



FAA Navigation Programs AJM-32
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SatNav News

Sunny Skies for SkyWest in Sun Valley

WAAS equipage and a new approach bring benefits to SkyWest



Approach to Friedman Memorial Airport

Photo:
Alec Seybold,
Flight Tech
Engineering

SkyWest Airlines, the nation's largest regional airline recently partnered with Flight Tech Engineering (an FAA Navigation Service Provider) at Friedman Memorial Airport (SUN) to implement an innovative special instrument approach solution for their newly WAAS equipped ERJ175 aircraft. With no existing ground based navigational aids and only basic non-precision GPS approaches, SUN was previously hampered with numerous weather related diversions. I asked Brent Wilson, the company's Manager of Aircraft Operations to fill us in on some of the details of the new WAAS equipage and resulting benefits from the airline's perspective.

SNN: *Can you describe the SkyWest Operation, Fleet Mix, and primary regions of operation?*

SkyWest: SkyWest Airlines operates through partnerships with United Airlines, Delta Air Lines, American Airlines and Alaska Airlines. Our fleet of nearly 450 aircraft connect passengers to 227 cities across the United States, Canada and Mexico. The fleet mix

consists of CRJ200s (134), CRJ700s (86), CRJ900s (39) and ERJ175s (189).

SNN: *How many aircraft are WAAS LPV equipped and are there plans for more?*

SkyWest: SkyWest has 55 ERJ175 aircraft that are WAAS LPV equipped, and is currently working with avionics vendors for a solution to equip the existing CRJ fleet.

SNN: *What's required to use LPV in a Regional Jet?*

SkyWest: WAAS LPV is only used in the ERJ175 fleet. This fleet is equipped with Honeywell EPIC LOAD 27.3 (a software option we purchased), which is loaded with LPV software. Once this software is loaded on the aircraft its ready to use. There are no other equipage replacements required or Ops Specs approvals required.

For the CRJ, we are working with avionics vendors to determine the tech insert, or required equipage, that will be needed to effectively utilize LPV.

SNN: *What are the crew training requirements to use LPV approaches? Has that taken long to update/qualify the crews?*

SkyWest: Training for LPV is something that has been part of our Standard Operating Procedures Manual (SOPM) for some time. This includes descriptions about what an LPV is, how to load an LPV approach (verifying correct WAAS channel and FAS Data block), and any scratch pad messages that may indicate an LPV is not available. With LPV now available on some of our aircraft and being implemented at airports, our pilots are able to review the information available in our SOPM prior to using it. From a time to train

and difficulty perspective it is minimal and effective.

SNN: *What are the benefits of using WAAS LPV over RNP-AR (specifically RNP below 0.30)?*

SkyWest: It has been our experience that LPV provides somewhat lower minima than an RNP Instrument Approach Procedure (IAP) to 0.30. Basically similar to flying an ILS to CAT I minima but doing it as a non-precision approach. SkyWest does not currently conduct RNP AR approaches to minima below 0.30

SNN: *How does the new SUN RNAV (GPS) N RWY 31 (i.e. 'LPV') approach differ from the previous approach SkyWest used? Crew Feedback?*

SkyWest: The new approach, RNAV (GPS) N (IAP) takes advantage of the full capabilities of the ERJ175 by using an RNP Radius to Fix (RF) leg to join the WAAS (augmented) LPV final approach. Minimums improved from RNAV (GPS) X, 1631' at 3 nm to RNAV (GPS) N, 343' at 1 nm.

The RNAV (GPS) X has minimums of 1631' at .5 nm from the runway threshold after flying a 3.5-degree Vertical Path Angle (VPA). From a practical perspective this made it difficult



Photo: Tim Burke, FMAA Operations Manager

E175 Landing in IMC Conditions at SUN



Photo: Tim Burke,
FMAA Operations
Manager

SkyWest E175 emerging from the clouds in IMC Conditions

to conduct a safe descent, using normal maneuvers, to a landing in the touchdown zone. To accomplish a safe descent using normal maneuvers, a Visual Descent Point (VDP) had to be established almost 5.0 nm from the end of the runway. Reliability was impacted due to the need to execute a missed approach so far from the runway. The new RNAV (GPS) N IAP delivers the aircraft from a constant 3.50-degree Vertical Path Angle (VPA) to 343' DA .85NM from the runway threshold.

SNN: *Has the SUN RNAV (GPS) N RWY 31 (i.e. 'LPV') approach resulted in any tangible benefits to the SkyWest operation?*

SkyWest: Safety was significantly enhanced with vertical guidance from coupled LPV extending to the runway at a constant 3.50 degrees. At the point the aircraft breaks out of the clouds, (Decision Altitude is only 0.85NM from the landing threshold), the aircraft is setup on a stabilized approach ready for landing. The procedure provides a consistent repeatable safe track and outcome every time.

“Safety was significantly enhanced with vertical guidance from coupled LPV extending to the runway at a constant 3.50 degrees”

Crew feedback on the new approach has been entirely positive. They love the increased accuracy and consistency of the LPV procedure. It delivers them right to the runway in a configuration and at an altitude where they can just transition to a landing, and they enjoy how easy the LPV are to fly. In the

ERJ 175 they are set up and flown exactly like a normal RNAV procedure. The crew simply loads the approach in the FMS, sets their final segment altitude and arms the approach on the Guidance Panel.

Reliability is also improved from 65 – 99% resulting in substantial busing and ground handling cost savings and improved passenger experience.

SNN: *Do you plan to expand the use of LPV capabilities at other locations?*

SkyWest: SkyWest crews currently use LPV IAPs where ever they are available. The FAA continues to add new LPV approaches to the NAS, so it is our hope that as they do this, more LPV approaches will become available at more airports, including to runways that may not have had an instrument approach available in the past.

We want to thank SkyWest for sharing how equipping with WAAS LPV is making a difference with the carrier.

- Amy Trevisan, FAA AJM-32/NAVATAC