LPV Approaches

It wasn't that long ago when you only had one kind of approach with vertical guidance: the ILS. And if you weren't flying an ILS, you were managing step-down altitudes on a non-precision approach.

Now, all of that has changed. Over the past several years, the FAA has created GPS based LPV and LNAV/VNAV approaches at thousands of airports across the US. With GPS, the number of approaches with vertical guidance has tripled. But in many ways, so has the confusion.

So what's the difference between LPV and LNAV/VNAV approaches? They're both GPS based approaches with vertical guidance, but the similarities end there.

LPV: Localizer Performance With Vertical Guidance
LPV approaches are a WAAS/GPS based approach, and they're very similar to the ILS. But there is a difference. Even though LPV approaches have vertical guidance, they're not considered precision approaches. Instead, they're an approach with vertical guidance (APV).

So what's the difference? APV approaches don't meet the ICAO and FAA precision approach definitions, which apply mostly to localizer and glideslope transmitters. The precision approach definition also carries a lot of documentation, definition, and cost with it, so the FAA and ICAO adopted the APV definition, so they could build new approaches and not be burdened with the cost and paperwork.

So how do they work? The extremely accurate WAAS system (7.6 meters or better accuracy) gives you lateral and vertical guidance down to a decision altitude (DA) like an ILS. And, just like an ILS, an LPV approach's angular guidance gets more sensitive the closer you get to the runway. Keep in mind though, to fly them, you need a WAAS receiver. A baro-aided GPS won't work.

Required Navigation Performance (RNP) is a form of navigation that allows an aircraft to fly directly between two 3D points in space. The fundamental difference between RNP and RNAV is that RNP requires on-board performance monitoring and alerting capability. Think of this as a computer system that's constantly self-assessing and ensuring the reliability of navigation signals and position information.

According to GE Aviation, "RNP approaches with RNP values down to 0.1 allow aircraft to follow precise three-dimensional curved flight paths through congested airspace, around noise sensitive areas, or through difficult terrain."