

# RNAV GPS Approaches

Created by Jason T. Archer

	LNAV	LNAV+V	LPV	LNAV/VNAV	LP	LP+V
<b>Definition</b>	Lateral NAVigation	LNAV plus Advisory Vertical Guidance	Localizer Performance with Vertical Guidance	Lateral NAVigation/ Vertical NAVigation	Localizer Performance	Localizer Performance plus advisory Vertical Guidance
<b>Precision/non-Precision</b>	non-Precision	non-Precision	non-Precision*	non-Precision*	non-Precision	non-Precision
<b>WAAS<sup>1</sup>/non-WAAS</b>	non-WAAS or WAAS	WAAS	WAAS	Baro-aided or WAAS	WAAS	WAAS
<b>Flown to a:</b>	MDA	MDA	DA	DA	MDA	MDA
<b>Guidance is:</b>	Lateral	Vertical as reference only. Use baro-altimeter for all altitude restrictions to an MDA.	Lateral & Vertical	Vertical (provided by WAAS or approach certified baro-VNAV) & Lateral	Lateral	Vertical as reference only. Use baro-altimeter for all altitude restrictions to an MDA.
<b>Course Width</b>	Linear	Linear	Angular	Angular	Angular	Angular
	0.3nm from FAF to MAP	0.3nm from FAF to MAP	Transitions from 0.3 mile at FAF to 700' @ runway threshold	Transitions from 0.3 mile at FAF to 700' @ runway threshold	Transitions from 0.3 mile at FAF to 700' @ runway threshold	Transitions from 0.3 mile at FAF to 700' @ runway threshold
<b>Annunciation of Approach Type Occurs:</b>	w/in 2nm of FAF	w/in 2nm of FAF	WHEN THE FAF BECOMES THE ACTIVE WAYPOINT!!!	WHEN THE FAF BECOMES THE ACTIVE WAYPOINT!!!	WHEN THE FAF BECOMES THE ACTIVE WAYPOINT!!!	WHEN THE FAF BECOMES THE ACTIVE WAYPOINT!!!
<b>CDI Sensitivity is in:</b>	In miles	In miles	In degrees	In degrees	In degrees	In degrees
<b>Equipment Checks<sup>2</sup></b>	RAIM Check Required	RAIM Check Required	No RAIM Check Required	No RAIM Check Required	No RAIM Check Required	No RAIM Check Required
	Database Up-to-Date	Database Up-to-Date	Database Up-to-Date	Database Up-to-Date	Database Up-to-Date	Database Up-to-Date
<b>Alternate Selection</b>	Need to file a non-GPS based approach	Can file GPS as alternate with LNAV minima	Can file GPS as alternate with LNAV minima	Need to file a non-GPS based approach	Can file GPS as alternate with LNAV minima	Can file GPS as alternate with LNAV minima
<b>Comparision</b>		Occurs when obstacles make it not possible for a LPV or LNAV/VNAV	Similar to an ILS with sensitivity increasing from the FAF to the MAP.	Similar to an LPV	Similar to a LOC	Similar to an ILS with a visual final approach segment
<b>Misc.</b>		Is an LNAV approach where vertical guidance is advisory only as it does not ensure obstacle clearance below the MDA. LNAV+V is not listed on a chart.	May use as a precision approach if DA ≤ 300 HAT on an IPC or Practical.	baro-VNAV may be restricted by temperature	Is independent of LPV	LP+V is not listed on a chart.
<b>Examples</b>	RNAV (GPS) - B @ KGBR	LNAV(GPS) RWY 5 @ 5B2	RNAV (GPS) RWY 3 @ 1B1		RNAV (GPS) RWY 24 @ KROA	RNAV (GPS) RWY 11 @ KGBR

## Acronyms

- ✓ +V = Advisory Glideslope
- ✓ RNP = Required National Performance 0.3 nm; virtually all GPS approaches require an RNP of 0.3 nm which means on the final approach course with a centered needle you can be expected to be within 0.3 nm of the centerline 95% of the time. 0.3nm ~ 1584ft
- ✓ DA = Decision Altitude (MSL) i.e. a point in space, immediate decision for missed or continue approach
- ✓ MDA = Minimum Descent Altitude (MDA) i.e. lowest altitude allowed without visuals to descent on approach or circle-to-land until required visual references are seen.
- ✓ RNP = Required Navigation Performance; Special authorization from FAA required (AC 90-101)
- ✓ baro-VNAV = uses approach certified barometric altitude info from the pitot-static system to compute vertical guidance. Maybe temperature restricted.

\*APV = Approach with Vertical Guidance For example, baro-VNAV, LDA with glidepath, LNAV/VNAV and LPV are APV approaches.

Alternates - when using TSO-C129 and TSO-C196 (non-WAAS) users may file based on a a GPS-based IAP at either the destination or the alternate but not at both. When using TSO-C145 and TSO-C146 (WAAS) at an alternate, planning must be based on flying the LNAV or cycling minimum line, or GPS or conventional procedure with “or GPS” in the title. Upon arrival, LNAV/VNAV or LPV maybe used. WAAS users with authorized baro-VNAV may pan for LNAV/VNAV DA.

<sup>1</sup>WAAS units default to lowest approach option based on lowest horizontal and vertical limits. Check Annunciator 2 miles from FAF to confirm approach type (this should be a cockpit call out). All GPS or WAAS-equipped aircraft revert to the LNAV decision altitude.

<sup>2</sup>Or verify GPS database with the approach you are going to fly & Check RAIM NOTAMS

<sup>3</sup>With proper approach and runway lighting