

# NextGen Works for Washington State

NextGen is an FAA-led collaborative modernization effort that is moving the National Airspace System (NAS) from ground-based analog technologies to new smarter, satellite-based and digital systems and procedures. NextGen is making aviation safer, more efficient, and better for the environment.

The FAA expects NextGen to deliver \$161 billion in benefits to aircraft operators, government, passengers, and the general public through 2030. So far, NextGen has delivered \$2.7 billion in benefits. The following programs and technologies are improving the flying experience in the skies over Washington state:

## Performance Based Navigation

PBN delivers routes and procedures that use primarily satellite-based navigation and advanced avionics to fly with greater precision and accuracy than ground-based navigation aids and standard equipment. Benefits include shorter and more-direct flight paths, improved airport arrival rates, enhanced controller productivity, increased safety due to repeatable and predictable flight paths, fuel savings, and reduced exhaust emissions. PBN comprises Area Navigation (RNAV) and Required

Navigation Performance (RNP). RNAV permits aircraft to fly any desired flight path within the coverage of ground- or space-based navigation aids, within the limits of aircraft avionics, or with a combination of avionics and navigation aids. RNP increases the precision of RNAV to operate safely near high terrain or in congested airspace through an onboard performance monitoring and alerting capability.

Twelve airports across the state publish one or more of these PBN procedures: RNAV Standard Instrument Departures (SID), RNAV Standard Terminal Arrivals (STAR), and RNP approaches.

RNAV (GPS) Wide Area Augmentation System (WAAS)-capable approach procedures are available at 35 Washington airports, enabling instrument-rated pilots to file a flight plan and fly to these airports during low-visibility weather conditions. WAAS is a system of satellites and ground stations that correct GPS signals for better position accuracy. It allows the FAA to design satellite-enabled approach procedures with vertical and horizontal guidance, improving safety regardless of visibility or whether the approach is flown during the day or at night.

**RNAV STAR, RNAV SID, and RNP Approach Procedures Published for Washington Airports**

Airports	RNAV STAR	RNAV SID	RNP approaches
Bellingham International	1		2
Ed Carlson Memorial Field/South Lewis County		1	
Grant County International			4
Joint Base Lewis-McChord	2	1	
King County International/Boeing Field			1
Omak Municipal		1	
Pangborn Memorial		2	2
Pullman-Moscow Regional			1
Seattle-Tacoma International	2	4	9
Spokane International			4
Tri-Cities			4
Yakima Air Terminal/McAllister Field			3

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## Optimized Profile Descent

An OPD is a PBN arrival procedure designed to reduce level offs during descent, saving fuel as well as reducing emissions and noise. By using a combination of RNAV STAR and RNP approach procedures, some flights into Seattle-Tacoma International Airport are even more efficient from initial descent all the way to the runway.

## Greener Skies over Seattle

Seattle-Tacoma served an estimated 45.7 million passengers in 2016, nearly 8 percent more than 2015, making it the ninth-ranked U.S. airport in passenger numbers. Washington state's busiest airport is a main hub for Alaska Airlines and its regional subsidiary, Horizon Air, and is a gateway to Asia and Europe for Delta Air Lines. Such prominence made Greener Skies, a collaborative project involving the FAA, airlines, the Port of Seattle, and the Boeing Corp., even more significant. By adding 27 new procedures, including more RNAV arrivals with OPDs and RNP approaches, aircraft are burning less fuel and creating fewer emissions and less noise.

## Automatic Dependent Surveillance–Broadcast

ADS-B, a modern system to track airplanes and a foundation of NextGen, helps pilots and air traffic controllers create a safer, more efficient NAS. ADS-B

Out relies on aircraft avionics, a constellation of GPS satellites and a network of ground stations across the country — including those located across Washington state — to transmit an aircraft's position, ground speed, and other data. Its coverage area and accuracy are far greater than radar, updating the location of an aircraft every second, compared to radar, which has an average refresh rate of 5 seconds around airports and 12 seconds in en route airspace.

The FAA has mandated that aircraft operating in most controlled U.S. airspace be equipped for ADS-B Out by January 1, 2020. ADS-B In, which is optional, offers more choices to operators who equip, such as a display of other nearby aircraft.

## Data Communications

Data Comm improves how pilots and air traffic controllers convey critical flight information. Digital text-based messages supplement the analog voice system and swiftly deliver clear, accurate information.

Seattle-Tacoma International Airport uses the Data Comm tower service, which speeds up departure clearances and can prevent delays or cancellations. Data Comm minimizes misunderstood or missed messages over congested radio frequencies, and provides controllers and pilots more time to concentrate on other critical tasks.

### Additional NextGen programs and capabilities in place at Seattle-Tacoma include:

- Collaborative Air Traffic Management
- On-demand NAS information
- Time Based Flow Management
- Ground Based Interval Management-Spacing adapted for tower
- Airport Surface Detection System–Model X
- Improved Multiple Runway Operations
- Simultaneous dependent approaches to closely spaced parallel runways

Besides Seattle-Tacoma, expanded low-visibility operations using lower runway visual range minimums are available at Bellingham International, Paine Field/Snohomish County, and Spokane International airports.

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