

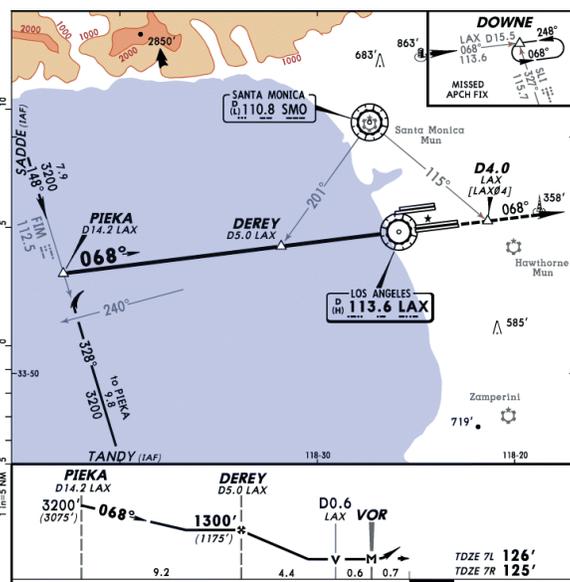
# JEPP'S BRIEFING



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If you want to start a lively discussion, call the non-precision approach a “dive and drive” approach. Is there truth to the term? Is it derogatory? Are these approach procedures designed to encourage “dive and drive” flying? Can all non-precision approaches be flown with constant descent angles similar to an ILS? Should they?

To answer some of those questions, we should look at the instrument approach procedure design specifications in the TERPs criteria. By design, the ILS glide slope is specified to be a minimum of three degrees. This means that ILS approaches are designed to be flown as constant angle descents from the final approach fix (FAF) all the way down to landing. *That is not true for non-precision approaches.* Non-precision approaches were not designed for optimum descent rates - they were designed so that we as pilots would be at the minimum altitude in each segment of the approach. Specifically, the altitude over the FAF approach fix was designed to be the minimum altitude to clear all obstacles in the intermediate segment by 500 feet.



Los Angeles, Calif, VOR or GPS Rwy 7L/R

## The Chart Clinic – Twenty Second in a Series

### Shallow Final Approach Segments

In the first illustration of a non-precision profile view, look at the altitudes on the VOR or GPS Rwy 7L/7R approach at Los Angeles, California International Airport. At DEREY, the FAF, the altitude is 1,300 feet and the runway 7R touchdown zone elevation (TDZE) is 125 feet. By adding 50 feet to the TDZE, that is a descent of 1,125 feet in 5.7 nautical miles. That computes to be 197 feet per mile, or 1.86 degrees. **Very shallow!** On the other hand, the ILS glide slope minimum rate of descent is 318 feet per mile, or three degrees. If you fly a constant descent rate of about three degrees on the LAX VOR approach, you will be down to the minimum descent altitude (MDA) in 2.2 miles, or 3.5 miles before the end of the runway.

There are advantages and disadvantages in reaching the MDA so early. The advantage is that you get plenty of time to look for the runway, or its environment, while flying at the MDA. The disadvantage in many airplanes is that at the lower approach speeds, the body angle is high and it is hard to see over the panel. So with the descent from the FAF, level off at the MDA, then another descent to the runway, one can easily see where the term “dive and drive” comes from. There is also a strong inclination to start descending below the MDA early if there is visual ground contact. Statistically, the largest percentage of fatal accidents happen in the last portion of non-precision approaches.

Looking at some of the specific procedure information on the Los Angeles chart, the profile view starts at PIEKA intersection. By referring to the plan view you can see that the thickest line on the approach procedure is the line from PIEKA to the missed approach point. In the plan view, the altitude and distances are not shown since all this information is depicted in the profile view. The altitude at PIEKA is 3,200 feet since that is the altitude when arriving there from the transitions from SADDLE and TANDY that are shown in the plan view.

### Parenthetical Heights

When at PIEKA, the MSL altitude is 3,200 feet and the height above the TDZE is 3,075 which is shown in parentheses. Remember that the numbers in parentheses are **not above the ground below you.** When at PIEKA, you are over the Pacific ocean (obviously sea level), so your height above the surface

below you is 3,200 feet and not the number in parentheses. In this case, the height above the surface below you is not significant, but a mountain could be below PIEKA as high as 2,200 feet for the initial approach segments into PIEKA.

### Intermediate Segment

PIEKA is an intermediate fix, and it is the beginning of the intermediate segment to DEREY. In the TERPs criteria and ICAO Pans-Ops documents, the intermediate segment is used to slow the airplane down and get it configured to enter the final approach segment. The intermediate segment has an optimum descent gradient of only 150 feet per nautical mile. The actual angle from PIEKA to DEREY is 2.00 degrees which is less than the maximum of 3 degrees for the intermediate segment and it is still less than the normal precision final approach segment.

PIEKA intersection is formed by the FIM (Fillmore) 148° radial, the 14.2 DME from the LAX VORTAC, and the 068° inbound course to LAX. To keep the profile view clean and uncluttered, we decided to include only the DME values in the profile view since they are the values that continue to change while on final. The intersection values are referred to once when setting them up to form the intersection, and from that point you only have to watch the movement of the VOR needle to tell when you are at an intersection. Also, to keep the chart presentation clean, only the letter “D” is included with the DME values to indicate that an intersection or fix can be formed by a DME.

Each type of fix has a different symbol in the profile view to assist in telling the type of fix to expect when flying the approach. Since PIEKA and DEREY are intersections, a vertical dashed line is used for their depiction. The VOR has a solid black vertical line that tapers from larger at the top to smaller at the bottom. An NDB is depicted the same way since it is a navaid. On the approach at Los Angeles there is a VDP indicated by the stylized letter “V.” The vertical line for a VDP is a very thin vertical line since it is not a mandatory fix when shooting the approach. The other fixes in the profile at Los Angeles are required for this approach.

### Visual Descent Point

On the final approach segment at Los Angeles the FAA has established a visual descent point (VDP). By definition, the VDP is at the intersection of the lowest MDA and a three-degree descent to the runway. With the latest TERPs change, the VDP angle will be the same as the visual guidance slope indicator (VGS) where it exists on the straight-in landing

runway. VGSI is another way of saying VASI (visual approach slope indicator) or PAPI (precision approach path indicator). A VDP is established only at locations where there is a DME to establish its position. The VDP is primarily an advisory location to help establish where a normal descent to the runway can be flown from an MDA. This helps to keep the airplane above obstacles until a normal final descent is made.

At Los Angeles, the missed approach point is at the LAX VOR which is 0.7 miles prior to the end of the runway. Notice there are two arrows after the MAP. The upper one indicates a pull up for the missed approach procedure after the VOR and the other one indicates that the portion of the approach from the VOR to the runway is flown in visual conditions. Remember the missed approach can be executed from any place on final, but the exact track for the final approach must be flown until passing the VOR. A missed approach climb can be started significantly before the VOR (as long as ATC knows).

There is a small vertical line above the runway threshold to indicate the end of the segment after the VOR. This is the end of the 0.7 mile segment. The TDZEs for both runways are shown above the runway symbol since this approach is designed for straight-in landings on both runway 7L and 7R.

### Minimum, Maximum, etc.

All the altitudes in the Jeppesen profile views are *minimum* altitudes except where specifically stated as *maximum*, *mandatory*, or *recommended*. Look at the profile view for the Oakland, California GPS Rwy 11 approach. The final approach fix altitude at SACJU is a mandatory altitude of 1,800 feet. The letters "MANDATORY" are included in all capital letters so they are easily seen. At Oakland, it is important to be AT 1,800 feet at SACJU since the departures out of San Francisco International Airport just to the south need the airspace above the FAF into Oakland.

The altitude indicators of MAXIMUM and RECOMMENDED were used occasionally in the past, but are very rare today.

After passing SACJU at Oakland, there is a stepdown fix that is known as an ATD fix. ATD are the letters meaning along track

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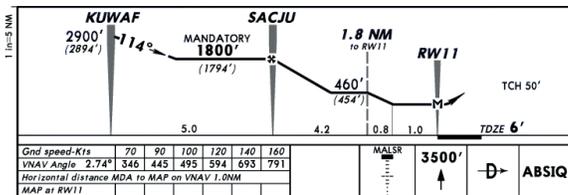
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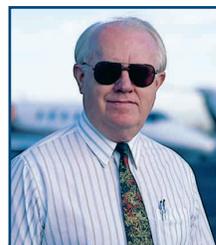
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Oakland, Calif, GPS Rwy 11

distance and are used to indicate the formation of the stepdown fix as 1.8 miles along the track prior to the RW11 which is the missed approach point.

In the next article, we will continue looking at the profile view with an emphasis on constant angle descents.



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