



# The noise impact of the FAA's NextGen program on Vashon Island

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<http://www.nornp.org>

# TOPICS

- ▶ Fundamentals of airport flow: Why do we have so many arrivals over Vashon when SeaTac's runway is North/South and we're West of the airport?
  - ▶ Statistics on Southflow vs. Northflow.
- ▶ Conventional RADAR STAR vs. the new NextGen 'HAWKZ' RNAV approach.
- ▶ What was the intended outcome of this change?
  - ▶ What actually happened, especially in terms of altitude.
- ▶ Resources to learn more and studying real time flight paths and procedures.
- ▶ What have other communities done about this.
- ▶ Questions

## but first...the “Schultz Curve”

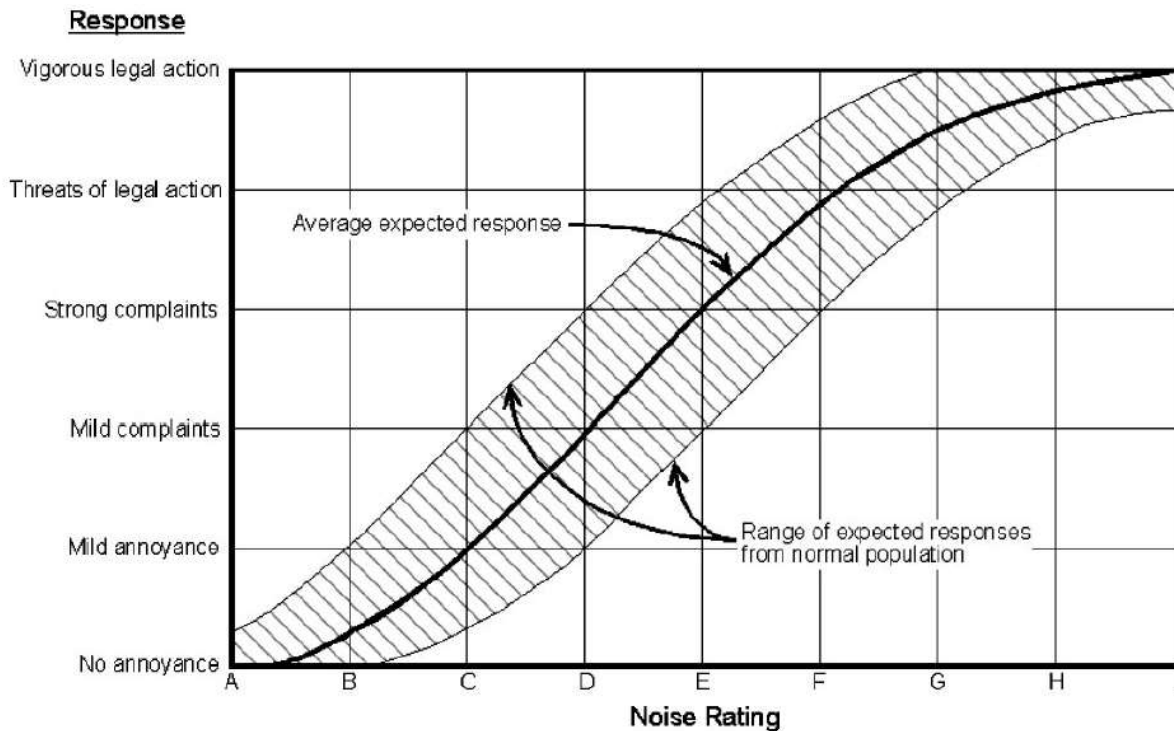
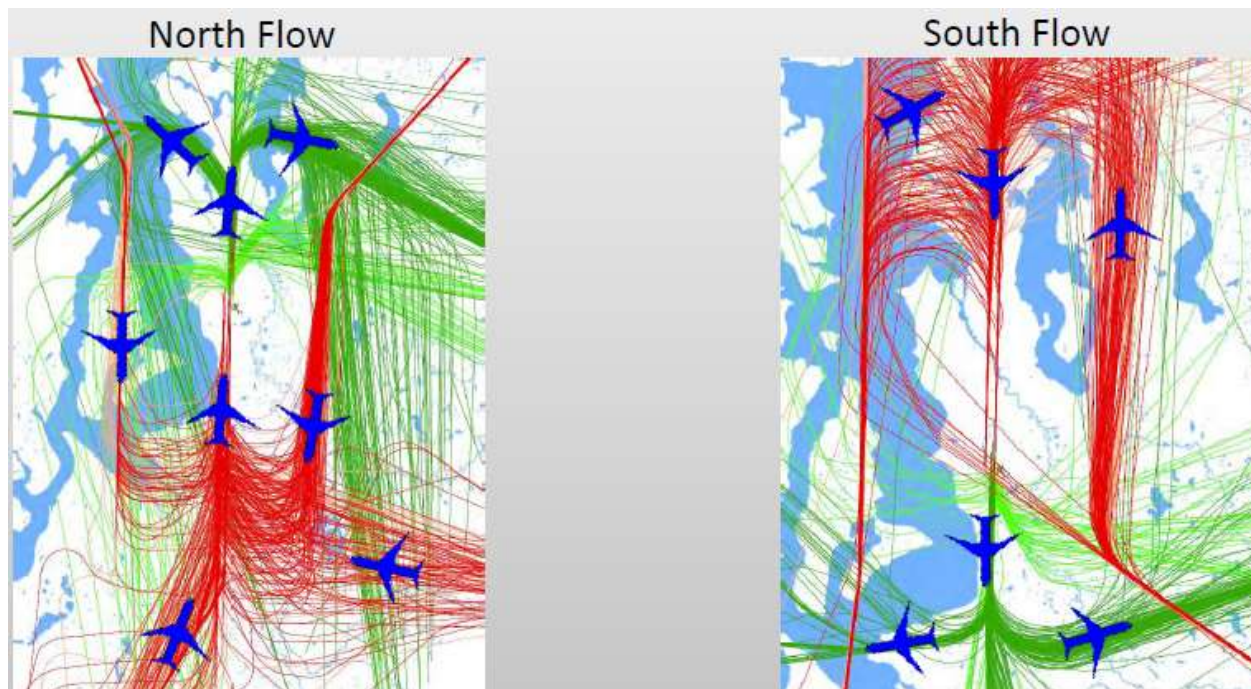


FIG. 1. Relationship between community noise rating and predicted behavioral consequences of environmental noise exposure, adapted from Fig. D-16 of Appendix D of “Levels Document” (EPA, 1974).

i.e., everybody responds differently.

# Fundamentals of Airport Flow

- ▶ An airplane's lift is a function of the airspeed, not the ground speed.
- ▶ By taking off and landing into the wind, ground speed is reduced.
- ▶ Outside special circumstances, for example Blue Angels practice, the flow of an airport flips according to the current and predicted wind direction.



Source: Slide 11 from [http://www.portseattle.org/ABOUT/COMMISSION/MEETINGS/2017/2017\\_04\\_25\\_RM\\_3c\\_supp\\_reduced.pdf](http://www.portseattle.org/ABOUT/COMMISSION/MEETINGS/2017/2017_04_25_RM_3c_supp_reduced.pdf)

## Westside Downwind Arrivals Stats: Southflow vs. Northflow

- ▶ Southern winds and therefore Southflow are generally associated with cloudy/rainy weather and - unsurprisingly - predominate in the Puget Sound.
- ▶ Measured in “%of the time” in 2016: 73.8% Southflow and 26.2% Northflow
- ▶ Measured in operations 2016: 71.5% Southflow and 28.5% Northflow
- ▶ 195 days\* completely Southflow, 128 mixed, and 43 completely Northflow.

## Vashon Daily Downwind Overflights

- ▶ Need to pick two days that are otherwise similar except one Southflow and the other Northflow. For example in 2016 two Thursdays: July 7<sup>th</sup> and July 14<sup>th</sup>.
- ▶ Southflow July 7<sup>th</sup>: 665 Total SeaTac arrivals, or which 245 flew over Vashon.
- ▶ Northflow July 14<sup>th</sup>: 662 Total SeaTac arrivals, or which 97 flew over Vashon.

\*On this slide “day” is defined as a ‘service day’, 3AM to 3AM, not a calendar date. Just like the ferry schedule.

# Conventional RADAR Approach vs. NextGen

## ▶ Conventional Approach

- ▶ Air Traffic Control provides a sequence of vectors for planes to fly until final approach.
- ▶ These individualized instructions naturally created a broader distribution of plane noise.
- ▶ The descent was optimized based on traffic conditions so that planes stayed high until the length of the downwind leg was known.

## ▶ NextGen Approach

- ▶ Every single plane follows the exact same GPS enforced path within an error of tens of feet. The technology enabling this is called Required Navigational Performance.
- ▶ Planes are brought low early in case they are able to make a sharp right turn into Elliot Bay and over downtown. However every plane is brought low early regardless of whether this shorter arrival is possible.
- ▶ While the new NextGen RNAV (Area Navigation) governing Southflow downwinds requires leaving Vashon Island at 6000 feet, planes are usually lower and often much lower - as low as 3000 feet. There is a definite trend depending on the airline (Virgin America is the worse), so I suspect it's just a matter of pilot preference, but don't know.



(HAWKZ.HAWKZ6) 17285  
 HAWKZ SIX ARRIVAL (RNAV) Arrival Routes

AL-582 (FAA)

SEATTLE-TACOMA INTL (SEA)  
 SEATTLE, WASHINGTON

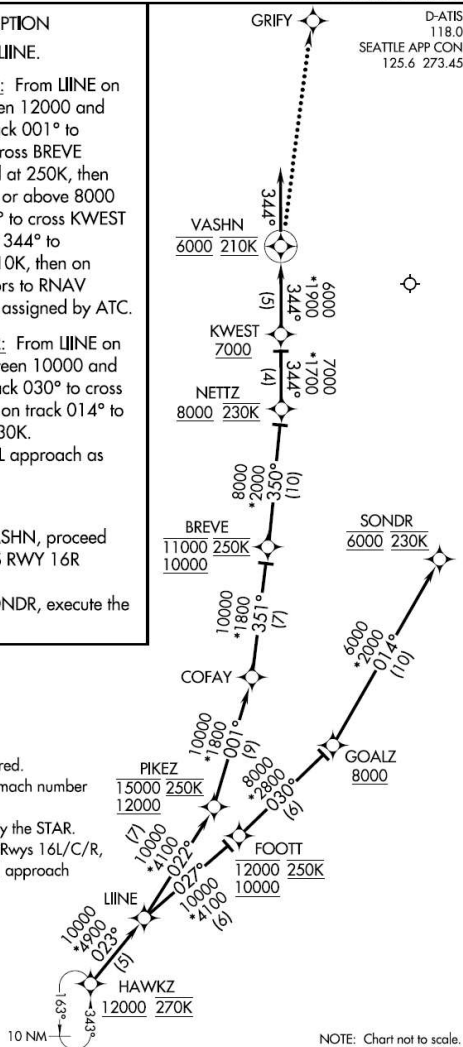
**ARRIVAL ROUTE DESCRIPTION**  
 From HAWKZ on track 023° to LIINE.

**LANDING RUNWAYS 16L/C/R:** From LIINE on track 022° to cross PIKEZ between 12000 and 15000 and at 250K, then on track 001° to COFAY, then on track 351° to cross BREVE between 10000 and 11000 and at 250K, then on track 350° to cross NETTZ at or above 8000 and at 230K, then on track 344° to cross KWEST at or above 7000, then on track 344° to cross VASHN at 6000 and at 210K, then on track 344°. Expect RADAR vectors to RNAV (RNP)/ILS/VISUAL approach as assigned by ATC.

**LANDING RUNWAYS 34L/C/R:** From LIINE on track 027° to cross FOOTT between 10000 and 12000 and at 250K, then on track 030° to cross GOALZ at or above 8000, then on track 014° to cross SONDR at 6000 and at 230K. Expect RNAV (RNP)/ILS/VISUAL approach as assigned by ATC.

**LOST COMMUNICATIONS**  
**LANDING RUNWAY 16:** At VASHN, proceed direct GRIFY and execute the ILS RWY 16R approach.  
**LANDING RUNWAY 34:** At SONDR, execute the ILS RWY 34L approach.

- NOTE: RADAR required.
- NOTE: RNAV 1.
- NOTE: DME/DME/IRU or GPS required.
- NOTE: Turbojet aircraft descend via mach number until intercepting 280K. Maintain 280K until slowed by the STAR.
- NOTE: For non-RNP aircraft landing Rwy 16L/C/R, expect RADAR vectors to final approach course prior to VASHN.



NOTE: Chart not to scale.

HAWKZ SIX ARRIVAL (RNAV) Arrival Routes  
 (HAWKZ.HAWKZ6) 12OCT17

SEATTLE, WASHINGTON  
 SEATTLE-TACOMA INTL (SEA)

# The new NextGen RNAV called "HAWKZ"

## The cause of the problem.



NW-1, 12 OCT 2017 to 09 NOV 2017

# This is what the FAA planned to happen:

## Required Navigation Performance (RNP) Approaches

- Consistent, controlled approaches
- Substantially shortened flight path length (green vs. blue)
- Noise exposure reductions with accurate routings over less noise sensitive areas (e.g. Elliott Bay)
- Reduced greenhouse emissions
- Minimized operational costs



Source: Slide presented at the Port Of Seattle April meeting.

Note that it doesn't even reflect the actual location of the RNP path, i.e. this is an old slide, and assumed all flights would turn right into Elliot Bay.

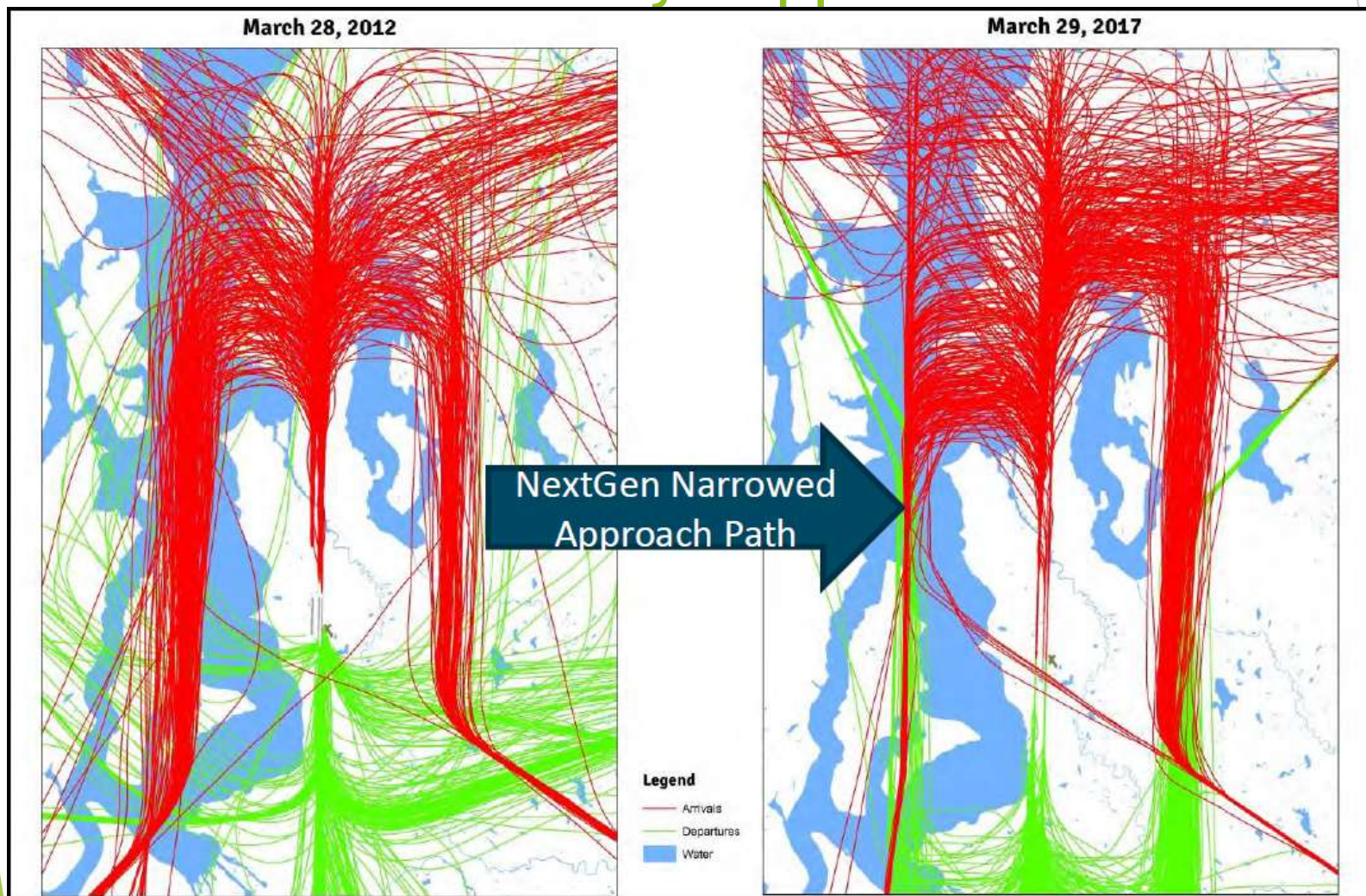
Note also that Vashon is relegated as a "less noise sensitive area."



Federal Aviation  
Administration

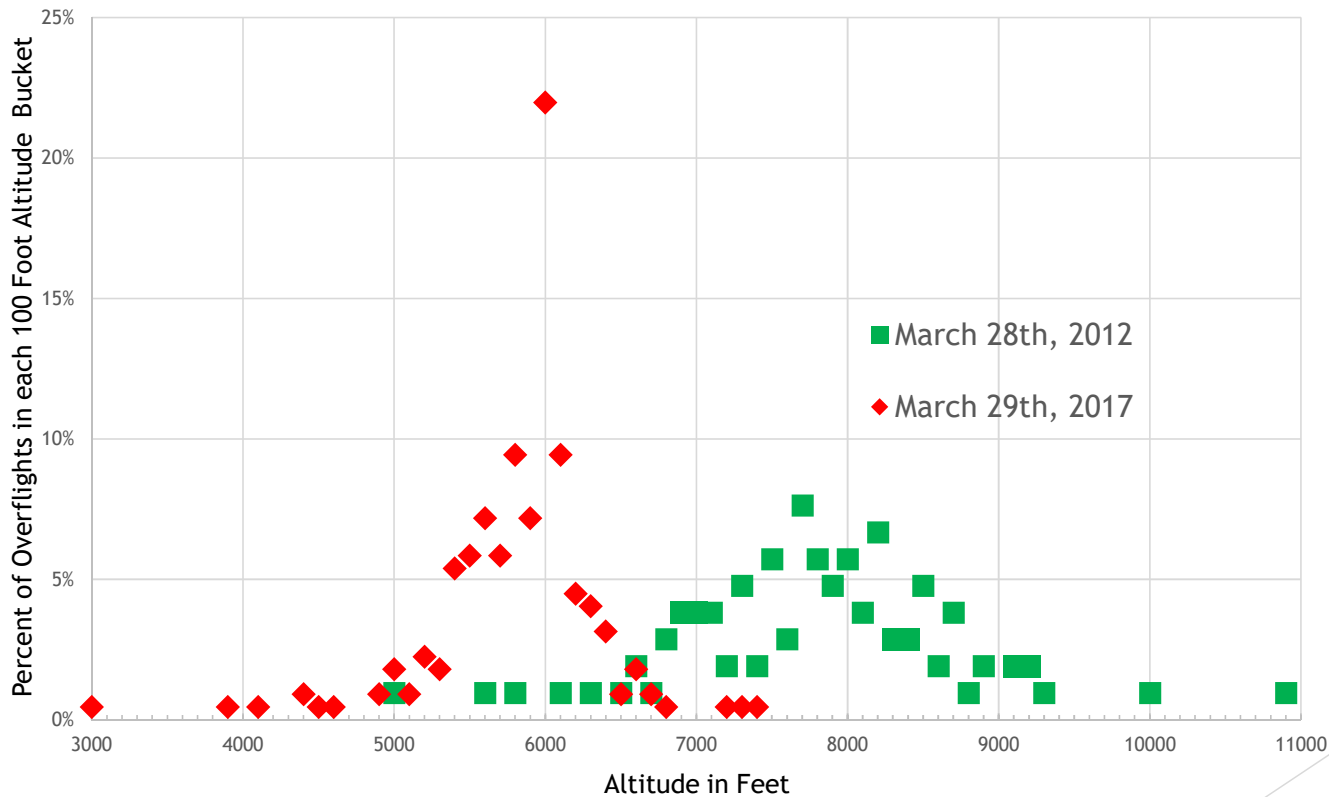


# This is what actually happened:



...but that's only half the story, look at what happened to the altitudes:

Distribution of Altitudes Passing North Over Waypoint VASHN Latitude (47.511503)



# To Summarize NextGen Changes Over Vashon

- ▶ Razor sharp downwind flight paths with every flight following the exact same path.
- ▶ The Port's own slide though shows this focusing of noise is for naught as paths randomly diverge again just North of Vashon.
- ▶ In addition to narrowing paths, flights were also substantially lowered in altitude:

Date	% < 6000'	% between 6000' and 6100'	% >= 6100'
March 28 <sup>th</sup> , 2012	2.85%	0%	97.15%
March 29 <sup>th</sup> , 2017	51.57%	21.97%	20.46%

- ▶ When the airport is in Northflow, the situation is basically reversed, but not nearly as painful since:
  - ▶ The sheer volume of flights is two and half times less.
  - ▶ Flights are mainly from Alaska & Asia, and those from Asia are more modern and less noisy aircraft. Subjectively for instance the B777 seems quiet for its altitude.
  - ▶ In south flow older B737 and the A320 series with their annoying 'whine'\* noise predominate.
- ▶ Extended low and level flying over large parts of Puget Sound have become the norm.

\*See <http://a320whine.com>

## Resources (all these links will be on nornp.org):

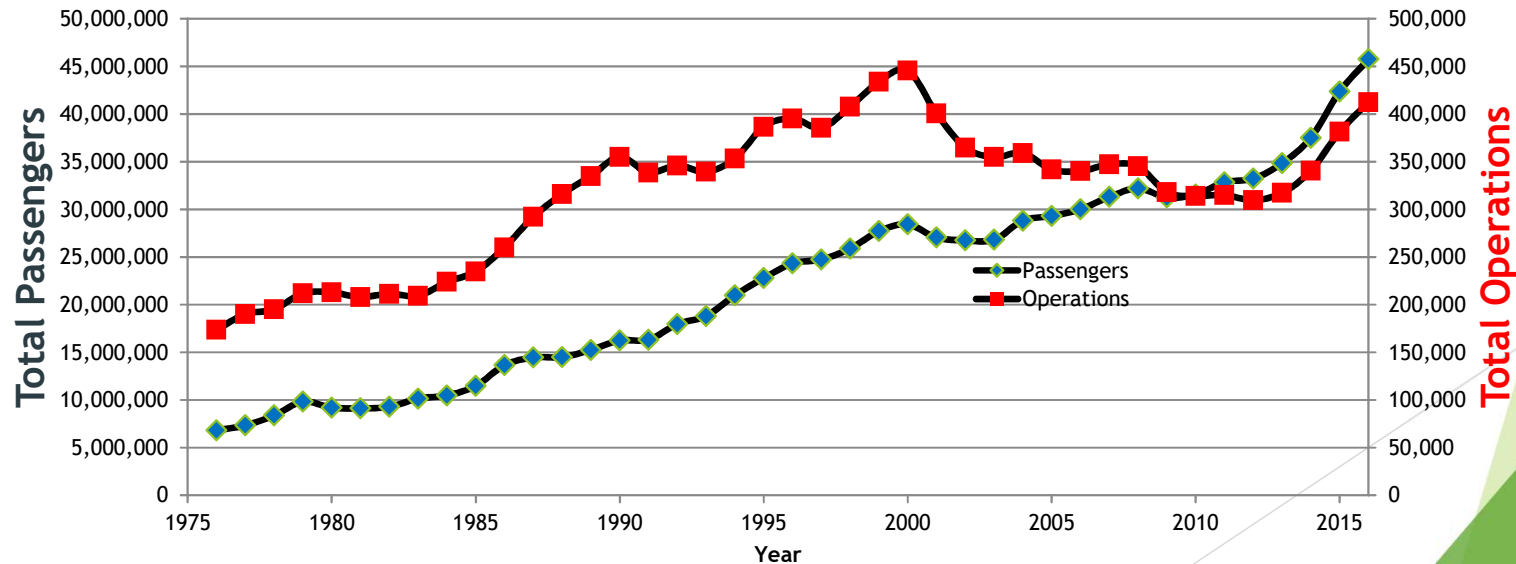
- ▶ Real Time Flight Tracking:  
[www.flightaware.com](http://www.flightaware.com) (ADSB & MLAT)  
[www.flightradar24.com](http://www.flightradar24.com) (ADSB & MLAT)  
<https://secure.symphonymcdm.com/publicvue/AirSceneFrames.asp?NoMenu=True&ContentFrame=https%3A%2F%2Fwww%2Esymphonymcdm%2Ecom%2FMobileVue%2F%3Facc%3Dsea%26noLogo%3Dtrue>  
(RADAR with 10 minute delay)
- ▶ Build your own ADS-B ground receiving station using a Raspberry Pi!  
<http://flightaware.com/adsb/piaware/build>
- ▶ Air Traffic Control Recordings:  
<https://www.liveatc.net/search/?icao=ksea> (go to 'KSEA Approach')
- ▶ Wind Predictions:  
<http://aviationweather.gov/metar/data?ids=ksea&format=decoded&hours=3&taf=on&layout=on&date=0> (most accurate for the next 24 hours)  
<http://forecast.weather.gov/MapClick.php?w3=sfcwind&w3u=1&w10u=0&w13u=1&AheadHour=0&Submit=Submit&FcstType=graphical&textField1=47.449&textField2=-122.3093&site=all&unit=0&dd=&bw=> (less frequently updated and less accurate but goes for 4 days).
- ▶ Port Of Seattle Noise Comment Form:  
<https://www.portseattle.org/Environmental/Noise/Pages/Noise-Comment-Form.aspx>  
Also phone (206)787-5393 and email [noiseabatement@portseattle.org](mailto:noiseabatement@portseattle.org)

# Does Complaining To The Port Help?

- ▶ Probably, in that compliant numbers are an object measure of how upset the population is. The Port also counts distinct individuals, so one person complaining a lot is less useful. Two arguments to be prepared for if you speak with them are:
  - ▶ They will tell you that you are imaging it.
  - ▶ If you persist they will tell you that SeaTac is the busiest it's even been and that's why you're hearing so much more noise. This is true in terms of passengers but not operations (take offs and landings), that peaked in the year 2000.

## SeaTac Passenger and Operations Statistics: 1976 to 2016

Source: <http://www.portseattle.org/About/Publications/Statistics/Airport-Statistics/Pages/default.aspx>





## Is there any hope?

- ▶ Until recently it looked bleak. The FAA has been ignoring laws passed by congress to study the severe environmental damage being caused by NextGen.
- ▶ However just recently a case brought by the City of Phoenix and its Sky Harbor Airport, and adjudicated by the DC Federal Court, ruled against the FAA. The full judgement is available here:  
[https://www.cadc.uscourts.gov/internet/opinions.nsf/DF8089F070552F818525818B00501670/\\$file/15-1158-1690499.pdf](https://www.cadc.uscourts.gov/internet/opinions.nsf/DF8089F070552F818525818B00501670/$file/15-1158-1690499.pdf)

It makes for amazing reading for the usually very staid court. Especially on Page 15: “The idea that a change with these effects would not be highly controversial is 'so implausible' that it could not reflect reasoned decisionmaking.”

- ▶ The biggest difference between Phoenix and Seattle though is that the airport was on the people's side in Phoenix whereas here they are very much invested in NextGen - whether it works or not.
- ▶ Convincing the Port of Seattle to put the citizen's interests ahead of those of the FAA would be a very good first step.

QUESTIONS?

