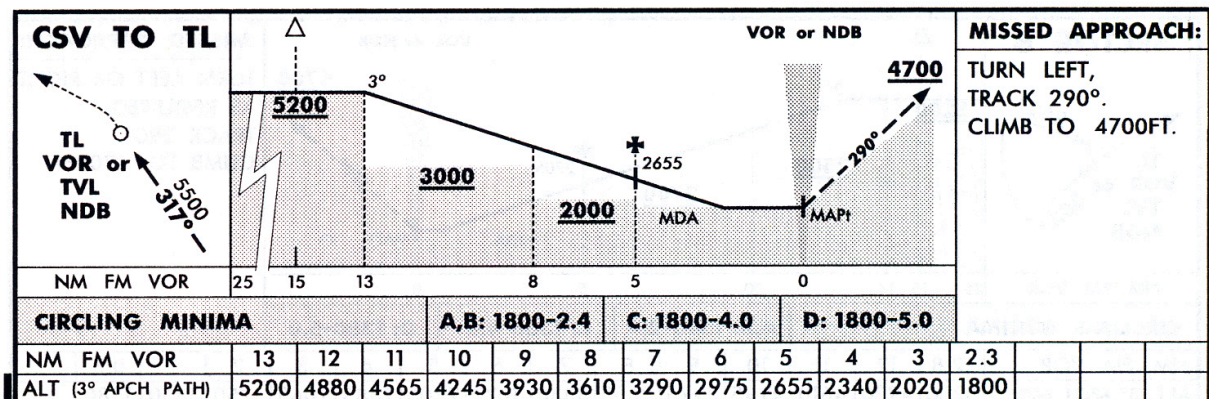


INSTRUMENT ARRIVAL PROCEDURES

Although the visual approach is by far the simplest, the IFR pilot has other options when it comes to getting down from LSALT to the destination runway. These include a number of prescribed procedures using the various radio navigation aids.

THE DME/GPS ARRIVAL . This involves establishing the aircraft on a prescribed inbound track, or in some cases a prescribed sector. While the pilot maintains the aircraft on the track or within the sector by reference to an NDB or VOR, he/she commences a descent profile which is determined by limiting heights at various distances determined by DME or GPS.

The DME or GPS arrival procedure shown below is for arrival at Townsville QLD from Collinsville on a track of 317°M [See designated route W258 on ERC 4] . The LSALT for the last route segment is 5500ft. The lowest IFR level to plan for this track is 6000ft [even thousands and above LSALT]. You may descend to 5200ft once you have passed 25 nm. You must remain



not below 5200 ft until you have passed 13 nm. Then the descent may be continued to not below 3000ft until 8 nm. At 8 nm you may descend to not below 2000ft until you are within 5 nm. At 5 nm you may descend to MDA of 1800ft [or 1700ft if you have the actual QNH]. If visual reference is established with a visibility of 2.4 km or better [assuming a Category B aeroplane], you may circle and land. If not you must turn left and climb on 290°M to 4700ft. This will allow you to either go to your alternate, or try the Townsville NDB, VOR, ILS or GPS approach.

Note that even though it would not be illegal to fly the DME arrival as a series of step descents as described above, it is usual to set up a steady descent and use the DME steps as a means of checking your progress. The chart shows the 'ideal' 3° descent profile which suits most airline type aircraft. The distance/altitude table across the bottom of the chart shows that profile. At 13 nm you would leave 5200 feet and set up a descent which allows you to be passing through 4880 feet at 12 nm, 4564 feet at 11 nm, 4245 feet at 10 nm and so on.

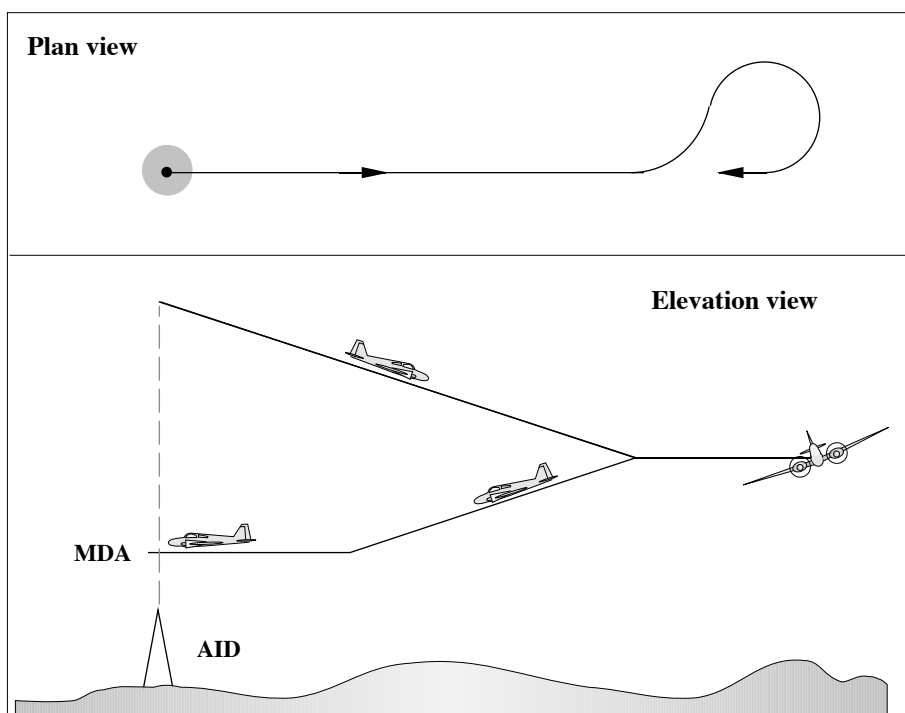
In many cases the same procedure can be flown using the GPS instead of the DME for distance information. When this is done, the aircraft must still track on the ground based aid [NDB or VOR] while using the GPS for *distance information only*. This procedure is very useful in cases where there is no DME situated at the aerodrome.

The DME arrival allows the aircraft to descend to MSA en route to the aid. There is no manoeuvring required once you are established on the specified track. This makes it just as time efficient as a visual approach!

THE NON PRECISION APPROACH

If the destination has no ILS and a visual approach or DME or GPS arrival is not available, the pilot must maintain a level not less than LSALT until within 25 nm when descent may be made to MSA [if MSA is lower than the LSALT for the route]. The aircraft must not descend below MSA or LSALT, which ever is the lower, until it passes over the station. It may then enter a holding pattern if necessary [see later], before commencing the approach.

This type of non-precision instrument approach commences from a point directly over the NDB or VOR from which the aircraft tracks outbound following a specified track which ensures safe terrain clearance. At some specified time or distance from the aid, the aircraft turns to intercept a track back towards the aid. This inbound track may be either the reciprocal of the outbound track or another specified track which ensures safe terrain clearance. This inbound track will usually take the aircraft back to pass overhead the aid once more. During the procedure the aircraft descends according to published limiting altitudes until, on the inbound track, it reaches the Minimum Descent Altitude [MDA] below which it must not descend unless visual reference has been established.



A typical non precision approach is shown in the figure above. From overhead the aid the pilot tracks outbound on the specified track descending to not below a specified level. He then carries out a procedure turn to place the aircraft inbound to the aid on the reciprocal of the out bound track. He continues the descent to the published MDA.

Note that there are many variations on this procedure. In some cases the outbound leg may be flown without descending, with the descent commencing when the inbound track is established. In other cases the descent may continue during the turn, or the inbound track may be another track other than the reciprocal of the outbound track. You should browse through your DAPs to become familiar with the various presentations.